WHICH FACTORS?

INTERNATIONAL EVIDENCE

By

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ABSTRACT

This thesis investigates five major asset-pricing models recently proposed in the literature. Those models are Fama and French's (2015) five-factor model and its six-factor extension adding a momentum factor (Carhart, 1994), the q-factor model of Hou, Xue, and Zhang (2015) and its five-factor extension (q5) proposed by Hou, Mo, Xue, and Zhang (2015), and the four-factor model of Stambaugh and Yuan (2017). We apply these models to real-world stock market data from 88 developed and emerging markets and compare their performance.

Our primary tool to evaluate their performance is the factor spanning test of Huberman and Kandel (1987) performed by Fama and French (2015) and Hou, Mo, Xue, and Zhang (2018), among others. The comparison aims to find a superior model that should be applied when analyzing stock returns.

We find that not all the factors inherent in these five asset-pricing models are significant in the international markets. Among the models, the most disappointing is that of Stambaugh and Yuan (2017) because none of its two new factors (MGMT and PERF) or even their aggregate (UMO) delivers a reliably positive average premium in the countries or groups of countries considered. For the other models, the factors based on value and performance did very well for almost all countries. For the value factor (HML), we cannot confirm Fama and French's (2015) assertion that it is redundant in their five-factor model. Further, the value effect remains unexplained by the q and q5 models.

The performance of the size factor is affected by the way it is measured. Fama and French's size factor is significant for only two countries (China and South Korea). Stambaugh–Yuan's size factor does better than Fama and French's, as it is significant for Canada, India, Turkey, and across the emerging, non-US, and all markets. However, we reject their claim that eliminating stocks most likely to be mispriced allows delivering a higher size premium. The reason is that Hou, Xue, and Zhang's (2015) size factor is positive and significant in all countries (excepted France) and for all the groups of countries considered.

Overall, the Stambaugh–Yuan four-factor model failed to yield its promise in international markets over the last three decades. None of the Fama–French five-factor and six-factor models or the Hou–Xue–Zhang q-factor model and the Hou–Mo–Xue–Zhang q5 model spans the other models. Hence, we conclude that these new models are about the same as none of them stand out as the best.

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CHAPTER 1 INTRODUCTION

In finance, no subject is more important than that of asset pricing. In his 2013 Nobel Lecture, Fama (2014) begins as follows (p.1467):

> The Nobel Foundation asks that the Nobel lecture cover the work for which the Prize is awarded. The announcement of this year's Prize cites empirical work in asset pricing. I interpret this to include work on efficient capital markets and work on developing and testing asset pricing models—the two pillars, or perhaps more descriptive, the Siamese twins of asset pricing.

From this quote, it is clear that asset pricing is one of the pillars of modern finance. In this introductory section, we will first discuss the relevant literature with the specific aim of motivating the research questions of this thesis. Then, we will briefly discuss the methods used to answer these open questions and the results obtained. We close the introduction by describing how the thesis proceeds.

To truly understand the theory behind the pricing of capital assets, one must start from the ground-breaking work of Markovitz (1952) nearly three-quarters of a century ago. Markovitz's main contribution to the literature on asset pricing is to formalize the principle of diversification, the science of combining securities into portfolios to minimize risk for a given expected return or, equivalently, to maximize expected returns for a targeted level of risk. From Markowitz's work emerges the key idea that covariance is the key to portfolio diversification. In particular, by combining different securities in a portfolio, the portfolio's total risk or variance can be reduced to a limit known as systematic risk, which depends primarily on the average level of correlation between the securities that comprise the portfolio.

Since systematic risk cannot be eliminated by diversification, investors must demand compensation to bear it. On the other hand, the diversifiable portion of total risk should not be rewarded because it can easily be avoided. Markovitz's work was instrumental in bringing rigour to the field of finance. However, given the limited processing power available in the 1950s, Markowitz's optimization framework was difficult to apply in practice because it involves inverting matrices. The next breakthrough comes from Tobin (1958), who showed that Markowitz's framework could be significantly simplified and improved when one allows investors to put money in a riskless asset. In this case, the efficient frontier of investment opportunities becomes a straight line fully described by only two assets: a risk-free asset (often represented by a T-bill or a zero-beta portfolio) and a tangency portfolio of risky investments

(usually characterized by a mutual fund). This new idea—known as the Two-Fund Separation Theorem—made the job of professional portfolio managers much easier, as they only have to focus on two investable assets to serve their clients.

Even though Tobin's analysis has greatly simplified investors' job, the presence of a universal benchmark against which all performance can be assessed was lacking. The development of the capital asset pricing model (CAPM) by Sharpe (1964), Lintner (1965), and Black (1972) filled the gap. While the CAPM can be rigorously derived from the general equilibrium framework, its main appeals are (i) the simplicity and intuitiveness of its predictions and (ii) its consistency with the principle of diversification. As discussed by Fama and French (1996b), the CAPM makes two critical predictions. The first is that the market beta of an asset, which measures how this asset's returns covariate with the market's returns, is the only variable needed to determine the expected returns on financial assets. The second prediction is that the reward for holding beta risk is positive.

As it responds to a pressing need, the CAPM was quickly adopted by practitioners and academics. The model carries implications for risk assessment, cost-of-capital calculation, performance measurement, and many other applications. However, one of the CAPM's main problems, as the "Siamese twin" of market efficiency, is that it

cannot be tested independently.[1] To test the CAPM, one needs a model that specifies how information is reflected on prices (an efficient markets theory); but to test market efficiency, one also needs an asset-pricing model. This issue is known as the joint-hypothesis problem. In this regard, Fama (2014, p.1467-1468) notes:

> We can't test whether the market does what it is supposed to do unless we specify what it is supposed to do. In other words, we need an asset pricing model, a model that specifies the characteristics of rational expected asset returns in a market equilibrium. Tests of efficiency basically test whether the properties of expected returns implied by the assumed model of market equilibrium are observed in actual returns. If the tests reject, we don't know whether the problem is an inefficient market or a bad model of market equilibrium. This is the joint hypothesis problem emphasized in Fama (1970).

Therefore, all asset-pricing tests are joint-tests of asset-pricing and market efficiency.

As a model for pricing securities, the CAPM was a resounding success from the initial empirical studies. Reviewing the early literature on the joint test of the CAPM and market efficiency, Fama (1970, p.383) concludes that "with but a few exceptions, the efficient markets model stands up well." The strongest support perhaps comes from Jensen (1978, p.96), who asserts: "In the literature of finance, accounting, and the economics of uncertainty, the efficient market hypothesis is accepted as a fact of

[1] According to Fama (1970, p.383), an efficient market is "a market in which prices always 'fully reflect' available information."

life, and a scholar who purports to model behavior in a manner which violates it faces a difficult task of justification." Conducting cross-sectional tests, Fama and MacBeth (1973, p.607) note: "We cannot reject the hypothesis of these models that the pricing of common stocks reflects the attempts of risk-averse investors to hold portfolios that are 'efficient' in terms of expected value and dispersion of return." Even if they did not back the Sharpe-Lintner version of the CAPM, Black, Jensen, and Scholes (1972) found—in their time-series tests—results consistent with Black's (1972) version of the CAPM.[2]

However, the mid-1970s and 1980s marked a sea of change with contradicting evidence coming from almost everywhere. For instance, Cross (1973) shows that returns are much more likely to increase on Fridays than on Mondays, a phenomenon known as the Monday or weekend effect [see Pettengill (2003) for a review of this literature]. Similarly, Rozeff and Kinney (1976) show that returns for January are much higher than predicted by the CAPM; a result later substantiated and developed by Keim (1983) and Reinganum (1983). However, the two anomalies that really put researchers on notice are the value effect highlighted by Basu (1977) and the size effect discovered by Banz (1981) and Reinganum (1981). The value effect is the tendency of value stocks (stocks that are undervalued, whether measured by book-to-market or earnings-to-price or other metrics) to generate higher abnormal returns

[2] See also a similar evidence in Jensen (1968), Gibbons (1982), and Stambaugh (1982).

than growth stocks (those with low book-to-market or high earnings-to-price ratios). For its part, the size effect reflects the propensity of small stocks to outperform big stocks, so that self-funded portfolios selling big stocks to buy small stocks generate positive abnormal returns.

Since the 1980s, the number of reported anomalies has increased so much that Cochrane (2011) called it a "zoo" in his AFA Presidential Address. Harvey, Liu, and Zhu (2016) note that no less than hundreds of anomalous variables have been proposed over the past forty years. In line with McLean and Pontiff (2016), they blame data mining for the proliferation of anomalies and propose to increase the hurdle needed to qualify an anomaly as significant. Hou, Xue, and Zhang (2020) find a similar result while replicating 450 anomalies published in finance and accounting journals.

While applying a higher statistical hurdle or adjusting for transaction cost (Novy-Marx and Velikov, 2016) are just some of the tools considered to curb the anomalies, the method of choice favoured by financial economists is, however, to develop new asset-pricing models by adding new factors to the CAPM. Fama and French (1993) take the first step in this direction by proposing a three-factor pricing model (FF3), which comprises the market factor and two mimicking factors related to size (small minus big, SMB) and value (high minus low, HML). SMB is intended to capture the size anomaly, while HML aims to capture the value effect.

While testing their FF3, Fama and French (1996a) were unable to explain the momentum anomaly discovered by Jegadeesh and Titman (1993).[3] Based on this evidence, Carhart (1997) adds a momentum factor (up minus down, UMD) to the FF3, resulting in the four-factor model (C4). But even with the C4, new anomalies continued to surface. Two anomalies prove particularly important in the asset-pricing literature. First, numerous studies find that investment-related variables predict average returns; and this predictive ability is not lost even when one controls for firm size and value. For instance, Titman, Wei, and Xie (2004) find that stocks with high abnormal capital investments subsequently achieve negative abnormal returns. Cooper, Gulen, and Schill (2008) similarly find that firms with high asset growth are associated with low returns even if one controls for size, book-to-market ratio, lagged returns, accruals, and other growth measures. Similar results are obtained for alternative measures of investment such as net operating assets (Hirshleifer, Hou, Teoh, and Zhang, 2004), investment-to-assets (Lyandres, Sun, and Zhang, 2008), investment growth (Xing, 2008), and net stock issues (Loughran and Ritter, 1995; Fama and French, 2008).

Second, numerous researchers find that average returns are positively related to profitability. For instance, Novy-Marx (2013) finds that profitable firms (those with

[3] The momentum effect refers to the tendency of winning stocks over the past year (winners) to outperform stocks that have done poorly over the same period (losers).

high gross profits-to-assets) generate significantly higher returns than unprofitable firms, even when one controls for size and value. Similar evidence is obtained for alternative measures of profitability based on return-on-equity (ROE; Haugen and Baker, 1996), the return-on-assets (ROA; Balakrishnan, Bartov, and Faurel, 2010), and profit margin (Soliman, 2008).

To explain the growing number of anomalies, new asset-pricing models have been proposed. They include the five-factor (FF5) and six-factor (FF6) asset-pricing models by Fama and French (2015, 2018), which add to the FF3 or C4 two factors related to investment (conservative minus aggressive, CMA) and profitability (robust minus weak, RMW). Another model that considers investment and profitability factors is the q-factor model of Hou, Xue, and Zhang (2015). They consider four factors: market, size, investment, and profitability. More recently, Hou, Mo, Xue, and Zhang (2020) augment the q-factor model with an additional expected growth (EG) factor to get the q5 model. Stambaugh and Yuan (2017) propose a four-factor model (SY4) consisting of the market and size factors and two additional mispricing factors intended to accommodate a large set of anomalies. The two new factors are an investment factor (MGMT) and performance factor (PERF), constructed from 11 anomalies. Barillas and Shanken (2018) propose a new model that combines six factors from

various existing models.[4] Finally, Daniel, Hirshleifer, and Sun (2018) develop a three-factor model that accommodates a market factor and two additional short-term and long-term factors intended to capture the effects of financing and profitability.

With the rapid development of new asset-pricing models, naturally comes the question to know which of them perform best in explaining average returns. The key question is whether the proposed factors provide an independent marginal explanation of their own, or are they subsumed by the other factors? To conduct such factor comparisons, the method of choice is the mean-variance spanning test of Huberman and Kandel (1987). The first of such factor-spanning tests was conducted by Fama and French (2015). Testing various multifactor specifications, they find that their five-factor model does not provide marginal explanatory power over the four-factor model that drops the HML factor. Further, they find that regressing HML on the other four factors produces an intercept of only four basis points with a t-statistic of only 0.47, which prompted them to conclude (p.12): "In the spirit of Huberman and Kandel (1987), the evidence suggests that in U.S. data for 1963–2013, adding HML does not improve the mean-variance-efficient tangency portfolio produced by combining the risk-free asset, the market portfolio, SMB, RMW, and CMA. It will be interesting to examine whether this result shows up in U.S. data for the pre-1963

[4] In particular, Barillas and Shanken (2018) combine the Fama and French's size factor (SMB), Carhart's momentum factor (UMD), Hou, Xue and Zhang's investment (I/A) and profitability factors (ROE), and Asness and Frazzini's (2013) monthly value factor (HMLm) to form their six-factor model.

period or in international data." In the present thesis, we answer this call and test whether HML is redundant using a large cross-section of international data.

Stambaugh and Yuan (2017) find not only that their way of constructing the size factor (which eliminates highly mispriced stocks) produces a size premium nearly twice the usual estimates, but also that their C4 model does a better job than the FF5, FF6, and q-factor models explaining a large set of anomalies. In factor spanning tests, Stambaugh and Yuan find that Fama–French's five-factor model "fares least well" while their C4 model performs the best even if it cannot fully explain the ROE-based factor. The reason for this conclusion is that the q-factor model can explain neither of their two mispricing factors.

More recently, however, Hou, Mo, Xue, and Zhang (2019) find that their augmented q5 model subsumes Stambaugh–Yuan's factors.

The changing results in this factor battle beg the question: Are the conclusions robust? This is an important question because all the results come from a single sample: the US data. The problem at hand is even more important as the proposed factors are primarily empirically motivated.[5]

[5] There is, however, some evidence that the factor might capture fundamental risk. For example, Liew and Vassalou (2000) find that HML and SMB predict the future growth in the real economy in developed markets, even in the presence of business cycle variables. Durand, Lim, and Zumwalt (2011) relate HML to investors' fear (measured by the implied volatility index, VIX), while Sy and Zaman (2011) relate SMB to the increased default risk in in small businesses when Democrats hold all the levers of power. Hahn and Lee (2006) find also evidence suggesting that SMB and HML are premiums compensating the risks related to changing credit market conditions, while Parker and Julliard (2005)

Fama and French (2010) call for more research to settle the factor battle using either the pre-1963 period or international data. In this thesis, we answer this call using a large cross-section of international stocks. More specifically, we ask the following open research questions: Is HML subsumed in the international markets? Is the size premium obtained using Stambaugh–Yuan's approach higher than those obtained with other methods? Does one of the models stand out relative to the others in explaining international stock returns?

To address these questions, we consider a large sample of more than 37,000 stocks from 88 countries (for a total of more than 6.4 million stock-month observations) from 1981 to 2020. Our results are as follows. Regarding the redundancy of the HML factor, we find that the existing evidence is particular to the sample considered by Fama and French (2015). Over the past three decades, the HML factor was significantly positive in most international markets (including the United States). Such significance is not eroded in factor-spanning tests involving not only FF5 and FF6 but also the C4, q, and q5 models. Given this, we conclude that the claim of redundancy of the HML factor results from sample selection bias.

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relate the factors to consumption risk. Even if the documented link between UMD and macroeconomic risk is not strong (e.g., Liew and Vassalou, 2000), Maio and Santa-Clara (2012) find that the C4 performs the best among several pricing models in consistently meeting the theoretical restrictions underlying the Inter-temporal CAPM of Merton (1973). More recently, Nazaire, Pacurar, and Sy (2020) find using a dummy variable approach that characteristics perform better than betas.

Our results also reject Stambaugh–Yuan's claim that the way they construct the size factor SMB—which consists of avoiding stocks that are likely to be highly mispriced—provides a more prominent size premium. While Stambaugh–Yuan's measure (which is significantly positive in Canada, India, Turkey, and across the emerging, non-US, and all markets) performs better than Fama and French's measure (which is significantly positive only for China and South Korea), we find that both are supplanted by Hou, Xue, and Zhang's (2015) measure (which is positive and significant everywhere except in France).

Among the models considered, Stambaugh and Yuan's C4 performs the worst because its two new factors (MGMT and PERF) or even their aggregate (UMO) are either statistically insignificant or negative in all the countries or groups of countries considered. On the other hand, the FF5 and FF6 models do not span the q and q5 models, and reversely the q and q5 models do not subsume the FF5 and FF6 models. The reason for this conclusion is that FF5 and FF6 models cannot explain the size and performance factors obtained using the approach of Hou, Xue, and Zhang, while the q and q5 models mainly fail to explain the HML and RMW factors, which tended to be pervasive in the international markets during the past three decades. Hence, we conclude that none of the FF5, FF6, q, and q5 models stand out as the clear winner.

The rest of the thesis is organized as follows. The next chapter (Chapter 2) reviews the main asset-pricing models. Chapter 3 describes the data and provides summary descriptive statistics on the various data used. Chapter 4 discusses the methodology used. Chapter 5 presents the empirical results, while Chapter 6 concludes. The Appendix details the computation of the anomalies and presents supplementary results.

CHAPTER 2 REVIEW OF THE MAIN ASSET-PRICING MODELS

This section aims to describe the main asset-pricing models that are part of the international factor-spanning tests conducted in this research. We will start by presenting the general theoretical framework used to derive most asset-pricing models. Then, we will discuss one-by-one the pricing models considered, beginning with the CAPM.

2.1 Theoretical Framework

Without loss of generality, consider a two-period economy with a representative investor (Lucas, 1978; Breeden, 1979) that tries to maximize a concave utility function over these two periods: $U = u(c_t) + \beta E_t[u(c_{t+1})]$, where $E_t[.]$ stands for conditional expectations, c_t denotes consumption at time t, and β is a subjective discount

factor intended to capture the agent's impatience. The representative agent is endowed with a revenue y_t at time t and y_{t+1} at time $t+1$. To invest the savings, the agent has access to a security i with a price p_{it} at time t that pays off a dividend d_{it+1} and can be sold at a price of p_{it+1} at time $t+1$. In other words, the security delivers a total payoff of $x_{it+1} = p_{it+1} + d_{it+1}$ at $t+1$.

With these assumptions, the agent's intertemporal problem is to find the number n of securities to buy to maximize utility:

$$\underset{\{n\}}{\text{Max}} \; u(c_t) + \beta E_t[u(c_{t+1})], \tag{1}$$

subject to the following two budget constraints: $c_t = y_t - np_{it}$ and $c_{t+1} = y_{t+1} + nx_{it+1}$. Substituting into (1) yields the following problem:

$$\underset{\{n\}}{\text{Max}}\, u(y_t - np_{it}) + \beta E_t[u(y_{t+1} + nx_{it+1})]. \tag{2}$$

The first-order condition is $-p_{it}u'(y_t - np_{it}) + \beta E_t[x_{it+1}u'(y_{t+1} + nx_{it+1})] = 0$. Given the utility function's concavity, the latter condition is a sufficient condition for attaining optimality. Solving the equality yields:

$$p_{it}u'(c_t) = \beta E_t[x_{it+1}u'(c_{t+1})], \tag{3}$$

and

$$p_{it} = E_t[m_{t+1}x_{it+1}], \tag{4}$$

where $m_{t+1} = \beta \frac{u'(c_{t+1})}{u'(c_t)}$ is the stochastic discount factor (SDF) or intertemporal marginal rate of substitution (IMRS). Equation (3) expresses the idea that, in equilibrium, the cost of postponing consumption at time t to buy an additional unit of the security, $p_{it}u'(c_t)$, must match the expected marginal utility of liquidating the security at $t+1$ and consuming the payoff, $E_t[x_{it+1}u'(c_{t+1})]$.

Dividing each side of (4) by p_{it} it easily follows that the general pricing equation can be rewritten in terms of returns as follows:

$$E_t[(1 + R_{it+1})m_{t+1}] = 1, \tag{5}$$

where $R_{it+1} = \frac{p_{it+1}+d_{it+1}-p_{it}}{p_{it}} = \frac{x_{it+1}}{p_{it}} - 1$ is the security return at time $t+1$. Expanding (5) and assuming the existence of a conditionally riskless asset (with return R_{ft+1}), the expected excess security return can be written as:

$$E_t[r_{it+1}] = -(1 + E_t[R_{ft+1}])Cov_t[r_{it+1}, m_{t+1}], \tag{6}$$

where $r_{it+1} = R_{it+1} - R_{ft+1}$ is the excess security return at $t+1$ and Cov_t is the conditional covariance operator.

The key insight from (6) is that risk premium is determined by conditional covariation with the IMRS. A risk premium is required if the asset negatively correlates with the IMRS, as in this case, the asset's return is expected to be below average when needed the most (when the IMRS is high). A countercyclical investment (i.e., assets that pay off big when the IMRS is high) will deliver a negative risk premium.

In the next section, we will derive the CAPM from (6).

2.2 The Capital Asset Pricing Model

As popularized by Cochrane (2001) in his widely diffused textbook, the CAPM directly ensues from (6). Under the assumption of a representative agent, the IMRS can be seen as a function of aggregate consumption. Hence, the CAPM automatically ensues if aggregate consumption can be substituted with aggregate wealth for one reason or another. To achieve this goal, Dittmar (2002) assumes a static setting in which consumption and wealth are equivalent. In contrast, Harvey and Siddique (2000) postulate a two-period economy where all terminal wealth is consumed, thus ensuring the consumption-wealth equivalence. On the other hand, Cochrane (2001) considers a log utility function, which implies that consumption is proportional to wealth.

With any of these assumptions, the IMRS can be written as:

$$m_{t+1} = a_t + b_t r_{Mt+1}, \tag{7}$$

where r_{Mt+1} is the excess market return at time $t+1$ relative to the riskless rate, and a_t and b_t are parameters. Substituting the IMRS obtained in (7) into (6) yields:

$$E_t[r_{it+1}] = -b_t(1 + E_t[R_{ft+1}])Cov_t[r_{it+1}, r_{Mt+1}]. \tag{8}$$

Since (8) holds for any i, it must also be satisfied for the market, thus yielding:

$$E_t[r_{Mt+1}] = -b_t(1 + E_t[R_{ft+1}])Var_t[r_{Mt+1}]. \tag{9}$$

By combining (8) and (9), it follows that:

$$-b_t(1 + E_t[R_{ft+1}]) = \frac{E_t[r_{it+1}]}{Cov_t[r_{it+1}, r_{Mt+1}]} = \frac{E_t[r_{Mt+1}]}{Var_t[r_{Mt+1}]}, \tag{10}$$

or

$$E_t[r_{it+1}] = \beta_{it} E_t[r_{Mt+1}], \tag{11}$$

where $\beta_{it} = \frac{Cov_t[r_{it+1}, r_{Mt+1}]}{Var_t[r_{Mt+1}]}$, the security's conditional beta, measures the systematic risk sustained. Equation (11) is the conditional version of the CAPM.

The main advantage of the CAPM is its simplicity and intuitiveness. The model predicts that the relation between beta and expected return is linear and that only the beta can explain the difference of expected returns between assets. This latter prediction has been challenged in the literature. Some researchers find that the beta is not related to the cross-section of average returns (e.g., Fama and French, 1992). Others find numerous non-beta variables predict the behaviour of average stock returns. In the following subsection, we review the extensions proposed to mitigate the shortcomings of the CAPM.

2.3 Multifactor Pricing Models

Two general asset-pricing models have been proposed that include the market and other factors. The first is Merton's (1973) intertemporal CAPM (ICAPM). The main idea behind the ICAPM is that some of the changes in the investment oppor-

tunity set can be predicted with some state variables, which ultimately affect investor's demand. In other words, with dynamic investment opportunities, the optimal choice of the representative investor will be determined not only by the market factor but also by state variables that help hedge shifts in investment opportunities.

Ross (1976) similarly proposes a multifactor asset-pricing model—called asset pricing theory (APT)—but from a different argument. The premise of Ross's analysis is that returns can be represented by a linear multifactor data generating process, where the factor sensitivities (the factor-specific betas) have the same interpretation as the market beta. Relying on the absence of arbitrage argument, Ross shows that the expected excess returns of any asset must, in this context, be linear functions of the factors' expected returns.

Both the ICAPM and APT can be generated from the general pricing framework (6) by assuming that the IMRS is linear in the factors:

$$m_{t+1} = b_{0t} + \sum_{k=1}^{K} b_{kt} f_{kt+1}. \tag{12}$$

where b_{0t} and b_{kt} $(k = 1, ..., K)$ are parameters and f_{kt+1} denotes the return on factor k at time $t+1$. Without loss of generality, we assume that the factors are conditionally uncorrelated with each other, that is, $Cov_t[f_{kt+1}, f_{\ell t+1}] = 0$ for $k \neq \ell$.

Substituting (12) into (6) yields:

$$E_t[r_{it+1}] = -\sum_{k=1}^{K}(1 + E_t[R_{ft+1}])b_{kt}Cov_t[r_{it+1}, f_{kt+1}]. \tag{13}$$

Since the factors are conditionally uncorrelated with each other, (13) implies:

$$E_t[f_{kt+1}] = -(1 + E_t[R_{ft+1}])b_{kt}Var_t[f_{kt+1}] \quad \forall k = 1, ..., K. \tag{14}$$

This latter identity yields:

$$(1 + E_t[R_{ft+1}])b_{kt} = -\frac{E_t[f_{kt+1}]}{Var_t[f_{kt+1}]}. \tag{15}$$

Replacing (15) into (13) gives the multifactor pricing model:

$$E_t[r_{it+1}] = \sum_{k=1}^{K} \beta_{ikt} E_t[f_{kt+1}]. \tag{16}$$

where $\beta_{ikt} = \frac{Cov_t[r_{it+1}, f_{kt+1}]}{Var_t[f_{kt+1}]}$ is the security's conditional beta relative to factor k.

Equation (16) is pretty general and nests the conditional version of the CAPM (Merton, 1980) as a particular case when we assume that $f_{1t} = r_{Mt}$ and $f_{kt} = 0$ for $k > 1$. However, to be of any use, the factors must be specified. Below, we will consider many situations, starting with Fama and French's (1993) FF3 model.

2.3.1 The Three-Factor Model

Fama and French (1993) observe that two asset classes tend to beat the market: small stocks and value stocks. Authors such as Banz (1981) and Reinganum (1981) find that small (big) stocks tend to generate positive (negative) CAPM abnormal returns, so that an auto-financed portfolio selling big stocks to buy small stocks tends to generate a significantly positive abnormal return. Fama and French (2008) find that the effect is primarily due to microcaps and is marginal among medium and

larger stocks. Similarly, the literature has pointed out the value effect (Basu, 1977; Stattman, 1980; Rosenberg, Reid, and Lanstein, 1985; Chan, Hamao, and Lakonishok, 1992; Fama and French, 1992), which is the propensity of value stocks (those that seem undervalued whether measured by book-to-market or earnings-to-price or other ratios) to outperform growth stocks.

The conditional version of the FF3 model is obtained by extending the conditional CAPM to consider two additional factors: SMB (small minus big) and HML (high minus low):

$$E_t[r_{it+1}] = \beta_{iMt}E_t[r_{Mt+1}] + \beta_{iSt}E_t[SMB_{t+1}] + \beta_{iHt}E_t[HML_{t+1}]. \qquad (17)$$

In (17), SMB captures any common variations related to market capitalization. Likewise, HML is a value factor capturing the common variations related to market valuation.

Fama and French (1996b) find that the FF3 captures anomalies related to size, value, sales growth, long-term return reversal, and short-term contrarian. However, they find that the FF3 cannot explain the momentum effect documented by Jegadeesh and Titman (1993).

2.3.2 Carhart's Four-Factor Model

Because of Fama and French's (1996) finding that the FF3 cannot explain the momentum effect, Carhart (1997) adds a momentum factor (UMD), thus obtaining

C4. While Carhart (1997) initially uses the C4 to investigate mutual funds, the UMD is often used to examine portfolios sorted on momentum. Fama and French (2014, 2015) find that including UMD is crucial when the LHS test portfolios are formed on past returns.

2.3.3 Fama–French's Five-Factor and Six-Factor Models

In 2015, Fama and French developed a new pricing model that augments their FF3 with two factors based on investment and profitability. The new model is justified by the three-factor model's inability to explain a growing list of anomalies. For example, Ikenberry, Lakonishok, and Vermaelen (1995) find that investors tend to underreact share repurchases significantly. Even if they control the firms' size and book-to-market ratio, a buy-and-hold strategy delivers an abnormal return of more than 12% in the four years following the share repurchases announcement. Similarly, building on extensive literature, Pontiff and Woodgate (2008) show that share issuance has a solid predictive ability on the cross-section of stock returns. This aptitude is even more statistically significant than that of size, book-to-market, or momentum. In addition to this, Hou et al. (2015) find that their q-factor model performs better than the FF3 model explaining a large cross-section of nearly 80 anomalies.

Rather than relying upon rationality or arbitrage arguments, Fama and French base their analysis on the dividend discount model:

$$M_t = \sum_{\tau=1}^{\infty} \frac{E(D_{t+\tau})}{(1+r)^{\tau}}, \tag{18}$$

where M_t denotes the stock price at time t, $E(D_{t+\tau})$ is the dividend expected at $t+\tau$, and r is the average expected stock return or internal rate of return. Relying on clean surplus accounting, the dividend D_t at time t can be replaced by the difference between earnings per share (Y_t) and investment (I_t), thus yielding [see Equation (9) in Miller and Modigliani (1961)]:

$$M_t = \sum_{\tau=1}^{\infty} \frac{E(Y_{t+\tau} - I_{t+\tau})}{(1+r)^{\tau}}. \tag{19}$$

Dividing both sides of (19) by time t book equity (B_t) and with straightforward algebra, we have:

$$(1+r)^{\tau} = \sum_{\tau=1}^{\infty} E\left(\frac{Y_{t+\tau}}{B_t} - \frac{I_{t+\tau}}{B_t}\right) \times \frac{B_t}{M_t}. \tag{20}$$

Equation (20) implies that all else being equal, average expected stock return or internal rate of return will be positively affected by book-to-market ratio (B_t/M_t), positively influenced by profitability ($Y_{t+\tau}/B_t$), and negatively influenced by investment ($I_{t+\tau}/B_t$). Based on this theoretical justification, Fama and French (2015) propose a five-factor model (FF5) that adds to the FF3 a profitability factor (robust minus weak, RMW) and an investment factor (conservative minus aggressive, CMA). The FF5 model can be represented as:

$$E[r_{it}] = \beta_{iM} E[r_{Mt}] + \beta_{iS} E[SMB_t] + \beta_{iH} E[HML_t] + \beta_{iR} E[HML_t] + \beta_{iH} E[HML_t]. \tag{21}$$

They also consider a six-factor model that further adds the UMD factor.

In testing their new models, Fama and French (2015) find the HML factor—even if it is justified by theory—is redundant once RMW and CMA are factored in. Besides, while they find that the data reject the model in formal tests, it still can account for between 71% and 94% of the cross-sectional variance of portfolios formed on firm size, value, performance, and investment—a performance that is better than that of the FF3.

2.3.4 The q and q5 Models

Hou, Xue, and Zhang (2015) propose an asset-pricing model: the q-factor model. The model includes the usual market and size factors and two additional factors related to investment and profitability motivated by the q theory for investment (Cochrane, 1991).

Considering a two-period economy with a representative investor/household discussed above, Hou et al. (2015) focus their analysis on the supply (production) side by considering a set of N firms indexed by $i = 1, \ldots, N$. While the investor maximizes its expected utility as in (1), firm i chooses the level of initial investment (I_{it}) to maximize the cum-dividend equity value at time t while taking as given the stochastic discount factor obtained in (4):

$$\underset{\{I_{it}\}}{\text{Max}} \; P_{it} + D_{it}. \tag{22}$$

The price is given by the first-order condition of the investor problem $p_{it} = E_t[m_{t+1}x_{it+1}] = E_t[m_{t+1}(P_{it+1} + D_{it+1})] = E_t[m_{t+1}\pi_{it+1}A_{it+1}]$, since the terminal price and dividend are given by $P_{it+1} = 0$ and $D_{it+1} = \pi_{it+1}A_{it+1}$. The dividend is given by the firm's free cash flow, which equals operating cash flow ($\pi_{it}A_{it}$, where π_{it} and A_{it} denote profitability and assets at time t, respectively) minus investment and adjustment costs ($\frac{a}{2}(\frac{I_{it}}{A_{it}})^2 A_{it}$, where $a > 0$ is a positive parameter measuring the adjustment cost incurred while changing the scale of assets). In short, we have $D_{it} = \pi_{it}A_{it} - I_{it} - (\frac{a}{2})(\frac{I_{it}}{A_{it}})^2 A_{it}$. Since in this two-period economy A_{it} depreciates fully at the beginning of $t+1$, we will have $A_{it+1} = I_{it}$.

With this notation, the first-order condition of the firm's problem is given by:

$$1 + a\frac{I_{it}}{A_{it}} = E_t[m_{t+1}\pi_{it+1}]. \tag{23}$$

With the identities $P_{it+1} = 0$ and $A_{it+1} = I_{it}$, the return on the stock of firm i at time $t+1$ can be represented as:

$$r_{it+1} = \frac{P_{it+1}+D_{it+1}}{P_{it}} = \frac{\pi_{it+1}A_{it+1}}{E_t[m_{t+1}\pi_{it+1}A_{it+1}]} = \frac{\pi_{it+1}}{E_t[m_{t+1}\pi_{it+1}]} = \frac{\pi_{it+1}}{1+a\frac{I_{it}}{A_{it}}}. \tag{24}$$

Equation (24) implies that expected stock returns increase with expected profitability and decrease with investment shock, all else being equal. The relation between expected returns and investment and profitability is a conditional one. Characteristics based on valuation ratios such as net stock issues, composite issuance, book-to-

market can be seen more as proxies of investment than expected profitability. Therefore, their documented negative relation with the cross-section of returns is consistent with the negative investment-expected return relation. On the other hand, variables like earnings surprises, contrarian, momentum, and financial distress can be seen as proxies for expected profitability.

Based on these insights, Hou et al. (2015) propose a q-factor model consisting of the market and size factors and two factor-mimicking portfolios based on investment and profitability similar to Fama and French (1993, 1996) factors:

$$E[r_{it}] = \beta_{iM} E[r_{Mt}] + \beta_{iME} E[r_{MEt}] + \beta_{iI/A} E[r_{I/At}] + \beta_{iROE} E[r_{ROEt}]. \qquad (25)$$

Although theoretically grounded by (24), the q-factor model can only be seen as an approximative and ad-hoc empirical model. In comparing the q-model with the FF3 and C4 models in explaining a large set of nearly 80 anomalies, Hou et al. (2015, p.650) find that "with a few exceptions, the q-factor model's performance is at least comparable to, and in many cases better than that of the Fama–French (1993) 3-factor model and the Carhart (1997) 4-factor." Moreover, Hou, Xue, and Zhang (2016) extended the number of test assets to 437 anomaly variables and added the FF5 model in their comparisons. They similarly find that their q-factor model dominates the FF5 model in all categories except the value-minus-growth category.

Building on the argument that in the multiperiod framework, ceteris paribus, (24) implies that the expected stock return is set to increase with investment-to-

assets growth, Hou, Mo, Xue, and Zhang (2020) propose to augment the q-model with an additional expected investment-to-assets growth factor. They call the resulting five-factor model the q5 model. They find that the q5 model resolves many of the q-factor model's shortcomings.

Hou, Mo, Xue, and Zhang (2019) use mean-variance spanning tests to compare most popular asset pricing models, including the FF5, FF6, q, q5, and C4 models. They find that the q-factor model spans the FF5 and FF6 models and that the q5 model subsumes the C4 model.

2.3.5 Stambaugh–Yuan's Four-Factor Model

Stambaugh and Yuan (2017) propose a four-factor model (C4) consisting of the market and size factors and two additional mispricing factors intended to accommodate a large set of anomalies. The two new factors (MGMT and PERF) are constructed from 11 anomalies.

2.3.6 Other Research

Barillas and Shanken (2018) propose a model that combines six factors from various existing models. Those factors are the market, SMB, UMD, I/A, ROE, and HMLm. Daniel, Hirshleifer, and Sun (2018) recently developed a three-factor model that accommodates a market factor and two additional factors intended to capture the effects of financing and profitability. This model is not covered in this thesis

because it requires daily data to compute the factors. See Table 1 for a summary of the other works that have been done in the literature.

CHAPTER 3 DATA AND DESCRIPTIVE STATISTICS

The global data used in this thesis are from Thomson DATASTREAM. The initial sample includes 62,942 securities from over 100 countries. We deleted the countries with only a few firms in their local market, such as Bermuda (2 stocks), Cayman Islands (3 stocks), Channel Islands (35 stocks listed in London), Jersey (1 stock), Mongolia (1 stock), Namibia (1 stock), Papua New Guinea (2 stocks), Rwanda (1 stock), Slovenia (1 stock), and Uganda (1 stock). Moreover, we exclude the countries in a war situation like Iraq and Syria. With this initial screening, we ended up with a sample of 88 countries. Of this list, 26 are classified as developed markets (DMs) according to the FTSE list, and the remaining 62 are emerging markets (EMs). The list of these markets is in Table 2.

To focus the study on the most important markets, we further divide all the countries into ten developed market groups and nine emerging market groups. The

ten developed market groups include nine markets (Australia, Canada, France, Germany, Hong Kong, Japan, South Korea, the United Kingdom, and the United States), and the rest of the other 17 markets are placed in a portfolio we call "other developed markets." The nine emerging market groups include eight markets (Brazil, China, India, Malaysia, Pakistan, Taiwan, Thailand, and Turkey). The rest of the 54 markets are placed in a portfolio we call "other emerging markets."

For each market, we consider the stocks traded on the major exchange. However, for some of the countries, we consider multiple exchanges. Those are China (Shanghai and Shenzhen stock exchanges), Germany (Frankfurt, Stuttgart, Hamburg, and Munich stock exchanges), India (Bombay and National stock exchanges), Malaysia (Kuala Lumpur and MESDAQ stock exchanges), Russia (Russian Trading System and Moscow Stock Exchanges), and the United States (NYSE, Amex, and Nasdaq).

We follow the screening procedures of Ince and Porter (2006), Lee (2011), and Tobek and Hronec (2018) to reduce the potential for errors in the Datastream database. In particular, we dropped:

1. the stocks with less than 12 monthly observations,
2. the observations with trailing zero-returns and missing returns,
3. the non-equity instruments such as warrants, preferred stocks, trusts, and others by following the process described by Griffin, Kelly, and Nardari's (2010, Table B.1),

4. the financial companies (Banks, Financial Services, Insurance, and Real Estate),
5. the observations for which price is higher than one million,
6. the observations with lagged return index lower than 0.01,
7. observations with an end-of-previous-month share price lower than $1,
8. returns above 300% that reverses within one mouth. Specifically, if R_t or R_{t-1} greater than 300% and $(1+R_t)(1+R_{t-1})-1<50\%$, then we set R_t and R_{t-1} as missing,
9. monthly returns that fall out the 2% and 98% range in each country.

After finishing the screening process described above, the final sample consists of 37,055 stocks from 88 countries, for a total of 6,445,312 monthly observations. Figure 1 exhibits our sample stocks' distribution across the 88 countries over the entire sample period, from July 1981 to June 2020. The United States is the most represented with about 20% of the sample (9,840 stocks), followed by China (11%, 3,846 stocks), India (10%, 3,846 stocks), Japan (7%, 2,707 stocks), South Korea (5%, 1995 stocks), Hong Kong (5%, 1,685 stocks), Australia (4%, 1525), the UK (3%, 999), Germany (3%, 929), Canada (2%, 729), and France (2%, 643).

Table 2 shows the distribution of the number of stocks by country over January 1981 to June 2020. Most of the developing markets have full data coverage except Finland (the sample starts in 1987), Israel (1986), Luxembourg (1992), Poland (1992), Portugal (1988), South Korea (1984), Spain (1986), and Sweden (1982).

However, only three emerging markets cover the full sample period (Malaysia, Philippines, and South Africa). For most emerging markets, coverage starts from the mid-1990s. Over the sample period, the number of firms considered increases from 1,547 stocks in 1981 to 34,373 in 2020.

Table 3 presents descriptive statistics for the 20 groups considered. Columns 2 to 4 present the average, minimum, and maximum capitalization weight of each group. The country with the highest average weight is the United States, which accounts for 33.91% of the global capitalization. Japan (24.75%) comes next, followed by China (6.77%), the United Kingdom (4.87%), Germany (4.41%), and France (3.10%). The total weight of the developed markets (86.47%) is significantly higher than that of the emerging markets (13.53%).

The rest of the table presents the mean, *t*-statistic, standard deviation, and correlations of each country with all other countries. The statistics are for both the value-weighted and equally weighted index returns. South Korea shows the highest average monthly return (1.49% per month on the value-weighted basis and 2.29% on the equally weighted basis). On the value-weighted basis, Taiwan and Malaysia underperform all markets with average returns of 0.69% and 0.75%, respectively. Emerging Markets usually show higher growth and performance opportunities. However, the average return of the EMs was slightly lower than that of the DMs (0.98% vs 0.81% on the value-weighted basis and 1.02% vs 1.14% on the equal-weighted basis).

As we expected, the EMs index return is more volatile than that of the DMs on the value-weighted basis (compare a standard deviation of 6.30% per month with 4.88%). Considering the value-weighted indexes, South Korea is most volatile in the DMs, with a standard deviation of 10.39% per month. In comparison, Turkey is most volatile in the EMs, with a standard deviation of 13.10% per month.

The United States has the highest average correlation with the rest of the world (84%). Across DMs, the correlations are higher than 60% on the value-weighted basis, while in contrast, most EMs have a correlation with their peers lower than 60%, except Brazil (70%). On an equal-weight basis, the result is similar. The United States (82%) still delivers the highest correlation. DMs still have stronger correlations with the rest of the world than EMs, probably because they are more integrated into the world market (Pukthuanthong and Roll 2009; Bekaert, Harvey, Lundblad, and Siegel, 2011; Akbari, Ng, and Solnik, 2020).

Table 4 presents the descriptive statistics of firm characteristics for the 20 groups. The average market capitalization ranges from $398 million for China to $8 million for India. For the developed markets, Australia's ($47 million) and South Korea's ($62 million) average market capitalization are much lower than the $89 million average obtained for the other developed markets, while Japan ($309 million) delivers the highest average market cap. For emerging markets, only China ($398 million), Taiwan ($212 million), and Brazil ($122 million) deliver an average market capitalization that is higher than that of the other developed markets.

Furthermore, Table 4 also shows the averages of BTM (book-to-market), MOM (momentum), INV (investment), OP (operating profitability), ROE (return-on-equity), TQ (log of Tobin's Q), COP (operating cash flow to assets), DROE (change in return-on-equity), DINV (change in investment), NSI (net stock issues), CEI (composite equity issuance), ACR (accruals), NOA (net operating assets), AG (assets growth), ITA (investment-to-assets), GPA (gross profitability premium), ROA (return-on-assets), OSC (Ohlson score). The figures for these variables vary considerably from one market to another.

CHAPTER 4 METHODOLOGY

4.1 Factor Spanning Test Methodology

Our principal tool to evaluate the asset-pricing models is the factor spanning test initiated by Huberman and Kandel (1987). The factor-spanning regressions are a direct way to test if a combination of explanatory factors f_{kt} $(k = 1, \ldots, K)$ can fully span another factor (g_t). There are two steps to determine the factor that the others span.

The first step of the factor spanning test is to place the factor to be spanned on the left-hand side of the following spanning regression:

$$g_t = \alpha + \sum_{k=1}^{K} \beta_k f_{kt} + \epsilon_t. \tag{26}$$

The second step is to infer from the parameters estimated from regression (26) whether the factor g_t is spanned or not. Huberman and Kandel (1987) show that

the set of K factor span g_t if and only if the following two conditions hold: $\alpha = 0$ and $\sum_{k=1}^{K} \beta_k - 1 = 0$.

A problem with testing mean-variance spanning from a joint hypothesis that $\alpha = 0$ and $\sum_{k=1}^{K} \beta_k - 1 = 0$ is that the joint test will put much more weight on the second part test ($\sum_{k=1}^{K} \beta_k - 1 = 0$), given that the betas are generally estimated much more precisely than the alphas (Kan and Zhou, 2012). Given this problem, even if we provide a test of whether $\sum_{k=1}^{K} \beta_k - 1 = 0$ via a χ^2 statistic, we follow the standard in the literature and test for factor spanning by testing whether $\alpha = 0$ via a robust GMM-based (Newey and West, 1987) t-statistic.

4.2 Construction of the Factors

Before calculating the factors, to mitigate the effects of outliers, all variables are winsorized at 2nd and 98th percentiles. The seven models we consider in this study are as follows:

1. The FF3 model extends the CAPM by including size and value factors: $r_{it} = \alpha_i + \beta_{iM} r_{M,t} + \beta_{iS} SMB_t + \beta_{iH} HML_t + \epsilon_{it}$.

2. The C4 model adds the momentum factor (UMD) to the FF3 model: $r_{it} = \alpha_i + \beta_{iM} r_{Mt} + \beta_{iS} SMB_t^* + \beta_{iH} HML_t + \beta_{iU} UMD_t + \epsilon_{it}$.

3. The FF5 model consists of the market, size, value, investment, and profitability factors:$r_{it} = \alpha_i + \beta_{iM} r_{Mt} + \beta_{iS} SMB_t + \beta_{iH} HML_t + \beta_{iR} RMW_t + \beta_{iC} CMA_t + \epsilon_{it}$.

4. The FF6 model adds the UMD factor to the FF5 model: $r_{it} = \alpha_i + \beta_{iM} r_{Mt} + \beta_{iS} SMB_t + \beta_{iH} HML_t + \beta_{iR} RMW_t + +\beta_{iC} CMA_t + \epsilon_{it}$.

5. The q-factor model consists of the market, size, investment, and profitability factors: $r_{it} = \alpha_i + \beta_{iMKT} MKT_t + \beta_{iME} r_{MEt} + \beta_{iI/A} r_{I/At} + \beta_{iROE} r_{ROEt} + \epsilon_{it}$.

6. The q5 model adds the expected growth factor to the q-factor model: $r_{it} = \alpha_i + \beta_{iMKT} MKT_t + \beta_{iME} r_{MEt} + \beta_{iI/A} r_{I/At} + \beta_{iROE} r_{ROEt} + \beta_{iEG} r_{EGt} + \epsilon_{it}$.

7. The C4 model comprises of the market, size, MGMT, and PERF factors: $r_{it} = \alpha_i + \beta_{iM} r_{Mt} + \beta_{iS} SMB_t^* + \beta_{iMGMT} MGMT_t + \beta_{iPERF} PERF_t + \epsilon_{it}$.

4.2.1 The Fama–French Factors

Following Fama and French's (2015) method, we construct the SMB and HML factors from independent 2x3 sorts by interacting size with book-to-market ratio. At the end of June of year t, stocks are split into two groups (small and big) based on the median size, and independently into three groups (low, medium, and high) based on the 30 and 70 percentiles of book-to-market. Taking intersections of the two size portfolios and three book-to-market portfolios, SMB is the average of the three small portfolio returns minus the average of the three big portfolio returns. HML is the average of two high portfolio returns minus the average of the two low portfolio returns.

Fama and French (2015) add the operating profitability and investment into the FF3 model to form the FF5 model. To compute the operating profitability, we use the total revenue (Datastream code WC01001) minus cost of goods sold

(WC01051), minus selling, general, and administrative expenses (WC01101), and minus interest expense (WC01251), divided by book equity. Book equity is total assets (WC02999) minus total liability (WC03351). The investment factor is the annual change in total assets (WC02999) scaled by one-year-lagged total assets. We independently split stocks into three profitability and investment groups (low, medium, and high) based on the 30 and 70 percentiles. We form the six portfolios that intersect the two size with three profitability and separately the six portfolios that intersect the two size with three investment portfolios. RMW is the average of two high profitability portfolio returns minus the average of the two low profitability portfolio returns. CMA is the average return of the two low investment portfolio returns minus the average return of the two high investment portfolio returns.

Momentum is measured as the cumulative average return over the past 12 months, skipping the most recent month's returns, to avoid the short-term contrarian effect (Jegadeesh, 1990). Similarly to the other factors' construction, we split stocks into two groups based on the median size and independently into three groups (low, medium, and high) based on the 30 and 70 percentiles of momentum. We compute the value-weighted returns of the six size-momentum portfolios and construct UMD as the average of the two high portfolio returns (up) minus the average of the two low portfolio returns (down).

4.2.2 The q and q5 Factors

The r_{ME}, $r_{I/A}$ and r_{ROE} factors proposed by Hou et al. (2015) come from triple independent 2x3x3 sorts of stocks on size, investment-to-assets, and ROE. The size

characteristic is market equity (Datastream code MV), investment-to-assets is the annual change in total assets (WC02999) scaled by one-year-lagged total assets. The ROE variable is directly downloaded from Datastream (code WC80301) without alteration. We divide all stocks into two groups, small and big, based on the median size using the 30 and 70 percentiles of investment-to-assets to split the stocks into three groups (low, medium, and high). We similarly sort stocks into three ROE groups based on the 30% and 70% breakpoints. We take the interactions of the two size, three investment-to-assets, and three ROE portfolios to create eighteen portfolios. The r_{ME} factor is the average of the nine small portfolio returns minus the average of the nine big portfolio returns, $r_{I/A}$ is the average returns of the six low-investment-to-assets portfolios minus the average returns of the six high-investment-to-assets portfolios, and r_{ROE} is the average returns of the six high ROE portfolios minus the average returns of the six low ROE portfolios.

Hou, Mo, Xue, and Zhang (2020) propose an additional expected growth factor (r_{EG}) to be added to the q-factor, yielding the q5 model. We construct r_{EG} from independent 2x3 sorts on size and the expected one-year-ahead investment-to-assets change, denoted as DINV. To predict DINV, we use the log of Tobin's q, operating cash flow-to-assets, and the change in ROE. Tobin's q is the market value (code MV) plus the long-term debt (code WC03251) plus the short-term debt (code WC03051) divided by total assets (code 02999). If Tobin's q equal to zero, we set it as missing. Operating cash flow-to-assets, denoted as Cop, is total revenue (code WC01001 zero if missing) minus cost of goods sold (code WC01051 zero if missing)

minus selling, general, and administrative expenses (code WC01101 zero if missing) plus research and development expenditures (code WC01201 zero if missing) minus change in accounts receivable (code WC02051 zero if missing) minus change in inventory (code WC02101 zero if missing) minus change in prepaid expense (code WC02140 zero if missing) plus the change in deferred revenue (code WC03262 zero if missing) plus the change in accrued expenses (code WC03069 zero if missing) and divided by total assets (code WC02999 missing if zero). We calculate the change in ROE with quarterly earnings and, using ROE minus one-year-lagged ROE, measured as DROE. To predict the DINV, we use 120 months rolling windows to run cross-sectional regressions of DINV on the log of Tobin's q, Cop and DROE. In particular, the regressors we are using are lagged by one year relative to the latest log of Tobin's q, Cop, and DROE values used in calculating the DINV. Besides, we winsorize the log of Tobin's q, Cop, and DROE at 2^{nd} and 98^{th} percentiles before running the regression.

We use median size to split stocks into two groups, small and big. We independently sort stocks into three groups (low, medium, and high) based on the 30 and 70 percentiles of the DINV. The factor r_{EG} is constructed as the average of three high portfolio returns minus the average of the three low portfolio returns.

4.2.3 The Stambaugh–Yuan Factors

Stambaugh and Yuan (2017) construct their two mispricing factors (MGMT and PERF) from two groups of anomalies. MGMT contains different investment

measures, including net stock issues, composite equity issuance, accruals, net operating assets, asset growth, changes in gross property, plant, and equipment, and inventory-to-assets. On the other hand, PERF contains different profitability measures, includes failure probability, O-score, momentum, gross profitability, and return-on-assets. Because daily returns are not widely available on Datastream, we give up on failure probability in this study. They construct the MGMT and PERF by equally weighting a stock's percentile rankings across the variables in each group.

Stambaugh and Yuan (2017) form the size factor, SMB, from two independent 2x3 sorts on size and MGMT, and on size and PERF. The stocks are sorted into two size groups based on the median. Then, stocks independently are sorted into three groups based on the low 20%, middle 60%, and high 20% of MGMT and PERF. We take the intersection of the two size portfolios and three MGMT portfolios, and separately, three PERF portfolios. We end up with six size-MGMT portfolios and six size-PERF portfolios. SMB is the average of two small-median portfolio returns minus the two big-median portfolio returns. MGMT is the average of two low size-MGMT portfolio returns minus the average of two high portfolio returns. PERF is the average of two low-size-PERF portfolio returns minus the average of two high-size-PERF portfolio returns.

4.3 Summary Statistics on the Characteristics Used to Build the Factors

Table 5 shows the rank correlations of firm characteristics in each country. First, we sorted stocks into 100 rankings for each country and month based on a firm characteristic. Second, we compute for each month the cross-sectional correlation

coefficient between the current and lagged rankings. Finally, we average the series of correlations within each country. The results show that almost all the correlations are higher than 80%. Therefore, we conclude that the firm characteristics' effects are relatively stable and that no large transaction costs will be incurred when these characteristics are used to form portfolios.

Table 6 presents time-series averages of the coefficients from Fama–MacBeth regressions of stock returns on size and other firm characteristics from January 1981 to May 2020. We report the regression results with a single independent variable. We require at least 24 monthly observations in each month to consider that month. We follow Hou, Xue, Zhang's (2020) method to standardize each characteristic by subtracting their cross-sectional mean and then dividing by their standard deviation. We do this to allow a better comparison of the characteristics' effects between themselves and across time. For size and book-to-market, we use their logarithm in the regression to follow the standard in the literature.

Panel A of Table 6 shows the regression results for each of the 19 groups. Consistent with the reported size effect, there is a significant negative size premium in five of the nine developed countries considered. Those countries are Australia (t = -4.52), Canada (t = -5.41), Hong Kong (t = -2.28), Japan (t = -11.27), South Korea (t = -4.46). However, the size effect is not significant for France (t = -0.78), the United Kingdom (t = 0.12), and across the aggregated 17 other developed markets (t = -0.84), while it is significantly positive in Germany (t = 4.83) and the United States. The opposite size effect observed for the United States is consistent with the

capitalization boom of large technology firms such as Apple, Microsoft, Facebook, Google, and the likes.

For the emerging markets, the size effect is confirmed for Brazil (t = -3.48), India (t = -4.30), Pakistan (t = -2.82), Taiwan (t = -5.01) and Turkey (t = -5.01). However, the size effect is not significant for Thailand (t = -1.25) and across the aggregated portfolio of 54 other emerging markets (t = -0.77). For China, we observe a reverse size effect, given that the coefficient on the size characteristic is positive and significant at the 10% level (t = 1.93).

Consistent with the value effect, the coefficient on the book-to-market characteristic is positive and significant for most of the markets, except for Canada (t = -0.67), Japan (t = -5.72), the United Kingdom (t = -2.45), China (t = 0.70), India (t = 0.99), and Pakistan (t = -0.94).

Consistent with the momentum effect, the momentum characteristic's coefficient is positive and significant for all developed markets but Japan (t = -2.33) and South Korea (t = -4.00). However, except for the portfolio that aggregates the 54 other emerging markets (t = -4.00), the momentum effect is not significant in the eight emerging markets considered.

Panel B of Table 6 shows the regression results across developed markets, emerging markets, all non-US markets, and global markets. Reflecting the reverse size effect documented in the United States and the weight of this country, the size effect is only significant for the non-US markets (t = -2.77). The size effect is not significant for emerging markets (t = 1.06). The value effect is confirmed for the

developed markets ($t = 8.25$), emerging markets ($t = 3.51$), and global markets ($t = 8.79$), while it reversed for the non-US markets ($t = -4.52$). The momentum effect is positive and significant for the developed markets ($t = 4.20$) and global markets ($t = 3.82$). The momentum effect is not significant for emerging markets ($t = 1.11$) and non-US markets ($t = 0.80$).

CHAPTER 5 EMPIRICAL RESULTS

We primarily rely on spanning tests to compare all the factor models, following Fama–French (1993, 2015, 2016), Carhart (1997), Hou–Xue–Zhang (2015), Hou-Mo-Xue-Zhang (2018), and Stambaugh–Yuan (2016). We start by discussing the descriptive statistics of the factors in Section 5.1. We proceed in Section 5.2 by discussing the results exploring which factors are subsumed in their model. Section 5.3 discusses whether the Fama–French models are subsumed. Section 5.4 explores whether q and q5 models are subsumed, while Section 5.5 investigates whether Stambaugh–Yuan's model is subsumed.

5.1 Descriptive Statistics of the Factors

Table 7 presents the statistics of all the factors considered in this study. The first column shows the mean and *t*-statistics for the market factor: the value-weighted market index return in excess of the one-month US T-bill return. To have a more accurate result for the spanning test, we only allowed one missing factor in

each model. Therefore, the starting date for the factors—shown in columns 2, 8, and 13—may differ from one country to another. Columns 3 to 7, 9 to 12, and 14 to 17, respectively, show the mean and t-statistics for Fama–French's factors, Hou–Xue–Zhang's factors, and Stambaugh–Yuan's factors. The SMB in the Fama–French model is insignificant in most countries (China and South Korea are the only exceptions). The SMB factor is also insignificant across the developed markets, emerging markets, non-US markets, and global markets. However, the size factor r_{ME} computed using Hou–Xue–Zhang's approach (from 18 portfolios) is positive and significant in most countries and across all the groups of countries considered.

Stambaugh and Yuan construct their SMB by considering only stocks that are least likely to be mispriced to find that their (p.1272) "resulting SMB delivers a small-firm premium of 46 bps per month over our 1967–2013 sample period, nearly twice the premium of 25 bps implied by the familiar SMB factor in the Fama-French three-factor model." Our study allows us to examine the robustness of this finding directly. For several countries, Stambaugh and Yuan's hypothesis is verified. For the past three decades, Fama and French's SMB is significant at standard levels in two countries (Canada and South Korea). For China, the average size premium obtained with the Stambaugh and Yuan approach (1.17% per month) is about 28 basis points larger than that obtained with the Fama and French approach (0.89% per month). For South Korea, the difference between the two size premiums is puny (compare 1.18% to 1.17% per month). However, several other countries or groups

of countries for which the SMB factor computed with the Stambaugh–Yuan approach are significant: Canada, India, Turkey, and across the emerging, non-US, and global markets.

However, compared with the size factor computed using Hou–Xue–Zhang's approach (r_{ME}), the exclusion of the most mispriced stocks through the Stambaugh–Yuan approach always yields a lower size premium. China is the only exception we can find, given that SMB* gives a slightly higher average return (compare 1.05% to 1.17% per month). Given this result, we conclude that the Stambaugh–Yuan finding of a larger size effect when the most mispriced stocks are excluded is not robust.

Consistent with the documented value effect, we find that HML is significant in most countries and across the groups of developed markets, emerging markets, non-US markets, and all markets (global). The HML factor is not statistically reliable for only two countries: Canada (0.32% per month, $t = 1.06$) and China (0.57% per month, $t = 1.37$).

The RMW factor is significant for all countries and groups except for Canada. Even for Canada, the magnitude of the RMW premium (3.84% per year) is economically significant, prompting us to conclude that profitability is an important determinant of international stock returns.

A different result emerges for the investment factors (CMA or $r_{I/A}$), which is not positive for the countries or groups of countries. This result suggests that high investment stocks did not underperform low investment stocks.

The average UMD premium for the nine developed markets is significant at the standard levels for all but two markets (Japan and South Korea). The UMD is also reliably positive for the portfolio of other developed markets. In contrast, for emerging markets, the average UMD premium is significantly positive only for Brazil and the portfolio of other emerging markets.

The evidence shows that the r_{ROE} factor is important for describing average return across all the countries. The r_{ROE} factor is positive and economically significant for all countries and groups. In contrast, the expected growth factor, r_{EG}, is negative in 15 out of 23 groups. The average r_{EG} returns of the rest of the eight groups are positive but insignificant.

The MGMT factor is positive but statistically insignificant only in Australia, other DMs, Malaysia, and Pakistan. Further, the PERF factor is always associated with a negative, the reverse of what one would observe if PERF was priced according to what is stated in the literature.

5.2 Which Factors are Redundant?

Table 8 present the results obtained when each of the factors in Fama–French's FF5 model is regressed on their peers in the model. We do not find any country for which the significant market premium becomes insignificant when purged of its commonalities with the other factors (SMB, HML, RMW, and CMA). The same conclusion holds when we consider the developed, non-US, and global portfolios.

As discussed above, Fama and French's SMB factor is significantly positive only for China and South Korea. However, for both countries, the alphas obtained after regressing them on the other four factors remain significant, implying that the SMB factor is not subsumed by its peers in the FF5 model.

The most interesting results from Table 8 are obtained on the HML factors, not only because most of them are significant but also because of Fama and French's (2015) finding that HML is redundant in their FF5 model. Table 8 shows that this redundancy is not robust in different periods and samples. As discussed in Section 5.1, the HML factor is significantly positive on average at the 5% level in 21 out of the 23 countries or groups of countries considered. However, in all the 21 situations where the average factor is significantly positive on average, we also find that the alphas obtained when HML is regressed on the market and SMB, RMW, and CMA factors are also significant at the 1% level of statistical significance. Given this evidence, we conclude that the HML factor is not redundant.

Do the other factors in the FF5 model subsume the RMW premium? The answer to this question is no. While except for Canada, the RMW factor was significantly positive for all markets and groups, we do not find this result in the spanning tests. The only exception is the United States, whose significant average raw RMW (0.70% per month, $t = 3.79$) delivers a small alpha of 8 basis points per month ($t = 0.47$) in the spanning regression. Given the statistical and economic significance of the RMW alpha in 21 of the 23 countries or groups considered, we conclude that the RMW factor is not redundant in the FF5 model.

Because none of the investment factors CMA is significant, we do not discuss the spanning tests' results regarding this variable.

Table 9 shows the factor spanning tests based on Fama and French's six-factor model, which adds the momentum factor. In Section 5.1, we reported that for seven of the nine developed markets considered alone, the momentum effect is reliably positive (Australia, Canada, France, Germany, Hong Kong, the UK, and the US). The question then is whether the other five factors in the six-factor model subsume the significant momentum premiums. Out of the seven markets, the momentum effect is subsumed in only two cases. The first is Hong Kong, where the 0.93% monthly average UMD premium ($t = 3.10$) translates into an alpha of -0.03% per month in the spanning regression, which is just 0.08 standard error from zero. The other case is the United States, where the 1.24% ($t = 4.99$) monthly average UMD premium is reduced to an alpha of 0.53% ($t = 1.72$). For the emerging markets, UMD is significant only for Brazil. However, this significance is not explained by the other five factors.

Table 10 shows the factor-spanning test results on the q-factor model. Here we are interested in finding which of the four factors (MKT, r_{ME}, $r_{I/A}$, and r_{ROE}) are reliably positive but entirely explained by the three other factors. We are able to find just three of such instances, and they all involve the size factor r_{ME}. The first case involves Germany, for which the significant average r_{ME} premium (0.44% per month, $t = 2.46$) yields an alpha of only ten basis points ($t = 0.49$) when r_{ME} is regressed on MKT, $r_{I/A}$, and r_{ROE}. The second situation is given by the size premium

of Pakistan (1.62% per month, $t = 2.42$), which delivers an alpha of 13 basis points ($t = 0.49$) in the spanning regression. Finally, the last situation is observed when all emerging markets' stocks are simultaneously considered. In this case, the average size effect (1.02% per month, $t = 4.78$) yields a small alpha of just 15 basis points ($t = 0.15$) in the spanning regression.

We present in Table 11the results for the q5 model. The results for the MKT, r_{ME}, $r_{I/A}$, and r_{ROE} factors remain generally robust: they are not spanned except for the three size premiums discussed above. Further, none of the R_{EG} factors appear to be spanned.

Table 12 reports the results from Stambaugh and Yuan's spanning tests, which explore whether any of the MKT, SMB*, MGMT, and PERF premiums is explained by their peers in the model. As expected, we find no internal inconsistency for the model in any country, as we find no instance where the other three factors fully explain a reliably positive premium.

5.3 Are the Fama–French Factors Subsumed?

Rather than testing whether a given positive factor realization is subsumed by their peers, we explore here whether the other pricing models explain the Fama and French factors.

5.3.1 The q and q5 Models

Tables 13 and 14 investigate whether the Fama–French factors are redundant in the q and q5 models, respectively. Since the SMB factor is reliably positive only

for China and South Korea, we naturally focus on these two countries. For China, the significant average SMB premium (0.89% per month, $t = 3.08$) is lowered to 0.55% per month in the q-factor regression but is still statistically significant at the 5% level ($t = 2.22$). However, the Chinese size premium is further lowered in the q5 spanning regression (the alpha is now just 0.35% per month) to the extent that it is no longer statistically significant ($t = 2.22$). For South Korea, the significant size premium (1.17% per month, $t = 2.88$) completely vanishes in both the q-factor (-0.34%, $t = -1.43$) and the q5 (-0.43%, $t = -1.82$) spanning regressions. These results are not surprising given the resemblance between the SMB and r_{ME} factors. A testimony of this is given by the high R-squared obtained in these four regressions (between 62% and 79%).

Hou, Xue, and Zhang (2015) do not consider a value factor in their model. So, a natural test of their model is to test whether it can explain HML. This is even more interesting as HML is not reliably positive for only two out of the 23 countries or groups of countries considered (see Section 5.1). In all 21 cases where HML is significantly positive on average, the alphas from the q-factor regressions remain significantly positive, which provides direct evidence against the q-factor model. Adding the expected growth factor to the q-factor model does not alleviate the significant HML alphas, suggesting that the q5 model cannot explain the value effect.

Both the FF5 and q-factor models have investment and profitability factors. The two investment factors (CMA and $r_{I/A}$) are based on the percentage change in

total assets, so they are very similar. In contrast, the variables used to measure the profitability factor are different: RMW is based on gross profit-to-assets while r_{ROE} is based on return-on-equity. Besides, for all the countries considered, there is no instance where CMA and $r_{I/A}$ are reliably positive on average. Given this, we focus the discussion on whether RMW is explained by the q-factor or q5 models. We find that the answer to this question is generally no. Whereas RMW is significantly positive on average for all countries or groups considered but Canada, its alphas obtained in the q and q5 regressions are either statistically insignificant or of negative sign. The only exceptions are observed for Brazil, Thailand, Turkey for the q-factor model and Hong Kong, Brazil, India, Thailand, Turkey, other DMs for the q5 model.

5.3.2 The Stambaugh–Yuan Model

Table 15 reports the results obtained when Fama–French's factors are regressed on Stambaugh–Yuan's factors. For size, the focus is on China and South Korea, whose SMB factors are reliably positive. We therefore focus on these two countries. For both countries, their significant SMB premiums disappear in the spanning regression, which is not surprising because of the commonalities between the SMB and SMB* factors.

Can Stambaugh–Yuan's four-factor model explain HML? This investigation is interesting for two reasons. First, the value premium is large and significant for almost all the countries and groups considered (Canada and China are the exceptions). Second, Stambaugh and Yuan (2017) add to their two mispricing factors the

market and SMB but chose not to include HML. They justify this choice as follows (p.1275): "Rather than constructing a five-factor model by adding our two mispricing factors to the three factors of Fama and French (1993), we opt for only four factors. That is, we do not include a book-to-market factor and instead include only a size factor in addition to the market and our mispricing factors. Our motivation here is parsimony and long-standing evidence that firm size is related not only to average return but also to a number of other stock characteristics, such as volatility, liquidity, and sensitivities to macroeconomic conditions." The results obtained in Table 15 suggest that Stambaugh–Yuan's four-factor model is unable to explain the value premium for all 21 countries and groups where HML is significantly positive on average. The implication is that a model that includes HML is likely to provide a better description of international stock returns.

The Stambaugh–Yuan model does, however, a better job on the momentum and performance. While the UMD was significantly positive for seven out of nine developed markets considered (Japan and South Korea are the exceptions), these positive UMD premiums are all fully explained by Stambaugh–Yuan's model. For emerging markets, UMD is significantly positive only for Brazil and across the other EMs, but here again, the reliable premium is explained by Stambaugh–Yuan's model. The Stambaugh–Yuan model does also well explaining the performance factor. While excepted Canada, the RMW premium is positive and significant for all countries or groups considered, the alphas obtained in the spanning regression are either nonsignificant or negative.

5.4 Are the q and q5 Subsumed?

5.4.1 The Fama–French Models

Tables 16 and 17 report the factor-spanning tests of the q and q5 models versus the FF5 and FF6 models, respectively. Since the expected growth and investment factors are not reliably positive on average for all countries and groups of countries, the focus of the spanning tests is on the r_{ME} and r_{ROE} factors. Hou–Xue–Zhang's size factor is reliably positive for 16 markets (Australia, Canada, Germany, Hong Kong, Japan, South Korea, the UK, the US, Brazil, China, Malaysia, Pakistan, Taiwan, Thailand, and Turkey) as well as across all groups of countries. However, Fama and French's FF5 and FF6 models can explain the significant size premiums of solely Canada and China. The size factor, r_{ME}, earns an average return of 0.71% per month ($t = 2.79$) in Canada and an average return of 1.05% ($t = 4.01$) in China. The FF5 and FF6 models reduce the size premium to an intercept of 0.19% ($t = 1.21$) and 0.20% ($t = 1.34$) in Canada, 0.19% ($t = 1.48$) and 0.20% ($t = 1.56$) in China, respectively.

As discussed above, the profitability factor r_{ROE} is significantly positive for all countries and groups of countries. The models do not explain any of the premiums, prompting us to conclude that Fama and French's models do not span the q5 model.

5.4.2 The Stambaugh–Yuan Model

In Table 18, we regress the factors in the q and q5 models on the factors inherent in Stambaugh–Yuan's model. For the 16 markets for which Hou–Xue–Zhang's size

factor r_{ME} is reliably positive, the Stambaugh–Yuan model explains none of them. Stambaugh–Yuan also fails to explain the positive and significant profitability factor (r_{ROE}) observed for all countries and groups of countries. Given these results, we conclude that Stambaugh–Yuan's four-factor model does not span the q5 model.

5.5 Are the Stambaugh–Yuan Factors Subsumed?

We consider one more mispricing factor, UMO (underpriced minus overpriced), into the competition. UMO combines the MGMT and PERF, which takes the average of each stock's rankings across the 11 anomalies. UMO comes from an independent 2x3 sorts on size and UMO. We split the stocks from the size portfolio into two groups based on the median. Moreover, we sort the stocks from the UMO portfolio into three groups based on the breakpoints 20th and 80th percentiles. The UMO is the average of two low portfolio returns minus the average of the two high portfolio returns.

5.5.1 The Fama–French Models

Tables 19 and 20 report the factor spanning test on Stambaugh–Yuan factors versus the Fama–French FF5 and FF6 models, respectively. Since none of the PERF, MGMT, and UMO factors is reliably positive, we focus on their size factor SMB*. In Section 5.1, we reported that this size premium is significant for five countries (Canada, China, India, South Korea, and Turkey) and across the emerging markets, the non-US markets, and all markets. The question then is to know whether the positive size effects are fully explained by the FF5 and FF6 models.

The answer is generally yes. This is so because the FF5 and FF6 models explain the significant SMB* premiums effects in Canada, China, India, South Korea, and across the emerging markets, the non-US markets, and all markets. The only country where the significant size premium is completely explained is Turkey. Given this evidence, we conclude that Fama and French's model cannot explain the size effect that is computed by eliminating stocks that are most likely to be mispriced.

5.5.2 The q and q5 Models

In tables 21 and 22, we explore whether the q and q5 models explain the Stambaugh–Yuan factor premiums, focusing again on SMB*. Like the Fama–French models, the q and q5 models can fully explain the positive SMB* for China, India, South Korea, and across the emerging, non-US, global groups. The only SMB* premiums still significant are that of Canada and Turkey. These results—allied with the non-significantly positive premiums obtained on MGMT, PERF, and UMO—suggest Stambaugh–Yuan's three-factor and four-factor models provide the worst performance among all models for international stock markets over the past three decades.

CHAPTER 6 CONCLUSION

This thesis compares the performance of the Fama–French five-factor and six-factor models, Hou–Xue–Zhang's q-factor model, Hou–Mo–Xue–Zhang's q5 model, and Stambaugh–Yuan's four-factor model in 17 countries and five groups of countries for the past three decades.

We first test which factors are significant. We find that the Fama–French size factor is only significant in China and South Korea. The size factor from Stambaugh–Yuan's model is significant in several other countries or groups of countries: Canada, India, Turkey, and across the emerging, non-US, and global markets. Therefore, we confirmed Stambaugh–Yuan's size factor is better than the size factor computed with Fama–French's approach. However, when compared with the size factor computed with Hou–Xue–Zhang's approach, Stambaugh–Yuan's size factor is largely dominated. Therefore, we conclude that the claimed larger size effect when the most mispriced stocks are excluded is not robust and is likely due to sample selection bias.

The HML factor is significant in all countries and groups except China and Canada, consistent with the documented value effect. The RMW factor is insignificant only in Canada. The momentum effect is confirmed in 15 out of the 23 groups. The r_{ROE} factor is positive and significant in all the countries we consider. However, the Fama–French and Hou–Xue–Zhang investment factors (CMA and $r_{I/A}$) and Stambaugh–Yuan's factors PERF and UMO are negative everywhere. Further, the r_{EG} and MGMT factors are either insignificant or negative in all countries.

We test which factors are subsumed within their model. The primary tool we rely on is the factor spanning test. The results on the FF5 and FF6 models show that the SMB and HML are not redundant factors in their models, while the RMW factor is redundant only in Canada. Moreover, The UMD factor is subsumed in Hong Kong and the United States. For Hou–Xue–Zhang's factors, we only discussed the size and profitability factors since the investment and expected growth factors are not reliably positive in any group. We find that the size factor r_{ME} is redundant in Germany, Pakistan, and all emerging markets. We find that the size factor r_{ME} is redundant in Germany, Pakistan, and all emerging markets, while the r_{ROE} is never redundant. Furthermore, none of Stambaugh–Yuan's factors appear to be spanned in their model.

In the factor spanning tests, we find that Fama–French's SMB factor can be explained by both the q and q5 models, while the RMW cannot be spanned by the q-factor model in Canada, Brazil, Thailand, and Turkey, and by the q5 model in Hong Kong, India, Canada, Brazil, India, Thailand, Turkey, and the group of other

developed markets. Furthermore, the q and q5 models cannot explain the value and momentum factors. While the Stambaugh–Yuan model does a good job explaining the UMD and RMW factors, the model does poorly when it comes to the momentum factor UMD.

For the Stambaugh–Yuan factors, we conclude that the Fama–French models can explain the SMB* in Canada, South Korea, China, India, EMs, non-US, and across all markets. Similarly, the SMB* is subsumed within the q and q5 models in South Korea, China, India, EMs, non-US, and global markets. The other mispricing factors (MGMT, PERF, and UMO) are not discussed since they are not positive and significant on average.

For the factors inherent in the q and q5 models, the results show that r_{ME} is subsumed in Canada and China by the FF5 model, and in Canada, China, and Turkey by the FF6 model. The FF5 and FF6 models cannot, however, explain the $r_{I/A}$, r_{ROE}, and r_{EG} factors. Moreover, the Stambaugh–Yuan four-factor model cannot explain any of the Hou-Mo-Xue-Zhang factors.

This thesis provides a framework for analyzing which asset-pricing model performs best in a specific country. One of the limitations of the study is that we did not consider factors constructed with daily returns, such as those proposed by Daniel, Hirshleifer, and Sun (2018). In future research, it would be interesting to include other models, such as Asness and Frazzini's (2013) six-factor model.

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Table 1. Review of the Main Asset-Pricing Papers

Study	Sample Period	Methodology	Main findings
Sharpe (1994) and Lintner (1965)	NA	Theoretical	Capital assets pricing model.
Fama and French (1993)	1963-1991	TS regression	Three market-based factors perform well for stock portfolios while two bond-based factors perform well for bond portfolios.
Carhart (1997)	1962-1993	TS and CS regression	Adding a momentum factor (UMD) to the three-factor model improves the pricing of mutual funds returns.
Fama and French (2015)	1963-2013	GRS	The five-factor model performs better than the three-factor model but fails to capture the low average returns on small stocks. They also find that HML is a redundant factor.
Hou, Xue, and Zhang (2015)	1972-2012	GRS	A q-factor model consisting of the market, size, investment, and profitability factors outperforms the Fama–French and Carhart models in capturing many of the significant anomalies.
Fama and French (2016)	1963-2014	GRS	Positive exposures to RMW and CMA capture the high average returns associated with low beta stocks and explain the effects of share repurchases and low return volatility.
Stambaugh and Yuan (2017)	1967-2013	CS regression and GRS	A four-factor model adding two mispricing factors (PERF and MGMT) to the market and size factors can accommodate a wide range of anomalies and outperforms both the four-factor model of Hou, Xue, Zhang (2015) and the five-factor model of Fama and French (2015).
Daniel, Hirshleifer, and Sun (2018)	1972-2014	Spanning test and CS regression	A three-factor model adding to a market a short-term mispricing factor (PEAD) and a long-term mispricing factor (FIN) capture a large number of anomalies.
Barillas and Shaken (2018)	1972-2015	GRS	Based on the literature, they propose a six-factor model consisting of the market, size, value, profitability, momentum, and investment factors and find that it does a good job in model comparisons.
Bellmam, Tan, and Lakhnati (2018)	2011-2016	Spanning test	The explore the robustness of Fama and French's findings in the Shanghai A-share exchange market. They find that the three-factor model outperforms the CAPM and five-factor model, confirm that HML is redundant in the five-factor model.
Hou, Xue, Zhang, and Mo (2019)	1967-2016	Spanning test	Their q-factor model subsumes Fama and French's (2015) five-factor and six-factor models, while the q5 model subsumes the Stambaugh–Yuan (2017) four-factor model.
Ahmed, Bu, and Tsvetanov (2019)	1968-2016	GRS, TS regression, and CS regression	Stambaugh and Yuan's four-factor model performs best, followed by the q-factor model and Fama–French's 5-factor model. Then Barillas and Shanken's six-factor model closes the ranking.
Hou, Xue, and Zhang (2020)	1963-2018	GRS and CS regression	The q5 model shows strong explanatory power and outperforms Fama–French's six-factor model.

Table 2. Distribution of the Sample of Stocks by Country from January 1981 to May 2020

This table reports the number of stocks for each country for selected years between 1981 and 2020. The data are from Datastream. We follow the FTSE Group list to identify the developed and emerging markets.

Country	Selected years																
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008	2011	2014	2015	2016	2018	2019	2020
Developed markets																	
Australia	24	29	37	122	142	299	363	482	663	958	1109	1201	1235	1298	1458	1460	1447
Austria	8	8	10	15	17	22	25	27	29	36	37	39	39	40	44	49	49
Belgium	10	11	24	25	25	29	44	47	55	68	68	73	76	77	80	81	81
Canada	44	59	85	150	184	224	294	354	423	504	559	637	662	678	722	727	726
Denmark	11	13	14	41	50	57	63	67	67	80	83	85	86	88	103	107	107
Finland			1	19	24	47	71	81	85	89	90	100	106	113	130	132	132
France	35	39	46	112	125	172	264	328	356	436	477	535	571	595	638	643	642
Germany	36	37	49	137	151	177	298	381	406	518	570	663	688	720	898	914	886
Hong Kong	22	30	45	125	228	300	392	574	684	789	934	1116	1193	1292	1587	1634	1617
Ireland	1	1	4	7	7	7	12	13	13	17	18	20	22	22	25	25	25
Israel			29	32	88	115	135	152	175	220	233	237	236	235	254	258	257
Italy	9	10	24	31	31	43	72	106	116	144	153	182	203	216	262	271	270
Japan	561	599	662	1174	1294	1494	1621	1795	1955	2113	2181	2334	2427	2508	2659	2691	2682
Luxembourg					4	4	6	5	6	5	5	6	6	6	6	6	6
Netherlands	20	22	28	32	35	40	58	60	61	62	63	66	70	75	80	80	79
New Zealand			3	18	21	30	43	48	59	69	74	93	96	101	103	103	103
Norway	5	6	7	8	14	17	30	38	51	75	84	102	109	126	166	167	166
Poland					4	19	60	70	103	190	386	525	545	569	606	605	608
South Korea		153	187	337	358	503	595	852	971	1149	1281	1403	1548	1658	1843	1825	1800
United Kingdom	138	156	176	211	222	273	311	388	543	660	709	810	856	895	982	988	986
United states	578	683	846	957	1199	1703	2538	3063	3624	4166	4413	4997	5220	5311	5959	6069	5823
Other DMs	26	70	107	175	207	260	371	467	553	691	768	876	949	1026	1203	1230	1227

Table 2 – Continued

Country	Selected years																
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008	2011	2014	2015	2016	2018	2019	2020
Emerging markets																	
Argentina		1	1	4	30	38	42	49	50	55	57	58	59	61	67	67	67
Bahrain									14	15	16	16	17	17	17	18	18
Bangladesh					46	66	80	92	97	109	129	160	175	182	202	207	207
Botswana											8	10	10	11	14	14	14
Brazil						129	195	215	231	281	306	329	332	344	367	372	373
Bulgaria							2	5	6	108	117	122	123	125	126	126	125
Chile				57	74	81	87	88	100	109	117	127	125	127	134	136	135
China					132	432	827	1117	1340	1625	2331	2710	2941	3148	3861	3927	3917
Colombia					11	17	17	22	20	32	36	38	36	34	34	26	32
Cote d'Ivoire										25	30	29	30	29	31	28	27
Croatia									22	44	60	60	61	61	62	62	63
Cyprus					13	14	16	30	30	32	33	36	38	41	42	42	42
Czech Republic					3	5	5	5	6	7	8	8	9	9	9	9	9
Ecuador															11	10	4
Egypt						36	57	88	102	119	127	144	153	162	164	164	163
Estonia						1	4	4	5	10	11	11	12	12	13	13	13
Ghana											20	20	20	24	26	26	26
India	5	7	9	468	747	1595	1659	1699	2228	2594	2831	3070	3220	3324	3760	3719	3660
Malaysia	4	15	103	123	186	288	365	426	572	646	705	753	765	774	804	818	809
Pakistan				4	111	150	307	321	337	361	366	373	382	363	398	397	393
Taiwan			9	60	92	142	235	363	474	551	661	738	765	797	847	853	852
Thailand			20	88	159	230	245	259	336	374	395	469	505	520	576	587	588
Turkey				44	69	100	123	155	172	189	220	264	268	269	277	279	279
Other EMs	10	10	99	287	437	612	740	889	1243	1777	2414	2581	2652	2707	2834	2854	2838
Developed Markets	1528	1926	2384	3728	4430	5835	7666	9398	10998	13039	14295	16100	16943	17649	19808	20065	19719
Emerging Markets	19	33	241	1135	2110	3936	5006	5827	7385	9063	10998	12126	12698	13141	14676	14754	14654
Entire Universe	1547	1959	2625	4863	6540	9771	12672	15225	18383	22102	25293	28226	29641	30790	34484	34819	34373

Table 3. Description Statistics

This table reports summary descriptive statistics by group. The statistics are the average, minimum, and maximum monthly weight relative to the global capitalization, the value-weighted and equal-weighted average monthly index returns, and the associated *t*-statistic and standard deviation, the average correlation between the country index and the other country indexes.

Group	Weight			Value-Weighted Market Return				Equally Weighted Market Return			
	Mean	Min	Max	Mean	*t*-stat	St. Dev.	Correlation	Mean	*t*-stat	St. Dev.	Correlation
Developed markets											
Australia	1.55	0.79	3.01	0.96	2.99	6.96	0.69	0.78	2.16	7.79	0.73
Canada	2.27	1.26	3.38	0.94	3.62	5.59	0.76	1.19	4.05	6.37	0.79
France	3.10	1.38	5.02	1.19	4.15	6.17	0.77	1.23	4.62	5.73	0.72
Germany	4.41	2.36	7.92	0.97	3.42	6.13	0.77	0.87	3.57	5.30	0.74
Hong Kong	1.91	0.36	3.62	0.95	2.67	7.70	0.62	0.92	2.36	8.42	0.66
Japan	24.75	8.21	53.75	0.83	2.97	6.05	0.76	1.07	3.50	6.62	0.63
South Korea	1.50	0.12	3.01	1.49	2.93	10.39	0.65	2.29	4.21	11.32	0.67
United Kingdom	4.87	2.66	6.67	1.10	4.40	5.38	0.79	1.00	3.80	5.70	0.78
United states	33.91	23.80	56.31	1.16	5.04	4.95	0.84	0.81	3.00	5.87	0.82
Other DMs	8.20	3.34	13.35	1.05	4.27	5.34	0.89	1.05	4.39	5.14	0.87
Emerging markets											
Brazil	1.40	0.00	2.32	1.30	2.24	10.02	0.70	1.25	2.66	8.24	0.67
China	6.77	0.01	20.72	1.15	2.17	9.88	0.30	1.75	3.19	10.32	0.34
India	1.73	0.00	4.33	0.91	2.23	8.82	0.42	1.01	2.45	8.95	0.53
Malaysia	0.99	0.03	3.18	0.75	2.06	7.87	0.44	0.85	1.98	9.28	0.56
Pakistan	0.13	0.00	0.28	0.90	2.02	8.51	0.20	1.10	3.17	6.73	0.36
Taiwan	1.21	0.59	2.48	0.69	1.49	9.02	0.50	1.10	2.23	9.78	0.52
Thailand	0.75	0.02	1.93	0.93	2.57	7.17	0.57	1.15	3.99	5.77	0.58
Turkey	0.40	0.05	0.78	1.07	1.61	13.01	0.43	1.64	2.49	12.93	0.46
Other EMs	4.15	0.26	9.77	0.96	3.09	6.69	0.66	1.16	4.84	5.16	0.64
DMs	86.18	65.08	99.71	0.98	2.78	4.88	0.99	1.02	4.23	5.22	0.96
EMs	13.82	0.29	34.92	0.81	4.39	6.30	0.65	1.14	4.65	5.30	0.78

Table 4. Descriptive Statistics for the Firm Characteristics

This table reports the average of the firm characteristics for each country over the period January 1981 to May 2020. The firm characteristics are SIZE (market capitalization), BTM (book-to-market), MOM (momentum), INV (investment), OP (operating profitability), ROE (return-on-equity), TQ (log of Tobin's Q), COP (operating cash flow to assets), DROE (change in return-on-equity), DINV (change in investment), NSI (net stock issues), CEI (composite equity issuance), ACR (accruals), NOA (net operating assets), AG (assets growth), ITA (investment-to-assets), GPA (gross profitability premium), ROA (return-on-assets), OSC (Ohlson score). DINV, NSI, CEL, ACR, and ROA are 100 times the original result.

Group	SIZE	BTM	MOM	INV	OP	ROE	TQ	COP	DROE	DINV	NSI	CEL	ACR	NOA	AG	ITA	GPA	ROA	OSC
Developed Market																			
Australia	47.41	0.66	-0.40	0.05	0.05	-1.48	-2.82	0.03	-0.63	-2.36	4.10	3.15	-4.26	0.09	0.06	0.05	0.06	-3.01	-4.05
Canada	96.09	0.63	0.36	0.07	0.19	7.62	-1.56	0.11	-0.38	-1.56	0.96	-0.01	-4.38	0.25	0.08	0.08	0.16	2.59	-5.28
France	169.05	0.63	0.58	0.07	0.27	10.55	-1.62	0.13	-0.44	-1.05	0.11	-1.34	-4.36	0.21	0.07	0.04	0.16	3.06	-5.91
Germany	170.71	0.55	0.36	0.05	0.27	8.69	-1.76	0.17	-0.17	0.12	0.00	-1.07	-4.97	0.18	0.05	0.05	0.29	2.72	-5.99
Hong Kong	97.08	0.78	-0.10	0.09	0.10	10.82	-1.85	0.05	-0.81	-2.69	0.15	-1.16	-1.67	0.15	0.08	0.05	0.13	4.73	-5.83
Japan	309.41	0.77	0.33	0.06	0.15	5.91	-1.69	0.08	-0.31	-2.46	0.16	-1.26	-3.03	0.22	0.06	0.05	0.24	2.20	-5.87
South Korea	62.05	1.04	0.40	0.10	0.15	6.95	-1.29	0.07	-0.96	-2.67	0.53	-1.36	-3.84	0.51	0.14	0.07	0.19	2.46	-4.98
United Kingdom	95.86	0.58	0.57	0.06	0.22	11.20	-2.16	0.14	-0.22	-0.86	0.32	-1.81	-3.81	0.11	0.06	0.04	0.30	4.70	-6.07
United states	108.78	0.50	0.09	0.06	0.23	9.81	-1.61	0.13	-0.41	-0.74	0.71	-0.05	-3.99	0.17	0.06	0.05	0.34	3.36	-5.77
Other DMs	89.11	0.74	0.46	0.06	0.20	9.49	-1.48	0.12	-0.26	-1.43	0.00	-0.91	-3.91	0.25	0.06	0.05	0.19	3.16	-5.56
Emerging Market																			
Brazil	121.68	0.60	0.18	0.02	0.13	9.12	-1.36	0.10	-0.38	-1.82	-0.01	-2.05	-3.69	0.28	0.03	0.03	0.21	3.08	-5.62
China	397.93	0.41	0.48	0.11	0.12	7.44	-1.51	0.04	-0.68	-3.28	0.26	-0.24	-3.00	0.36	0.11	0.06	0.14	3.43	-5.39
India	7.52	0.86	-0.53	0.06	0.25	12.57	-1.17	0.11	-1.09	-1.30	0.00	0.05	-3.39	0.42	0.06	0.04	0.14	4.30	-4.60
Malaysia	60.91	0.85	-0.08	0.06	0.10	7.91	-2.14	0.07	-0.80	-2.49	0.05	-1.28	-2.01	0.23	0.06	0.04	0.12	3.54	-5.58
Pakistan	8.41	0.95	-0.18	0.04	0.24	15.19	-1.24	0.11	-0.42	-0.64	1.56	-1.29	-4.25	0.43	0.04	0.03	0.18	4.29	-4.51
Taiwan	211.87	0.65	-0.01	0.06	0.13	7.82	-1.63	0.08	-0.83	-2.15	0.96	-1.02	-3.93	0.20	0.05	0.04	0.17	4.27	-5.82
Thailand	68.36	0.70	0.28	0.09	0.18	11.25	-1.35	0.08	-1.18	-2.29	1.61	0.96	-4.43	0.45	0.14	0.07	0.24	4.86	-4.78
Turkey	59.28	0.81	-0.05	0.05	0.20	16.35	-1.70	0.14	-1.36	-0.26	0.42	-0.37	-4.07	0.24	0.06	0.05	0.28	5.91	-5.89
Other EMs	77.01	0.80	0.28	0.06	0.16	12.40	-1.74	0.11	-0.66	-1.56	0.26	-1.51	-3.67	0.24	0.06	0.05	0.19	5.08	-5.74

Table 5. Rank Correlation

This table shows the rank correlation of firm characteristics in each country. We firstly construct every single firm characteristic into 100 rankings by countries and date. Secondly, we compute the correlation coefficient between the two rankings. At final, we average the correlations within each country. The firm characteristics are SIZE (market capitalization) BTM (book-to-market), MOM (momentum), INV (investment), OP (operating profitability), ROE (return-on-equity), TQ (log of Tobin's Q), COP (operating cash flow to assets), DROE (change in return-on-equity), DINV (change in investment), NSI (net stock issues), CEI (composite equity issuance), ACR (accruals), NOA (net operating assets), AG (assets growth), ITA (investment-to-assets), GPA (gross profitability premium), ROA (return-on-assets), OSC (Ohlson score).

Group	SIZE	BTM	MOM	INV	OP	ROE	TQ	COP	DROE	DINV	NSI	CEL	ACR	NOA	AG	ITA	GPA	ROA	OSC
Developed Market																			
Australia	0.99	0.98	0.88	0.93	0.97	0.97	0.99	0.95	0.90	0.95	0.94	0.92	0.89	0.98	0.93	0.93	0.98	0.97	0.98
Canada	1.00	0.98	0.89	0.94	0.98	0.97	0.99	0.96	0.90	0.94	0.94	0.91	0.90	0.98	0.93	0.94	0.99	0.98	0.98
France	1.00	0.99	0.89	0.94	0.98	0.97	0.99	0.96	0.91	0.95	0.93	0.92	0.89	0.99	0.93	0.92	0.98	0.98	0.99
Germany	1.00	0.99	0.89	0.94	0.98	0.97	0.99	0.96	0.91	0.96	0.90	0.89	0.89	0.99	0.93	0.90	0.99	0.97	0.99
Hong Kong	0.99	0.98	0.89	0.93	0.98	0.97	0.98	0.95	0.90	0.95	0.91	0.93	0.90	0.98	0.93	0.93	0.98	0.98	0.98
Japan	1.00	0.99	0.85	0.91	0.98	0.97	0.99	0.95	0.91	0.95	0.94	0.76	0.88	0.99	0.87	0.87	0.99	0.98	0.99
South Korea	0.98	0.96	0.83	0.89	0.96	0.95	0.99	0.92	0.89	0.92	0.91	0.62	0.88	0.97	0.89	0.90	0.97	0.95	0.97
United Kingdom	1.00	0.99	0.91	0.94	0.98	0.98	0.99	0.97	0.91	0.95	0.93	0.92	0.90	0.98	0.93	0.93	0.99	0.98	0.98
United states	1.00	0.98	0.89	0.93	0.97	0.98	0.99	0.96	0.91	0.95	0.94	0.90	0.90	0.99	0.93	0.94	0.99	0.98	0.99
Other DMs	1.00	0.99	0.90	0.93	0.98	0.97	0.99	0.95	0.91	0.95	0.92	0.91	0.89	0.99	0.93	0.92	0.99	0.98	0.98
Emerging Market																			
Brazil	1.00	0.99	0.89	0.94	0.98	0.97	0.99	0.95	0.90	0.93	0.91	0.89	0.88	0.98	0.93	0.91	0.99	0.97	0.98
China	0.99	0.98	0.87	0.94	0.97	0.97	0.99	0.94	0.91	0.92	0.86	0.86	0.88	0.98	0.94	0.94	0.97	0.98	0.98
India	0.99	0.99	0.84	0.94	0.98	0.98	0.99	0.94	0.92	0.94	0.92	0.71	0.89	0.98	0.93	0.93	0.98	0.98	0.99
Malaysia	0.99	0.98	0.86	0.93	0.99	0.97	0.99	0.95	0.90	0.95	0.91	0.92	0.89	0.99	0.93	0.92	0.98	0.98	0.99
Pakistan	1.00	0.98	0.86	0.92	0.96	0.97	0.99	0.94	0.92	0.94	0.91	0.76	0.89	0.99	0.92	0.92	0.98	0.98	0.99
Taiwan	1.00	0.98	0.87	0.94	0.98	0.97	0.99	0.94	0.90	0.92	0.89	0.89	0.87	0.97	0.93	0.92	0.98	0.96	0.97
Thailand	0.99	0.98	0.86	0.93	0.97	0.97	0.99	0.94	0.90	0.94	0.90	0.87	0.89	0.98	0.92	0.92	0.99	0.97	0.98
Turkey	1.00	0.98	0.88	0.93	0.97	0.97	0.99	0.93	0.90	0.93	0.91	0.81	0.88	0.98	0.93	0.91	0.98	0.97	0.98
Other EMs	1.00	0.98	0.89	0.92	0.98	0.97	0.99	0.95	0.90	0.94	0.89	0.84	0.88	0.98	0.91	0.90	0.99	0.97	0.98

Table 6. Fama–MacBeth Regressions

This table presents the time-series average of the slope coefficients from the Fama–MacBeth regression of returns on each characteristic. Below each slope coefficient is the robust GMM-based *t*-statistic. All variables are winsorized at the 2nd and 98th percentiles. We require each characteristic has at least 23 observations in each month for each country to be considered in that month. The firm characteristics are SIZE (market capitalization) BTM (book-to-market), MOM (momentum), INV (investment), OP (operating profitability), ROE (return-on-equity), TQ (log of Tobin's Q), COP (operating cash flow to assets), DROE (change in return-on-equity), DINV (change in investment), NSI (net stock issues), CEI (composite equity issuance), ACR (accruals), NOA (net operating assets), AG (assets growth), ITA (investment-to-assets), GPA (gross profitability premium), ROA (return-on-assets), OSC (Ohlson score).

Group	SIZE	BTM	MOM	INV	OP	ROE	TQ	COP	DROE	DINV	NSI	CEL	ACR	NOA	AG	ITA	GPA	ROA	OSC
Panel A: Individual stocks from each group																			
Developed Markets																			
Australia	-4.79	4.09	0.13	0.75	0.68	0.87	-0.48	0.14	0.61	-0.39	-0.13	-0.44	0.04	0.01	0.65	0.75	-0.18	0.97	-0.50
	(-4.52)	(8.28)	(1.28)	(8.64)	(8.07)	(7.15)	(-3.85)	(1.26)	(5.76)	(-3.51)	(-1.04)	(-5.85)	(0.31)	(0.07)	(7.03)	(7.37)	(-1.64)	(8.79)	(-4.19)
Canada	-5.25	-0.22	0.33	0.35	0.27	1.15	-0.46	0.19	0.95	-0.16	0.11	-0.14	0.33	0.00	0.62	0.08	0.35	0.98	-0.33
	(-5.41)	(-0.67)	(2.98)	(3.97)	(2.12)	(11.06)	(-4.05)	(1.96)	(12.84)	(-1.90)	(1.17)	(-1.66)	(4.40)	(0.03)	(6.72)	(1.04)	(3.66)	(9.16)	(-3.16)
France	-0.78	0.91	0.45	0.60	0.38	0.88	0.44	-0.41	1.00	-0.77	0.33	0.27	0.85	0.29	0.70	0.25	-0.32	0.52	-0.30
	(-1.38)	(3.91)	(4.54)	(9.10)	(3.67)	(9.85)	(7.51)	(-6.04)	(13.13)	(-12.60)	(4.29)	(3.36)	(5.40)	(4.83)	(10.46)	(3.72)	(-5.66)	(6.21)	(-4.06)
Germany	1.79	1.33	0.31	0.19	-0.38	0.67	0.20	0.15	0.75	-0.14	-0.08	-0.05	0.18	0.25	0.35	0.38	0.29	0.54	-0.25
	(4.83)	(6.44)	(3.30)	(2.92)	(-1.86)	(8.74)	(3.44)	(2.87)	(10.68)	(-2.86)	(-1.70)	(-0.79)	(3.59)	(3.62)	(5.32)	(5.74)	(6.12)	(6.95)	(-3.32)
Hong Kong	-3.76	0.36	0.36	0.34	0.92	1.38	-0.65	0.77	0.97	0.58	-0.44	-0.54	-0.06	-0.61	0.56	0.53	1.14	1.10	-0.98
	(-2.28)	(2.41)	(3.27)	(4.38)	(6.61)	(13.80)	(-7.99)	(7.24)	(12.59)	(5.38)	(-4.97)	(-7.41)	(-0.87)	(-8.10)	(6.81)	(6.69)	(11.68)	(10.05)	(-8.59)
Japan	-6.55	-1.28	-0.22	-0.16	0.07	-0.18	0.74	-0.41	0.58	-0.84	-0.10	-0.02	0.22	1.41	-0.07	-0.25	-0.19	-0.47	1.34
	(-11.27)	(-5.72)	(-2.33)	(-2.78)	(0.79)	(-1.90)	(13.04)	(-7.77)	(6.14)	(-14.51)	(-1.84)	(-0.31)	(3.61)	(24.08)	(-1.26)	(-4.42)	(-3.42)	(-6.52)	(19.23)
South Korea	-8.69	0.62	-0.58	-0.12	0.53	1.18	0.24	0.34	0.62	0.33	-0.26	-0.31	0.31	0.11	-0.04	-0.09	3.06	0.79	-0.10
	(-4.46)	(2.13)	(-4.00)	(-1.04)	(5.15)	(8.66)	(2.48)	(2.10)	(3.94)	(1.43)	(-1.81)	(-3.87)	(2.18)	(0.96)	(-0.32)	(-0.84)	(11.70)	(6.12)	(-0.75)
UK	0.06	-0.43	0.35	0.29	0.10	0.74	-0.40	0.56	0.59	0.31	-0.14	-0.21	0.11	-0.31	0.49	0.10	0.34	0.72	-0.41
	(0.12)	(-2.45)	(3.95)	(4.66)	(1.14)	(7.87)	(-4.74)	(6.72)	(10.55)	(4.47)	(-2.17)	(-3.14)	(1.72)	(-3.09)	(7.19)	(1.51)	(5.29)	(7.45)	(-3.42)
US	6.14	1.45	0.62	0.27	0.26	0.92	-0.27	0.54	0.92	0.13	-0.07	-0.55	0.16	-0.37	0.49	0.12	0.43	0.85	-0.69
	(5.44)	(9.60)	(6.28)	(5.57)	(4.35)	(10.61)	(-6.96)	(6.99)	(21.45)	(2.14)	(-1.36)	(-9.84)	(3.83)	(-6.67)	(10.81)	(2.95)	(10.69)	(10.03)	(-8.06)
Other DMs	-0.36	3.06	0.56	0.09	0.52	0.96	0.20	0.08	0.91	-0.07	-0.30	-0.17	0.41	0.29	0.21	0.01	0.00	0.87	-0.66
	(-0.84)	(17.61)	(6.19)	(1.22)	(9.67)	(15.03)	(4.41)	(1.03)	(17.80)	(-1.23)	(-6.29)	(-2.58)	(2.06)	(3.69)	(2.71)	(0.11)	(-0.06)	(13.36)	(-3.73)

Table 6 – Continued

Group	SIZE	BTM	MOM	INV	OP	ROE	TQ	COP	DROE	DINV	NSI	CEL	ACR	NOA	AG	ITA	GPA	ROA	OSC
Emerging Markets																			
Brazil	-2.72	1.07	0.17	0.53	-0.17	0.99	-0.30	0.45	0.99	-0.36	-0.54	-0.35	-0.01	-0.34	0.59	0.13	0.61	0.43	-0.74
	(-3.48)	(5.78)	(1.54)	(6.49)	(-1.49)	(11.41)	(-3.37)	(4.97)	(10.74)	(-3.92)	(-6.73)	(-3.83)	(-0.13)	(-3.61)	(6.62)	(0.91)	(6.27)	(3.56)	(-7.19)
China	3.11	0.16	-0.15	0.82	0.48	0.62	-0.12	-0.15	0.55	-0.32	-0.04	0.01	0.40	-0.46	0.85	0.30	0.42	0.75	-0.45
	(1.93)	(0.70)	(-1.05)	(4.97)	(4.35)	(7.01)	(-1.68)	(-1.74)	(7.75)	(-4.12)	(-0.62)	(0.11)	(4.42)	(-4.66)	(5.82)	(4.14)	(4.84)	(7.15)	(-5.06)
India	-7.20	0.28	0.02	0.08	0.61	-1.72	1.10	-0.63	-0.20	1.22	-0.30	0.02	0.18	0.21	-0.24	0.64	0.38	0.37	0.89
	(-4.30)	(0.99)	(0.13)	(0.89)	(6.77)	(-6.01)	(11.33)	(-6.63)	(-2.17)	(17.31)	(-3.56)	(0.34)	(2.58)	(2.94)	(-2.71)	(7.25)	(6.49)	(3.80)	(8.46)
Malaysia	-1.27	2.95	-0.23	-0.19	0.12	0.03	0.31	-0.04	0.63	-0.50	-0.22	-0.32	0.24	-0.13	-0.13	-0.32	1.41	-0.10	-0.01
	(-0.93)	(15.65)	(-1.88)	(-2.43)	(1.21)	(0.27)	(4.29)	(-0.58)	(8.76)	(-5.76)	(-3.48)	(-5.28)	(3.11)	(-1.51)	(-1.65)	(-4.06)	(12.55)	(-0.89)	(-0.10)
Pakistan	-3.79	-0.94	-0.19	0.47	0.49	1.71	-2.67	0.33	1.18	-0.15	-0.47	0.29	0.06	-0.43	0.64	0.09	0.55	1.35	-0.64
	(-2.82)	(-2.30)	(-1.40)	(4.27)	(3.71)	(11.68)	(-8.98)	(3.01)	(9.22)	(-1.24)	(-4.84)	(3.05)	(0.50)	(-3.50)	(5.38)	(0.84)	(4.39)	(9.72)	(-4.51)
Taiwan	-6.26	1.50	0.03	0.59	0.53	1.03	-0.09	0.07	0.72	-0.11	0.25	-0.03	0.10	-0.30	0.83	0.50	0.90	0.74	-0.41
	(-5.01)	(4.75)	(0.22)	(5.26)	(4.77)	(8.87)	(-1.11)	(0.79)	(7.38)	(-1.26)	(2.36)	(-0.36)	(1.43)	(-3.79)	(7.43)	(5.51)	(9.02)	(6.30)	(-3.85)
Thailand	-1.54	1.31	0.13	0.36	0.45	0.97	0.39	0.03	0.63	-0.08	-0.15	-0.14	0.04	0.31	0.40	0.38	-0.21	0.34	-0.04
	(-1.25)	(9.77)	(0.87)	(5.10)	(7.34)	(11.63)	(6.95)	(0.49)	(7.38)	(-1.10)	(-2.58)	(-1.91)	(0.58)	(4.32)	(5.78)	(4.35)	(-2.87)	(4.19)	(-0.52)
Turkey	-6.64	1.23	0.20	0.43	1.14	1.27	0.07	1.16	0.60	0.61	-0.38	-0.49	0.48	-0.15	0.56	0.42	2.46	1.43	-0.98
	(-4.89)	(4.35)	(1.50)	(4.66)	(10.60)	(9.96)	(0.83)	(11.67)	(5.67)	(6.00)	(-4.42)	(-5.18)	(4.12)	(-1.35)	(5.80)	(2.91)	(20.58)	(12.04)	(-7.21)
Other EMs	-0.47	3.74	0.50	0.23	0.42	1.17	0.11	0.06	1.01	-0.14	-0.19	-0.38	0.07	-0.47	0.25	-0.13	0.50	1.10	-0.94
	(-0.77)	(13.14)	(4.19)	(2.17)	(5.66)	(14.71)	(1.98)	(0.49)	(13.84)	(-1.31)	(-2.40)	(-5.95)	(0.80)	(-5.91)	(2.47)	(-1.03)	(6.15)	(14.67)	(-11.67)
Panel B: Individual stocks from developed, emerging, non-US, and global markets																			
Developed	5.74	1.46	0.38	-0.09	0.27	0.27	0.80	-0.19	0.35	0.80	0.04	-0.02	-0.35	0.09	-0.26	0.42	0.09	0.28	0.67
	(8.06)	(8.25)	(4.20)	(-1.89)	(5.55)	(4.47)	(13.61)	(-5.42)	(5.75)	(29.90)	(0.80)	(-0.49)	(-6.74)	(2.58)	(-6.76)	(8.43)	(1.73)	(5.25)	(9.70)
Emerging	1.09	0.88	0.15	0.24	0.49	0.41	0.83	-0.07	0.03	0.80	-0.12	-0.12	-0.05	0.29	-0.42	0.57	0.16	0.38	0.82
	(1.06)	(3.51)	(1.11)	(2.88)	(5.96)	(5.69)	(10.21)	(-1.42)	(0.31)	(13.86)	(-1.46)	(-2.78)	(-1.00)	(3.93)	(-5.92)	(6.67)	(2.15)	(4.45)	(10.91)
Non-US	-1.69	-1.59	0.08	-0.50	-0.24	-0.03	0.03	0.85	-0.39	0.91	-1.03	-0.36	-0.26	0.37	1.49	-0.11	-0.37	0.25	0.00
	(-2.77)	(-4.52)	(0.80)	(-8.59)	(-4.11)	(-0.20)	(0.28)	(20.26)	(-5.80)	(8.13)	(-14.94)	(-5.74)	(-6.35)	(4.91)	(21.42)	(-2.04)	(-5.13)	(5.23)	(0.04)
Global	5.23	1.51	0.33	-0.08	0.24	0.29	0.80	-0.18	0.29	0.81	0.03	0.01	-0.28	0.11	-0.23	0.39	0.08	0.28	0.64
	(8.04)	(8.79)	(3.82)	(-1.77)	(5.16)	(5.27)	(15.33)	(-5.77)	(5.60)	(30.41)	(0.54)	(0.30)	(-5.43)	(3.08)	(-6.19)	(8.19)	(1.65)	(5.21)	(10.10)

Table 7. Descriptive Statistics for the Factors

This table presents the average of the factor returns for each group. Below each average return is the robust GMM-based *t*-statistic. The starting date of each group is different on each model and list it below as well. The Mkt is the market factor for all the models. SMB, HML, UMD, CMA, RMW are the size, value, momentum, investment, and profitability factors from Fama–French's models. r_{ME}, $r_{I/A}$, r_{ROE}, r_{EG} are the size, investment, profitability, and expected growth factors from Hou–Xue–Zhang models. SMB*, MGMT, PERF are the size, and two mispricing factors from Stambaugh–Yuan's model.

Group	MKT	Starting date	Fama–French factors					Starting date	Hou–Xue–Zhang factors				Starting date	Stambaugh–Yuan factors		
			SMB	HML	UMD	CMA	RMW		r_{ME}	$r_{I/A}$	r_{ROE}	r_{EG}		SMB*	MGMT	PERF
Australia	0.64	1981:07	-0.99	1.73	0.91	-1.78	1.39	2000:07	1.20	-2.03	3.18	-0.24	1987:01	0.02	0.15	-1.60
	(1.87)		(-2.41)	(7.49)	(3.26)	(-6.58)	(2.29)		(5.74)	(-7.21)	(10.11)	(-0.79)		(0.04)	(0.39)	(-3.82)
Canada	0.62	1981:07	0.42	0.32	1.25	-0.77	0.32	1999:07	0.72	-1.07	1.85	-0.97	1986:01	0.62	-0.85	-1.81
	(2.34)		(1.39)	(1.06)	(3.90)	(-3.24)	(0.71)		(2.79)	(-3.92)	(5.59)	(-3.09)		(2.31)	(-2.91)	(-4.35)
France	0.87	1981:07	-0.16	0.78	1.28	-0.91	0.91	1987:07	0.21	-0.46	2.20	0.06	1987:01	-0.01	-0.32	-1.63
	(3.05)		(-0.92)	(3.59)	(5.05)	(-4.84)	(2.72)		(1.15)	(-2.55)	(11.33)	(0.36)		(-0.08)	(-1.67)	(-5.66)
Germany	0.65	1981:07	-0.24	0.71	0.95	-0.71	1.05	1990:07	0.44	-0.21	2.51	-0.19	1988:01	-0.27	-0.36	-1.46
	(2.22)		(-1.55)	(3.89)	(4.48)	(-4.19)	(4.22)		(2.46)	(-1.18)	(11.69)	(-1.16)		(-1.69)	(-2.00)	(-6.53)
Hong Kong	0.63	1981:07	-0.30	1.05	0.93	-1.17	1.88	1992:07	1.47	-0.85	2.84	-0.37	1986:07	-0.18	-0.47	-1.67
	(1.67)		(-0.92)	(4.27)	(3.10)	(-5.39)	(4.5)		(4.82)	(-3.64)	(7.79)	(-1.39)		(-0.49)	(-1.89)	(-4.98)
Japan	0.51	1981:07	0.15	0.64	-0.15	-0.48	0.51	1981:07	0.55	-0.18	1.23	-0.17	1981:07	0.24	-0.05	-0.34
	(1.79)		(0.96)	(4.28)	(-0.69)	(-3.90)	(4.64)		(3.32)	(-1.80)	(9.33)	(-1.11)		(1.31)	(-0.39)	(-1.60)
South Korea	0.83	1989:07	1.17	1.20	-0.74	-0.64	0.91	1996:07	1.77	-0.19	2.36	-0.53	1987:01	1.18	-0.25	-0.80
	(1.45)		(2.88)	(3.84)	(-2.08)	(-2.84)	(3.58)		(4.40)	(-0.58)	(8.49)	(-1.97)		(2.36)	(-0.84)	(-1.95)
UK	0.78	1981:07	-0.06	0.75	1.24	-0.81	1.40	1987:07	0.47	-0.45	2.50	-0.35	1985:01	0.21	-0.59	-1.54
	(3.13)		(-0.30)	(4.52)	(4.99)	(-5.56)	(6.61)		(2.52)	(-3.09)	(10.90)	(-1.04)		(0.85)	(-3.03)	(-5.72)
US	0.84	1981:07	-0.39	1.06	0.87	-0.86	0.70	1981:07	0.68	-0.39	2.38	0.19	1981:07	-0.30	-0.34	-1.42
	(3.77)		(-1.75)	(6.15)	(3.60)	(-6.03)	(3.79)		(3.83)	(-2.50)	(12.85)	(1.50)		(-1.35)	(-2.96)	(-7.16)
Other DMs	0.74	1981:07	-0.04	0.85	1.28	-0.44	0.87	1985:07	0.56	0.03	2.36	-0.14	1985:07	0.07	0.22	-1.49
	(2.75)		(-0.33)	(4.73)	(5.66)	(-3.41)	(4.78)		(4.55)	(0.28)	(14.64)	(-0.97)		(0.43)	(1.14)	(-6.26)
Brazil	1.11	1995:07	-0.57	1.37	0.81	-1.11	1.62	199701	0.62	-0.36	2.33	-0.58	1995:12	-0.27	-0.05	-1.40
	(1.81)		(-1.75)	(4.68)	(2.18)	(-4.69)	(5.18)		(2.32)	(-1.38)	(7.64)	(-2.16)		(-0.89)	(-0.14)	(-3.71)
China	0.63	1993:07	0.89	0.57	-0.04	-0.26	0.98	1996:07	1.05	-0.18	1.67	0.23	1994:01	1.17	-0.20	-1.07
	(1.17)		(3.08)	(1.37)	(-0.13)	(-0.80)	(3.68)		(4.01)	(-1.50)	(7.10)	(0.52)		(3.62)	(-0.74)	(-2.54)
India	0.68	1992:07	0.30	1.33	0.61	-1.66	1.43	1992:07	2.42	-1.17	2.80	-0.46	1991:01	0.98	-1.50	-2.21
	(1.28)		(0.78)	(3.91)	(1.61)	(-6.52)	(2.34)		(4.69)	(-4.92)	(9.15)	(-1.55)		(2.08)	(-4.19)	(-5.51)
Malaysia	0.55	1989:07	-0.11	0.91	0.33	-1.05	1.28	1992:07	0.83	-0.24	2.37	0.14	1987:07	0.24	0.02	-0.89

	(1.23)		(-0.39)	(4.23)	(1.16)	(-5.54)	(3.97)		(3.16)	(-1.34)	(10.66)	(0.74)		(0.82)	(0.09)	(-2.98)
Pakistan	0.76	1993:07	-0.74	1.29	0.21	-0.97	1.38	2005:07	1.62	-0.69	3.85	-0.49	1993:07	0.26	0.08	-1.55
	(1.42)		(-1.66)	(3.16)	(0.59)	(-2.45)	(3.43)		(2.42)	(-1.89)	(8.32)	(-1.13)		(0.46)	(0.18)	(-2.97)
Taiwan	0.37	1991:07	0.14	1.10	0.04	-1.20	1.13	1995:07	1.31	-0.36	2.89	-0.30	1994:01	0.14	-0.66	-1.39
	(0.82)		(0.50)	(3.92)	(0.12)	(-5.03)	(4.39)		(4.77)	(-1.58)	(10.56)	(-1.39)		(0.45)	(-2.44)	(-3.82)
Thailand	0.47	1991:07	-0.42	1.57	0.46	-0.73	1.27	1993:07	0.65	-0.38	2.19	0.03	1989:07	-0.11	-0.31	-0.96
	(1.15)		(-1.59)	(4.46)	(1.19)	(-3.46)	(6.39)		(2.81)	(-2.11)	(9.46)	(0.10)		(-0.35)	(-0.96)	(-2.41)
Turkey	1.19	1992:07	0.01	1.94	-0.06	-0.57	1.32	1999:07	1.37	-0.45	2.01	-0.37	1990:07	1.12	-0.58	-1.08
	(1.70)		(0.04)	(3.53)	(-0.15)	(-1.77)	(2.90)		(4.33)	(-1.62)	(5.70)	(-0.80)		(2.11)	(-1.01)	(-2.11)
Other EMs	0.64	1981:07	-0.32	1.96	0.65	-0.52	1.38	1994:07	1.10	0.50	3.33	-0.05	199512	0.53	0.52	-1.62
	(1.74)		(-1.19)	(3.60)	(2.20)	(-1.73)	(4.87)		(4.94)	(1.87)	(12.36)	(-0.18)		(1.42)	(1.60)	(-5.10)
DMs	0.67		0.01	0.95	0.68	-0.66	0.81		0.62	-0.24	2.07	0.03		0.15	-0.26	-1.08
	(2.92)		(0.06)	(5.72)	(2.93)	(-4.42)	(5.02)		(5.12)	(-1.66)	(11.89)	(0.25)		(1.07)	(-3.22)	(-7.11)
EMs	0.49		0.37	1.73	0.78	-0.49	1.51		1.02	0.02	2.63	0.13		0.71	-0.19	-1.09
	(1.44)		(1.15)	(6.13)	(2.69)	(-1.70)	(4.43)		(4.78)	(0.10)	(12.20)	(0.56)		(2.00)	(-0.98)	(-3.89)
Non-US	0.59		0.16	1.15	0.65	-0.43	0.74		0.80	-0.01	2.02	-0.02		0.40	-0.25	-1.13
	(2.24)		(1.44)	(7.58)	(2.72)	(-2.84)	(5.37)		(6.74)	(-0.05)	(12.24)	(-0.08)		(3.03)	(-2.43)	(-7.27)
Global	0.64		0.07	1.09	0.78	-0.64	0.84		0.76	-0.15	2.11	0.03		0.30	-0.28	-1.19
	(2.75)		(0.62)	(7.18)	(3.44)	(-4.68)	(5.65)		(6.44)	(-1.14)	(13.29)	(0.22)		(2.28)	(-3.47)	(-8.19)

Table 8. Spanning Test Within the Fama–French Five-Factor Model

The table presents the results from the spanning test within the Fama–French five-factor model. Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, SMB, HML, RMW, and CMA are the market, size, value, profitability, and investment factors from Fama–French's five-factor model. The numbers in parentheses are the robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	RMW	CMA	$\chi 2$	R^2
Australia	MKT	0.64	0.74		0.09	0.18	-0.07	0.11	14.07	3.17
		(1.87)	(1.37)		(1.21)	(1.52)	(-1.87)	(0.98)	[0.00]	
	SMB	-0.99	0.05	0.08		-0.36	-0.02	0.01	58.43	5.58
		(-2.41)	(0.09)	(1.40)		(-2.18)	(-0.43)	(0.16)	[0.00]	
	HML	1.73	1.63	0.06	-0.14		-0.03	-0.12	89.02	7.88
		(7.49)	(5.08)	(1.34)	(-2.21)		(-1.02)	(-1.75)	[0.00]	
	RMW	1.39	2.18	-0.18	-0.08	-0.21		0.01	12.53	2.10
		(2.29)	(1.74)	(-2.80)	(-0.42)	(-1.02)		(0.04)	[0.00]	
	CMA	-1.78	-1.90	0.04	0.01	-0.15	0.00		89.76	2.36
		(-6.58)	(-6.53)	(0.95)	(0.16)	(-1.71)	(0.04)		[0.00]	
Canada	MKT	0.62	0.69		-0.02	-0.01	-0.16	-0.05	80.91	6.34
		(2.34)	(2.54)		(-0.39)	(-0.10)	(-3.65)	(-0.82)	[0.00]	
	SMB	0.42	0.76	-0.02		-0.22	-0.11	0.14	128.91	9.84
		(1.39)	(2.55)	(-0.40)		(-4.95)	(-2.98)	(2.29)	[0.00]	
	HML	0.32	0.29	-0.01	-0.22		0.09	0.09	24.75	8.16
		(1.06)	(0.91)	(-0.10)	(-2.77)		(1.59)	(0.91)	[0.00]	
	RMW	0.32	0.71	-0.37	-0.25	0.19		0.03	42.05	11.57
		(0.71)	(1.78)	(-4.60)	(-1.99)	(1.45)		(0.26)	[0.00]	
	CMA	-0.77	-0.84	-0.04	0.11	0.07	0.01		81.90	2.02
		(-3.24)	(-3.62)	(-0.82)	(2.84)	(0.94)	(0.26)		[0.00]	
France	MKT	0.87	0.93		-0.61	-0.13	-0.08	0.06	65.05	14.68
		(3.05)	(2.69)		(-5.79)	(-1.09)	(-1.44)	(0.52)	[0.00]	
	SMB	-0.16	0.24	-0.23		-0.22	-0.01	0.00	131.19	18.13
		(-0.92)	(1.15)	(-6.06)		(-2.35)	(-0.32)	(0.02)	[0.00]	
	HML	0.78	1.00	-0.05	-0.22		0.06	0.35	74.01	17.23
		(3.59)	(4.74)	(-0.66)	(-2.29)		(2.03)	(3.30)	[0.00]	
	RMW	0.91	0.79	-0.10	-0.03	0.20		-0.05	20.11	2.19
		(2.72)	(2.22)	(-1.51)	(-0.32)	(2.14)		(-0.42)	[0.00]	
	CMA	-0.91	-1.18	0.52	0.00	0.32	-0.01		28.66	12.07
		(-4.84)	(-6.54)	(0.02)	(0.02)	(4.33)	(-0.41)		[0.00]	
Germany	MKT	0.65	0.82		-0.88	-0.24	-0.22	0.13	200.72	27.06
		(2.22)	(2.53)		(-8.42)	(-2.68)	(-4.09)	(1.31)	[0.00]	
	SMB	-0.24	0.34	-0.27		-0.37	-0.04	0.19	281.57	35.09
		(-1.55)	(1.86)	(8.09)		(6.25)	(-1.33)	(3.81)	[0.00]	
	HML	0.71	0.88	-0.08	-0.42		0.02	0.39	87.92	24.75
		(3.89)	(4.78)	(-2.12)	(-4.55)		(0.36)	(3.95)	[0.00]	
	RMW	1.05	1.02	-0.18	-0.11	0.04		-0.10	76.58	4.66
		(4.22)	(3.78)	(-3.15)	(-1.34)	(0.36)		(-1.08)	[0.00]	
	CMA	-0.71	-0.94	0.04	0.19	0.35	-0.04		14.63	14.02
		(-4.19)	(-5.63)	(1.34)	(3.31)	(6.41)	(-1.10)		[0.00]	
Hong Kong	MKT	0.63	0.92		-0.19	0.06	-0.21	-0.01	17.46	3.85
		(1.67)	(1.61)		(-1.83)	(0.38)	(-1.78)	(-0.04)	[0.00]	
	SMB	-0.30	1.26	-0.09		-0.23	-0.39	0.28	38.41	31.23
		(-0.92)	(2.61)	(-2.05)		(1.75)	(-3.50)	(2.45)	[0.00]	
	HML	1.05	1.51	0.02	-0.12		-0.01	0.23	43.96	7.36

		(4.27)	(6.81)	(0.35)	(-1.77)		(-0.25)	(3.45)	[0.00]	
	RMW	1.88	1.81	-0.17	-0.63	-0.04		-0.08	47.26	28.22
		(4.50)	(3.37)	(-1.70)	(-6.95)	(-0.26)		(-0.35)	[0.00]	
	CMA	-1.17	-1.56	0.00	0.16	0.24	-0.03		7.44	11.18
		(-5.39)	(-5.92)	(-0.04)	(2.61)	(2.39)	(-0.36)		[0.01]	
Japan	MKT	0.51	1.18		0.07	-0.69	-0.05	0.45	6.40	12.40
		(1.79)	(4.06)		(0.82)	(-5.78)	(-0.19)	(2.10)	[0.01]	
	SMB	0.15	0.41	0.02		-0.12	-0.24	0.15	29.58	5.72
		(0.96)	(2.65)	(0.82)		(-1.79)	(-2.64)	(1.28)	[0.00]	
	HML	0.64	0.97	-0.16	-0.08		-0.08	0.39	17.65	20.27
		(4.28)	(6.57)	(-6.85)	(-1.81)		(-0.81)	(3.13)	[0.00]	
	RMW	0.51	0.28	-0.01	-0.06	-0.03		-0.53	667.34	39.83
		(4.64)	(3.18)	(-0.19)	(-2.36)	(-0.82)		(-10.24)	[0.00]	
	CMA	-0.48	-0.31	0.05	0.04	0.17	-0.62		157.36	43.37
		(-3.90)	(-2.94)	(2.02)	(1.33)	(3.44)	(-10.19)		[0.00]	
South Korea	MKT	0.83	1.55		-0.05	-0.36	-0.22	0.05	37.28	5.48
		(1.45)	(2.41)		(-0.54)	(-2.22)	(-1.78)	(0.23)	[0.00]	
	SMB	1.17	1.49	-0.02		0.03	-0.47	-0.15	45.85	14.48
		(2.88)	(3.93)	(-0.53)		(0.20)	(-4.97)	(0.09)	[0.00]	
	HML	1.20	1.27	-11.00	0.02		0.09	0.12	15.27	5.67
		(3.84)	(4.22)	(-2.55)	(0.20)		(0.98)	(1.23)	[0.00]	
	RMW	0.91	1.20	-0.06	-0.28	0.07		0.01	85.60	15.38
		(3.58)	(4.48)	(-1.68)	(-4.73)	(1.06)		(0.05)	[0.00]	
	CMA	-0.64	-0.65	0.01	-0.07	0.07	0.00		98.83	2.08
		(-2.84)	(-2.89)	(0.23)	(-1.57)	(1.40)	(0.05)		[0.00]	
UK	MKT	0.78	1.76		-0.25	-0.17	-0.37	0.33	39.90	12.89
		(3.13)	(6.11)		(-3.39)	(-1.93)	(-3.54)	(3.01)	[0.00]	
	SMB	-0.06	0.75	-0.14		-0.44	-0.20	-0.10	153.48	14.82
		(-0.30)	(2.84)	(-3.18)		(-5.74)	(-2.22)	(1.24)	[0.00]	
	HML	0.75	1.12	-0.05	-0.25		-0.10	0.27	100.18	17.58
		(4.52)	(5.93)	(-1.79)	(-5.48)		(-2.00)	(4.09)	[0.00]	
	RMW	1.40	1.70	-0.20	-0.19	-0.17		-0.04	70.34	11.19
		(6.61)	(6.78)	(-3.36)	(-2.10)	(-1.80)		(-0.47)	[0.00]	
	CMA	-0.81	-1.09	0.11	0.07	0.27	-0.02		18.41	11.33
		(-5.56)	(-7.73)	(2.98)	(1.20)	(4.06)	(-0.47)		[0.00]	
US	MKT	0.84	1.30		-0.27	-0.26	-0.52	-0.08	151.58	14.62
		(3.77)	(5.33)		(-3.74)	(-1.95)	(-6.07)	(-0.67)	[0.00]	
	SMB	-0.39	0.57	-0.16		-0.47	-0.51	-0.02	76.96	35.20
		(-1.75)	(2.04)	(-2.82)		(-5.22)	(-5.21)	(-0.19)	[0.00]	
	HML	1.06	1.16	-0.07	-0.22		0.26	0.36	21.25	37.64
		(6.15)	(7.64)	(-1.83)	(-6.17)		(3.22)	(7.19)	[0.00]	
	RMW	0.70	0.08	-0.18	-0.30	0.31		-0.38	192.89	43.10
		(3.79)	(0.47)	(-5.66)	(-5.95)	(3.06)		(-5.26)	[0.00]	
	CMA	-0.86	-1.00	-0.02	-0.01	0.35	-0.31		83.89	19.21
		(-6.03)	(-6.34)	(-0.66)	(-0.19)	(7.30)	(-5.23)		[0.00]	
DMs	MKT	0.74	0.75		-0.54	0.05	-0.12	-0.10	77.34	8.12
		(2.75)	(2.15)		(-4.38)	(0.44)	(-1.18)	(-0.75)	[0.00]	
	SMB	-0.04	0.17	-0.13		-0.14	-0.07	0.03	245.21	11.02
		(-0.33)	(1.05)	(-4.88)		(-2.43)	(-1.43)	(0.40)	[0.00]	
	HML	0.85	1.06	0.02	-0.22		-0.03	0.50	27.60	20.33
		(4.73)	(6.37)	(0.45)	(-2.31)		(-0.77)	(5.25)	[0.00]	
	RMW	0.87	0.87	-0.07	-0.16	-0.05		-0.19	49.09	3.85
		(4.78)	(4.15)	(-1.29)	(-1.42)	(-0.76)		(-1.61)	[0.00]	
	CMA	-0.44	-0.62	-0.03	0.03	0.33	-0.08		51.09	18.90
		(-3.41)	(-5.28)	(-0.79)	(0.40)	(7.06)	(1.71)		[0.00]	
Brazil	MKT	1.11	0.62		-1.09	0.19	-0.08	0.14	29.72	37.87
		(1.81)	(1.01)		(-9.85)	(1.66)	(-0.62)	(1.09)	[0.00]	

	SMB	-0.57	0.04	-0.32		-0.02	-0.14	-0.10	149.45	38.69
		(-1.75)	(0.12)	(-9.43)		(-0.26)	(-2.26)	(-1.37)	[0.00]	
	HML	1.37	1.21	0.07	-0.02		-0.12	-0.26	54.83	7.67
		(4.68)	(3.98)	(1.58)	(-0.26)		(-1.60)	(-3.40)	[0.00]	
	RMW	1.62	1.58	-0.03	-0.18	-0.12		-0.10	147.52	4.26
		(5.18)	(4.74)	(-0.65)	(-2.45)	(-1.59)		(-1.33)	[0.00]	
	CMA	-1.11	-0.79	0.04	-0.10	-0.20	-0.08		88.72	8.06
		(-4.69)	(-3.05)	(1.05)	(-1.35)	(-3.04)	(-1.31)		[0.00]	
China	MKT	0.63	1.23		-0.05	-0.18	-0.49	-0.05	21.97	10.82
		(1.17)	(1.75)		(-0.21)	(-1.89)	(-2.01)	(-0.32)	[0.00]	
	SMB	0.89	1.20	-1.00		-0.07	-0.24	0.24	35.08	19.93
		(3.08)	(4.83)	(-0.20)		(-1.55)	(-1.73)	(2.68)	[0.00]	
	HML	0.57	0.40	-0.14	-0.25		0.46	-0.23	5.36	18.22
		(1.37)	(0.81)	(-1.71)	(-1.48)		(1.90)	(-1.58)	[0.02]	
	RMW	0.98	1.15	-0.11	-0.24	0.13		0.10	32.44	20.69
		(3.68)	(4.57)	(-2.30)	(-1.92)	(2.18)		(0.72)	[0.00]	
	CMA	-0.26	-0.70	-0.02	0.41	-0.11	0.18		1.14	14.17
		(-0.80)	(-2.01)	(-0.34)	(1.45)	(-1.18)	(0.63)		[0.28]	
India	MKT	0.68	0.44		-0.29	0.35	-0.05	0.04	39.74	12.94
		(1.28)	(0.67)		(-3.36)	(3.45)	(-1.05)	(0.40)	[0.00]	
	SMB	0.30	0.68	-0.19		-0.01	-0.03	0.12	47.53	6.59
		(0.78)	(1.72)	(-4.28)		(-0.15)	(-0.77)	(1.05)	[0.00]	
	HML	1.33	1.87	1.16	-0.01		-0.09	0.31	30.99	17.81
		(3.91)	(5.59)	(3.35)	(-0.15)		(-2.68)	(4.30)	[0.00]	
	RMW	1.43	1.83	-0.09	-0.07	-0.31		-0.06	83.78	4.71
		(2.34)	(3.08)	(-1.09)	(-0.81)	(-2.24)		(-0.45)	[0.00]	
	CMA	-1.66	-2.02	0.01	0.07	0.26	-0.01		35.37	10.29
		(-6.52)	(-7.69)	(0.41)	(0.98)	(4.13)	(-0.44)		[0.00]	
Malaysia	MKT	0.55	0.02		0.36	0.40	-0.05	0.00	0.83	8.54
		(1.23)	(0.04)		(2.53)	(2.78)	(-0.36)	(0.00)	[0.36]	
	SMB	-0.11	-0.52	0.09		0.02	0.31	0.31	1.49	30.57
		(-0.39)	(-1.45)	(2.39)		(0.22)	(4.00)	(1.94)	[0.22]	
	HML	0.91	1.39	0.09	0.01		-0.02	0.33	14.78	13.79
		(4.23)	(5.70)	(1.99)	(0.22)		(-0.35)	(2.76)	[0.00]	
	RMW	1.28	1.55	-0.03	0.66	-0.05		-0.05	1.77	21.86
		(3.97)	(4.46)	(-0.34)	(2.81)	(-0.36)		(-0.31)	[0.18]	
	CMA	-1.05	-1.20	0.00	0.21	0.26	-0.02		18.09	17.21
		(-5.54)	(-4.78)	(0.00)	(2.63)	(1.97)	(-0.30)		[0.00]	
Pakistan	MKT	0.76	1.23		-0.45	-0.24	-0.25	0.14	150.51	25.51
		(1.42)	(2.36)		(-5.66)	(-3.44)	(-3.28)	(2.20)	[0.00]	
	SMB	-0.74	0.25	-0.46		-0.28	-0.15	0.06	128.20	24.10
		(-1.66)	(0.50)	(-7.17)		(-3.06)	(-1.68)	(0.78)	[0.00]	
	HML	1.29	1.53	-0.23	-0.28		-0.20	0.01	109.23	10.78
		(3.16)	(3.70)	(-3.68)	(-2.38)		(-2.52)	(0.07)	[0.00]	
	RMW	1.38	1.68	-0.20	-0.12	-0.16		0.01	68.76	6.62
		(3.43)	(3.91)	(-3.69)	(-1.66)	(-2.21)		(0.16)	[0.00]	
	CMA	-0.97	-1.08	0.12	0.05	0.01	0.02		17.77	1.76
		(-2.45)	(-3.00)	(2.03)	(0.77)	(0.07)	(0.16)		[0.00]	
Taiwan	MKT	0.37	1.43		-0.39	-0.14	-0.93	-0.24	86.97	21.36
		(0.82)	(2.65)		(-2.09)	(-1.01)	(-5.93)	(-1.82)	[0.00]	
	SMB	0.14	0.85	-0.12		-0.14	-0.36	0.17	50.01	18.82
		(0.50)	(2.83)	(-2.50)		(-2.51)	(-3.39)	(1.84)	[0.00]	
	HML	1.10	1.98	-0.06	-0.19		-0.26	0.33	40.83	17.77
		(3.92)	(6.04)	(-0.93)	(-2.21)		(-3.22)	(4.15)	[0.00]	
	RMW	1.13	1.09	-0.22	-0.27	-0.15		-0.32	466.39	43.04
		(4.39)	(4.68)	(-5.50)	(-3.08)	(-3.06)		(-4.19)	[0.00]	
	CMA	-1.20	-0.97	-0.07	0.16	0.23	-0.40		26.62	32.01

		(-5.03)	(-3.56)	(-1.63)	(1.88)	(3.35)	(-3.69)		[0.00]	
Thailand	MKT	0.47	0.36		-1.05	-0.05	-0.18	0.01	172.55	51.71
		(1.15)	(1.17)		(-15.18)	(-0.60)	(-2.04)	(0.14)	[0.00]	
	SMB	-0.42	0.41	-0.48		-0.17	-0.22	0.08	162.24	55.81
		(-1.59)	(1.99)	(-9.16)		(-2.24)	(-3.32)	(0.85)	[0.00]	
	HML	1.57	2.00	-0.05	-0.35		-0.39	0.08	41.76	14.05
		(4.46)	(5.03)	(-0.64)	(-2.30)		(-3.62)	(0.12)	[0.00]	
	RMW	1.27	1.38	-0.09	-0.23	-0.20		-0.20	253.63	16.94
		(6.39)	(6.63)	(-1.98)	(-3.30)	(-4.86)		(-2.30)	[0.00]	
	CMA	-0.73	-0.44	0.01	0.11	0.05	-0.25		19.69	8.77
		(-3.46)	(-2.06)	(0.14)	(0.92)	(0.63)	(-2.55)		[0.00]	
Turkey	MKT	1.19	1.16		-0.45	0.08	0.05	0.35	9.96	9.02
		(1.70)	(1.33)		(-3.86)	(0.64)	(0.45)	(2.07)	[0.01]	
	SMB	0.01	0.92	-0.15		-0.25	-0.13	0.15	44.47	14.97
		(0.04)	(2.17)	(-3.76)		(-3.75)	(-1.43)	(1.52)	[0.00]	
	HML	1.94	2.55	0.03	-0.23		-0.60	-0.27	163.69	35.18
		(3.53)	(5.49)	(0.63)	(-3.89)		(-6.63)	(-2.57)	[0.00]	
	RMW	1.32	2.08	0.01	-0.11	-0.52		-0.41	235.67	37.58
		(2.90)	(6.84)	(0.46)	(-1.47)	(-6.04)		(-5.80)	[0.00]	
	CMA	-0.57	0.12	0.07	0.10	-0.18	-0.32		82.95	17.52
		(-1.77)	(0.39)	(1.96)	(1.48)	(-2.47)	(-4.08)		[0.00]	
Other EMs	MKT	0.64	0.03		-0.67	0.07	0.14	-0.08	83.88	29.87
		(1.74)	(0.06)		(-5.78)	(0.94)	(2.61)	(-0.83)	[0.00]	
	SMB	-0.32	0.08	-0.37		-0.16	0.09	0.07	128.82	32.17
		(-1.19)	(0.23)	(-10.26)		(-1.95)	(1.16)	(1.34)	[0.00]	
	HML	1.96	1.82	0.06	-0.25		-0.08	0.04	40.28	8.26
		(3.60)	(5.14)	(0.86)	(-1.98)		(-0.86)	(0.58)	[0.00]	
	RMW	1.38	1.35	0.13	0.14	-0.08		-0.11	18.58	4.39
		(4.87)	(5.12)	(2.21)	(1.16)	(-0.95)		(-1.87)	[0.00]	
	CMA	-0.52	-0.30	-0.08	0.12	0.04	-0.12		26.32	4.61
		(-1.73)	(-0.81)	(-0.84)	(1.32)	(0.55)	(-1.66)		[0.00]	
DMs	MKT	0.67	1.34		-0.21	-0.18	-0.63	-0.01	63.78	19.5
		(2.92)	(5.81)		(-1.75)	(-2.06)	(-4.71)	(-0.15)	[0.00]	
	SMB	0.01	0.25	-0.07		0.03	-0.32	-0.04	64.8	10.89
		(0.06)	(1.32)	(-1.52)		(-0.40)	(-3.93)	(-0.68)	[0.00]	
	HML	0.95	0.88	-0.07	0.04		0.44	0.36	1.62	27.39
		(5.72)	(4.85)	(-2.11)	(-0.39)		(4.17)	(4.72)	[0.20]	
	RMW	0.81	0.43	-0.19	-0.31	0.34		-0.28	104.99	39.58
		(5.02)	(2.62)	(-4.98)	(-6.54)	(5.46)		(-3.61)	[0.00]	
	CMA	-0.66	-0.71	-0.01	-0.05	0.35	-0.34		28.56	16.3
		(-4.42)	(-4.00)	(-0.15)	(-0.70)	(4.83)	(-3.18)		[0.00]	
EMs	MKT	0.49	0.48		-0.30	0.01	0.00	-0.05	90.8	6.51
		(1.44)	(1.13)		(-2.48)	(-0.08)	(-0.03)	(-0.43)	[0.00]	
	SMB	0.37	0.08	-0.20		0.05	0.11	0.06	79.59	8.89
		(1.15)	(0.25)	(-3.29)		(-0.49	(1.39)	(0.58)	[0.00]	
	HML	1.73	1.96	0.01	0.05		-0.03	0.16	14.5	2.48
		(6.13)	(7.15)	(0.08)	(-0.49)		(-0.52)	(1.82)	[0.00]	
	RMW	1.51	1.45	0.00	0.20	-0.05		-0.17	24.07	3.60
		(4.43)	(4.15)	(-0.03)	(-1.45)	(-0.51)		(-1.45)	[0.00]	
	CMA	-0.49	-0.81	-0.02	0.04	0.12	-0.07		55.87	3.54
		(-1.70)	(-4.11)	(-0.46)	(-0.55)	(1.57)	(-1.48)		[0.00]	
Non-US	MKT	0.59	1.25		-0.53	-0.18	-0.56	-0.09	139.33	16.1
		(2.24)	(3.90)		(-4.79)	(-1.49)	(-4.12)	(-0.90)	[0.00]	
	SMB	0.16	0.15	-0.13		0.17	-0.21	-0.08	118.67	12.36
		(1.44)	(1.03)	(-3.50)		(2.61)	(-3.59)	(-1.47)	[0.00]	
	HML	1.15	1.02	-0.06	0.22		0.34	0.28	2.01	19.25
		(7.58)	(5.79)	(-1.41)	(2.38)		(4.20)	(3.20)	[0.16]	

	RMW	0.74	0.48	-0.12	-0.19	0.24		-0.21	154.04	19.24
		(5.37)	(3.10)	(-4.09)	(-4.05)	(4.19)		(-3.95)	[0.00]	
	CMA	-0.43	-0.51	-0.03	-0.10	0.28	-0.29		67.35	11.1
		(-2.84)	(-3.13)	(-0.96)	(-1.40)	(3.21)	(-3.81)		[0.00]	
Global	MKT	0.64	1.18		-0.29	-0.08	-0.59	-0.11	73.89	14.71
		(2.75)	(4.59)		(-2.56)	(-0.83)	(-4.36)	(-1.10)	[0.00]	
	SMB	0.07	0.24	-0.08		0.00	-0.15	-0.01	54.6	3.66
		(0.62)	(1.15)	(-2.00)		(0.05)	(-1.92)	(-0.25)	[0.00]	
	HML	1.09	0.96	-0.03	0.00		0.39	0.29	5.18	21.77
		(7.18)	(5.12)	(-0.81)	(0.05)		(4.23)	(4.02)	[0.02]	
	RMW	0.84	0.42	-0.18	-0.15	0.37		-0.24	57.35	28.09
		(5.65)	(2.51)	(-4.47)	(-2.48)	(5.02)		(-2.90)	[0.00]	
	CMA	-0.64	-0.73	-0.04	-0.02	0.30	-0.25		32.35	10.83
		(-4.68)	(-4.22)	(-1.08)	(-0.25)	(4.40)	(-2.64)		[0.00]	

Table 9. Spanning Test Within the Fama–French Six-Factor Model

The table presents the results from the spanning test within the Fama–French six-factor model. Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, SMB, HML, RMW, CMA, and UMD are the market, size, value, profitability, investment, and momentum factors from Fama–French's six-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	UMD	CMA	RMW	$\chi2$	R^2
Australia	MKT	0.64	0.94		0.02	0.11	-0.33	0.01	-0.04	23.63	8.57
		(1.87)	(1.94)		(0.33)	(0.92)	(-2.93)	(0.07)	(-1.33)	[0.00]	
	SMB	-0.99	0.27	-0.02		-0.39	-0.31	-0.08	0.00	89.21	11.18
		(-2.41)	(0.57)	(0.34)		(-2.49)	(-3.49)	(-0.99)	(0.06)	[0.00]	
	HML	1.73	1.68	0.04	-0.16		-0.11	-0.15	-0.02	76.08	9.78
		(7.49)	(5.13)	(0.89)	(-2.57)		(-1.92)	(-2.19)	(-0.69)	[0.00]	
	UMD	0.91	0.73	-0.17	-0.19	-0.18		-0.28	0.08	98.62	21.56
		(3.26)	(1.97)	(-2.86)	(-3.25)	(-2.09)		(-3.33)	(2.34)	[0.00]	
	CMA	-1.78	-1.63	0.00	-0.04	-0.18	-0.21		0.02	100.95	8.22
		(-6.58)	(-6.11)	(0.07)	(-0.99)	(-2.23)	(-3.59)		(0.41)	[0.00]	
	RMW	1.39	2.56	-0.12	0.03	-0.01	0.39	0.38		0.54	4.46
		(2.29)	(2.34)	(-2.22)	(0.19)	(-0.05)	(3.46)	(1.39)		[0.46]	
Canada	MKT	0.62	0.99		-0.01	-0.05	-0.29	-0.13	-0.13	157.65	15.55
		(2.34)	(3.82)		(-0.12)	(-0.69)	(-4.34)	(-2.25)	(-3.68)	[0.00]	
	SMB	0.42	0.71	-0.01		-0.21	-0.04	0.15	-0.12	66.96	9.98
		(1.39)	(2.36)	(-0.12)		(-4.63)	(0.83)	(2.41)	(-3.00)	[0.00]	
	HML	0.32	0.47	-0.21	-0.21		-0.14	0.05	0.09	35.61	10.00
		(1.06)	(1.53)	(-2.62)	(-2.62)		(-2.28)	(0.48)	(1.69)	[0.00]	
	UMD	1.25	1.27	-0.34	0.04	-0.14		-0.28	0.05	145.16	17.23
		(3.90)	(4.08)	(-3.87)	(0.91)	(-2.47)		(-3.85)	(0.90)	[0.00]	
	CMA	-0.77	-0.52	-0.11	-0.11	0.04	-0.21		0.02	67.21	7.89
		(-3.24)	(-1.95)	(-2.28)	(3.14)	(0.49)	(-3.13)		(0.54)	[0.00]	
	RMW	0.32	0.70	-0.26	-0.08	-0.09	0.34	0.03		14.51	6.10
		(0.71)	(1.64)	(-2.78)	(-0.89)	(-0.68)	(4.14)	(0.29)		[0.00]	
France	MKT	0.87	1.26		-0.55	-0.19	-0.39	-0.08	-0.06	120.94	22.47
		(3.05)	(3.70)		(-5.61)	(-1.55)	(-4.71)	(-0.77)	(-1.13)	[0.00]	
	SMB	-0.16	0.23	-0.22		-0.22	-0.01	0.01	-0.01	107.87	18.14
		(-0.92)	(1.10)	(-5.32)		(-2.39)	(0.18)	(0.07)	(-0.33)	[0.00]	
	HML	0.78	1.10	-0.07	-0.21		-0.12	0.31	0.06	35.05	18.87
		(3.59)	(5.10)	(-1.40)	(-2.41)		(-1.52)	(0.10)	(2.16)	[0.00]	
	UMD	1.28	1.05	-0.23	0.01	-0.17		-0.36	0.04	46.59	22.19
		(5.05)	(4.34)	(-3.48)	(0.18)	(-1.56)		(-3.35)	(0.82)	[0.00]	
	CMA	-0.91	-0.88	-0.03	0.00	0.26	-0.21		0.00	54.25	18.58
		(-4.84)	(-5.13)	(-0.79)	(0.07)	(3.75)	(-4.41)		(-0.14)	[0.00]	
	RMW	0.91	0.36	-0.15	-0.06	0.21	0.27	0.36		14.56	-1.38
		(2.72)	(0.92)	(-2.20)	(-0.61)	(2.19)	(1.98)	(0.92)		[0.00]	
Germany	MKT	0.65	1.05		-0.81	-0.22	-0.43	0.02	-0.12	261.01	37.92
		(2.22)	(3.78)		(-9.08)	(-2.76)	(-5.34)	(0.23)	(-2.49)	[0.00]	
	SMB	-0.24	0.39	-0.29		-0.37	-0.07	0.17	-0.03	202.41	35.73
		(-1.55)	(2.18)	(-8.34)		(-6.27)	(-1.84)	(3.36)	(-0.96)	[0.00]	
	HML	0.71	0.90	-0.09	-0.43		-0.02	0.38	0.02	65.41	24.83
		(3.89)	(4.95)	(-2.18)	(-4.54)		(-0.53)	(3.86)	(0.43)	[0.00]	
	UMD	0.95	0.82	-0.35	-0.15	-0.05		-0.21	0.16	53.21	22.55
		(4.48)	(3.49)	(-4.91)	(-1.95)	(-0.53)		(-1.96)	(1.88)	[0.00]	
	CMA	-0.71	-0.84	0.01	0.17	0.34	-0.09		-0.03	21.65	15.70
		(-4.19)	(-4.91)	(0.23)	(3.03)	(6.15)	(-2.00)		(-0.66)	[0.00]	
	RMW	1.05	0.98	-0.02	-0.05	-0.06	0.14	-0.04		19.54	5.11
		(4.22)	(3.54)	(-0.54)	(-0.60)	(-0.53)	(1.50)	(-0.40)		[0.00]	

Hong Kong	MKT	0.63	0.64		-0.18	0.03	-0.67	-0.45	-0.09	89.49	31.39
		(1.67)	(1.51)		(-1.69)	(0.22)	(-6.41)	(-2.45)	(-1.09)	[0.00]	
	SMB	-0.30	1.25	-0.12		-0.23	-0.06	0.23	-0.38	42.49	31.49
		(-0.92)	(2.58)	(-1.73)		(-1.75)	(-0.62)	(1.82)	(-3.26)	[0.00]	
	HML	1.05	1.51	0.01	-0.13		-0.01	0.22	-0.01	32.63	7.38
		(4.27)	(6.78)	(0.21)	(-1.79)		(-0.28)	(3.27)	(-0.23)	[0.00]	
	UMD	0.93	-0.03	-0.43	-0.06	-0.02		-0.66	0.08	107.08	44.83
		(3.10)	(-0.08)	(-4.90)	(-0.64)	(-0.28)		(-7.11)	(1.42)	[0.00]	
	CMA	-1.17	-1.24	-0.14	0.11	0.18	-0.32		0.00	61.79	30.05
		(-5.39)	(-5.31)	(-2.40)	(2.05)	(2.53)	(-4.75)		(0.04)	[0.00]	
	RMW	1.88	2.01	-0.06	-0.55	-0.13	0.12	0.00		17.62	25.24
		(4.50)	(3.86)	(-0.67)	(-6.21)	(-0.94)	(1.28)	(-0.01)		[0.00]	
Japan	MKT	0.51	1.05		0.02	-0.69	-0.28	0.19	-0.09	13.08	15.56
		(1.79)	(3.47)		(0.21)	(-6.16)	(-2.94)	(0.85)	(0.37)	[0.00]	
	SMB	0.15	0.35	0.06		-0.13	-0.14	0.02	-0.25	55.77	8.26
		(0.96)	(2.16)	(0.21)		(-1.94)	(-2.44)	(0.19)	(-2.91)	[0.00]	
	HML	0.64	0.95	-0.17	-0.09		-0.04	0.36	-0.09	22.40	20.51
		(4.28)	(6.35)	(-7.03)	(-1.99)		(-0.72)	(2.97)	(-0.88)	[0.00]	
	UMD	-0.15	-0.35	-0.13	-0.19	-0.08		-0.88	-0.15	40.07	27.91
		(-0.69)	(-1.61)	(-2.95)	(-2.16)	(-0.72)		(-4.81)	(-0.93)	[0.00]	
	CMA	-0.48	-0.32	0.02	0.01	0.13	-0.17		-0.55	246.09	51.65
		(-3.90)	(-3.53)	(0.84)	(0.19)	(3.06)	(-5.64)		(-9.16)	[0.00]	
	RMW	0.51	0.29	0.02	-0.04	-0.06	-0.05	-0.64		439.04	38.04
		(4.64)	(3.20)	(0.91)	(-1.49)	(-1.52)	(-1.69)	(-11.31)		[0.00]	
South Korea	MKT	0.83	0.71		-0.10	-0.26	-0.68	-0.06	0.00	34.38	20.87
		(1.45)	(1.18)		(-0.90)	(-1.54)	(-5.80)	(-0.31)	(-0.01)	[0.00]	
	SMB	1.17	1.38	-0.05		0.04	-0.11	-0.17	-0.44	31.65	15.23
		(2.88)	(3.56)	(-0.90)		(0.23)	(-1.00)	(-1.74)	(-4.57)	[0.00]	
	HML	1.20	1.31	-0.10	0.03		0.06	0.12	0.07	5.20	5.95
		(3.84)	(4.13)	(-1.98)	(0.23)		(0.41)	(1.17)	(0.98)	[0.02]	
	UMD	-0.74	0.86	-0.24	-0.08	0.05		-0.15	0.27	20.99	26.72
		(-2.08)	(-2.47)	(-5.01)	(-0.99)	(0.42)		(-1.53)	(3.24)	[0.00]	
	CMA	-0.64	-0.73	-0.01	-0.07	0.08	-0.10		0.03	90.11	3.48
		(-2.84)	(-3.09)	(-0.31)	(1.68)	(1.36)	(-1.57)		(0.44)	[0.00]	
	RMW	0.91	1.17	0.02	-0.19	0.07	0.21	0.04		38.66	19.43
		(3.58)	(4.42)	(0.73)	(-3.50)	(1.18)	(3.10)	(0.66)		[0.00]	
UK	MKT	0.78	1.83		-0.26	-0.20	-0.20	0.25	-0.28	43.15	14.96
		(3.13)	(6.77)		(-3.57)	(-2.33)	(-2.32)	(1.89)	(-2.71)	[0.00]	
	SMB	-0.06	0.79	-0.15		-0.45	-0.09	0.06	-0.16	155.00	15.51
		(-0.30)	(3.03)	(-3.34)		(-5.75)	(-1.71)	(0.80)	(-1.79)	[0.00]	
	HML	0.75	1.16	-0.07	-0.25		-0.10	0.22	-0.06	96.22	19.25
		(4.52)	(6.39)	(-2.10)	(-5.55)		(-2.08)	(3.17)	(-0.97)	[0.00]	
	UMD	1.24	0.53	-0.12	-0.09	-0.19		-0.40	0.41	43.56	31.97
		(4.99)	(1.72)	(-2.15)	(-1.66)	(-2.09)		(-4.31)	(4.15)	[0.00]	
	CMA	-0.81	-0.88	0.07	0.03	0.20	-0.21		0.06	24.65	18.74
		(-5.56)	(-5.42)	(1.84)	(0.77)	(2.87)	(-4.45)		(1.14)	[0.00]	
	RMW	1.40	1.17	-0.12	-0.23	-0.04	0.25	-0.01		48.39	20.95
		(6.61)	(4.74)	(-2.46)	(-3.20)	(-0.52)	(3.53)	(-0.11)		[0.00]	
US	MKT	0.84	1.30		-0.28	-0.26	-0.42	-0.37	-0.36	[0.00]	28.18
		(3.77)	(5.87)		(-5.26)	(-2.04)	(-5.04)	(-3.56)	(-5.14)	[0.00]	
	SMB	-0.39	0.61	-0.19		-0.47	-0.10	-0.09	-0.48	94.00	35.97
		(-1.75)	(2.29)	(-3.68)		(-5.25)	(-1.26)	(-1.26)	(-4.32)	[0.00]	
	HML	1.06	1.17	-0.09	-0.23		-0.03	0.33	0.26	15.32	37.82
		(6.15)	(7.80)	(-2.07)	(-6.34)		(-0.76)	(5.17)	(3.32)	[0.00]	
	UMD	0.87	0.48	-0.38	-0.12	-0.09		-0.73	0.17	34.85	37.52
		(3.60)	(1.96)	(-4.24)	(-1.24)	(-0.77)		(-5.68)	(1.26)	[0.00]	
	CMA	-0.86	-0.72	-0.10	-0.04	0.28	-0.23		-0.22	82.21	32.58

		(-6.03)	(-5.07)	(-3.32)	(-0.79)	(5.01)	(-6.45)		(-4.37)	[0.00]	
	RMW	0.70	0.16	-0.13	-0.20	0.07	0.06	-0.30		37.03	35.91
		(3.79)	(0.81)	(-4.17)	(-2.39)	(0.62)	(0.69)	(-3.52)		[0.00]	
Other DMs	MKT	0.74	1.12		-0.49	0.03	-0.34	-0.18	-0.05	85.58	15.04
		(2.75)	(3.10)		(-4.14)	(0.32)	(-3.30)	(-1.48)	(-0.45)	[0.00]	
	SMB	-0.04	0.16	-0.13		-0.14	0.01	0.03	-0.07	178.24	11.04
		(-0.33)	(0.98)	(-4.63)		(-2.43)	(0.27)	(0.42)	(-1.47)	[0.00]	
	HML	0.85	1.09	0.01	-0.22		-0.02	0.49	-0.03	26.41	20.42
		(4.73)	(6.88)	(0.33)	(-2.30)		(-0.40)	(5.11)	(-0.67)	[0.00]	
	UMD	1.28	1.25	-0.22	0.02	-0.04		-0.25	0.19	34.84	15.43
		(5.66)	(5.24)	(-3.06)	(0.27)	(-0.39)		(-2.17)	(2.42)	[0.00]	
	CMA	-0.44	-0.48	-0.05	0.03	0.32	-0.10		-0.06	55.30	20.84
		(-3.41)	(-3.92)	(-1.62)	(0.42)	(6.69)	(-2.04)		(-1.26)	[0.00]	
	RMW	0.87	0.77	-0.08	-0.09	-0.03	0.09	-0.05		19.55	4.88
		(4.78)	(3.20)	(-1.36)	(-0.84)	(-0.47)	(1.16)	(-0.38)		[0.00]	
Brazil	MKT	1.11	0.77		-1.07	0.16	-0.15	0.13	-0.09	27.07	38.60
		(1.81)	(1.23)		(-9.97)	(1.35)	(-1.25)	(1.05)	(-0.68)	[0.00]	
	SMB	-0.57	0.00	-0.32		-0.01	-0.04	-0.10	-0.14	107.75	38.84
		(-1.75)	(0.00)	(-9.49)		(-0.16)	(0.61)	(-1.36)	(-2.24)	[0.00]	
	HML	1.37	1.32	0.06	-0.01		-0.13	-0.26	-0.12	50.56	9.79
		(4.68)	(4.25)	(1.33)	(-0.16)		(-1.74)	(-3.67)	(-1.53)	[0.00]	
	UMD	0.81	1.09	-0.08	0.06	-0.18		-0.05	-0.03	35.49	6.30
		(2.18)	(2.39)	(-1.17)	(0.61)	(-1.68)		(-0.46)	(0.31)	[0.00]	
	CMA	-1.11	-0.76	0.04	-0.10	-0.20	-0.03		-0.08	99.61	8.18
		(-4.69)	(-2.96)	(1.01)	(-1.33)	(-3.15)	(-0.45)		(-1.31)	[0.00]	
	RMW	1.62	1.03	-0.06	-0.24	-0.04	0.04	-0.10		77.08	2.05
		(5.18)	(3.27)	(-1.55)	(-3.38)	(-0.52)	(0.66)	(-1.17)		[0.00]	
China	MKT	0.63	1.16		-0.05	-0.24	-0.22	-0.05	-0.38	22.15	11.76
		(1.17)	(1.71)		(-0.23)	(-2.27)	(-1.44)	(-0.35)	(-1.65)	[0.00]	
	SMB	0.89	1.19	-0.01		-0.08	-0.03	0.24	-0.23	38.94	19.98
		(3.08)	(4.83)	(-0.23)		(-1.59)	(-0.33)	(2.64)	(-1.56)	[0.00]	
	HML	0.57	0.07	-0.15	-0.21		-0.83	-0.20	0.72	17.11	38.36
		(1.37)	(0.16)	(-2.04)	(-1.47)		(-5.72)	(-2.05)	(3.46)	[0.00]	
	UMD	-0.04	-0.28	-0.05	-0.03	-0.30		-0.02	0.45	63.36	31.26
		(-0.13)	(1.07)	(-1.42)	(-0.33)	(-7.55)		(-0.29)	(5.23)	[0.00]	
	CMA	-0.26	-0.72	-0.02	0.41	-0.12	-0.04		0.20	0.92	14.26
		(-0.80)	(-2.20)	(-0.37)	(1.43)	(-1.60)	(-0.32)		(0.82)	[0.34]	
	RMW	0.98	0.92	-0.10	-0.37	0.27	0.29	-0.09		9.04	17.11
		(3.68)	(4.09)	(-2.98)	(-3.95)	(6.66)	(3.09)	(-0.46)		[0.00]	
India	MKT	0.68	0.68		-0.27	0.23	-0.43	-0.04	-0.02	35.83	21.39
		(1.28)	(1.13)		(-3.18)	(2.17)	(-2.94)	(-0.39)	(-0.39)	[0.00]	
	SMB	0.30	0.70	-0.20		-0.02	-0.04	0.11	-0.03	27.93	6.68
		(0.78)	(1.81)	(-3.66)		(-0.22)	(-0.36)	(1.00)	(-0.65)	[0.00]	
	HML	1.33	1.92	0.11	-0.01		-0.19	0.27	-0.07	35.91	21.00
		(3.91)	(5.79)	(2.16)	(-0.22)		(-2.02)	(3.61)	(-2.22)	[0.00]	
	UMD	0.61	0.67	-0.23	-0.03	-0.21		-0.17	0.07	185.44	23.74
		(1.61)	(1.57)	(-2.32)	(-0.35)	(-2.44)		(-2.40)	(1.65)	[0.00]	
	CMA	-1.66	-1.89	-0.02	0.06	0.23	-0.13		0.00	40.49	12.27
		(-6.52)	(-7.41)	(-0.38)	(0.94)	(3.46)	(-2.37)		(-0.12)	[0.00]	
	RMW	1.43	2.44	-0.03	-0.12	-0.05	0.10	-0.15		17.19	2.33
		(2.34)	(4.20)	(-0.33)	(-1.22)	(-0.38)	(0.65)	(-1.11)		[0.00]	
Malaysia	MKT	0.55	0.03		0.11	0.21	-0.59	-0.14	-0.08	8.27	21.48
		(1.23)	(0.06)		(0.66)	(1.05)	(-2.50)	(-0.62)	(-0.83)	[0.00]	
	SMB	-0.11	-0.48	-0.03		-0.03	-0.23	0.23	0.27	9.11	36.09
		(-0.39)	(-1.30)	(0.62)		(-0.38)	(-3.70)	(1.31)	(4.52)	[0.00]	
	HML	0.91	1.35	0.05	-0.03		-0.13	0.28	-0.03	11.42	16.60
		(4.23)	(5.27)	(0.93)	(-0.38)		(-1.84)	(2.13)	(-0.50)	[0.00]	

	UMD	0.33	0.03	-0.34	-0.35	-0.24		-0.24	-0.07	82.22	38.69
		(1.16)	(0.07)	(-3.12)	(-3.11)	(-1.83)		(-1.86)	(-0.88)	[0.00]	
	CMA	-1.05	-1.16	-0.02	0.16	0.23	-0.11		-0.02	12.98	19.51
		(-5.54)	(-4.76)	(-0.56)	(1.59)	(1.73)	(-1.55)		(-0.42)	[0.00]	
	RMW	1.28	1.60	0.02	0.17	-0.28	-0.05	-0.08		13.82	8.28
		(3.97)	(4.51)	(0.25)	(0.87)	(-1.64)	(-0.39)	(-0.42)		[0.00]	
Pakistan	MKT	0.76	1.20		-0.45	-0.25	-0.33	0.10	-0.18	200.06	30.67
		(1.42)	(2.37)		(7.09)	(-3.84)	(-4.14)	(1.75)	(-2.55)	[0.00]	
	SMB	-0.74	0.27	-0.49		-0.29	-0.15	0.05	-0.13	73.85	25.05
		(-1.66)	(0.53)	(7.36)		(-3.28)	(-0.93)	(0.57)	(-1.36)	[0.00]	
	HML	1.29	1.54	-0.27	-0.29		-0.18	-0.01	-0.17	81.61	12.43
		(3.16)	(3.80)	(-4.00)	(-2.55)		(-1.48)	(-0.16)	(-2.20)	[0.00]	
	UMD	0.21	0.17	-0.21	-0.08	-0.10		-0.09	0.13	75.16	13.68
		(0.59)	(0.53)	(-2.96)	(-1.01)	(-1.62)		(-1.64)	(2.32)	[0.00]	
	CMA	-0.97	-1.05	0.09	0.04	-0.01	-0.13		0.03	26.97	2.92
		(-2.45)	(-2.84)	(1.64)	(0.58)	(-0.16)	(-1.48)		(0.35)	[0.00]	
	RMW	1.38	1.24	-0.17	-0.14	-0.17	0.26	-0.06		35.04	7.00
		(3.43)	(3.02)	(-3.13)	(-1.69)	(-2.40)	(3.40)	(-0.69)		[0.00]	
Taiwan	MKT	0.37	1.32		-0.43	-0.13	-0.17	-0.29	-0.89	68.79	22.33
		(0.82)	(2.65)		(-2.20)	(-1.04)	(-1.44)	(-2.10)	(-5.67)	[0.00]	
	SMB	0.14	0.74	-0.13		-0.14	-0.16	0.11	-0.31	56.39	21.81
		(0.50)	(2.45)	(-2.78)		(-2.46)	(-2.60)	(1.25)	(-3.05)	[0.00]	
	HML	1.10	1.98	-0.06	-0.19		0.00	0.33	-0.26	37.54	17.77
		(3.92)	(6.10)	(-0.96)	(-2.34)		(-0.02)	(3.89)	(-2.90)	[0.00]	
	UMD	0.04	-0.54	-0.07	-0.23	0.00		-0.30	0.21	26.19	25.71
		(0.12)	(-1.56)	(-1.49)	(-2.38)	(-0.02)		(-3.43)	(1.94)	[0.00]	
	CMA	-1.20	-1.02	-0.08	0.10	0.22	-0.20		-0.34	39.61	36.06
		(-5.03)	(-4.32)	(-1.92)	(1.27)	(3.56)	(-3.60)		(-3.08)	[0.00]	
	RMW	1.13	1.09	-0.25	-0.23	-0.15	0.07	-0.36		190.42	43.33
		(4.39)	(4.86)	(-6.13)	(-2.55)	(-3.46)	(1.07)	(-4.55)		[0.00]	
Thailand	MKT	0.47	0.50		-0.98	-0.12	-0.19	0.02	-0.11	187.69	54.12
		(1.15)	(1.68)		(-12.95)	(-1.58)	(-2.64)	(0.19)	(-1.20)	[0.00]	
	SMB	-0.42	0.38	-0.47		-0.15	0.03	0.08	-0.23	110.95	55.93
		(-1.59)	(1.92)	(-9.75)		(-2.09)	(0.64)	(0.85)	(-3.49)	[0.00]	
	HML	1.57	2.01	-0.11	-0.29		-0.25	0.08	-0.27	51.65	22.35
		(4.46)	(5.68)	(-1.68)	(-2.03)		(-2.52)	(0.66)	(-3.24)	[0.00]	
	UMD	0.46	0.85	-0.26	0.09	-0.38		0.02	0.30	15.41	28.05
		(1.19)	(2.28)	(-2.49)	(0.46)	(-2.79)		(0.20)	(2.58)	[0.00]	
	CMA	-0.73	-0.45	0.01	0.11	0.05	0.01		-0.26	18.02	8.79
		(-3.46)	(-2.05)	(0.19)	(0.91)	(0.64)	(0.21)		(-2.61)	[0.00]	
	RMW	1.27	1.05	0.00	-0.25	-0.14	0.12	-0.14		102.21	17.96
		(6.39)	(5.59)	(-0.09)	(-3.76)	(-3.46)	(2.51)	(-1.73)		[0.00]	
Turkey	MKT	1.19	0.80		-0.49	0.15	-0.62	0.13	0.10	20.84	16.50
		(1.70)	(1.02)		(-4.26)	(1.53)	(-3.67)	(1.02)	(0.98)	[0.00]	
	SMB	0.01	0.82	-0.17		-0.22	-0.19	0.09	-0.11	46.62	16.84
		(0.04)	(1.97)	(-3.63)		(-3.32)	(-2.01)	(0.88)	(-1.23)	[0.00]	
	HML	1.94	2.57	0.05	-0.21		0.19	-0.21	-0.60	83.00	36.77
		(3.53)	(5.62)	(1.51)	(-3.55)		(1.77)	(-2.08)	(-7.13)	[0.00]	
	UMD	-0.06	-0.43	-0.13	-0.12	0.13		-0.30	0.09	93.22	24.72
		(-0.15)	(-1.12)	(-3.07)	(-2.23)	(1.80)		(-4.20)	(1.60)	[0.00]	
	CMA	-0.57	-0.01	0.02	0.06	-0.13	-0.29		-0.27	118.15	24.72
		(-1.77)	(-0.04)	(0.97)	(0.87)	(-2.02)	(-5.34)		(-3.86)	[0.00]	
	RMW	1.32	1.70	0.02	-0.10	-0.35	0.14	-0.41		58.69	34.36
		(2.90)	(6.18)	(0.70)	(-1.19)	(-3.69)	(20.20)	(-5.02)		[0.00]	
Other EMs	MKT	0.64	0.65		-0.60	0.02	-0.47	-0.12	0.16	120.73	42.09
		(1.74)	(1.72)		(-6.65)	(0.22)	(-5.30)	(-2.10)	(3.27)	[0.00]	
	SMB	-0.32	0.18	-0.40		-0.17	-0.08	0.06	0.10	107.35	32.68

		(-1.19)	(0.67)	(-8.15)		(-2.02)	(-1.04)	(1.11)	(1.21)	[0.00]	
	HML	1.96	1.95	0.02	-0.26		-0.11	0.02	-0.07	35.48	9.17
		(3.60)	(5.70)	(0.22)	(-2.08)		(-1.38)	(0.37)	(-0.75)	[0.00]	
	UMD	0.65	1.32	-0.37	-0.09	-0.09		-0.12	0.09	98.52	22.11
		(2.20)	(4.81)	(-4.33)	(-1.05)	(-1.37)		(-1.51)	(1.56)	[0.00]	
	CMA	-0.52	-0.06	-0.14	0.11	0.03	-0.18		-0.10	48.81	6.67
		(-1.73)	(-0.15)	(-2.14)	(1.13)	(0.36)	(-1.45)		(-1.46)	[0.00]	
	RMW	1.38	1.19	0.11	0.02	-0.08	0.14	-0.09		15.87	4.19
		(4.87)	(4.18)	(1.95)	(0.13)	(-1.03)	(1.88)	(-1.39)		[0.00]	
DMs	MKT	0.67	1.35		-0.19	-0.23	-0.34	-0.19	-0.43	89.15	27.59
		(2.92)	(6.13)		(-1.81)	(-2.83)	(-4.33)	(-1.91)	(-3.22)	[0.00]	
	SMB	0.01	0.25	-0.07		0.03	0.00	-0.04	-0.32	72.64	10.89
		(0.06)	(1.32)	(-1.58)		(0.42)	(0.06)	(-0.64)	(-3.68)	[0.00]	
	HML	0.95	0.91	-0.10	0.04		-0.10	0.30	0.47	4.27	28.84
		(5.72)	(5.12)	(-3.01)	(0.41)		(-1.96)	(3.86)	(4.40)	[0.04]	
	UMD	0.68	0.40	-0.29	0.01	-0.20		-0.53	0.40	46.17	35.62
		(2.93)	(1.85)	(-3.91)	(0.06)	(-1.99)		(-4.97)	(4.14)	[0.00]	
	CMA	-0.66	-0.53	-0.07	-0.04	0.26	-0.22		-0.21	48.80	26.17
		(-4.42)	(-3.29)	(-1.88)	(-0.65)	(3.90)	(-4.91)		(-2.05)	[0.00]	
	RMW	0.81	0.57	-0.20	-0.34	0.29	0.08	-0.32		76.01	40.55
		(5.02)	(3.43)	(-4.37)	(-6.64)	(4.69)	(2.08)	(-4.26)		[0.00]	
EMs	MKT	0.49	0.68		-0.29	-0.04	-0.20	-0.13	0.01	58.08	9.66
		(1.44)	(1.55)		(-2.35)	(-0.38)	(-1.87)	(-1.10)	(0.12)	[0.00]	
	SMB	0.37	0.05	-0.20		0.06	0.03	0.07	0.11	31.60	8.96
		(1.15)	(0.18)	(-2.96)		(0.55)	(0.38)	(0.65)	(1.36)	[0.00]	
	HML	1.73	2.07	-0.02	0.05		-0.18	0.08	-0.02	19.46	6.50
		(6.13)	(7.49)	(-0.37)	(0.55)		(-2.96)	(0.88)	(-0.35)	[0.00]	
	UMD	0.78	1.05	-0.17	0.03	-0.23		-0.41	0.05	73.76	17.45
		(2.69)	(3.47)	(-1.61)	(0.40)	(-3.56)		(-5.28)	(1.06)	[0.00]	
	CMA	-0.49	-0.51	-0.06	0.04	0.06	-0.22		-0.05	153.17	12.27
		(-1.70)	(-2.32)	(-1.23)	(0.61)	(0.85)	(-3.42)		(-1.06)	[0.00]	
	RMW	1.51	0.97	0.03	0.17	0.08	0.06	-0.08		6.55	2.85
		(4.43)	(2.99)	(0.35)	(1.21)	(0.82)	(0.84)	(-0.63)		[0.01]	
Non-US	MKT	0.59	1.34		-0.51	-0.21	-0.38	-0.28	-0.41	189.38	25.04
		(2.24)	(4.55)		(-5.18)	(-1.97)	(-4.70)	(-2.64)	(-3.11)	[0.00]	
	SMB	0.16	0.17	-0.14		0.17	-0.03	-0.09	-0.20	111.80	12.56
		(1.44)	(1.12)	(-4.03)		(2.54)	(-0.67)	(-1.63)	(-3.43)	[0.00]	
	HML	1.15	1.05	-0.07	0.22		-0.06	0.25	0.35	3.29	
		(7.58)	(5.99)	(-1.85)	(2.29)		(-1.60)	(2.78)	(4.21)	[0.07]	
	UMD	0.65	0.58	-0.28	-0.08	-0.13		-0.53	0.24	45.24	25.95
		(2.72)	(2.48)	(-3.43)	(-0.63)	(-1.58)		(-5.98)	(2.33)	[0.00]	
	CMA	-0.43	-0.32	-0.09	-0.11	0.22	-0.22		-0.21	107.13	21.36
		(-2.84)	(-2.05)	(-2.96)	(-1.55)	(2.80)	(-5.20)		(-2.97)	[0.00]	
	RMW	0.74	0.57	-0.08	-0.22	0.22	0.11	-0.16		70.02	19.76
		(5.37)	(3.74)	(-2.43)	(-4.65)	(4.03)	(3.42)	(-2.87)		[0.00]	
Global	MKT	0.64	1.27		-0.27	-0.15	-0.37	-0.30	-0.42	99.39	23.94
		(2.75)	(5.21)		(-2.81)	(-1.67)	(-4.71)	(-2.72)	(-3.17)	[0.00]	
	SMB	0.07	0.25	-0.09		0.00	-0.02	-0.02	-0.14	55.66	3.71
		(0.62)	(1.21)	(-2.21)		(0.01)	(-0.31)	(-0.35)	(-1.78)	[0.00]	
	HML	1.09	1.00	-0.05	0.00		-0.09	0.24	0.41	8.39	23.15
		(7.18)	(5.49)	(-1.67)	(0.01)		(-2.20)	(3.12)	(4.44)	[0.00]	
	UMD	0.78	0.60	-0.29	-0.04	-0.20		-0.53	0.30	45.31	29.15
		(3.44)	(2.62)	(-3.53)	(-0.30)	(-2.02)		(-5.75)	(3.34)	[0.00]	
	CMA	-0.64	-0.52	-0.09	-0.02	0.22	-0.21		-0.16	52.38	20.88
		(-4.68)	(-3.12)	(-2.60)	(-0.35)	(3.46)	(-4.91)		(-1.76)	[0.00]	
	RMW	0.84	0.60	-0.19	-0.23	0.35	0.06	-0.26		39.40	28.29
		(5.65)	(3.63)	(-3.85)	(-4.10)	(4.79)	(1.64)	(-3.13)		[0.00]	

Table 10. Spanning Test Within the q-Factor Model

The table presents the results from the spanning test within the q-factor model. Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, r_{ME}, $r_{I/A}$, and r_{ROE} are the market, size, investment, profitability factors from the q-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	r_{ME}	$r_{I/A}$	r_{ROE}	χ^2	R^2
Australia	MKT	0.64	1.74		-0.21	-0.36	-0.44	74.93	19.22
		(1.87)	(2.04)		(-1.50)	(-2.38)	(-3.13)	[0.00]	
	r_{ME}	1.20	1.01	-0.08		-0.11	0.01	45.98	2.29
		(5.74)	(2.56)	(-1.78)		(-1.38)	(0.15)	[0.00]	
	$r_{I/A}$	-2.03	-2.51	-0.12	-0.09		0.23	81.86	17.00
		(-7.21)	(-7.22)	(-2.54)	(-1.22)		(3.86)	[0.00]	
	r_{ROE}	3.18	4.00	-0.21	0.34	0.02		13.69	21.12
		(10.11)	(13.07)	(-3.64)	(3.23)	(0.15)		[0.00]	
Canada	MKT	0.62	1.32		-0.06	-0.24	-0.42	128.86	21.26
		(2.34)	(3.32)		(-0.62)	(-2.69)	(-4.85)	[0.00]	
	r_{ME}	0.72	0.81	-0.03		0.03	-0.02	108.74	0.36
		(2.79)	(2.20)	(-0.62)		(0.38)	(-0.36)	[0.00]	
	$r_{I/A}$	-1.07	-1.21	-0.14	0.04		0.13	31.20	9.56
		(-3.92)	(-4.01)	(-2.66)	(0.39)		(1.78)	[0.00]	
	r_{ROE}	1.85	2.30	-0.36	0.19	-0.04		64.26	20.20
		(5.59)	(8.01)	(-6.42)	(1.82)	(-0.37)		[0.00]	
France	MKT	0.87	1.55		-0.77	0.06	-0.31	220.12	29.69
		(3.05)	(4.61)		(-8.38)	(0.54)	(-3.99)	[0.00]	
	r_{ME}	0.21	0.18	-0.28		0.07	0.12	104.56	28.02
		(1.15)	(0.91)	(-6.88)		(1.03)	(2.29)	[0.00]	
	$r_{I/A}$	-0.46	-0.60	0.02	0.07		0.05	67.88	1.02
		(-2.55)	(-2.66)	(0.55)	(1.11)		(0.88)	[0.00]	
	r_{ROE}	2.20	2.29	-0.15	0.06	0.15		62.83	11.97
		(11.33)	(12.48)	(-3.42)	(0.89)	(2.25)		[0.00]	
Germany	MKT	0.65	1.14		-0.92	0.08	-0.08	214.42	34.14
		(2.22)	(3.07)		(-9.63)	(0.96)	(-1.08)	[0.00]	
	r_{ME}	0.44	0.10	-0.33		0.09	0.21	93.28	38.73
		(2.46)	(0.49)	(-10.04)		(1.60)	(3.17)	[0.00]	
	$r_{I/A}$	-0.21	-0.44	0.03	0.10		0.05	74.22	1.68
		(-1.18)	(-1.90)	(0.96)	(1.55)		(0.92)	[0.00]	
	r_{ROE}	2.51	2.46	-0.04	0.07	0.31		31.82	12.70
		(11.69)	(10.63)	(-0.99)	(0.90)	(3.69)		[0.00]	
Hong Kong	MKT	0.63	2.00		-0.29	-0.10	-0.45	142.01	15.70
		(1.67)	(2.77)		(-2.46)	(-0.59)	(-3.69)	[0.00]	
	r_{ME}	1.47	2.82	-0.18		0.21	-0.38	76.06	15.20
		(4.82)	(6.13)	(-2.45)		(2.04)	(-4.50)	[0.00]	
	$r_{I/A}$	-0.85	-1.71	-0.03	0.12		0.22	23.64	11.41
		(-3.64)	(-4.71)	(-0.60)	(2.09)		(2.79)	[0.00]	
	r_{ROE}	2.84	3.88	-0.26	0.37	-0.36		50.79	27.08
		(7.79)	(13.07)	(-3.51)	(3.24)	(-4.58)		[0.00]	
Japan	MKT	0.51	0.94		0.05	-0.05	-0.40	30.47	3.25
		(1.79)	(2.76)		(0.59)	(-0.24)	(-2.42)	[0.00]	
	r_{ME}	0.55	0.75	0.02		0.10	-0.16	56.95	2.68
		(3.32)	(4.46)	(0.59)		(1.12)	(-1.82)	[0.00]	
	$r_{I/A}$	-0.18	0.16	0.00	0.03		-0.28	417.98	14.03
		(-1.80)	(1.68)	(-0.25)	(1.10)		(-6.95)	[0.00]	
	r_{ROE}	1.23	1.22	-0.07	-0.46	-0.08		178.67	17.31
		(9.33)	(10.22)	(-2.58)	(-4.82)	(-1.72)		[0.00]	

South Korea	MKT	0.83	4.04		-0.31	-0.03	-0.81	41.68	14.83
		(1.45)	(4.69)		(-2.32)	(-0.12)	(-4.40)	[0.00]	
	r_{ME}	1.77	2.08	-0.10		-0.31	-0.11	62.12	8.50
		(4.40)	(4.10)	(-2.29)		(-2.58)	(-0.92)	[0.00]	
	$r_{I/A}$	-0.19	-0.20	0.00	-0.17		0.08	120.50	6.31
		(-0.58)	(-0.61)	(-0.12)	(-2.25)		(1.24)	[0.00]	
	r_{ROE}	2.36	2.75	-0.16	0.08	-0.06		99.72	13.58
		(8.49)	(9.94)	(-4.98)	(1.16)	(-0.95)		[0.00]	
UK	MKT	0.78	1.82		-0.35	0.15	-0.36	142.51	15.28
		(3.13)	(6.02)		(-4.62)	(1.50)	(-4.07)	[0.00]	
	r_{ME}	0.47	0.65	-0.22		0.00	-0.01	137.42	7.95
		(2.52)	(2.07)	(-4.39)		(-0.01)	(-0.18)	[0.00]	
	$r_{I/A}$	-0.45	-0.74	0.06	0.00		0.10	103.33	1.94
		(-3.09)	(-3.73)	(1.43)	(-0.01)		(1.79)	[0.00]	
	r_{ROE}	2.50	2.69	-0.21	0.15	-0.01		52.40	8.91
		(10.90)	(12.32)	(-4.04)	(1.88)	(-0.18)		[0.00]	
US	MKT	0.84	2.24		-0.34	-0.14	-0.52	186.60	21.13
		(3.77)	(7.01)		(-4.86)	(-1.37)	(-5.38)	[0.00]	
	r_{ME}	0.68	1.48	-0.23		-0.06	-0.26	59.52	10.25
		(3.83)	(4.01)	(-3.46)		(-0.61)	(-2.55)	[0.00]	
	$r_{I/A}$	-0.39	-0.60	-0.06	-0.04		0.12	95.06	4.89
		(-2.50)	(-1.99)	(-1.47)	(-0.62)		(1.38)	[0.00]	
	r_{ROE}	2.38	2.85	-0.30	0.16	-0.23		61.35	21.13
		(12.85)	(13.57)	(-4.78)	(1.39)	(-2.23)		[0.00]	
Other DMs	MKT	0.74	2.07		-0.62	-0.07	-0.44	95.78	18.87
		(2.75)	(5.88)		(-5.36)	(-0.41)	(-5.26)	[0.00]	
	r_{ME}	0.56	0.48	-0.16		-0.06	0.08	156.72	13.51
		(4.55)	(2.19)	(-5.20)		(-0.82)	(1.41)	[0.00]	
	$r_{I/A}$	0.03	-0.18	-0.02	-0.05		0.08	104.43	1.37
		(0.28)	(-0.88)	(-0.43)	(-0.82)		(1.36)	[0.00]	
	r_{ROE}	2.36	2.45	-0.16	0.12	0.11		51.07	11.15
		(14.64)	(15.81)	(-4.22)	(1.34)	(1.35)		[0.00]	
Brazil	MKT	1.11	2.60		-1.11	-0.01	-0.19	64.96	24.64
		(1.81)	(3.60)		(-6.53)	(-0.06)	(-1.38)	[0.00]	
	r_{ME}	0.62	0.78	-0.20		-0.01	0.06	166.16	24.22
		(2.32)	(2.41)	(-8.35)		(-0.09)	(1.04)	[0.00]	
	$r_{I/A}$	-0.36	-0.66	0.00	-0.01		0.11	35.00	1.82
		(-1.38)	(-1.89)	(-0.06)	(-0.09)		(1.36)	[0.00]	
	r_{ROE}	2.33	2.51	-0.06	0.16	0.09		26.03	4.72
		(7.64)	(8.09)	(-1.40)	(1.40)	(0.99)		[0.00]	
China	MKT	0.63	1.80		-0.08	-1.14	-0.67	39.49	16.10
		(1.17)	(2.65)		(-0.39)	(-4.45)	(-3.89)	[0.00]	
	r_{ME}	1.05	1.72	-0.02		-0.39	-0.38	61.75	16.10
		(4.01)	(6.24)	(-0.39)		(-2.48)	(-3.77)	[0.00]	
	$r_{I/A}$	-0.18	0.35	-0.09	-0.13		-0.19	177.04	16.89
		(-1.50)	(1.85)	(-5.87)	(-2.36)		(-3.42)	[0.00]	
	r_{ROE}	1.67	2.09	-0.14	-0.52	-0.35		101.03	24.55
		(7.10)	(8.96)	(-5.25)	(-3.28)	(-3.79)		[0.00]	
India	MKT	0.68	3.34		-0.13	-0.10	-0.75	52.21	17.80
		(1.28)	(3.11)		(-1.07)	(-0.68)	(-3.84)	[0.00]	
	r_{ME}	2.42	2.36	-0.09		0.03	0.06	13.06	2.05
		(4.69)	(3.23)	(-1.27)		(0.21)	(0.31)	[0.00]	
	$r_{I/A}$	-1.17	-1.19	-0.02	0.01		0.05	128.17	0.92
		(-4.92)	(-3.78)	(-0.68)	(0.21)		(0.54)	[0.00]	
	r_{ROE}	2.80	3.16	-0.21	0.07	0.03		38.25	17.06
		(9.15)	(10.05)	(-5.12)	(0.56)	(0.31)		[0.00]	
Malaysia	MKT	0.55	2.45		0.18	0.01	-0.99	33.29	30.18

		(1.23)	(3.57)		(1.24)	(0.06)	(-4.63)	[0.00]	
	r_{ME}	0.83	1.42	0.08		0.51	-0.19	8.41	17.64
		(3.16)	(3.68)	(1.18)		(2.23)	(-1.91)	[0.00]	
	$r_{I/A}$	-0.24	-0.70	0.00	0.23		0.09	19.02	12.04
		(-1.34)	(-2.62)	(0.05)	(2.20)		(1.36)	[0.00]	
	r_{ROE}	2.37	2.57	-0.26	0.12	-0.12		208.05	30.78
		(10.66)	(13.36)	(-5.56)	(1.44)	(-2.16)		[0.00]	
Pakistan	MKT	0.76	2.04		-0.21	0.02	-0.11	70.54	10.89
		(1.42)	(3.62)		(-1.70)	(0.20)	(-1.29)	[0.00]	
	r_{ME}	1.62	0.13	-0.25		0.00	0.52	12.14	27.94
		(2.42)	(0.23)	(-1.39)		(0.02)	(4.93)	[0.00]	
	$r_{I/A}$	-0.69	-0.02	0.01	0.00		-0.16	61.52	3.42
		(-1.89)	(-0.04)	(0.20)	(0.02)		(-1.81)	[0.00]	
	r_{ROE}	3.85	2.95	-0.10	-0.16	0.38		40.43	26.81
		(8.32)	(6.49)	(-1.37)	(-1.85)	(6.42)		[0.00]	
Taiwan	MKT	0.37	1.80		-0.25	-0.33	-0.42	80.89	13.49
		(0.82)	(2.66)		(-1.47)	(-1.88)	(-3.73)	[0.00]	
	r_{ME}	1.31	1.47	-0.07		0.18	-0.03	31.02	4.97
		(4.77)	(5.73)	(-1.59)		(2.37)	(-0.32)	[0.00]	
	$r_{I/A}$	-0.36	-0.54	-0.07	0.14		0.02	123.06	6.19
		(-1.58)	(-2.43)	(-1.91)	(2.41)		(0.37)	[0.00]	
	r_{ROE}	2.89	2.94	-0.21	0.05	-0.05		64.01	9.35
		(10.56)	(10.68)	(-4.06)	(0.38)	(-0.31)		[0.00]	
Thailand	MKT	0.47	1.27		-1.14	0.12	-0.07	149.82	44.89
		(1.15)	(2.90)		(-9.41)	(0.97)	(-0.55)	[0.00]	
	r_{ME}	0.65	0.82	-0.39		0.19	0.01	97.70	46.88
		(2.81)	(2.70)	(-11.99)		(1.63)	(0.15)	[0.00]	
	$r_{I/A}$	-0.38	-0.60	0.05	0.23		0.05	15.31	5.48
		(-2.11)	(-2.40)	(1.01)	(1.64)		(0.58)	[0.00]	
	r_{ROE}	2.19	2.17	-0.04	0.07	0.02		17.15	1.25
		(9.46)	(8.99)	(-0.54)	(0.59)	(0.15)		[0.00]	
Turkey	MKT	1.19	1.85		-0.39	0.03	-0.21	13.08	2.98
		(1.70)	(1.93)		(-2.15)	(0.17)	(-0.91)	[0.00]	
	r_{ME}	1.37	1.56	-0.06		0.09	-0.05	55.81	3.08
		(4.33)	(4.00)	(-2.12)		(0.72)	(-0.57)	[0.00]	
	$r_{I/A}$	-0.45	-0.38	0.00	0.06		-0.10	70.05	2.02
		(-1.62)	(-1.11)	(0.17)	(0.71)		(-1.10)	[0.00]	
	r_{ROE}	2.01	2.21	-0.03	-0.14	-0.05		64.19	2.29
		(5.70)	(8.79)	(-0.87)	(-1.17)	(-0.57)		[0.00]	
Other EMs	MKT	0.64	1.50		-0.86	-0.17	0.01	75.07	28.68
		(1.74)	(3.27)		(-5.02)	(-1.41)	(0.07)	[0.00]	
	r_{ME}	1.10	0.81	-0.31		-0.12	0.16	120.95	30.58
		(4.94)	(3.44)	(-8.83)		(-1.76)	(2.43)	[0.00]	
	$r_{I/A}$	0.50	-0.40	-0.11	-0.20		0.36	36.76	13.63
		(1.87)	(-1.44)	(-1.50)	(-1.68)		(4.42)	[0.00]	
	r_{ROE}	3.33	2.82	0.01	0.32	0.24		9.93	15.60
		(12.36)	(9.84)	(0.07)	(3.79)	(2.24)		[0.00]	
DMs	MKT	0.67	2.33		-0.31	-0.10	-0.72	88.47	24.95
		(2.92)	(5.91)		(-2.88)	(-1.08)	(-5.37)	[0.00]	
	r_{ME}	0.62	0.86	-0.11		-0.05	-0.09	102.49	3.74
		(5.12)	(3.93)	(-2.40)		(-0.87)	(-1.16)	[0.00]	
	$r_{I/A}$	-0.24	-0.26	-0.04	-0.06		0.04	65.47	1.26
		(-1.66)	(-1.10)	(-1.07)	(-0.90)		(0.54)	[0.00]	
	r_{ROE}	2.07	2.35	-0.31	0.04	-0.11		64.13	22.86
		(11.89)	(12.77)	(-6.55)	(0.52)	(-1.23)		[0.00]	
EMs	MKT	0.49	1.68		-0.48	-0.06	-0.27	185.34	17.98
		(1.44)	(3.59)		(-4.23)	(-0.48)	(-2.14)	[0.00]	

	r_{ME}	1.02	0.15	-0.19		0.17	0.36	36.27	28.23
		(4.78)	(0.51)	(-4.60)		(2.70)	(4.54)	[0.00]	
	$r_{I/A}$	0.02	-0.21	-0.02	0.17		0.04	78.49	5.43
		(0.10)	(-0.66)	(-0.51)	(1.97)		(0.40)	[0.00]	
	r_{ROE}	2.63	2.35	-0.09	0.03	0.32		26.03	20.55
		(12.20)	(10.95)	(-1.73)	(0.37)	(4.33)		[0.00]	
Non-US	MKT	0.59	2.23		-0.45	-0.23	-0.64	186.10	21.92
		(2.24)	(6.22)		(-3.77)	(-2.01)	(-5.50)	[0.00]	
	r_{ME}	0.80	0.78	-0.14		-0.05	0.05	94.00	8.87
		(6.74)	(4.56)	(-3.15)		(-0.68)	(0.80)	[0.00]	
	$r_{I/A}$	-0.01	0.20	-0.08		-0.05	-0.06	149.00	1.82
		(-0.05)	(1.02)	(-2.24)		(-0.68)	(-1.14)	[0.00]	
	r_{ROE}	2.02	2.10	-0.21	-0.06	0.05		95.97	15.82
		(12.24)	(11.24)	(-5.59)	(-1.20)	(0.80)		[0.00]	
Global	MKT	0.64	2.26		-0.27	-0.19	-0.68	96.98	22.48
		(2.75)	(5.55)		(-2.50)	(-1.98)	(-4.83)	[0.00]	
	r_{ME}	0.76	0.68	-0.09		-0.04	0.06	80.57	4.66
		(6.44)	(3.18)	(-2.10)		(-0.78)	(0.88)	[0.00]	
	$r_{I/A}$	-0.15	-0.15	-0.07	-0.05		0.04	77.37	2.22
		(-1.14)	(-0.66)	(-1.92)	(-0.80)		(0.53)	[0.00]	
	r_{ROE}	2.11	2.23	-0.26	0.04	0.07		49.41	20.02
		(13.29)	(12.32)	(-5.61)	(0.51)	(0.84)		[0.00]	

Table 11. Spanning Test Within the q5 Model

The table presents the results from the spanning test within the q5 model. Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, r_{ME}, $r_{I/A}$, r_{ROE}, r_{EG} are the market, size, investment, profitability, and expected growth factors from the Hou-Mo-Xue-Zhang q5 model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	r_{ME}	$r_{I/A}$	r_{ROE}	r_{EG}	$\chi 2$	R^2
Australia	MKT	0.64	1.47		-0.27	-0.40	-0.35	-0.34	98.84	21.72
		(1.87)	(1.76)		(-2.02)	(-2.67)	(-2.46)	(-3.42)	[0.00]	
	r_{ME}	1.20	0.77	-0.10		-0.14	0.08	-0.29	90.98	8.09
		(5.74)	(1.93)	(-2.49)		(-2.06)	(0.80)	(-3.12)	[0.00]	
	$r_{I?A}$	-2.03	-2.55	-0.13	-0.12		0.26	-0.18	120.37	19.16
		(-7.21)	(-7.58)	(-2.87)	(-1.75)		(4.31)	(-3.06)	[0.00]	
	r_{ROE}	3.18	3.91	-0.16	0.36	0.09		0.37	1.80	27.50
		(10.11)	(12.84)	(-2.91)	(3.47)	(0.78)		(5.31)	[0.18]	
	r_{EG}	-0.24	-0.64	-0.09	-0.15	-0.21	0.22		127.22	17.43
		(-0.79)	(-2.19)	(-3.14)	(-2.78)	(-3.67)	(4.57)		[0.00]	
Canada	MKT	0.62	1.29		-0.06	-0.24	-0.41	-0.02	114.79	21.27
		(2.34)	(3.00)		(-0.65)	(-2.69)	(-4.23)	(-0.16)	[0.00]	
	r_{ME}	0.72	0.65	-0.03		0.04	0.02	-0.10	116.04	1.61
		(2.79)	(1.86)	(-0.64)		(0.42)	(0.30)	(-0.97)	[0.00]	
	$r_{I?A}$	-1.07	-1.15	-0.14	0.04		0.11	0.04	24.56	9.70
		(-3.92)	(-3.94)	(-2.68)	(0.43)		(1.40)	(0.39)	[0.00]	
	r_{ROE}	1.85	2.56	-0.28	0.13	0.03		0.48	12.17	37.32
		(5.59)	(10.40)	(-5.51)	(1.43)	(0.30)		(6.73)	[0.00]	
	r_{EG}	-0.97	-1.55	-0.01	0.04	-0.13	0.44		11.42	27.34
		(-3.09)	(-2.91)	(-0.16)	(0.41)	(-1.06)	(3.85)		[0.00]	
France	MKT	0.87	1.51		-0.77	0.05	-0.30	-0.08	115.50	29.81
		(3.05)	(4.71)		(-8.30)	(0.49)	(-3.98)	(-0.56)	[0.00]	
	r_{ME}	0.21	0.19	-0.28		0.07	0.11	0.01	53.73	28.03
		(1.15)	(0.93)	(-6.84)		(1.04)	(2.33)	(0.14)	[0.00]	
	$r_{I?A}$	-0.46	-0.62	0.02	0.07		0.06	-0.06	31.50	1.27
		(-2.55)	(-2.57)	(0.51)	(1.11)		(0.97)	(-0.57)	[0.00]	
	r_{ROE}	2.20	2.33	-0.14	0.07	0.15		0.23	31.52	14.54
		(11.33)	(12.36)	(-3.44)	(0.99)	(2.29)		(2.79)	[0.00]	
	r_{EG}	0.06	-0.45	-0.02	-0.04	0.01	0.13		80.87	4.34
		(0.36)	(-2.64)	(-0.56)	(-0.60)	(0.14)	(2.87)		[0.00]	
Germany	MKT	0.65	1.09		-0.92	0.08	-0.07	-0.21	120.82	34.99
		(2.22)	(2.93)		(-9.81)	(0.94)	(-0.87)	(-1.55)	[0.00]	
	r_{ME}	0.44	0.08	-0.33		0.09	0.21	-0.09	73.02	39.17
		(2.46)	(0.40)	(-10.51)		(1.58)	(3.29)	(-1.57)	[0.00]	
	$r_{I?A}$	-0.21	-0.44	0.03	0.10		0.05	0.01	34.31	1.69
		(-1.18)	(-1.88)	(0.94)	(1.54)		(0.90)	(0.12)	[0.00]	
	r_{ROE}	2.51	2.45	-0.04	0.07	0.32		0.13	13.87	13.58
		(11.69)	(10.73)	(-0.81)	(0.89)	(3.88)		(1.44)	[0.00]	
	r_{EG}	-0.19	-0.17	-0.06	0.01	-0.08	0.08		100.90	2.45
		(-1.16)	(-1.01)	(-1.81)	(0.12)	(-1.61)	(1.46)		[0.00]	
Hong Kong	MKT	0.63	1.43		-0.30	-0.08	-0.25	-0.58	133.17	23.52
		(1.67)	(2.13)		(-3.39)	(-0.64)	(-1.90)	(-3.84)	[0.00]	
	r_{ME}	1.47	2.67	-0.20		0.20	-0.33	-0.17	93.97	16.21
		(4.82)	(5.62)	(-3.04)		(1.95)	(-3.29)	(-1.16)	[0.00]	
	$r_{I?A}$	-0.85	-1.70	-0.03	0.12		0.22	0.01	17.68	11.41
		(-3.64)	(-4.54)	(-0.65)	(2.00)		(2.32)	(0.07)	[0.00]	
	r_{ROE}	2.84	3.69	-0.14	0.31	-0.27		0.53	9.30	37.08

		(7.79)	(12.52)	(-1.85)	(2.74)	(-3.83)		(5.39)	[0.00]	
	r_{EG}	-0.37	-0.66	-0.16	0.01	-0.07	0.26		57.56	32.47
		(-1.39)	(-2.35)	(-3.29)	(0.07)	(-1.22)	(4.86)		[0.00]	
Japan	MKT	0.51	1.12		0.04	-0.06	-0.52	-0.32	24.00	9.39
		(1.79)	(3.10)		(0.40)	(-0.25)	(-3.17)	(-1.94)	[0.00]	
	r_{ME}	0.55	0.58	0.01		0.05	-0.10	-0.22	50.63	6.01
		(3.32)	(3.14)	(0.40)		(0.40)	(-0.94)	(-3.08)	[0.00]	
	$r_{I?A}$	-0.18	0.11	-0.01	0.01		-0.27	-0.02	331.25	15.25
		(-1.80)	(1.13)	(-0.25)	(0.40)		(-6.68)	(-0.40)	[0.00]	
	r_{ROE}	1.23	1.29	-0.08	-0.50	-0.04		0.11	98.32	22.46
		(9.33)	(11.49)	(-3.28)	(-5.40)	(-0.93)		(1.50)	[0.00]	
	r_{EG}	-0.17	-0.32	-0.09	-0.05	-0.18	0.20		28.42	12.18
		(-1.11)	(-1.94)	(-2.22)	(-0.40)	(-4.48)	(2.06)		[0.00]	
South Korea	MKT	0.83	3.89		-0.31	0.00	-0.78	-0.13	33.11	15.05
		(1.45)	(4.13)		(-2.40)	(-0.01)	(-4.24)	(-0.54)	[0.00]	
	r_{ME}	1.77	1.95	-0.10		-0.29	-0.08	-0.11	67.44	9.02
		(4.40)	(3.61)	(-2.40)		(-2.26)	(-0.67)	(-0.94)	[0.00]	
	$r_{I?A}$	-0.19	0.02	0.00	-0.15		0.02	0.21	81.06	9.96
		(-0.58)	(0.06)	(-0.01)	(-1.99)		(0.32)	(2.86)	[0.00]	
	r_{ROE}	2.36	2.85	-0.14	0.02	-0.05		0.28	40.67	19.43
		(8.49)	(10.37)	(-5.05)	(0.31)	(-0.68)		(3.00)	[0.00]	
	r_{EG}	-0.53	-1.03	-0.02	0.19	-0.05	0.24		18.93	14.39
		(-1.97)	(-3.87)	(-0.53)	(2.33)	(-0.94)	(3.31)		[0.00]	
UK	MKT	0.78	1.80		-0.35	0.16	-0.34	-0.06	108.27	15.36
		(3.13)	(6.03)		(-4.62)	(1.56)	(-3.63)	(-0.55)	[0.00]	
	r_{ME}	0.47	0.64	-0.22		0.00	-0.01	-0.03	94.13	7.98
		(2.52)	(2.06)	(-4.37)		(0.03)	(-0.08)	(-0.33)	[0.00]	
	$r_{I?A}$	-0.45	-0.66	0.06	0.00		0.06	0.18	41.51	3.78
		(-3.09)	(-3.42)	(1.47)	(0.03)		(1.12)	(2.11)	[0.00]	
	r_{ROE}	2.50	2.61	-0.18	0.08	0.00		0.48	17.07	17.81
		(10.90)	(12.82)	(-3.84)	(1.16)	(-0.08)		(5.42)	[0.00]	
	r_{EG}	-0.35	-0.37	-0.01	0.11	-0.01	0.21		124.88	13.33
		(-1.04)	(-2.25)	(-0.54)	(1.99)	(-0.33)	(5.84)		[0.00]	
US	MKT	0.84	2.29		-0.36	-0.11	-0.53	-0.03	146.51	22.01
		(3.77)	(6.91)		(-5.38)	(-1.04)	(-4.72)	(-0.22)	[0.00]	
	r_{ME}	0.68	1.42	-0.24		-0.05	-0.23	-0.19	56.38	12.34
		(3.83)	(3.88)	(-3.65)		(-0.49)	(-2.35)	(-1.87)	[0.00]	
	$r_{I?A}$	-0.39	-0.72	-0.05	-0.03		0.15	-0.09	82.73	4.76
		(-2.50)	(-2.28)	(-1.09)	(-0.50)		(1.58)	(-0.85)	[0.00]	
	r_{ROE}	2.38	2.68	-0.25	0.16	-0.17		0.72	10.67	37.00
		(12.85)	(16.35)	(-4.94)	(1.64)	(-2.25)		(5.09)	[0.00]	
	r_{EG}	0.19	-0.48	-0.01	-0.04	-0.05	0.26		129.14	24.57
		(1.50)	(-4.10)	(-0.21)	(-0.89)	(-1.89)	(8.32)		[0.00]	
Other DMs	MKT	0.74	1.96		-0.71	-0.05	-0.38	-0.36	95.48	20.96
		(2.75)	(5.62)		(-6.06)	(-0.29)	(-4.51)	(-2.39)	[0.00]	
	r_{ME}	0.56	0.34	-0.17		-0.03	0.12	-0.32	203.12	19.83
		(4.55)	(1.63)	(-5.62)		(-0.52)	(2.34)	(-4.05)	[0.00]	
	$r_{I?A}$	0.03	-0.14	-0.01	-0.03		0.06	0.14	37.91	2.63
		(0.28)	(-0.69)	(-0.30)	(-0.53)		(0.99)	(1.67)	[0.00]	
	r_{ROE}	2.36	2.41	-0.13	0.08	0.17		0.32	12.79	15.33
		(14.64)	(15.98)	(-3.73)	(0.98)	(2.17)		(3.46)	[0.00]	
	r_{EG}	-0.14	-0.22	-0.06	0.09	-0.21	0.15		122.82	13.12
		(-0.97)	(-1.37)	(-2.42)	(1.64)	(-4.35)	(3.33)		[0.00]	
Brazil	MKT	1.11	2.37		-1.10	0.02	-0.18	-0.33	74.83	26.45
		(1.81)	(3.21)		(-6.80)	(0.13)	(-1.37)	(-2.50)	[0.00]	
	r_{ME}	0.62	0.76	-0.21		0.00	0.06	-0.04	162.80	24.35
		(2.32)	(2.40)	(-8.39)		(-0.05)	(1.08)	(-0.80)	[0.00]	

	$r_{I?A}$	-0.36	-0.60	0.00	0.00		0.11	0.09	26.89	2.72
		(-1.38)	(-1.71)	(0.13)	(-0.05)		(1.35)	(1.14)	[0.00]	
	r_{ROE}	2.33	2.52	-0.05	0.16	0.09		0.02	20.10	4.75
		(7.64)	(7.83)	(-1.37)	(1.39)	(1.02)		(0.22)	[0.00]	
	r_{EG}	-0.58	-0.54	-0.07	0.10	-0.05	0.02		58.86	3.69
		(-2.16)	(-1.76)	(-2.49)	(1.11)	(-0.82)	(0.22)		[0.00]	
China	MKT	0.63	1.44		-0.09	-1.02	-0.54	-0.44	45.29	17.75
		(1.17)	(1.91)		(-0.49)	(-4.09)	(-2.87)	(-1.94)	[0.00]	
	r_{ME}	1.05	1.64	-0.02		-0.37	-0.36	-0.09	52.80	16.42
		(4.01)	(5.60)	(-0.49)		(-2.56)	(-2.92)	(-0.58)	[0.00]	
	$r_{I?A}$	-0.18	0.45	-0.08	-0.12		-0.22	0.16	181.25	19.79
		(-1.50)	(2.46)	(-5.73)	(-2.55)		(-3.68)	(2.69)	[0.00]	
	r_{ROE}	1.67	2.19	-0.10	-0.56	-0.29		0.48	49.24	34.18
		(7.10)	(10.11)	(-3.65)	(-3.63)	(-3.30)		(4.19)	[0.00]	
	r_{EG}	0.23	-0.74	-0.05	0.22	-0.04	0.26		14.11	23.88
		(0.52)	(-3.20)	(-2.08)	(2.64)	(-0.57)	(4.02)		[0.00]	
India	MKT	0.68	2.82		-0.19	-0.02	-0.62	-0.51	48.51	24.82
		(1.28)	(2.82)		(-1.58)	(-0.09)	(-3.62)	(-2.87)	[0.00]	
	r_{ME}	2.42	2.14	-0.13		0.07	0.10	-0.28	14.88	5.94
		(4.69)	(2.87)	(-2.01)		(0.41)	(0.52)	(-1.60)	[0.00]	
	$r_{I?A}$	-1.17	-1.13	0.00	0.02		0.03	0.10	24.85	2.33
		(-4.92)	(-3.35)	(-0.09)	(0.43)		(0.36)	(0.83)	[0.00]	
	r_{ROE}	2.80	3.17	-0.19	0.05	0.04		0.12	32.28	18.39
		(9.15)	(10.32)	(-4.26)	(0.37)	(0.51)		(1.44)	[0.00]	
	r_{EG}	-0.46	-0.45	-0.17	0.15	-0.14	0.13		18.97	17.49
		(-1.55)	(-1.11)	(-5.00)	(0.74)	(-1.56)	(1.40)		[0.00]	
Malaysia	MKT	0.55	2.15		0.08	0.08	-0.83	-0.65	44.55	35.57
		(1.23)	(3.50)		(0.58)	(0.55)	(-4.33)	(-3.25)	[0.00]	
	r_{ME}	0.83	1.30	0.04		0.53	-0.14	-0.34	8.96	21.55
		(3.16)	(3.16)	(0.56)		(2.30)	(-1.30)	(-2.17)	[0.00]	
	$r_{I?A}$	-0.24	-0.67	0.02	0.24		0.07	0.12	16.15	13.16
		(-1.34)	(-2.48)	(0.53)	(2.48)		(1.03)	(1.47)	[0.00]	
	r_{ROE}	2.37	2.53	-0.23	0.09	-0.09		0.20	58.73	32.63
		(10.66)	(13.05)	(-5.04)	(1.11)	(-1.50)		(2.24)	[0.00]	
	r_{EG}	0.14	-0.16	-0.12	0.11	-0.14	0.13		33.30	25.92
		(0.74)	(-0.76)	(-3.31)	(1.12)	(-1.90)	(2.09)		[0.00]	
Pakistan	MKT	0.76	1.91		-0.21	0.01	-0.12	-0.11	52.75	11.75
		(1.42)	(3.24)		(-1.80)	(0.17)	(-1.32)	(-0.90)	[0.00]	
	r_{ME}	1.62	0.01	-0.26		0.00	0.50	-0.11	10.18	28.55
		(2.42)	(0.02)	(-1.46)		(0.01)	(4.70)	(-0.87)	[0.00]	
	$r_{I?A}$	-0.69	-0.03	0.01	0.00		-0.16	-0.01	25.09	3.43
		(-1.89)	(-0.07)	(0.18)	(0.01)		(-1.76)	(-0.12)	[0.00]	
	r_{ROE}	3.85	2.84	-0.11	-0.16	0.37		-0.08	19.27	27.27
		(8.32)	(6.55)	(-1.41)	(-1.80)	(5.80)		(-0.62)	[0.00]	
	r_{EG}	-0.49	-1.06	-0.09	-0.01	-0.08	-0.08		44.67	2.84
		(-1.13)	(-2.01)	(-0.97)	(-0.12)	(-0.88)	(-0.62)		[0.00]	
Taiwan	MKT	0.37	1.20		-0.26	-0.35	-0.31	-0.49	70.23	17.54
		(0.82)	(1.87)		(-1.44)	(-2.07)	(-2.78)	(-2.36)	[0.00]	
	r_{ME}	1.31	1.43	-0.07		0.17	-0.02	-0.04	22.55	5.07
		(4.77)	(5.51)	(-1.54)		(2.30)	(-0.25)	(-0.46)	[0.00]	
	$r_{I?A}$	-0.36	-0.62	-0.08	0.14		0.04	-0.08	68.52	6.67
		(-1.58)	(-2.62)	(-2.07)	(2.34)		(0.62)	(-1.00)	[0.00]	
	r_{ROE}	2.89	3.16	-0.14	0.08	-0.04		0.46	7.51	17.44
		(10.56)	(11.28)	(-3.01)	(0.64)	(-0.24)		(3.18)	[0.01]	
	r_{EG}	-0.30	-1.04	-0.10	-0.07	-0.03	0.19		86.11	17.09
		(-1.39)	(-4.19)	(-2.44)	(-1.04)	(-0.45)	(4.00)		[0.00]	
Thailand	MKT	0.47	1.24		-1.13	0.14	-0.06	-0.13	147.50	45.51

		(1.15)	(2.90)		(-9.54)	(0.97)	(-0.45)	(-1.22)	[0.00]	
	r_{ME}	0.65	0.82	-0.39		0.19	0.01	-0.01	54.39	46.89
		(2.81)	(2.70)	(-13.05)		(1.67)	(0.17)	(-0.08)	[0.00]	
	$r_{I?A}$	-0.38	-0.59	0.05	0.22		0.04	0.07	7.99	6.25
		(-2.11)	(-2.32)	(1.03)	(1.72)		(0.46)	(0.80)	[0.00]	
	r_{ROE}	2.19	2.16	-0.03	0.06	0.02		0.10	14.00	2.28
		(9.46)	(8.95)	(-0.44)	(0.46)	(0.17)		(1.09)	[0.00]	
	r_{EG}	0.03	-0.13	-0.09	0.12	-0.02	0.11		10.56	4.13
		(0.10)	(-0.51)	(-1.22)	(0.73)	(-0.08)	(1.17)		[0.00]	
Turkey	MKT	1.19	1.83		-0.40	0.04	-0.20	-0.11	12.82	3.14
		(1.70)	(1.87)		(-2.26)	(0.23)	(-0.85)	(-0.57)	[0.00]	
	r_{ME}	1.37	1.50	-0.06		0.10	-0.03	-0.16	64.48	5.09
		(4.33)	(4.09)	(-2.22)		(0.83)	(-0.44)	(-2.01)	[0.00]	
	$r_{I?A}$	-0.45	-0.36	0.00	0.08		-0.11	0.09	44.73	2.93
		(-1.62)	(-1.03)	(0.23)	(0.81)		(-1.17)	(1.15)	[0.00]	
	r_{ROE}	2.01	2.21	-0.03	-0.15	-0.03		0.10	32.29	3.03
		(5.70)	(8.65)	(-0.81)	(-1.23)	(-0.44)		(0.91)	[0.00]	
	r_{EG}	-0.37	-0.20	-0.01	0.10	-0.13	0.08		53.10	3.51
		(-0.80)	(-0.56)	(-0.56)	(1.16)	(-2.15)	(0.91)		[0.00]	
Other EMs	MKT	0.64	1.56		-0.84	-0.18	-0.02	0.10	60.87	28.93
		(1.74)	(3.35)		(-4.89)	(-1.47)	(-0.18)	(0.98)	[0.00]	
	r_{ME}	1.10	0.68	-0.30		-0.10	0.20	-0.16	138.32	32.22
		(4.94)	(2.97)	(-8.64)		(-1.45)	(3.07)	(-2.21)	[0.00]	
	$r_{I?A}$	0.50	-0.28	-0.11	-0.18		0.31	0.16	19.29	14.90
		(1.87)	(-1.01)	(-1.57)	(-1.39)		(3.34)	(1.72)	[0.00]	
	r_{ROE}	3.33	2.73	-0.01	0.24	0.28		0.44	0.12	27.08
		(12.36)	(10.29)	(-0.18)	(3.18)	(2.72)		(7.29)	[0.7282]	
	r_{EG}	-0.05	-0.67	0.03	0.09	-0.15	0.31		38.89	20.15
		(-0.18)	(-2.74)	(0.92)	(1.75)	(-2.39)	(5.56)		[0.00]	
DMs	MKT	0.67	2.14		-0.34	-0.05	-0.59	-0.26	159.91	26.74
		(2.92)	(4.40)		(-3.10)	(-0.62)	(-2.98)	(-1.65)	[0.00]	
	r_{ME}	0.62	0.79	-0.13		-0.03	-0.04	-0.14	111.30	5.16
		(5.12)	(3.49)	(-2.55)		(-0.50)	(-0.45)	(-1.48)	[0.00]	
	$r_{I?A}$	-0.24	-0.46	-0.02	-0.03		0.12	-0.10	49.38	1.64
		(-1.66)	(-2.00)	(-0.63)	(-0.52)		(1.61)	(-0.90)	[0.00]	
	r_{ROE}	2.07	2.22	-0.19	0.09	-0.03		0.63	7.65	46.49
		(11.89)	(14.14)	(-4.13)	(1.38)	(-0.48)		(8.72)	[0.01]	
	r_{EG}	0.03	-0.85	-0.06	-0.06	-0.09	0.47		34.08	40.61
		(0.25)	(-4.47)	(-1.55)	(-0.89)	(-1.51)	(6.67)		[0.00]	
EMs	MKT	0.49	1.68		-0.48	-0.06	-0.27	0.00	159.81	17.98
		(1.44)	(3.50)		(-4.15)	(-0.49)	(-2.13)	(-0.01)	[0.00]	
	r_{ME}	1.02	0.20	-0.19		0.14	0.33	0.07	29.67	28.54
		(4.78)	(0.71)	(-4.61)		(2.29)	(4.57)	(1.16)	[0.00]	
	$r_{I?A}$	0.02	0.06	-0.02	0.13		-0.08	0.35	23.14	15.18
		(0.10)	(0.14)	(-0.52)	(1.99)		(-0.49)	(1.75)	[0.00]	
	r_{ROE}	2.63	2.33	-0.08	-0.06	0.27		0.32	16.68	28.74
		(12.20)	(11.37)	(-1.83)	(-0.53)	(3.74)		(2.54)	[0.00]	
	r_{EG}	0.13	-0.72	0.00	0.30	0.06	0.32		3.50	25.72
		(0.56)	(-1.84)	(-0.01)	(2.86)	(1.13)	(3.58)		[0.06]	
Non-US	MKT	0.59	2.07		-0.42	-0.16	-0.55	-0.27	210.29	24.91
		(2.24)	(5.36)		(-3.40)	(-1.41)	(-4.11)	(-3.05)	[0.00]	
	r_{ME}	0.80	0.74	-0.14		-0.04	0.09	-0.07	77.85	8.58
		(6.74)	(4.17)	(-2.76)		(-0.51)	(1.39)	(-1.34)	[0.00]	
	$r_{I?A}$	-0.01	0.15	-0.05	-0.04		-0.06	0.05	103.15	1.32
		(-0.05)	(0.73)	(-1.57)	(-0.51)		(-1.02)	(0.70)	[0.00]	
	r_{ROE}	2.02	2.09	-0.17	-0.05	0.08		0.30	24.71	27.79
		(12.24)	(11.17)	(-4.71)	(-1.09)	(1.37)		(2.56)	[0.00]	

	r_{EG}	-0.02	-0.69	-0.11	0.05	-0.09	0.40		18.67	20.66
		(-0.08)	(-2.13)	(-2.47)	(0.76)	(-1.29)	(4.09)		[0.00]	
Global	MKT	0.64	2.14		-0.28	-0.13	-0.60	-0.19	152.40	23.33
		(2.75)	(4.20)		(-2.62)	(-1.26)	(-2.87)	(-1.11)	[0.00]	
	r_{ME}	0.76	0.68	-0.10		-0.01	0.08	-0.06	69.06	4.80
		(6.44)	(3.14)	(-2.16)		(-0.20)	(1.01)	(-0.67)	[0.00]	
	$r_{I?A}$	-0.15	-0.17	-0.04	-0.01		0.02	0.10	57.60	2.45
		(-1.14)	(-0.67)	(-1.28)	(-0.20)		(0.19)	(0.96)	[0.00]	
	r_{ROE}	2.11	2.15	-0.16	0.01	0.06		0.62	7.63	42.89
		(13.29)	(14.07)	(-3.88)	(0.19)	(0.91)		(8.93)	[0.01]	
	r_{EG}	0.03	-0.86	-0.04	0.06	-0.03	0.45		21.09	36.48
		(0.22)	(-4.84)	(-1.06)	(0.98)	(-0.67)	(6.76)		[0.00]	

Table 12. Spanning Test Within the Stambaugh–Yuan Four-Factor Model

The table presents the results from the spanning test within the Stambaugh–Yuan four-factor model. Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, SMB*, MGMT, and PERF are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB*	MGMT	PERF	χ2	R^2
Australia	MKT	0.64	1.35		0.00	-0.12	0.30	177.50	11.93
		(1.87)	(4.11)		(0.02)	(-2.38)	(5.94)	[0.00]	
	SMB*	0.02	0.45	0.00		0.18	0.36	12.99	10.53
		(0.04)	(0.86)	(0.02)		(2.23)	(4.24)	[0.00]	
	MGMT	0.15	0.47	0.10	-0.13		0.09	175.48	4.46
		(0.39)	(0.98)	(2.33)	(-2.16)		(1.27)	[0.00]	
	PERF	-1.60	-2.11	0.21	0.10	0.34		8.18	18.64
		(-3.82)	(-5.83)	(4.36)	(1.38)	(6.57)		[0.00]	
Canada	MKT	0.62	0.79		0.05	-0.25	0.23	117.22	21.31
		(2.34)	(2.75)		(0.60)	(-3.76)	(4.30)	[0.00]	
	SMB*	0.62	0.78	0.06		-0.06	0.07	112.38	2.54
		(2.31)	(2.48)	(0.62)		(-0.93)	(1.06)	[0.00]	
	MGMT	-0.85	-0.61	-0.07	-0.36		0.00	290.47	10.93
		(-2.91)	(-2.20)	(-1.01)	(-6.48)		(-0.01)	[0.00]	
	PERF	-1.81	-2.18	0.11	0.00	0.48		4.19	13.75
		(-4.35)	(-5.84)	(1.05)	(-0.01)	(4.10)		[0.04]	
France	MKT	0.87	0.81		-0.49	-0.32	0.20	150.79	19.79
		(3.05)	(2.30)		(-6.04)	(-3.81)	(2.09)	[0.00]	
	SMB*	-0.01	-0.01	-0.22		0.06	-0.05	294.06	14.35
		(-0.08)	(-0.07)	(-4.67)		(1.12)	(-1.26)	[0.00]	
	MGMT	-0.32	-0.16	0.05	-0.13		0.05	172.52	5.87
		(-1.67)	(-0.89)	(1.12)	(-3.89)		(1.18)	[0.00]	
	PERF	-1.63	-1.69	-0.10	0.09	0.16		36.54	5.33
		(-5.66)	(-6.34)	(-1.22)	(1.23)	(1.96)		[0.00]	
Germany	MKT	0.65	0.93		-0.64	-0.21	0.38	129.93	27.52
		(2.22)	(2.87)		(-8.22)	(-2.87)	(4.45)	[0.00]	
	SMB*	-0.27	0.01	-0.27		-0.06	0.06	207.61	17.79
		(-1.69)	(0.05)	(-6.22)		(-1.00)	(1.20)	[0.00]	
	MGMT	-0.36	-0.35	-0.06	-0.09		-0.02	138.70	2.55
		(-2.00)	(-1.78)	(-1.02)	(-2.76)		(-0.31)	[0.00]	
	PERF	-1.46	-1.62	0.10	-0.03	0.28		18.63	11.42
		(-6.53)	(-7.13)	(1.12)	(-0.31)	(3.92)		[0.00]	
Hong Kong	MKT	0.63	1.00		-0.16	-0.45	0.26	93.94	16.69
		(1.67)	(2.31)		(-2.08)	(-4.66)	(2.78)	[0.00]	
	SMB*	-0.18	0.55	-0.15		-0.12	0.28	60.90	8.13
		(-0.49)	(1.49)	(-2.07)		(-1.31)	(3.74)	[0.00]	
	MGMT	-0.47	-0.40	-0.06	-0.22		-0.05	500.73	12.31
		(-1.89)	(-1.78)	(-1.37)	(-5.56)		(-1.20)	[0.00]	
	PERF	-1.67	-1.99	0.24	-0.08	0.21		14.21	12.72
		(-4.98)	(-6.32)	(3.28)	(-1.16)	(2.32)		[0.00]	
Japan	MKT	0.51	0.62		0.06	-0.19	0.41	15.87	9.70
		(1.79)	(2.13)		(0.66)	(-1.05)	(4.66)	[0.00]	
	SMB*	0.24	0.27	0.02		-0.10	0.20	64.26	6.11
		(1.31)	(1.49)	(0.67)		(-1.55)	(2.56)	[0.00]	
	MGMT	-0.05	0.01	-0.06	-0.05		0.08	289.03	2.14
		(-0.39)	(0.11)	(-1.22)	(-1.50)		(1.93)	[0.00]	
	PERF	-0.34	-0.50	0.24	0.16	0.20		4.06	13.80

		(-1.60)	(-2.55)	(2.40)	(1.36)	(4.13)		[0.04]	
South Korea	MKT	0.83	1.42		-0.21	-0.41	0.49	44.69	19.03
		(1.45)	(2.50)		(-3.17)	(-2.84)	(5.21)	[0.00]	
	SMB*	1.18	1.57	-0.18		-0.19	0.34	30.10	9.33
		(2.36)	(3.00)	(-3.18)		(-1.18)	(3.30)	[0.00]	
	MGMT	-0.25	-0.24	-0.06	-0.11		-0.05	401.68	7.85
		(-0.84)	(-0.87)	(-1.11)	(-3.16)		(-0.97)	[0.00]	
	PERF	-0.80	-1.51	0.21	-0.10	0.26		15.36	19.69
		(-1.95)	(-4.12)	(4.13)	(-1.01)	(4.25)		[0.00]	
UK	MKT	0.78	1.16		-0.11	-0.21	0.28	46.05	7.42
		(3.13)	(4.29)		(-1.18)	(-2.72)	(3.40)	[0.00]	
	SMB*	0.21	0.11	-0.07		-0.09	0.05	105.66	1.29
		(0.85)	(0.42)	(-1.18)		(-1.37)	(0.69)	[0.00]	
	MGMT	-0.59	-0.29	-0.07	-0.11		0.13	206.89	3.97
		(-3.03)	(-1.62)	(-1.33)	(-2.09)		(1.50)	[0.00]	
	PERF	-1.54	-1.71	0.05	0.17	0.20		11.23	6.92
		(-5.72)	(-6.90)	(0.66)	(1.83)	(2.67)		[0.00]	
US	MKT	0.84	1.22		-0.21	-0.76	0.49	141.63	29.36
		(3.77)	(5.50)		(-3.91)	(-8.74)	(6.20)	[0.00]	
	SMB*	-0.30	0.26	-0.19		-0.46	0.39	59.53	15.93
		(-1.35)	(1.02)	(-2.77)		(-3.55)	(5.43)	[0.00]	
	MGMT	-0.34	-0.03	-0.14	-0.22		0.12	673.16	19.78
		(-2.96)	(-0.28)	(-5.30)	(-7.75)		(2.54)	[0.00]	
	PERF	-1.42	-1.53	0.32	0.31	0.37		0.00	25.74
		(-7.16)	(-8.35)	(4.33)	(2.99)	(5.40)		[0.98]	
Other DMs	MKT	0.74	1.32		-0.36	-0.25	0.35	44.90	13.96
		(2.75)	(4.05)		(-3.10)	(-2.00)	(3.26)	[0.00]	
	SMB*	0.07	0.17	-0.12		-0.05	0.10	139.69	5.15
		(0.43)	(1.00)	(-3.41)		(-0.70)	(2.20)	[0.00]	
	MGMT	0.22	0.38	-0.09	-0.14		0.04	46.00	3.68
		(1.14)	(1.80)	(-0.74)	(-3.24)		(0.48)	[0.00]	
	PERF	-1.49	-1.72	0.20	0.05	0.24		7.38	9.03
		(-6.26)	(-7.72)	(2.14)	(0.48)	(3.04)		[0.00]	
Brazil	MKT	1.11	1.28		-0.87	-0.15	0.32	108.99	30.08
		(1.81)	(1.88)		(-8.77)	(-1.19)	(2.12)	[0.00]	
	SMB*	-0.27	0.03	-0.28		-0.11	-0.03	175.15	27.32
		(-0.89)	(0.09)	(-6.48)		(-2.02)	(-0.43)	[0.00]	
	MGMT	-0.05	0.12	-0.18	-0.08		0.09	94.67	3.01
		(-0.14)	(0.31)	(-2.08)	(-1.28)		(1.28)	[0.00]	
	PERF	-1.40	-1.51	-0.05	0.09	0.16		15.58	9.05
		(-3.71)	(-3.81)	(-0.43)	(1.32)	(2.41)		[0.00]	
China	MKT	0.63	0.81		0.08	-0.27	0.27	5.81	3.44
		(1.17)	(1.29)		(0.45)	(-0.79)	(1.69)	[0.01]	
	SMB*	1.17	0.93	0.02		-0.06	0.25	29.54	8.68
		(3.62)	(3.85)	(0.44)		(-0.73)	(3.10)	[0.00]	
	MGMT	-0.20	0.06	-0.04	-0.05		0.24	97.59	10.86
		(-0.74)	(0.22)	(-0.65)	(-0.97)		(3.27)	[0.00]	
	PERF	-1.07	-1.02	0.31	0.43	0.09		1.90	18.89
		(-2.54)	(-3.63)	(3.12)	(4.91)	(1.80)		[0.17]	
India	MKT	0.68	1.55		-0.09	-0.20	0.48	49.02	18.97
		(1.28)	(2.97)		(-1.43)	(-2.31)	(5.17)	[0.00]	
	SMB*	0.98	1.35	-0.10		-0.14	0.19	66.24	3.52
		(2.08)	(2.35)	(-1.49)		(-1.75)	(1.77)	[0.00]	
	MGMT	-1.50	-1.23	-0.08	-0.12		0.07	415.28	3.13
		(-4.19)	(-3.15)	(-1.80)	(-2.75)		(1.14)	[0.00]	
	PERF	-2.21	-2.51	0.14	0.09	0.37		8.41	19.05
		(-5.51)	(-6.78)	(1.85)	(1.13)	(5.19)		[0.00]	

Malaysia	MKT	0.55	1.04		0.16	-0.17	0.57	5.54	28.88
		(1.23)	(2.74)		(1.36)	(-1.22)	(4.53)	[0.02]	
	SMB*	0.24	0.36	0.11		0.08	0.35	5.16	18.26
		(0.82)	(1.10)	(1.31)		(0.63)	(2.74)	[0.02]	
	MGMT	0.02	0.02	0.05	-0.07		-0.16	278.24	8.32
		(0.09)	(0.08)	(0.61)	(-1.40)		(-1.69)	[0.00]	
	PERF	-0.89	-1.05	0.28	-0.22	0.31		18.30	36.12
		(-2.98)	(-4.29)	(3.60)	(-1.96)	(4.99)		[0.00]	
Pakistan	MKT	0.76	1.08		-0.36	-0.12	0.27	96.42	26.57
		(1.42)	(2.22)		(-5.13)	(-2.13)	(4.65)	[0.00]	
	SMB*	0.26	0.52	-0.50		-0.15	0.09	167.70	18.88
		(0.46)	(0.91)	(-6.27)		(-2.53)	(1.34)	[0.00]	
	MGMT	0.08	0.02	-0.16	-0.17		-0.15	227.30	6.64
		(0.18)	(0.04)	(-2.62)	(-2.14)		(-1.97)	[0.00]	
	PERF	-1.55	-1.54	0.08	-0.13	0.34		29.91	12.60
		(-2.97)	(-3.72)	(1.42)	(-2.03)	(4.79)		[0.00]	
Taiwan	MKT	0.37	0.86		-0.23	-0.47	0.55	91.85	25.39
		(0.82)	(1.92)		(-1.97)	(-6.98)	(6.82)	[0.00]	
	SMB*	0.14	0.47	-0.10		0.11	0.28	61.85	17.31
		(0.45)	(1.55)	(-2.08)		(1.68)	(3.53)	[0.00]	
	MGMT	-0.66	-0.16	0.16	-0.28		0.27	55.58	20.82
		(-2.44)	(-0.63)	(1.57)	(-5.51)		(2.85)	[0.00]	
	PERF	-1.39	-1.33	0.40	0.28	0.34		0.01	29.34
		(-3.82)	(-3.92)	(4.03)	(2.86)	(6.94)		[0.93]	
Thailand	MKT	0.47	0.74		-0.74	-0.03	0.35	110.87	55.42
		(1.15)	(2.42)		(-7.18)	(-0.52)	(6.87)	[0.00]	
	SMB*	-0.11	0.33	-0.55		0.19	0.14	235.68	48.01
		(-0.35)	(1.33)	(-11.86)		(2.43)	(1.95)	[0.00]	
	MGMT	-0.31	-0.33	0.28	-0.03		-0.02	47.69	10.91
		(-0.96)	(-1.24)	(3.56)	(-0.53)		(-0.25)	[0.00]	
	PERF	-0.96	-1.37	0.33	-0.03	0.63		0.07	24.09
		(-2.41)	(-3.90)	(1.80)	(-0.25)	(5.74)		[0.78]	
Turkey	MKT	1.19	1.71		-0.30	-0.18	0.30	55.10	6.69
		(1.70)	(2.26)		(-2.43)	(-1.32)	(2.18)	[0.00]	
	SMB*	1.12	1.51	-0.15		0.01	0.17	117.09	6.27
		(2.11)	(2.85)	(-2.53)		(0.08)	(2.30)	[0.00]	
	MGMT	-0.58	0.09	0.01	-0.08		0.58	25.74	23.97
		(-1.01)	(0.17)	(0.08)	(-1.27)		(5.02)	[0.00]	
	PERF	-1.08	-1.00	0.11	0.40	0.09		25.37	25.72
		(-2.11)	(-3.07)	(2.25)	(7.36)	(2.34)		[0.00]	
Other EMs	MKT	0.64	1.31		-0.28	-0.26	0.20	107.36	18.81
		(1.74)	(3.55)		(-3.35)	(-4.40)	(2.60)	[0.00]	
	SMB*	0.53	0.80	-0.37		-0.19	0.00	144.72	11.64
		(1.42)	(2.18)	(-8.02)		(-2.37)	(-0.05)	[0.00]	
	MGMT	0.52	0.94	-0.16	-0.29		0.08	73.14	8.33
		(1.60)	(2.89)	(-1.92)	(-4.05)		(1.40)	[0.00]	
	PERF	-1.62	-2.11	0.00	0.08	0.21		27.82	4.99
		(-5.10)	(-8.17)	(-0.05)	(1.33)	(3.04)		[0.00]	
DMs	MKT	0.67	0.95		-0.21	-1.25	0.53	79.71	34.19
		(2.92)	(4.11)		(-2.61)	(-7.47)	(5.99)	[0.00]	
	SMB*	0.15	0.28	-0.09		-0.37	0.15	77.77	6.46
		(1.07)	(1.71)	(-2.32)		(-3.43)	(2.40)	[0.00]	
	MGMT	-0.26	-0.17	-0.10	-0.16		-0.03	883.50	27.40
		(-3.22)	(-1.99)	(-3.75)	(-9.85)		(-0.65)	[0.00]	
	PERF	-1.08	-1.29	0.15	-0.09	0.24		16.90	20.00
		(-7.11)	(-9.62)	(2.31)	(-0.64)	(5.04)		[0.00]	
EMs	MKT	0.49	1.36		-0.19	-0.41	0.53	75.86	23.27

		(1.44)	(3.74)		(-3.34)	(-3.99)	(5.17)	[0.00]	
	SMB*	0.71	1.06	-0.29		0.00	0.15	31.19	5.80
		(2.00)	(2.17)	(-3.60)		(-0.02)	(1.06)	[0.00]	
	MGMT	-0.19	0.05	0.00	-0.16		0.10	142.34	6.79
		(-0.98)	(0.23)	(-0.02)	(-3.95)		(1.41)	[0.00]	
	PERF	-1.09	-1.67	0.05	0.13	0.28		13.69	14.78
		(-3.89)	(-8.25)	(1.03)	(1.50)	(4.85)		[0.00]	
Non-US	MKT	0.59	1.56		-0.48	-0.60	0.79	27.40	31.34
		(2.24)	(5.72)		(-5.19)	(-2.97)	(7.79)	[0.00]	
	SMB*	0.40	0.73	-0.19		-0.11	0.23	78.92	9.90
		(3.03)	(4.23)	(-4.13)		(-1.09)	(3.63)	[0.00]	
	MGMT	-0.25	-0.09	-0.06	-0.14		0.04	265.21	9.08
		(-2.43)	(-0.75)	(-1.30)	(-5.07)		(0.70)	[0.00]	
	PERF	-1.13	-1.35	0.19	0.06	0.26		19.40	21.79
		(-7.27)	(-9.63)	(3.12)	(0.72)	(5.87)		[0.00]	
Global	MKT	0.64	1.10		-0.28	-1.23	0.59	107.38	34.77
		(2.75)	(4.53)		(-3.75)	(-7.92)	(6.11)	[0.00]	
	SMB*	0.30	0.43	-0.12		-0.33	0.12	106.79	5.11
		(2.28)	(2.55)	(-3.13)		(-3.28)	(1.80)	[0.00]	
	MGMT	-0.28	-0.16	-0.10	-0.16		-0.01	758.14	24.67
		(-3.47)	(-1.80)	(-3.46)	(-9.75)		(-0.34)	[0.00]	
	PERF	-1.19	-1.39	0.11	-0.04	0.24		21.26	19.11
		(-8.19)	(-10.79)	(1.72)	(-0.33)	(5.11)		[0.00]	

Table 13. Spanning Test: Fama–French vs q-Factor Models

Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB, HML, RMW, CMA are the size, value, profitability, and investment factors from Fama–French's five-factor model. UMD is the momentum factor. MKT, r_{ME}, $r_{I/A}$, and r_{ROE} are the market, size, investment, profitability factors from Hou–Xue–Zhang's q-factor model. The numbers in parentheses are robust GMM-based t-statistics, while p-values are in brackets.

Group		Mean	Int	MKT	r_{ME}	$r_{I/A}$	r_{ROE}	χ^2	R^2
Australia	SMB	-0.99	-0.17	0.06	0.89	0.05	-0.53	21.87	82.64
		(-2.41)	(-0.81)	(2.98)	(15.77)	(1.26)	(-11.36)	[0.00]	
	HML	1.73	1.94	0.07	0.19	0.07	0.02	21.56	5.88
		(7.49)	(4.44)	(1.38)	(2.96)	(0.71)	(0.24)	[0.00]	
	UMD	0.91	-1.18	-0.12	-0.11	-0.41	0.63	45.79	35.98
		(3.26)	(-2.73)	(-2.23)	(-1.56)	(-4.59)	(9.44)	[0.00]	
	RMW	1.39	0.18	-0.13	-0.22	-0.12	0.55	23.35	35.74
		(2.29)	(0.50)	(-2.82)	(-2.04)	(-1.56)	(7.01)	[0.00]	
	CMA	-1.78	0.16	0.02	-0.19	0.70	-0.26	48.84	59.41
		(-6.58)	(0.60)	(0.89)	(-4.41)	(12.00)	(-4.27)	[0.00]	
Canada	SMB	0.42	0.50	-0.06	0.75	-0.02	-0.39	24.08	69.95
		(1.39)	(1.52)	(-1.63)	(10.30)	(-0.27)	(-5.01)	[0.00]	
	HML	0.32	0.57	0.02	0.16	0.38	0.03	3.32	13.22
		(1.06)	(1.06)	(0.26)	(1.52)	(3.58)	(0.30)	[0.07]	
	UMD	1.25	0.02	-0.31	0.00	-0.49	0.36	25.26	25.68
		(3.90)	(0.04)	(-2.19)	(-0.01)	(-4.22)	(2.90)	[0.00]	
	RMW	0.32	-1.67	-0.08	-0.05	-0.15	1.12	0.20	53.25
		(0.71)	(-1.72)	(-0.82)	(-0.25)	(-1.08)	(5.12)	[0.66]	
	CMA	-0.77	-0.12	-0.02	-0.07	0.92	-0.14	15.50	80.06
		(-3.24)	(-0.63)	(-0.68)	(-1.29)	(18.03)	(-3.59)	[0.00]	
France	SMB	-0.16	0.03	0.00	0.92	-0.17	-0.21	26.75	74.05
		(-0.92)	(0.32)	(-0.10)	(22.67)	(-1.53)	(-6.34)	[0.00]	
	HML	0.78	1.05	-0.01	0.01	0.48	-0.05	12.34	16.03
		(3.59)	(4.56)	(-0.16)	(0.16)	(3.00)	(-0.53)	[0.00]	
	UMD	1.28	-0.26	-0.20	-0.01	-0.45	0.57	51.61	39.98
		(5.05)	(-0.80)	(-4.23)	(-0.08)	(-4.33)	(4.77)	[0.00]	
	RMW	0.91	0.46	-0.05	0.04	0.07	0.22	7.81	2.95
		(2.72)	(0.84)	(-0.66)	(0.30)	(0.46)	(1.43)	[0.01]	
	CMA	-0.91	0.01	-0.02	-0.02	0.85	-0.20	47.36	77.72
		(-4.84)	(0.09)	(-1.11)	(-0.72)	(24.14)	(-5.55)	[0.00]	
Germany	SMB	-0.24	0.00	-0.03	0.87	0.02	-0.26	29.09	72.32
		(-1.55)	(-0.04)	(-1.49)	(17.94)	(0.33)	(-6.57)	[0.00]	
	HML	0.71	0.78	-0.01	-0.14	0.34	0.00	41.41	9.59
		(3.89)	(3.94)	(-0.33)	(-2.51)	(3.59)	(-0.02)	[0.00]	
	UMD	0.95	-0.44	-0.24	0.05	-0.21	0.58	21.23	37.43
		(4.48)	(-1.38)	(-3.97)	(0.61)	(-2.06)	(7.05)	[0.00]	
	RMW	1.05	0.02	-0.07	-0.01	-0.08	0.46	17.21	15.33
		(4.22)	(0.08)	(-1.73)	(-0.13)	(-0.80)	(5.89)	[0.00]	
	CMA	-0.71	-4.64	0.85	-0.02	0.01	-0.15	33.22	75.29
		(-4.19)	(-0.18)	(23.25)	(-0.76)	(0.27)	(-1.61)	[0.00]	
Hong Kong	SMB	-0.30	-0.25	-0.07	0.86	0.09	-0.40	35.04	87.39
		(-0.92)	(-1.40)	(-2.50)	(22.87)	(1.99)	(-11.33)	[0.00]	
	HML	1.05	1.17	0.04	0.01	0.13	0.05	46.97	2.69
		(4.27)	(4.48)	(1.02)	(0.17)	(2.25)	(0.85)	[0.00]	
	UMD	0.93	-0.85	-0.22	0.12	-0.43	0.43	57.50	32.88
		(3.10)	(-1.64)	(-3.00)	(2.02)	(-3.75)	(4.37)	[0.00]	
	RMW	1.88	0.57	0.07	-0.33	-0.03	0.69	11.60	58.48

		(4.50)	(1.79)	(1.09)	(-4.71)	(-0.23)	(9.79)	[0.00]	
	CMA	-1.17	0.21	-0.05	-0.06	0.76	-0.29	70.39	62.08
		(-5.39)	(0.96)	(-1.40)	(-1.68)	(9.31)	(-7.08)	[0.00]	
Japan	SMB	0.15	-0.27	0.02	0.93	0.01	-0.05	2.88	89.82
		(0.96)	(-4.18)	(1.88)	(44.58)	(0.21)	(-1.62)	[0.09]	
	HML	0.64	1.11	-0.18	0.07	0.24	-0.29	95.23	22.06
		(4.28)	(7.16)	(-7.36)	(1.53)	(2.39)	(-5.34)	[0.00]	
	UMD	-0.15	-1.10	-0.08	-0.13	-0.34	0.83	15.20	38.25
		(-0.69)	(-0.49)	(-2.13)	(-2.04)	(-3.67)	(7.49)	[0.00]	
	RMW	0.51	-0.04	0.02	-0.04	-0.37	0.40	142.13	49.70
		(4.64)	(-0.42)	(0.88)	(-1.53)	(-6.12)	(8.08)	[0.00]	
	CMA	-0.48	0.01	0.00	0.00	0.97	-0.25	82.57	93.15
		(-3.90)	(0.24)	(-0.38)	(0.19)	(47.09)	(-13.35)	[0.00]	
South Korea	SMB	1.17	-0.34	0.08	0.90	-0.01	-0.17	2.73	78.59
		(2.88)	(-1.43)	(3.00)	(19.03)	(-0.12)	(-3.58)	[0.10]	
	HML	1.20	1.02	-0.11	0.13	0.17	-0.01	27.61	9.22
		(3.84)	(2.36)	(-2.37)	(1.93)	(1.94)	(-0.09)	[0.00]	
	UMD	-0.74	-1.02	-0.25	-0.21	-0.28	0.40	63.82	37.96
		(-2.08)	(-2.28)	(-6.58)	(-2.08)	(-2.87)	(4.23)	[0.00]	
	RMW	0.91	0.25	-0.05	-0.25	-0.08	0.47	60.45	32.36
		(3.58)	(0.88)	(-1.84)	(-5.17)	(-1.12)	(6.63)	[0.00]	
	CMA	-0.64	-0.11	-0.01	-0.03	0.79	-0.18	10.76	68.95
		(-2.84)	(-0.59)	(-0.47)	(-0.68)	(6.77)	(-5.64)	[0.00]	
UK	SMB	-0.06	-0.17	0.02	0.91	-0.06	-0.25	25.07	83.07
		(-0.30)	(-1.52)	(0.94)	(26.50)	(-1.48)	(-8.28)	[0.00]	
	HML	0.75	1.22	-0.05	-0.13	0.30	-0.14	90.06	12.54
		(4.52)	(6.30)	(-1.33)	(-2.68)	(4.18)	(-3.20)	[0.00]	
	UMD	1.24	-0.54	-0.13	-0.05	-0.58	62.00	106.37	43.42
		(4.99)	(-1.48)	(-2.25)	(-0.73)	(-7.75)	(7.42)	[0.00]	
	RMW	1.40	0.17	-0.13	-0.15	-0.06	0.58	54.98	43.29
		(6.61)	(0.69)	(-3.09)	(-2.42)	(-0.81)	(9.33)	[0.00]	
	CMA	-0.81	-0.14	-0.01	-0.05	0.76	-0.19	54.98	69.03
		(-5.56)	(-1.25)	(-0.28)	(-2.59)	(18.16)	(-5.87)	[0.00]	
US	SMB	-0.39	-0.15	0.05	0.97	-0.01	-0.40	47.08	90.83
		(-1.75)	(-1.31)	(1.71)	(443.99)	(-0.32)	(-9.11)	[0.00]	
	HML	1.06	0.80	-0.07	-0.14	0.27	0.22	31.27	24.85
		(6.15)	(3.01)	(-1.22)	(-2.83)	(5.24)	(2.25)	[0.00]	
	UMD	0.87	-0.48	-0.31	0.03	-0.68	0.56	29.02	41.37
		(3.60)	(-1.25)	(-3.21)	(0.31)	(-5.78)	(4.11)	[0.00]	
	RMW	0.70	-0.85	-0.06	-0.10	-0.18	0.68	42.85	58.12
		(3.79)	(-4.73)	(-1.62)	(-3.17)	(-3.47)	(10.51)	[0.00]	
	CMA	-0.86	-0.06	0.02	-0.02	0.85	-0.19	82.37	83.63
		(-6.03)	(-0.68)	(0.92)	(-1.33)	(34.20)	(-6.76)	[0.00]	
Other DMs	SMB	-0.04	-0.11	-0.05	0.79	-0.12	-0.23	43.25	77.82
		(-0.33)	(-1.18)	(-3.02)	(18.00)	(-2.41)	(-7.45)	[0.00]	
	HML	0.85	0.88	0.06	0.22	0.55	-0.07	2.96	21.63
		(4.73)	(4.14)	(2.10)	(3.00)	(7.15)	(-0.87)	[0.09]	
	UMD	1.28	-0.01	-0.21	0.04	-0.34	0.54	18.84	30.87
		(5.66)	(-0.03)	(-3.02)	(0.33)	(-2.89)	(5.75)	[0.00]	
	RMW	0.87	0.12	-0.04	-0.07	-0.09	0.34	39.78	14.16
		(4.78)	(0.68)	(-1.37)	(-1.11)	(-1.11)	(5.18)	[0.00]	
	CMA	-0.44	-0.12	0.01	0.00	0.93	-0.16	15.05	81.90
		(-3.41)	(-1.43)	(0.55)	(0.03)	(34.97)	(-4.32)	[0.00]	
Brazil	SMB	-0.57	-0.60	-0.10	0.96	-0.04	-0.09	9.36	80.05
		(-1.75)	(-3.34)	(-4.00)	(15.65)	(-1.12)	(-2.59)	[0.00]	
	HML	1.37	1.24	0.14	0.15	0.00	-0.11	24.91	8.69
		(4.68)	(3.52)	(3.05)	(1.68)	(-0.05)	(-1.28)	[0.00]	

	UMD	0.81	0.27	-0.13	0.01	-0.03	0.31	35.03	15.42
		(2.18)	(0.69)	(-1.92)	(0.08)	(-0.29)	(3.47)	[0.00]	
	RMW	1.62	1.15	-0.03	-0.13	-0.03	0.19	45.35	5.33
		(5.18)	(2.88)	(-0.61)	(-1.27)	(-0.32)	(2.49)	[0.00]	
	CMA	-1.11	-0.32	-0.01	0.02	0.72	-0.21	43.60	63.08
		(-4.69)	(-2.02)	(-0.56)	(0.46)	(17.20)	(-6.29)	[0.00]	
China	SMB	0.89	0.55	0.04	0.59	-0.02	-0.29	9.71	62.33
		(3.08)	(2.22)	(1.11)	(6.59)	(-0.18)	(-3.08)	[0.00]	
	HML	0.57	-0.74	-0.10	0.78	0.61	0.38	1.26	18.27
		(1.37)	(-1.09)	(-0.91)	(2.79)	(2.08)	(1.51)	[0.26]	
	UMD	-0.04	-0.68	-0.01	-0.17	-0.29	0.42	20.22	26.02
		(-0.13)	(-2.25)	(-0.19)	(-1.73)	(-2.09)	(3.50)	[0.00]	
	RMW	0.98	-0.40	-0.08	0.02	-0.15	0.68	8.96	58.97
		(3.68)	(-1.58)	(-2.37)	(0.19)	(-1.25)	(8.72)	[0.00]	
	CMA	-0.26	-0.04	-0.01	0.00	0.95	-0.20	9.28	82.39
		(-0.80)	(-0.39)	(-1.25)	(0.03)	(24.59)	(-4.72)	[0.00]	
India	SMB	0.30	-0.72	-0.14	0.82	20.02	-0.17	15.49	78.99
		(0.78)	(-2.38)	(-4.02)	(16.39)	(0.31)	(-3.00)	[0.00]	
	HML	1.33	1.40	0.24	0.23	0.19	-0.27	28.59	42.42
		(3.91)	(3.52)	(4.85)	(4.58)	(1.86)	(-4.66)	[0.00]	
	UMD	0.61	-0.93	-0.27	0.12	-0.43	0.37	38.86	36.68
		(1.61)	(-1.50)	(2.70)	(1.36)	(-4.33)	(2.79)	[0.00]	
	RMW	1.43	1.26	-0.06	-0.28	-0.12	0.53	7.27	13.06
		(2.34)	(1.74)	(-0.72)	(-1.83)	(-0.55)	(3.32)	[0.01]	
	CMA	-1.66	-0.27	-0.02	-0.06	0.86	-0.19	13.46	74.32
		(-6.52)	(-1.34)	(0.18)	(-2.49)	(12.45)	(-4.50)	[0.00]	
Malaysia	SMB	-0.11	-0.67	-0.03	-0.89	-0.02	-0.17	19.52	84.27
		(-0.39)	(-4.53)	(-1.36)	(31.52)	(-0.45)	(-3.22)	[0.00]	
	HML	0.91	1.57	0.03	0.14	0.21	-0.25	48.48	21.19
		(4.23)	(5.39)	(0.67)	(2.31)	(2.83)	(-3.06)	[0.00]	
	UMD	0.33	-1.22	-0.06	-0.21	-0.10	0.69	10.69	40.84
		(1.16)	(-2.68)	(-1.33)	(-1.90)	(-0.65)	(5.76)	[0.00]	
	RMW	1.28	0.04	0.11	0.62	-0.10	0.27	0.12	25.96
		(3.97)	(0.11)	(2.23)	(2.52)	(-0.43)	(2.93)	[0.73]	
	CMA	-1.05	-0.15	0.00	-0.02	0.80	-0.22	32.43	72.50
		(-5.54)	(-1.15)	(0.20)	(-0.84)	(19.72)	(-5.05)	[0.00]	
Pakistan	SMB	-0.74	-0.79	-0.10	0.72	0.10	-0.25	18.70	65.97
		(-1.66)	(-2.55)	(-1.49)	(12.17)	(1.39)	(-4.17)	[0.00]	
	HML	1.29	1.67	0.12	0.29	0.01	-0.19	22.10	8.42
		(3.16)	(3.05)	(1.26)	(3.44)	(0.06)	(-1.86)	[0.00]	
	UMD	0.21	0.07	-0.30	0.17	0.10	0.18	26.47	27.54
		(0.59)	(0.13)	(-2.83)	(1.09)	(0.96)	(1.94)	[0.00]	
	RMW	1.38	0.42	-0.12	-0.05	-0.09	0.34	55.44	24.24
		(3.43)	(1.09)	(-1.91)	(-0.61)	(-1.26)	(3.59)	[0.00]	
	CMA	-0.97	-0.34	0.13	0.02	0.62	-0.19	10.93	58.59
		(-2.45)	(-1.07)	(2.22)	(0.66)	(11.59)	(-2.44)	[0.00]	
Taiwan	SMB	0.14	0.08	-0.07	0.82	0.03	-0.31	25.39	79.15
		(0.50)	(0.69)	(-3.72)	(11.10)	(0.58)	(-11.05)	[0.00]	
	HML	1.10	2.17	0.15	0.12	0.62	-0.22	2.25	31.51
		(3.92)	(6.68)	(2.89)	(0.93)	(5.15)	(-3.69)	[0.13]	
	UMD	0.04	-0.53	-0.09	-0.17	-0.42	0.30	40.75	22.24
		(0.12)	(-1.28)	(-1.29)	(-1.48)	(-2.25)	(3.40)	[0.00]	
	RMW	1.13	-0.11	-0.13	-0.22	-0.35	0.51	48.39	58.81
		(4.39)	(-0.35)	(-3.64)	(-2.32)	(-4.41)	(6.60)	[0.00]	
	CMA	-1.20	0.02	-0.01	0.08	0.88	-0.30	11.33	79.70
		(-5.03)	(0.08)	(-0.64)	(1.36)	(16.46)	(-4.57)	[0.00]	
Thailand	SMB	-0.42	-0.44	-0.23	0.71	0.08	-0.07	22.86	77.45

		(-1.59)	(-2.64)	(-6.43)	(10.83)	(1.38)	(-1.43)	[0.00]	
	HML	1.57	1.73	0.29	0.52	0.07	-0.37	3.80	21.05
		(4.46)	(4.26)	(2.94)	(3.44)	(0.62)	(-3.18)	[0.05]	
	UMD	0.46	-0.56	-0.36	-0.02	0.07	0.52	5.07	26.40
		(1.19)	(-1.37)	(-2.90)	(-0.09)	(0.44)	(5.01)	[0.02]	
	RMW	1.27	0.37	-0.04	-0.14	-0.15	0.43	61.40	28.59
		(6.39)	(1.99)	(-0.84)	(-2.38)	(-2.29)	(7.82)	[0.00]	
	CMA	-0.73	-0.06	-0.02	-0.04	0.85	-0.13	9.87	64.03
		(-3.46)	(-0.42)	(-0.62)	(-0.68)	(16.92)	(-2.67)	[0.00]	
Turkey	SMB	0.01	-0.23	-0.08	0.94	0.05	-0.30	10.08	78.00
		(0.04)	(-1.35)	(-4.63)	(11.47)	(0.77)	(-7.70)	[0.00]	
	HML	1.94	1.25	0.07	0.09	0.13	0.07	24.90	6.13
		(3.53)	(3.78)	(2.25)	(1.51)	(1.75)	(0.91)	[0.00]	
	UMD	-0.06	-0.52	-0.15	-0.13	-0.34	0.28	83.59	25.86
		(-0.15)	(-1.27)	(-3.62)	(-1.80)	(-4.25)	(3.88)	[0.00]	
	RMW	1.32	0.71	-0.02	-0.05	-0.40	0.47	24.16	31.47
		(2.90)	(2.24)	(-0.48)	(-0.41)	(-3.14)	(5.47)	[0.00]	
	CMA	-0.57	-0.37	-0.03	0.04	0.70	-0.11	11.96	57.75
		(-1.77)	(-2.08)	(-1.28)	(0.68)	(11.65)	(-2.67)	[0.00]	
Other EMs	SMB	-0.32	-0.40	-0.16	0.75	0.13	-0.19	24.86	72.71
		(-1.19)	(-2.63)	(-5.14)	(16.13)	(3.84)	(-4.74)	[0.00]	
	HML	1.96	1.65	0.13	0.05	0.09	-0.17	30.20	7.25
		(3.60)	(5.85)	(2.53)	(0.56)	(1.31)	(2.45)	[0.00]	
	UMD	0.65	0.67	-0.38	-0.07	-0.17	0.22	75.87	28.10
		(2.20)	(1.86)	(-4.88)	(-0.76)	(-1.55)	(2.44)	[0.00]	
	RMW	1.38	0.45	0.11	0.00	-0.14	0.28	32.09	9.83
		(4.87)	(1.51)	(1.80)	(0.03)	(-1.63)	(2.75)	[0.00]	
	CMA	-0.52	-0.35	-0.06	-0.09	0.90	-0.03	5.83	79.44
		(-1.73)	(-1.95)	(-1.56)	(-1.84)	(13.31)	(-0.46)	[0.02]	
DMs	SMB	0.01	-0.06	0.01	0.85	0.01	-0.23	19.18	81.79
		(0.06)	(-0.53)	(0.55)	(17.76)	(0.30)	(-5.67)	[0.00]	
	HML	0.95	0.48	-0.07	0.28	0.35	0.21	2.74	23.68
		(5.72)	(2.24)	(-1.80)	(2.93)	(4.15)	(2.43)	[0.10]	
	UMD	0.68	-0.82	-0.19	0.04	-0.59	0.70	30.28	42.19
		(2.93)	(-2.70)	(-2.64)	(0.44)	(-5.28)	(6.51)	[0.00]	
	RMW	0.81	-0.87	-0.02	0.00	-0.11	0.80	19.67	69.71
		(5.02)	(-8.63)	(-1.05)	(-0.03)	(-1.90)	(20.45)	[0.00]	
	CMA	-0.66	-0.13	0.03	0.05	1.01	-0.16	2.32	94.01
		(-4.42)	(-2.31)	(1.67)	(1.75)	(51.48)	(-7.35)	[0.13]	
EMs	SMB	0.37	-0.49	-0.09	0.76	0.02	-0.13	51.23	78.35
		(1.15)	(-4.10)	(-3.54)	(19.80)	(0.68)	(-3.88)	[0.00]	
	HML	1.73	1.41	0.19	0.39	0.29	-0.14	4.76	26.66
		(6.13)	(5.07)	(5.56)	(7.65)	(4.41)	(-2.08)	[0.03]	
	UMD	0.78	-0.03	-0.27	-0.31	-0.52	0.58	27.34	28.10
		(2.69)	(-0.08)	(-2.32)	(-2.44)	(-5.97)	(4.76)	[0.00]	
	RMW	1.51	0.07	0.03	0.13	0.03	0.40	17.64	29.95
		(4.43)	(0.30)	(1.18)	(2.43)	(0.70)	(4.82)	[0.00]	
	CMA	-0.49	-0.21	-0.03	-0.04	0.97	-0.13	25.41	92.69
		(-1.70)	(-3.22)	(-2.30)	(-2.23)	(38.45)	(-5.98)	[0.00]	
Non-US	SMB	0.16	-0.36	-0.01	0.85	-0.01	-0.08	17.39	82.65
		(1.44)	(-4.93)	(-0.92)	(24.61)	(-0.43)	(-3.00)	[0.00]	
	HML	1.15	0.73	-0.04	0.41	0.27	0.06	3.47	23.35
		(7.58)	(3.47)	(-0.91)	(4.81)	(2.95)	(0.77)	[0.06]	
	UMD	0.65	-0.44	-0.18	-0.10	-0.48	0.63	22.67	33.19
		(2.72)	(-1.42)	(-2.19)	(-0.89)	(-5.61)	(4.98)	[0.00]	
	RMW	0.74	-0.31	-0.02	-0.04	-0.04	0.54	33.32	41.12
		(5.37)	(-2.28)	(-0.63)	(-0.95)	(-0.79)	(10.79)	[0.00]	

	CMA	-0.43	-0.12	0.01	0.03	1.02	-0.16	5.20	95.44
		(-2.84)	(-1.91)	(1.36)	(2.32)	(79.83)	(-6.11)	[0.02]	
Global	SMB	0.07	-0.27	0.00	0.87	0.00	-0.15	15.27	80.75
		(0.62)	(-2.63)	(-0.04)	(18.66)	(0.07)	(-3.55)	[0.00]	
	HML	1.09	0.56	-0.01	0.25	0.30	0.18	4.59	18.88
		(7.18)	(2.82)	(-0.37)	(2.48)	(3.89)	(2.29)	[0.03]	
	UMD	0.78	-0.51	-0.19	-0.06	-0.54	0.66	29.52	35.75
		(3.44)	(-1.91)	(-2.39)	(-0.52)	(-6.11)	(5.99)	[0.00]	
	RMW	0.84	-0.71	-0.01	-0.01	-0.06	0.74	15.26	56.97
		(5.65)	(-5.67)	(-0.53)	(-0.21)	(-0.86)	(14.91)	[0.00]	
	CMA	-0.64	-0.15	0.01	0.02	1.02	-0.17	8.43	95.48
		(-4.68)	(-2.79)	(1.46)	(1.26)	(72.04)	(-8.18)	[0.00]	

Table 14. Spanning Test: Fama–French vs q5 Models

Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB, HML, RMW, CMA are the size, value, profitability, and investment factors from Fama–French's five-factor model. UMD is the momentum factor. MKT, r_{ME}, $r_{I/A}$, $r_{ROE,}$ and r_{EG} are the market, size, investment, profitability and expected growth factors from Hou–Xue–Zhang's q-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	r_{ME}	$r_{I/A}$	r_{ROE}	r_{EG}	$\chi2$	R^2
Australia	SMB	-0.99	-0.19	0.06	0.88	0.05	-0.53	-0.02	18.23	82.67
		(-2.41)	(-0.87)	(2.82)	(14.90)	(1.16)	(-11.01)	(-0.57)	[0.00]	
	HML	1.73	1.87	0.06	0.17	0.05	0.04	-0.10	21.32	6.79
		(7.49)	(4.22)	(1.18)	(2.66)	(0.54)	(0.53)	(-1.52)	[0.00]	
	UMD	0.91	-1.09	-0.11	-0.08	-0.39	0.60	0.14	15.30	36.67
		(3.26)	(-2.61)	(-1.99)	(-1.04)	(-4.40)	(9.49)	(1.17)	[0.00]	
	RMW	1.39	0.33	-0.11	-0.17	-0.09	0.50	0.23	9.18	37.92
		(2.29)	(0.87)	(-2.32)	(-1.60)	(-1.07)	(6.00)	(3.00)	[0.00]	
	CMA	-1.78	0.19	0.03	-0.18	0.71	-0.27	0.04	43.04	59.56
		(-6.58)	(0.70)	(1.06)	(-4.43)	(12.05)	(-4.22)	(0.85)	[0.00]	
Canada	SMB	0.42	0.21	-0.06	0.72	-0.01	-0.30	-0.19	23.26	73.80
		(1.39)	(1.18)	(-1.63)	(10.30)	(-0.14)	(-8.93)	(-2.20)	[0.00]	
	HML	0.32	1.06	0.03	0.20	0.36	-0.11	0.32	0.66	20.93
		(1.06)	(2.96)	(0.28)	(2.12)	(3.50)	(-1.44)	(2.60)	[0.42]	
	UMD	1.25	-0.64	-0.31	-0.08	-0.47	0.55	-0.43	38.31	33.54
		(3.90)	(-1.41)	(-2.30)	(-0.51)	(-4.82)	(5.30)	(-3.08)	[0.00]	
	RMW	0.32	-0.30	-0.07	0.07	-0.19	0.73	0.88	1.68	71.69
		(0.71)	(-0.71)	(-1.12)	(0.49)	(-1.66)	(7.59)	(5.13)	[0.19]	
	CMA	-0.77	0.05	-0.01	-0.05	0.91	-0.19	0.11	8.27	81.25
		(-3.24)	(0.32)	(-0.62)	(-1.01)	(20.09)	(-5.20)	(3.09)	[0.00]	
France	SMB	-0.16	0.08	0.00	0.92	-0.16	-0.23	0.10	28.37	74.51
		(-0.92)	(0.68)	(-0.01)	(23.11)	(-1.60)	(-6.21)	(1.32)	[0.00]	
	HML	0.78	0.99	-0.01	0.01	0.47	-0.03	-0.13	23.16	16.82
		(3.59)	(4.30)	(-0.22)	(0.18)	(3.17)	(-0.33)	(-1.18)	[0.00]	
	UMD	1.28	-0.24	-0.20	-0.01	-0.45	0.57	0.03	49.58	40.00
		(5.05)	(-0.76)	(-4.22)	(-0.08)	(-4.44)	(4.69)	(0.28)	[0.00]	
	RMW	0.91	0.54	-0.05	0.04	0.07	0.21	0.19	3.83	3.53
		(2.72)	(0.98)	(-0.61)	(0.28)	(0.50)	(1.25)	(1.44)	[0.0505]	
	CMA	-0.91	0.01	-0.02	-0.02	0.85	-0.20	0.00	37.10	77.72
		(-4.84)	(0.07)	(-1.11)	(-0.72)	(24.30)	(-5.41)	(-0.12)	[0.00]	
Germany	SMB	-0.24	0.01	-0.03	0.88	0.02	-0.27	0.11	10.55	72.96
		(-1.55)	(0.12)	(-1.19)	(18.18)	(0.31)	(-7.08)	(2.68)	[0.00]	
	HML	0.71	0.75	-0.02	-0.16	0.35	0.01	-0.20	52.80	11.71
		(3.89)	(3.70)	(-0.68)	(2.84)	(3.62)	(0.17)	(-2.41)	[0.00]	
	UMD	0.95	-0.47	-0.25	0.04	-0.20	0.59	-0.14	20.26	37.99
		(4.48)	(-1.45)	(-4.03)	(0.45)	(-2.06)	(6.78)	(-1.18)	[0.00]	
	RMW	1.05	0.06	-0.06	0.01	-0.08	0.44	0.21	4.53	16.84
		(4.22)	(0.20)	(-1.26)	(0.06)	(-0.83)	(5.78)	(1.88)	[0.03]	
	CMA	-0.71	-0.16	0.00	-0.03	0.85	-0.17	-0.08	45.37	75.75
		(-4.19)	(-1.69)	(0.02)	(-1.00)	(24.00)	(-4.51)	(-1.96)	[0.00]	
Hong Kong	SMB	-0.30	-0.22	-0.06	0.86	0.09	-0.41	0.03	21.44	87.42
		(-0.92)	(-1.25)	(-2.34)	(21.66)	(1.92)	(-10.48)	(0.42)	[0.00]	
	HML	1.05	1.09	0.02	0.00	0.13	0.08	-0.13	35.40	3.91
		(4.27)	(4.04)	(0.43)	(0.02)	(2.31)	(1.43)	(-1.71)	[0.00]	
	UMD	0.93	-0.97	-0.25	0.11	-0.43	0.48	-0.18	69.68	33.97
		(3.10)	(-1.79)	(-3.39)	(1.83)	(-3.71)	(4.55)	(-1.58)	[0.00]	

	RMW	1.88	0.62	0.08	-0.33	-0.03	0.67	0.07	12.22	58.62
		(4.50)	(2.13)	(1.34)	(-4.26)	(-0.22)	(10.58)	(0.51)	[0.00]	
	CMA	-1.17	0.16	-0.07	-0.07	0.76	-0.27	-0.07	45.85	62.46
		(-5.39)	(0.75)	(-1.84)	(-1.75)	(9.59)	(-5.97)	(-1.07)	[0.00]	
Japan	SMB	0.15	-0.30	0.04	0.95	0.00	-0.03	0.08	0.29	91.39
		(0.96)	(-4.55)	(2.89)	(49.14)	(-0.05)	(-1.08)	(2.99)	[0.59]	
	HML	0.64	1.09	-0.20	0.06	0.16	-0.29	0.08	65.02	21.04
		(4.28)	(6.70)	(-6.91)	(1.45)	(1.38)	(-4.88)	(-1.20)	[0.00]	
	UMD	-0.15	-1.40	-0.10	-0.19	-0.43	0.94	-0.22	16.87	42.89
		(-0.69)	(-5.73)	(-2.48)	(-2.71)	(-2.98)	(7.70)	(-2.07)	[0.00]	
	RMW	0.51	-0.03	0.02	-0.03	-0.24	0.43	0.04	69.91	46.33
		(4.64)	(-0.33)	(0.90)	(-1.29)	(-4.18)	(7.52)	(1.97)	[0.00]	
	CMA	-0.48	0.02	-0.01	0.02	0.97	-0.27	0.02	71.78	94.50
		(-3.90)	(0.52)	(-0.78)	(1.52)	(48.66)	(-14.52)	(2.17)	[0.00]	
South Korea	SMB	1.17	-0.43	0.08	0.89	0.01	-0.15	0.08	4.80	78.88
		(2.88)	(-1.82)	(2.97)	(18.52)	(0.06)	(-3.05)	(-1.30)	[0.03]	
	HML	1.20	1.09	-0.11	0.14	0.16	-0.02	0.07	21.54	9.48
		(3.84)	(2.36)	(-2.32)	(1.99)	(1.85)	(-0.228)	(0.80)	[0.00]	
	UMD	-0.74	-1.19	-0.25	-0.22	-0.25	0.44	-0.16	64.10	39.00
		(-2.08)	(-2.48)	(-6.58)	(-2.12)	(-2.55)	(4.61)	(-1.51)	[0.00]	
	RMW	0.91	0.36	-0.04	-0.24	-0.10	0.45	0.11	35.44	33.03
		(3.58)	(1.22)	(1.86)	(-4.90)	(-1.47)	(6.39)	(1.10)	[0.00]	
	CMA	-0.64	0.09	-0.01	-0.01	0.76	-0.23	0.20	6.49	72.46
		(-2.84)	(0.56)	(-0.34)	(-0.45)	(6.61)	(-7.94)	(3.58)	[0.01]	
UK	SMB	-0.06	-0.14	0.02	0.91	-0.07	-0.27	0.10	13.41	83.44
		(-0.30)	(-1.18)	(1.04)	(27.06)	(-1.76)	(-8.59)	(2.19)	[0.00]	
	HML	0.75	1.19	-0.05	-0.13	0.31	-0.12	-0.10	70.23	13.11
		(4.52)	(6.24)	(-1.36)	(-2.70)	(4.37)	(-2.80)	(-1.31)	[0.00]	
	UMD	1.24	-0.56	-0.13	-0.05	-0.57	0.64	-0.06	77.91	43.49
		(4.99)	(-1.52)	(-2.25)	(-0.75)	(-7.89)	(7.50)	(-0.74)	[0.00]	
	RMW	1.40	0.30	-0.13	-0.14	-0.10	0.51	0.36	18.48	47.93
		(6.61)	(1.22)	(-2.89)	(-2.31)	(-1.34)	(7.56)	(4.98)	[0.00]	
	CMA	-0.81	-0.13	-0.01	-0.05	0.76	-0.19	0.03	51.09	69.08
		(-5.56)	(-1.14)	(-0.27)	(-2.61)	(17.56)	(-5.86)	(0.76)	[0.00]	
US	SMB	-0.39	-0.19	0.05	0.97	-0.01	-0.40	0.00	24.27	91.05
		(-1.75)	(-1.64)	(1.70)	(43.30)	(-0.27)	(-9.88)	(-0.07)	[0.00]	
	HML	1.06	0.75	-0.05	-0.12	0.25	0.23	0.04	15.51	24.77
		(6.15)	(2.76)	(-0.92)	(-2.34)	(4.99)	(2.49)	(0.42)	[0.00]	
	UMD	0.87	-0.56	-0.31	0.01	-0.70	0.59	-0.16	31.10	41.93
		(3.60)	(-1.39)	(-3.20)	(0.09)	(-5.71)	(4.15)	(-1.48)	[0.00]	
	RMW	0.70	-0.67	-0.06	-0.08	-0.15	0.59	0.32	10.16	61.63
		(3.79)	(-3.70)	(-1.70)	(-2.48)	(-3.08)	(9.42)	(4.28)	[0.00]	
	CMA	-0.86	-0.08	0.02	-0.02	0.85	-0.18	-0.05	59.36	83.61
		(-6.03)	(-0.93)	(1.12)	(-1.36)	(33.21)	(-5.90)	(-1.53)	[0.00]	
Other DMs	SMB	-0.04	-0.09	-0.04	0.84	-0.12	-0.24	0.11	22.62	79.30
		(-0.33)	(-0.95)	(2.50)	(19.62)	(-2.59)	(-7.96)	(2.33)	[0.00]	
	HML	0.85	0.80	-0.40	0.12	0.56	-0.03	-0.26	14.55	23.36
		(4.73)	(3.80)	(1.28)	(1.86)	(7.59)	(-0.36)	(-2.61)	[0.00]	
	UMD	1.28	-0.07	-0.22	-0.01	-0.34	0.58	-0.13	22.82	31.85
		(5.66)	(-0.26)	(-3.09)	(-0.06)	(-2.76)	(5.90)	(-1.13)	[0.00]	
	RMW	0.87	0.21	-0.03	0.00	-0.11	0.31	0.26	12.08	19.93
		(4.78)	(1.13)	(-1.15)	(-0.05)	(-1.33)	(4.85)	(3.24)	[0.00]	
	CMA	-0.44	-0.09	-0.01	0.01	0.93	-0.17	0.02	14.28	83.83
		(-3.41)	(-1.15)	(0.78)	(0.22)	(34.66)	(-5.04)	(0.69)	[0.00]	
Brazil	SMB	-0.57	-0.60	-0.10	0.96	-0.04	-0.09	0.00	8.43	80.00
		(-1.75)	(-3.28)	(-4.04)	(15.73)	(-1.13)	(-2.58)	(0.02)	[0.00]	
	HML	1.37	1.23	0.14	0.15	0.00	-0.11	-0.02	18.12	8.73

		(4.68)	(3.48)	(2.99)	(1.67)	(-0.02)	(-1.27)	(-0.24)	[0.00]	
	UMD	0.81	0.32	-0.12	0.01	-0.04	0.31	0.10	18.47	16.00
		(2.18)	(0.83)	(-1.80)	(0.13)	(-0.38)	(3.56)	(1.32)	[0.00]	
	RMW	1.62	1.21	-0.02	-0.12	-0.04	0.19	0.12	30.54	6.63
		(5.18)	(3.11)	(-0.41)	(-1.22)	(-0.49)	(2.67)	(1.66)	[0.00]	
	CMA	-1.11	-0.29	0.01	0.02	0.71	-0.21	0.05	25.42	63.44
		(-4.69)	(-1.93)	(-0.32)	(0.52)	(16.80)	(-6.20)	(1.32)	[0.00]	
China	SMB	0.89	0.35	0.03	0.58	0.04	-0.22	-0.27	16.48	65.06
		(3.08)	(1.26)	(0.83)	(7.14)	(0.38)	(-2.05)	(-1.85)	[0.00]	
	HML	0.57	0.03	-0.05	0.82	0.38	0.11	1.03	4.28	29.72
		(1.37)	(0.04)	(-0.47)	(3.13)	(1.40)	(0.47)	(3.90)	[0.04]	
	UMD	-0.04	-0.86	-0.02	-0.18	-0.24	0.49	-0.24	20.36	27.86
		(-0.13)	(-2.90)	(-0.44)	(-1.80)	(-1.75)	(4.68)	(-1.88)	[0.00]	
	RMW	0.98	-0.11	-0.06	0.03	-0.24	0.58	0.40	2.83	64.88
		(3.68)	(-0.56)	(-1.82)	(0.41)	(-2.02)	(8.70)	(3.19)	[0.09]	
	CMA	-0.26	-0.03	-0.01	0.00	0.92	-0.20	0.02	6.91	82.41
		(-0.80)	(-0.30)	(-1.23)	(0.05)	(23.65)	(-4.88)	(0.35)	[0.01]	
India	SMB	0.30	-0.72	-0.13	0.82	0.02	-0.17	0.01	15.12	78.99
		(0.78)	(-2.38)	(-3.84)	(16.41)	(0.29)	(-3.02)	(0.27)	[0.00]	
	HML	1.33	1.39	0.24	0.22	0.19	-0.27	-0.03	21.40	42.48
		(3.91)	(3.48)	(4.68)	(4.37)	(1.87)	(-4.64)	(-0.36)	[0.00]	
	UMD	0.61	-0.87	-0.25	0.14	-0.45	0.35	0.14	31.36	37.62
		(1.61)	(-1.41)	(-2.52)	(1.62)	(-4.51)	(2.67)	(1.67)	[0.00]	
	RMW	1.43	1.38	0.02	-0.24	-0.17	0.50	0.27	3.19	14.93
		(2.34)	(1.97)	(-0.20)	(-1.52)	(-0.87)	(3.02)	(1.62)	[0.07]	
	CMA	-1.66	-0.28	0.00	-0.07	0.86	-0.18	-0.03	10.32	74.42
		(-6.52)	(-1.38)	(-0.09)	(-2.34)	(12.76)	(-4.35)	(-0.54)	[0.00]	
Malaysia	SMB	-0.11	-0.67	-0.03	0.89	-0.02	-0.17	0.00	24.43	84.27
		(-0.39)	(-4.49)	(-1.47)	(33.59)	(-0.45)	(-3.05)	(-0.01)	[0.00]	
	HML	0.91	1.56	0.01	0.12	0.22	-0.23	-0.17	31.87	22.76
		(4.23)	(5.37)	(0.17)	(1.66)	(3.02)	(-2.68)	(-1.75)	[0.00]	
	UMD	0.33	-1.27	-0.09	-0.25	-0.07	0.72	-0.28	16.48	42.79
		(1.16)	(-2.76)	(-2.16)	(-2.32)	(-0.50)	(5.90)	(-2.36)	[0.00]	
	RMW	1.28	0.32	0.15	0.63	-0.10	0.16	0.49	0.91	30.80
		(3.97)	(0.72)	(3.25)	(2.76)	(-0.46)	(1.44)	(2.34)	[0.34]	
	CMA	-1.05	-0.15	0.01	-0.02	0.79	-0.23	0.02	33.45	72.53
		(-5.54)	(-1.10)	(0.34)	(-0.79)	(19.69)	(-4.85)	(0.48)	[0.00]	
Pakistan	SMB	-0.74	-0.78	-0.09	0.72	0.10	-0.25	0.00	15.09	65.97
		(-1.66)	(-2.62)	(-1.45)	(12.22)	(1.40)	(-4.15)	(0.03)	[0.00]	
	HML	1.29	1.46	0.10	0.27	0.00	-0.21	-0.20	25.96	11.11
		(3.16)	(2.63)	(1.04)	(3.39)	(0.03)	(-2.01)	(-1.92)	[0.00]	
	UMD	0.21	0.17	-0.29	0.17	0.10	0.18	0.10	13.61	28.36
		(0.59)	(0.35)	(-2.77)	(1.16)	(0.99)	(2.10)	(1.31)	[0.00]	
	RMW	1.38	0.66	-0.10	-0.03	-0.09	0.36	0.23	12.29	30.24
		(3.43)	(1.86)	(-1.55)	(-0.43)	(-1.28)	(4.74)	(2.55)	[0.00]	
	CMA	-0.97	-0.21	0.14	0.03	0.62	-0.18	0.12	3.94	60.07
		(-2.45)	(-0.62)	(2.36)	(0.92)	(11.96)	(-2.83)	(1.95)	[0.05]	
Taiwan	SMB	0.14	0.11	-0.06	0.83	0.04	-0.33	0.09	14.40	79.14
		(0.50)	(1.55)	(-3.39)	(10.91)	(0.71)	(-12.57)	(2.36)	[0.00]	
	HML	1.10	1.84	0.12	0.12	0.60	-0.16	-0.31	6.54	35.82
		(3.92)	(6.25)	(2.43)	(0.84)	(5.13)	(-2.94)	(-3.51)	[0.01]	
	UMD	0.04	-0.65	-0.11	-0.17	-0.43	0.33	-0.12	39.04	22.82
		(0.12)	(-1.67)	(-1.45)	(-1.48)	(-2.31)	(3.55)	(-1.03)	[0.00]	
	RMW	1.13	0.20	-0.10	-0.22	-0.34	0.45	0.29	25.57	63.24
		(4.39)	(0.69)	(-3.09)	(-2.23)	(-4.17)	(5.82)	(4.75)	[0.00]	
	CMA	-1.20	0.07	-0.01	0.09	0.88	-0.31	0.05	6.05	79.89
		(-5.03)	(0.31)	(-0.38)	(1.38)	(16.86)	(-4.96)	(0.98)	[0.01]	

Thailand	SMB	-0.42	-0.44	-0.23	0.71	0.08	-0.07	0.00	15.48	77.45
		(-1.59)	(-2.63)	(-6.65)	(10.78)	(1.40)	(-1.41)	(0.04)	[0.00]	
	HML	1.57	1.74	0.30	0.52	0.06	-0.38	0.08	2.94	21.45
		(4.46)	(4.24)	(2.91)	(3.40)	(0.54)	(-3.15)	(0.53)	[0.09]	
	UMD	0.46	-0.59	-0.38	-0.02	0.09	0.54	-0.22	10.71	28.38
		(1.19)	(-1.44)	(-3.09)	(-0.11)	(0.67)	(4.68)	(-1.20)	[0.00]	
	RMW	1.27	0.40	-0.03	-0.14	-0.17	0.40	0.22	19.30	35.82
		(6.39)	(2.33)	(-0.52)	(-1.91)	(2.59)	(8.11)	(3.87)	[0.00]	
	CMA	-0.73	-0.05	-0.01	-0.04	0.83	-0.14	0.09	6.20	65.16
		(-3.46)	(-0.34)	(-0.39)	(-0.74)	(18.39)	(-2.74)	(2.12)	[0.01]	
Turkey	SMB	0.01	-0.25	-0.08	-0.93	0.05	-0.30	-0.06	15.28	78.23
		(0.04)	(-1.41)	(-4.80)	(11.89)	(0.87)	(-8.01)	(-1.31)	[0.00]	
	HML	1.94	1.22	0.07	0.07	0.14	0.08	-0.13	23.47	7.75
		(3.53)	(3.90)	(2.24)	(1.25)	(2.08)	(1.12)	(-1.72)	[0.00]	
	UMD	-0.06	-0.51	-0.15	-0.12	-0.35	0.27	0.04	53.54	25.97
		(-0.15)	(-1.24)	(-3.58)	(-1.72)	(-4.39)	(3.84)	(0.54)	[0.00]	
	RMW	1.32	0.78	-0.01	0.00	-0.43	0.44	0.36	10.47	39.99
		(2.90)	(2.69)	(-0.36)	(0.00)	(-3.49)	(6.71)	(4.24)	[0.00]	
	CMA	-0.57	-0.37	-0.03	0.03	0.70	-0.11	-0.02	11.45	57.81
		(-1.77)	(-2.13)	(-1.30)	(0.63)	(11.76)	(-2.67)	(-0.66)	[0.00]	
Other EMs	SMB	-0.32	-0.46	-0.16	0.74	0.14	-0.16	-0.10	31.13	73.27
		(-1.19)	(-2.77)	(-5.01)	(16.58)	(4.15)	(-3.70)	(-2.09)	[0.00]	
	HML	1.96	1.68	0.13	0.06	0.09	-0.19	0.05	24.51	7.41
		(3.60)	(5.61)	(2.49)	(0.65)	(1.25)	(-2.60)	(0.59)	[0.00]	
	UMD	0.65	0.70	-0.38	-0.06	-0.18	0.20	0.05	62.74	28.21
		(2.20)	(1.97)	(-4.92)	(-0.64)	(-1.60)	(2.11)	(0.54)	[0.00]	
	RMW	1.38	0.75	0.10	0.07	-0.18	0.15	0.43	8.50	
		(4.87)	(2.34)	(1.61)	(0.87)	(-2.47)	(1.44)	(3.61)	[0.00]	
	CMA	-0.52	-0.35	-0.06	-0.09	0.90	-0.02	-0.01	6.33	79.45
		(-1.73)	(-1.93)	(-1.54)	(-1.95)	(13.37)	(-0.37)	(-0.24)	[0.01]	
DMs	SMB	0.01	-0.03	0.02	0.86	0.00	-0.26	0.08	9.32	82.86
		(0.06)	(-0.23)	(0.79)	(15.57)	(-0.06)	(-4.69)	(1.47)	[0.00]	
	HML	0.95	0.47	-0.06	0.29	0.37	0.21	0.02	0.90	24.82
		(5.72)	(2.00)	(-1.68)	(2.70)	(4.60)	(2.02)	(0.11)	[0.34]	
	UMD	0.68	-0.94	-0.20	0.02	-0.61	0.79	-0.19	27.53	42.45
		(2.93)	(-2.67)	(-2.80)	(0.21)	(-4.89)	(6.73)	(-1.41)	[0.00]	
	RMW	0.81	-0.61	-0.01	0.00	-0.04	0.68	0.24	2.60	73.77
		(5.02)	(-5.12)	(-0.77)	(0.05)	(-0.80)	(14.53)	(3.35)	[0.11]	
	CMA	-0.66	-0.11	0.03	0.05	1.01	-0.17	0.03	0.58	93.74
		(-4.42)	(-1.74)	(1.73)	(1.93)	(47.75)	(-6.34)	(0.81)	[0.45]	
EMs	SMB	0.37	-0.49	-0.09	0.76	0.02	-0.13	0.00	49.41	78.35
		(1.15)	(-4.14)	(-3.54)	(19.53)	(0.70)	(-3.82)	(-0.09)	[0.00]	
	HML	1.73	1.61	0.19	0.37	0.21	-0.23	0.28	3.56	31.95
		(6.13)	(6.31)	(5.46)	(7.01)	(2.72)	(-3.03)	(3.24)	[0.06]	
	UMD	0.78	-0.28	-0.28	-0.29	-0.42	0.69	-0.35	31.24	31.37
		(2.69)	(-0.59)	(-2.45)	(-2.51)	(-4.14)	(5.10)	(-1.98)	[0.00]	
	RMW	1.51	0.33	0.03	0.11	-0.07	0.28	0.36	12.24	42.66
		(4.43)	(1.92)	(1.17)	(2.08)	(-1.85)	(3.72)	(6.83)	[0.00]	
	CMA	-0.49	-0.21	-0.03	-0.04	0.97	-0.13	0.00	21.75	92.69
		(-1.70)	(-3.04)	(-2.30)	(-2.26)	(40.16)	(-5.93)	(0.14)	[0.00]	
Non-US	SMB	0.16	-0.38	0.00	0.87	-0.05	-0.09	0.05	11.83	84.64
		(1.44)	(-5.86)	(-0.30)	(24.51)	(-1.92)	(-3.92)	(2.72)	[0.00]	
	HML	1.15	0.76	-0.02	0.38	0.28	0.06	0.05	2.48	21.53
		(7.58)	(3.14)	(-0.44)	(4.23)	(2.90)	(0.65)	(0.80)	[0.12]	
	UMD	0.65	-0.51	-0.21	-0.12	-0.46	0.70	-0.21	22.71	34.41
		(2.72)	(-1.45)	(-2.42)	(-1.04)	(-5.26)	(5.00)	(-1.89)	[0.00]	
	RMW	0.74	-0.19	-0.02	-0.03	-0.02	0.49	0.09	20.26	42.38

		(5.37)	(-1.23)	(-0.54)	(-0.80)	(-0.42)	(8.44)	(1.76)	[0.00]	
	CMA	-0.43	-0.15	0.01	0.03	1.02	-0.16	0.00	4.34	95.35
		(-2.84)	(-1.99)	(1.60)	(2.42)	(77.20)	(-5.24)	(0.00)	[0.04]	
Global	SMB	0.07	-0.26	0.01	0.88	-0.02	-0.17	0.07	9.85	81.86
		(0.62)	(-2.14)	(0.26)	(17.58)	(-0.74)	(-3.21)	(1.64)	[0.00]	
	HML	1.09	0.58	0.00	0.25	0.32	0.17	0.06	1.66	20.36
		(7.18)	(2.88)	(0.15)	(2.43)	(3.86)	(2.02)	(0.42)	[0.20]	
	UMD	0.78	-0.67	-0.21	-0.08	-0.53	0.77	-0.26	29.39	36.42
		(3.44)	(-2.25)	(-2.58)	(-0.67)	(-5.26)	(6.72)	(-2.04)	[0.00]	
	RMW	0.84	-0.34	0.00	-0.02	-0.01	0.56	0.35	1.35	64.02
		(5.65)	(-2.19)	(-0.17)	(-0.33)	(-0.10)	(8.88)	(4.89)	[0.24]	
	CMA	-0.64	-0.14	0.02	0.02	1.02	-0.17	0.01	7.11	95.56
		(-4.68)	(-2.47)	(1.82)	(1.77)	(66.96)	(-6.92)	(0.42)	[0.01]	

Table 15. Spanning Test: Fama–French vs Stambaugh–Yuan Models

Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB, HML, RMW, CMA are the size, value, profitability, and investment factors from Fama–French's five-factor model. UMD is the momentum factor. MKT, SMB*, MGMT, and PERF are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB*	MGMT	PERF	χ2	R^2
Australia	SMB	-0.99	-0.57	-0.02	0.76	0.01	0.07	6.02	72.85
		(-2.41)	(-1.86)	(-0.76)	(14.29)	(0.17)	(1.01)	[0.01]	
	HML	1.73	1.80	-0.06	-0.03	-0.07	0.04	169.87	1.76
		(7.49)	(6.71)	(-1.41)	(-0.61)	(-0.99)	(0.66)	[0.00]	
	UMD	0.91	0.38	-0.03	0.00	0.01	-0.32	157.45	19.66
		(3.26)	(1.39)	(-0.63)	(-0.08)	(0.14)	(-5.51)	[0.00]	
	RMW	1.39	-1.65	0.08	0.09	0.21	0.09	30.74	15.60
		(2.29)	(-5.56)	(1.47)	(1.50)	(2.96)	(1.60)	[0.00]	
	CMA	-1.78	0.16	-0.02	0.20	0.09	-0.52	36.22	10.40
		(-6.58)	(0.25)	(-0.28)	(0.99)	(0.70)	(-4.01)	[0.00]	
Canada	SMB	0.42	0.28	-0.09	0.66	-0.03	0.03	19.34	54.40
		(1.39)	(1.38)	(-1.86)	(7.76)	(-0.82)	(0.84)	[0.00]	
	HML	0.32	0.21	-0.09	0.05	0.04	0.07	33.14	1.45
		(1.06)	(0.57)	(-0.91)	(0.62)	(-0.53)	(1.03)	[0.00]	
	UMD	1.25	0.55	-0.14	0.04	-0.06	-0.44	133.91	37.28
		(3.90)	(1.62)	(-1.49)	(0.53)	(-1.19)	(-5.69)	[0.00]	
	RMW	0.32	-0.63	0.02	0.15	0.29	0.02	13.94	15.38
		(0.71)	(-2.56)	(0.37)	(2.99)	(3.39)	(0.48)	[0.00]	
	CMA	-0.77	-0.28	-0.33	-0.29	-0.15	-0.33	34.88	19.86
		(-3.24)	(-0.75)	(-2.35)	(-2.08)	(-0.95)	(-5.29)	[0.00]	
France	SMB	-0.16	-0.13	0.05	0.78	-0.05	-0.05	25.00	73.30
		(-0.92)	(-1.22)	(-1.78)	(15.87)	(-1.92)	(-0.93)	[0.00]	
	HML	0.78	1.08	0.00	0.11	0.10	0.21	28.27	9.54
		(3.59)	(4.72)	(0.09)	(1.74)	(1.38)	(2.22)	[0.00]	
	UMD	1.28	0.09	-0.13	-0.06	0.07	-0.72	241.61	66.24
		(5.05)	(0.52)	(-3.05)	(-1.09)	(1.21)	(-18.18)	[0.00]	
	RMW	0.91	-0.48	0.02	0.10	0.24	0.27	15.16	23.11
		(2.72)	(-2.68)	(0.54)	(2.09)	(3.52)	(5.61)	[0.00]	
	CMA	-0.91	0.75	-0.06	-0.03	0.12	-0.15	38.11	2.39
		(-4.84)	(1.91)	(-0.97)	(-0.30)	(1.15)	(-1.15)	[0.00]	
Germany	SMB	-0.24	-0.11	-0.08	0.78	0.04	-0.04	28.64	75.93
		(-1.55)	(-1.05)	(-4.62)	(17.85)	(1.31)	(-1.20)	[0.00]	
	HML	0.71	0.87	0.00	-0.11	0.13	0.12	93.37	5.41
		(3.89)	(4.13)	(-0.11)	(-2.18)	(1.79)	(2.85)	[0.00]	
	UMD	0.95	0.03	-0.18	-0.15	0.03	-0.70	355.17	59.04
		(4.48)	(0.17)	(-3.43)	(-2.39)	(0.42)	(-6.37)	[0.00]	
	RMW	1.05	-0.46	0.03	0.13	0.30	0.14	25.55	15.00
		(4.22)	(-2.50)	(0.93)	(2.79)	(4.97)	(3.19)	[0.00]	
	CMA	-0.71	0.72	-0.07	-0.27	0.01	-0.27	84.77	9.51
		(-4.19)	(2.67)	(-1.54)	(-0.36)	(0.15)	(-3.15)	[0.00]	
Hong Kong	SMB	-0.30	-0.10	-0.13	0.77	-0.16	0.11	25.75	73.86
		(-0.92)	(-0.63)	(-3.12)	(14.59)	(-2.64)	(2.49)	[0.00]	
	HML	1.05	1.25	0.12	0.03	0.11	0.05	75.42	4.19
		(4.27)	(4.58)	(2.56)	(0.64)	(1.64)	(0.94)	[0.00]	
	UMD	0.93	-0.24	-0.11	0.00	-0.05	-0.57	199.15	48.13
		(3.10)	(-0.83)	(-2.18)	(0.12)	(-0.74)	(-9.04)	[0.00]	
	RMW	1.88	-0.74	-0.05	0.06	0.34	0.27	7.64	27.80

		(4.50)	(-3.73)	(-1.02)	(1.35)	(3.97)	(6.66)	[0.00]	
	CMA	-1.17	1.06	0.14	-0.32	0.37	-0.50	26.81	43.02
		(-5.39)	(3.14)	(1.73)	(-4.37)	(2.31)	(-4.91)	[0.00]	
Japan	SMB	0.15	-0.11	0.04	0.87	0.00	-0.09	9.59	86.97
		(0.96)	(-1.46)	(2.80)	(40.63)	(-0.06)	(-3.24)	[0.00]	
	HML	0.64	0.78	-0.19	0.01	0.21	0.18	46.35	23.78
		(4.28)	(5.67)	(-7.23)	(2.30)	(2.60)	(3.29)	[0.00]	
	UMD	-0.15	-0.42	0.00	-0.06	0.17	-0.88	379.38	73.11
		(-0.69)	(-3.42)	(0.01)	(-1.64)	(3.58)	(-21.79)	[0.00]	
	RMW	0.51	-0.43	-0.02	0.05	0.09	0.35	91.80	54.23
		(4.64)	(-5.84)	(-1.29)	(1.84)	(1.99)	(14.70)	[0.00]	
	CMA	-0.48	0.48	0.00	-0.08	-0.09	-0.23	332.06	32.45
		(-3.90)	(5.99)	(0.22)	(-2.91)	(-1.99)	(-6.72)	[0.00]	
South Korea	SMB	1.17	0.20	0.06	0.63	-0.14	-0.13	14.97	63.63
		(2.88)	(1.08)	(2.27)	(9.92)	(-1.94)	(-1.50)	[0.00]	
	HML	1.20	1.14	-0.08	0.07	0.14	-0.09	35.15	8.25
		(3.84)	(3.86)	(-1.74)	(1.76)	(1.97)	(-0.62)	[0.00]	
	UMD	-0.74	-1.00	-0.15	-0.06	0.07	-0.46	493.36	48.21
		(-2.08)	(-3.46)	(-4.37)	(-1.57)	(1.20)	(-11.38)	[0.00]	
	RMW	0.91	-0.44	0.02	-0.03	0.38	0.07	69.14	17.88
		(3.58)	(-1.99)	(0.44)	(-0.97)	(7.15)	(1.38)	[0.00]	
	CMA	-0.64	0.87	0.01	-0.18	0.12	-0.29	125.68	33.78
		(-2.84)	(3.93)	(0.35)	(-4.26)	(1.61)	(-4.75)	[0.00]	
UK	SMB	-0.06	-0.29	-0.04	0.85	-0.02	-0.05	12.73	81.09
		(-0.30)	(-2.96)	(-1.68)	(19.71)	(-0.53)	(-1.78)	[0.00]	
	HML	0.75	1.13	-0.01	-0.05	0.11	0.20	47.84	11.63
		(4.52)	(6.09)	(-0.38)	(-1.29)	(1.38)	(4.07)	[0.00]	
	UMD	1.24	0.04	-0.11	-0.22	0.01	-0.77	395.90	65.81
		(4.99)	(0.27)	(-2.57)	(-4.96)	(0.22)	(-19.67)	[0.00]	
	RMW	1.40	-0.59	0.10	0.05	0.19	0.16	24.53	17.40
		(6.61)	(-4.03)	(2.60)	(1.62)	(2.36)	(3.19)	[0.00]	
	CMA	-0.81	0.96	-0.12	-0.23	0.11	-0.40	184.17	37.11
		(-5.56)	(4.99)	(-3.66)	(-4.49)	(1.87)	(-7.49)	[0.00]	
US	SMB	-0.39	-0.14	-0.01	0.96	-0.10	-0.01	12.98	92.79
		(-1.75)	(-1.75)	(-0.55)	(48.77)	(-3.23)	(-0.45)	[0.00]	
	HML	1.06	1.23	-0.10	-0.22	0.28	0.04	65.33	20.48
		(6.15)	(6.33)	(-1.98)	(-3.39)	(3.11)	(0.58)	[0.00]	
	UMD	0.87	-0.52	-0.06	0.11	0.09	-1.05	244.32	76.82
		(3.60)	(-3.04)	(-1.37)	(1.32)	(1.31)	(-18.48)	[0.00]	
	RMW	0.70	-0.23	-0.02	0.00	0.47	0.32	4.19	41.78
		(3.79)	(-1.69)	(-0.60)	(0.06)	(6.61)	(7.28)	[0.04]	
	CMA	-0.86	0.30	0.11	-0.28	0.05	-0.30	389.97	40.52
		(-6.03)	(1.62)	(-3.38)	(-3.91)	(0.59)	(-4.10)	[0.00]	
Other DMs	SMB	-0.04	-0.17	-0.06	0.68	0.00	-0.04	79.84	68.74
		(-0.33)	(-2.15)	(-4.09)	(16.27)	(0.06)	(-1.39)	[0.00]	
	HML	0.85	0.98	0.33	0.26	0.12	0.15	22.98	14.35
		(4.73)	(5.96)	(1.12)	(4.28)	(2.82)	(2.39)	[0.00]	
	UMD	1.28	0.01	-0.08	0.07	0.01	-0.81	326.62	66.95
		(5.66)	(0.03)	(-1.86)	(0.89)	(0.28)	(-14.30)	[0.00]	
	RMW	0.87	-0.29	-0.02	0.08	0.24	0.18	20.23	21.99
		(4.78)	(-2.35)	(-0.59)	(1.42)	(3.76)	(3.53)	[0.00]	
	CMA	-0.44	0.63	-0.03	-0.08	-0.02	-0.18	149.55	7.15
		(-3.41)	(2.79)	(-0.54)	(-1.38)	(-0.31)	(-2.03)	[0.00]	
Brazil	SMB	-0.57	-0.37	-0.11	0.71	0.02	-0.11	42.75	76.26
		(-1.75)	(-2.16)	(-5.07)	(16.28)	(0.87)	(-2.98)	[0.00]	
	HML	1.37	1.29	0.14	0.22	-0.16	-0.06	43.27	11.77
		(4.68)	(4.34)	(3.21)	(2.77)	(-2.87)	(-0.74)	[0.00]	

	UMD	0.81	0.26	-0.05	-0.01	0.12	-0.41	47.32	22.09
		(2.18)	(0.67)	(-0.99)	(-0.12)	(1.76)	(-4.57)	[0.00]	
	RMW	1.62	-0.90	0.03	-0.02	0.32	0.16	22.13	28.12
		(5.18)	(-3.74)	(0.88)	(-0.31)	(6.53)	(3.36)	[0.00]	
	CMA	-1.11	1.55	-0.05	-0.30	0.03	-0.06	110.33	1.03
		(-4.69)	(5.15)	(1.63)	(-4.76)	(0.51)	(-1.29)	[0.00]	
China	SMB	0.89	0.11	0.00	0.74	-0.07	-0.04	20.68	66.61
		(3.08)	(0.81)	(0.05)	(18.20)	(-0.94)	(-0.79)	[0.00]	
	HML	0.57	0.85	-0.21	0.14	0.26	0.30	2.52	14.37
		(1.37)	(2.21)	(-2.71)	(0.82)	(0.98)	(1.80)	[0.11]	
	UMD	-0.04	-0.65	-0.01	0.03	-0.23	-0.56	530.38	54.67
		(-0.13)	(-3.65)	(-0.52)	(0.55)	(-3.47)	(-0.04)	[0.00]	
	RMW	0.98	-0.30	-0.02	-0.05	-0.02	0.30	66.98	15.63
		(3.68)	(1.93)	(-0.54)	(-1.00)	(-0.10)	(4.87)	[0.00]	
	CMA	-0.26	0.81	-0.12	-0.19	0.02	-0.32	-0.12	35.00
		(-0.80)	(3.96)	(-3.64)	(-2.57)	(0.18)	(-4.71)	[-3.64]	
India	SMB	0.30	-0.72	-0.16	0.65	-0.15	-0.09	91.72	68.43
		(0.78)	(-3.47)	(-4.18)	(15.73)	(-3.09)	(-2.35)	[0.00]	
	HML	1.33	1.50	0.15	0.29	0.13	0.16	9.95	29.18
		(3.91)	(5.39)	(2.97)	(7.23)	(1.90)	(3.06)	[0.00]	
	UMD	0.61	-0.27	-0.10	-0.05	0.06	-0.49	231.15	43.47
		(1.61)	(-0.79)	(-1.75)	(-0.98)	(1.18)	(-6.59)	[0.00]	
	RMW	1.43	-1.03	0.31	0.19	0.32	0.16	8.11	27.82
		(2.34)	(-4.28)	(0.85)	(3.79)	(5.24)	(2.25)	[0.00]	
	CMA	-1.66	1.25	-0.06	-0.21	0.03	-0.22	96.68	6.73
		(-6.52)	(2.01)	(-0.68)	(-2.80)	(0.34)	(-2.24)	[0.00]	
Malaysia	SMB	-0.11	-0.16	-0.03	0.72	0.04	0.05	10.68	75.29
		(-0.39)	(-0.85)	(-1.05)	(21.82)	(1.07)	(0.70)	[0.00]	
	HML	0.91	1.08	-0.01	0.20	-0.06	0.20	70.91	25.95
		(4.23)	(5.89)	(-0.20)	(4.33)	(-1.15)	(3.67)	[0.00]	
	UMD	0.33	-0.21	0.04	-0.12	-0.16	-0.65	179.55	54.15
		(1.16)	(-0.79)	(0.88)	(-1.80)	(-2.16)	(-7.15)	[0.00]	
	RMW	1.28	-0.88	-0.06	0.11	0.16	0.21	46.80	16.67
		(3.97)	(-5.88)	(-1.27)	(1.71)	(2.77)	(3.03)	[0.00]	
	CMA	-1.05	1.23	-0.04	0.47	-0.12	-0.57	6.91	15.53
		(-5.54)	(3.38)	(-0.62)	(2.27)	(-0.88)	(-0.47)	[0.01]	
Pakistan	SMB	-0.74	-0.63	-0.14	0.63	0.03	0.02	18.46	57.72
		(-1.66)	(-2.26)	(-2.64)	(13.90)	(0.73)	(0.55)	[0.00]	
	HML	1.29	1.46	-0.07	0.16	-0.03	0.09	32.69	6.23
		(3.16)	(3.88)	(-0.96)	(2.51)	(-0.64)	(1.69)	[0.00]	
	UMD	0.21	-0.08	-0.12	-0.06	-0.02	-0.31	233.58	26.07
		(0.59)	(-0.25)	(-2.15)	(-0.88)	(-0.59)	(-7.14)	[0.00]	
	RMW	1.38	-0.81	0.08	0.06	0.12	0.19	22.16	8.25
		(3.43)	(-2.07)	(1.68)	(1.00)	(1.94)	(2.60)	[0.00]	
	CMA	-0.97	1.06	-0.04	-0.07	0.17	-0.26	118.55	21.53
		(-2.45)	(2.99)	(-0.79)	(-1.57)	(3.56)	(-3.75)	[0.00]	
Taiwan	SMB	0.14	-0.05	-0.01	0.75	-0.05	-0.02	27.56	66.51
		(0.50)	(-0.28)	(-0.33)	(14.19)	(-1.01)	(-0.50)	[0.00]	
	HML	1.10	1.63	0.03	0.17	0.29	0.20	7.12	29.68
		(3.92)	(6.71)	(0.58)	(2.27)	(3.09)	(2.62)	[0.01]	
	UMD	0.04	-0.76	0.08	-0.07	0.14	-0.64	305.53	55.05
		(0.12)	(-4.32)	(2.12)	(-1.19)	(1.89)	(-10.86)	[0.00]	
	RMW	1.13	-0.60	-0.01	0.16	0.24	0.31	9.50	44.10
		(4.39)	(-3.22)	(-0.15)	(3.49)	(2.94)	(5.39)	[0.00]	
	CMA	-1.20	0.86	-0.17	-0.24	-0.07	0.28	581.96	46.83
		(-5.03)	(4.50)	(-3.63)	(-4.82)	(-1.35)	(-4.80)	[0.00]	
Thailand	SMB	-0.42	-0.36	-0.16	0.58	0.02	-0.09	45.48	74.54

		(-1.59)	(-2.82)	(-3.29)	(12.76)	(0.37)	(-2.55)	[0.00]	
	HML	1.57	1.76	0.24	0.38	0.10	0.19	0.12	23.50
		(4.46)	(5.36)	(3.01)	(3.92)	(1.21)	(2.73)	[0.72]	
	UMD	0.46	-0.20	-0.12	-0.10	-0.03	-0.62	65.02	51.60
		(1.19)	(-0.64)	(-1.08)	(-0.76)	(-0.37)	(-8.91)	[0.00]	
	RMW	1.27	-0.68	0.08	0.12	0.26	-0.03	11.19	14.61
		(6.39)	(-3.24)	(1.03)	(1.13)	(4.31)	(-0.62)	[0.00]	
	CMA	-0.73	1.02	0.02	-0.19	0.03	-0.20	122.98	19.88
		(-3.46)	(5.78)	(0.29)	(-2.52)	(0.70)	(-5.02)	[0.00]	
Turkey	SMB	0.01	-0.76	-0.06	0.63	0.05	-0.09	22.44	61.95
		(0.04)	(-3.03)	(-2.15)	(10.91)	(1.16)	(-1.23)	[0.00]	
	HML	1.94	1.50	0.09	0.20	-0.05	-0.04	19.98	5.53
		(3.53)	(3.76)	(1.52)	(1.83)	(-0.53)	(-0.30)	[0.00]	
	UMD	-0.06	-0.26	-0.12	-0.10	-0.01	-0.38	214.55	35.28
		(-0.15)	(-0.88)	(-2.61)	(-3.20)	(-0.18)	(-6.79)	[0.00]	
	RMW	1.32	-0.68	0.07	0.17	0.10	0.12	27.82	15.61
		(2.90)	(-2.12)	(1.78)	(3.34)	(1.23)	(1.94)	[0.00]	
	CMA	-0.57	1.74	-0.05	-0.27	0.08	-0.15	116.92	12.79
		(-1.77)	(5.30)	(-1.31)	(-2.66)	(1.06)	(-1.40)	[0.00]	
Other EMs	SMB	-0.32	-0.13	0.24	0.45	-0.02	-0.03	45.76	49.80
		(-1.19)	(-0.56)	(-5.74)	(4.98)	(-0.32)	(-0.43)	[0.00]	
	HML	1.96	2.19	0.09	0.11	-0.13	0.17	15.36	8.35
		(3.60)	(5.80)	(1.52)	(1.13)	(-1.34)	(2.24)	[0.00]	
	UMD	0.65	0.30	-0.23	-0.02	0.00	-0.46	173.58	44.15
		(2.20)	(1.33)	(-4.21)	(-0.48)	(-0.02)	(-7.68)	[0.00]	
	RMW	1.38	-0.69	-0.01	0.14	0.36	0.07	6.84	19.64
		(4.87)	(-2.80)	(-0.16)	(1.65)	(5.07)	(0.88)	[0.01]	
	CMA	-0.52	0.62	0.19	0.11	-0.03	-0.35	51.98	15.25
		(-1.73)	(2.28)	(3.60)	(2.08)	(-0.41)	(-4.40)	[0.00]	
DMs	SMB	0.01	-0.12	-0.02	0.83	-0.13	0.01	18.11	82.77
		(0.06)	(-1.94)	(-1.14)	(24.28)	(0.40)	(-1.14)	[0.00]	
	HML	0.95	1.23	-0.15	0.23	0.32	0.11	8.49	13.22
		(5.72)	(7.19)	(-3.09)	(2.01)	(1.11)	(-3.09)	[0.00]	
	UMD	0.68	-0.60	-0.05	-0.02	0.03	-1.23	91.99	63.74
		(2.93)	(-3.47)	(-1.19)	(-0.26)	(-16.21)	(-1.19)	[0.00]	
	RMW	0.81	0.54	-0.21	-0.21	-0.23	-0.36	132.15	31.65
		(5.02)	(2.95)	(-4.08)	(-2.52)	(-3.97)	(-4.08)	[0.00]	
	CMA	-0.66	-0.21	-0.01	0.08	0.33	0.34	1.97	12.83
		(-4.42)	(-1.28)	(-0.25)	(1.31)	(5.51)	(-0.25)	[0.16]	
EMs	SMB	0.37	-0.01	-0.08	0.56	-0.24	0.03	26.68	57.99
		(1.15)	(-0.02)	(-1.96)	(9.19)	(0.34)	(-1.96)	[0.00]	
	HML	1.73	2.06	-0.02	0.18	-0.04	0.20	13.79	10.07
		(6.13)	(6.27)	(-0.41)	(2.15)	(2.02)	(-0.41)	[0.00]	
	UMD	0.78	0.04	-0.02	-0.01	-0.06	-0.62	57.13	21.24
		(2.69)	(0.10)	(-0.27)	(-0.15)	(-4.23)	(-0.27)	[0.00]	
	RMW	1.51	0.86	0.09	-0.04	0.16	-0.41	10.99	6.50
		(4.43)	(2.25)	(0.90)	(-0.22)	(-2.36)	(0.90)	[0.00]	
	CMA	-0.49	-0.24	-0.10	0.00	0.05	0.28	21.70	7.62
		(-1.70)	(-1.00)	(-2.26)	(-0.03)	(4.80)	(-2.26)	[0.00]	
Non-US	SMB	0.16	-0.20	-0.02	0.78	-0.10	-0.05	31.89	77.60
		(1.44)	(-2.09)	(-0.92)	(23.08)	(-1.14)	(-0.92)	[0.00]	
	HML	1.15	1.22	-0.07	0.43	0.10	0.10	11.90	22.67
		(7.58)	(6.12)	(-1.48)	(5.26)	(1.09)	(-1.48)	[0.00]	
	UMD	0.65	-0.60	-0.02	0.04	0.14	-1.22	174.60	56.29
		(2.72)	(-2.78)	(-0.53)	(0.50)	(-11.98)	(-0.53)	[0.00]	
	RMW	0.74	0.52	-0.10	-0.04	-0.09	-0.30	381.34	21.21
		(5.37)	(3.27)	(-2.65)	(-0.78)	(-4.74)	(-2.65)	[0.00]	

	CMA	-0.43	-0.01	-0.06	-0.01	0.11	0.36	20.05	10.94
		(-2.84)	(-0.08)	(-1.47)	(-0.13)	(5.71)	(-1.47)	[0.00]	
Global	SMB	0.07	-0.18	-0.03	0.83	-0.07	0.00	21.67	81.95
		(0.62)	(-2.63)	(-1.72)	(25.03)	(0.00)	(-1.72)	[0.00]	
	HML	1.09	1.30	-0.09	0.22	0.24	0.13	16.37	10.12
		(7.18)	(7.86)	(-2.15)	(2.00)	(1.47)	(-2.15)	[0.00]	
	UMD	0.78	-0.63	0.01	-0.01	0.21	-1.22	158.21	61.04
		(3.44)	(-3.44)	(0.24)	(-0.11)	(-14.37)	(0.24)	[0.00]	
	RMW	0.84	0.49	-0.14	-0.07	-0.13	-0.35	128.60	22.56
		(5.65)	(2.67)	(-2.83)	(-0.81)	(-4.36)	(-2.83)	[0.00]	
	CMA	-0.64	-0.12	-0.05	0.03	0.30	0.35	5.07	13.03
		(-4.68)	(-0.74)	(-1.47)	(0.53)	(6.03)	(-1.47)	[0.02]	

Table 16. Spanning Test: q5 vs Fama–French Five-Factor Model

Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). r_{ME}, $r_{I/A}$, and $r_{ROE,}$ are the size, investment, and profitability factors from the q-factor model. R_{EG} is the expected growth factor from Hou–Mo-Xue–Zhang's q5 model. MKT, SMB, HML, RMW, CMA are the market, size, value, profitability, and investment factors from Fama–French's five-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	RMW	CMA	$\chi2$	R^2
Australia	r_{ME}	1.20	0.69	-0.13	0.70	0.19	0.18	-0.21	5.00	68.20
		(5.74)	(2.33)	(-6.09)	(20.45)	(2.97)	(2.80)	(-4.42)	[0.03]	
	$r_{I/A}$	-2.03	-0.83	-0.10	-0.29	0.13	-0.03	0.72	20.05	54.46
		(-7.21)	(-2.43)	(-2.89)	(-3.34)	(1.90)	(-0.90)	(12.39)	[0.00]	
	r_{ROE}	3.18	1.94	-0.16	-0.37	0.10	0.28	-0.16	54.14	45.09
		(10.11)	(4.38)	(-4.38)	(-5.35)	(1.07)	(3.72)	(-2.02)	[0.00]	
	r_{EG}	-0.24	-0.07	-0.10	-0.30	-0.08	0.06	0.10	36.41	18.95
		(-0.79)	(-0.17)	(-2.51)	(-3.46)	(-1.53)	(2.17)	(0.95)	[0.00]	
Canada	r_{ME}	0.72	0.19	0.00	0.86	0.24	0.17	-0.08	3.06	67.97
		(2.79)	(1.21)	(-0.09)	(17.70)	(5.64)	(4.75)	(-1.73)	[0.08]	
	$r_{I/A}$	-1.07	0.22	-0.06	0.01	-0.04	0.04	0.88	2.91	78.46
		(-3.92)	(1.40)	(-2.24)	(0.18)	(-1.00)	(1.12)	(17.92)	[0.09]	
	r_{ROE}	1.85	2.11	-0.14	-0.30	-0.22	0.35	0.09	52.70	52.99
		(5.59)	(8.48)	(-2.54)	(-3.30)	(-3.14)	(8.54)	(1.36)	[0.00]	
	r_{EG}	-0.97	-0.83	-0.04	-0.07	-0.05	0.33	0.17	23.30	27.12
		(-3.09)	(-3.27)	(-0.71)	(-1.54)	(-0.76)	(8.12)	(2.32)	[0.00]	
France	r_{ME}	0.21	0.21	-0.12	0.78	0.24	0.00	-0.04	2.95	77.17
		(1.15)	(2.13)	(-4.48)	(16.99)	(5.02)	(0.07)	(-0.82)	[0.09]	
	$r_{I/A}$	-0.46	0.30	-0.02	-0.02	0.02	0.00	0.85	6.68	70.42
		(-2.55)	(2.71)	(-1.28)	(-0.46)	(0.44)	(0.17)	(17.98)	[0.01]	
	r_{ROE}	2.20	2.06	-0.21	-0.13	0.02	0.08	-0.23	56.46	16.17
		(11.33)	(11.24)	(-4.39)	(-2.13)	(0.19)	(1.87)	(-2.57)	[0.00]	
	r_{EG}	0.06	-0.05	-0.05	-0.02	-0.07	0.07	-0.10	107.61	5.31
		(0.36)	(-0.31)	(-1.38)	(-0.27)	(-1.09)	(3.22)	(-1.10)	[0.00]	
Germany	r_{ME}	0.44	0.37	-0.10	0.82	0.22	0.12	-0.10	0.20	75.70
		(2.46)	(3.66)	(-4.77)	(17.83)	(5.65)	(3.76)	(-2.55)	[0.66]	
	$r_{I/A}$	-0.21	0.42	-0.03	0.03	-0.01	0.05	0.87	1.03	71.63
		(-1.18)	(4.84)	(-1.26)	(0.80)	(-0.33)	(1.76)	(27.78)	[0.31]	
	r_{ROE}	2.51	2.19	-0.13	-0.03	0.00	0.27	-0.12	46.13	18.86
		(11.69)	(11.02)	(-2.82)	(-0.43)	(0.07)	(4.70)	(-1.86)	[0.00]	
	r_{EG}	-0.19	-0.15	-0.05	-0.03	-0.15	0.11	0.01	88.56	7.36
		(-1.16)	(-0.96)	(-1.52)	(-0.63)	(-2.77)	(2.93)	(0.18)	[0.00]	
Hong Kong	r_{ME}	1.47	0.90	-0.09	0.89	0.32	0.04	-0.18	0.04	83.97
		(4.82)	(5.78)	(-3.08)	(20.39)	(7.09)	(1.25)	(-2.76)	[0.85]	
	$r_{I/A}$	-0.85	-0.14	-0.06	0.00	0.01	0.15	0.72	2.56	53.00
		(-3.64)	(-0.75)	(-1.38)	(-0.04)	(0.28)	(4.57)	(12.83)	[0.11]	
	r_{ROE}	2.84	2.13	-0.26	-0.30	0.03	0.36	-0.02	60.05	57.32
		(7.79)	(5.90)	(-5.12)	(-3.93)	(0.35)	(3.89)	(-0.21)	[0.00]	
	r_{EG}	-0.37	-0.24	-0.18	-0.14	-0.08	0.11	-0.06	44.17	28.18
		(-1.39)	(-1.11)	(-3.21)	(-2.51)	(-1.23)	(1.73)	(-0.43)	[0.00]	
Japan	r_{ME}	0.55	0.12	0.02	0.98	0.24	0.01	-0.13	3.46	93.26
		(3.32)	(2.34)	(1.85)	(66.47)	(8.44)	(0.39)	(-3.63)	[0.06]	
	$r_{I/A}$	-0.18	0.22	-0.01	-0.02	-0.03	0.06	0.84	5.06	86.96
		(-1.80)	(5.61)	(-2.22)	(-1.18)	(-2.36)	(2.38)	(27.94)	[0.02]	
	r_{ROE}	1.23	0.97	-0.07	-0.05	-0.13	0.49	-0.30	34.56	48.67
		(9.33)	(10.03)	(-4.29)	(-1.17)	(-3.37)	(7.49)	(-3.30)	[0.00]	

	r_{EG}	-0.17	-0.12	-0.13	-0.11	-0.17	0.27	0.04	22.71	11.99
		(-1.11)	(-0.89)	(-3.25)	(-2.91)	(-2.36)	(2.63)	(0.32)	[0.00]	
South Korea	r_{ME}	1.77	0.65	-0.07	0.87	0.33	-0.02	-0.07	0.14	85.65
		(4.40)	(3.97)	(-3.76)	(30.41)	(8.27)	(-0.71)	(-2.04)	[0.71]	
	$r_{I/A}$	-0.19	0.47	0.00	-0.01	-0.01	0.05	0.83	2.42	51.15
		(-0.58)	(2.30)	(-0.03)	(-0.21)	(-0.35)	(1.48)	(18.18)	[0.12]	
	r_{ROE}	2.36	2.06	-0.09	-0.03	-0.01	0.43	-0.07	30.75	30.17
		(8.49)	(7.44)	(-3.43)	(-0.62)	(-0.11)	(8.25)	(-1.10)	[0.00]	
	r_{EG}	-0.53	-0.44	0.00	-0.01	0.02	0.31	0.23	12.62	19.38
		(-1.97)	(-1.99)	(-0.11)	(-0.29)	(0.44)	(4.58)	(3.00)	[0.00]	
UK	r_{ME}	0.47	0.43	-0.07	0.92	0.19	0.13	-0.08	2.40	81.27
		(2.52)	(3.81)	(-3.51)	(33.53)	(5.43)	(4.75)	(-2.26)	[0.12]	
	$r_{I/A}$	-0.45	0.24	-0.01	-0.01	0.01	0.09	0.86	0.48	63.74
		(-3.09)	(2.07)	(-0.35)	(-0.32)	(0.24)	(2.29)	(21.58)	[0.49]	
	r_{ROE}	2.50	1.77	-0.11	-0.15	-0.20	0.55	-0.07	42.65	42.27
		(10.90)	(9.60)	(-2.89)	(-2.57)	(-3.49)	(10.47)	(-1.15)	[0.00]	
	r_{EG}	-0.35	-0.73	-0.15	-0.13	-0.02	0.27	-0.13	21.77	8.14
		(-1.04)	(-1.71)	(-1.32)	(-1.13)	(-0.19)	(3.37)	(-0.95)	[0.00]	
US	r_{ME}	0.68	0.64	-0.08	0.93	0.24	0.22	-0.05	18.82	89.22
		(3.83)	(8.25)	(-4.25)	(47.54)	(8.01)	(8.46)	(-1.72)	[0.00]	
	$r_{I/A}$	-0.39	0.40	-0.06	-0.03	0.00	0.13	0.99	0.22	81.12
		(-2.50)	(4.49)	(-1.99)	(-1.13)	(0.09)	(4.25)	(26.79)	[0.64]	
	r_{ROE}	2.38	2.02	-0.14	-0.17	0.00	0.63	0.05	23.53	60.56
		(12.85)	(15.28)	(-3.08)	(-4.24)	(-0.02)	(11.08)	(0.79)	[0.00]	
	r_{EG}	0.19	0.05	0.00	-0.07	-0.05	0.23	0.00	34.66	14.43
		(1.50)	(0.30)	(-0.04)	(-1.66)	(-1.11)	(3.40)	(-0.10)	[0.00]	
Other DMs	r_{ME}	0.56	0.46	-0.04	0.91	0.28	0.09	-0.07	3.79	79.09
		(4.55)	(5.70)	(-2.81)	(31.57)	(7.93)	(2.69)	(-1.82)	[0.05]	
	$r_{I/A}$	0.03	0.29	-0.01	-0.04	0.06	0.11	0.79	1.85	73.63
		(0.28)	(3.93)	(-0.65)	(-1.28)	(2.02)	(4.24)	(19.83)	[0.17]	
	r_{ROE}	2.36	2.27	-0.19	-0.25	-0.06	0.24	-0.05	74.58	19.73
		(14.64)	(11.92)	(-5.00)	(-3.03)	(-0.69)	(4.43)	(-0.63)	[0.00]	
	r_{EG}	-0.14	-0.01	-0.07	-0.13	-0.15	0.20	0.32	24.03	12.30
		(-0.97)	(-0.05)	(-2.30)	(-1.72)	(-1.83)	(3.33)	(3.34)	[0.00]	
Brazil	r_{ME}	0.62	0.56	-0.01	0.76	0.18	0.05	-0.02	0.18	80.74
		(2.32)	(3.44)	(-0.48)	(20.60)	(5.74)	(1.39)	(-0.55)	[0.67]	
	$r_{I/A}$	-0.36	0.44	-0.03	-0.10	-0.01	0.06	0.81	7.39	60.12
		(-1.38)	(2.59)	(-1.15)	(-2.44)	(-0.32)	(1.64)	(21.30)	[0.01]	
	r_{ROE}	2.33	2.03	-0.07	-0.02	-0.11	0.24	-0.20	30.44	11.31
		(7.64)	(6.76)	(-1.71)	(-0.23)	(-1.15)	(3.28)	(-1.79)	[0.00]	
	r_{EG}	-0.58	-0.25	-0.09	-0.09	-0.10	0.10	0.25	45.24	11.17
		(-2.16)	(-0.92)	(-2.58)	(-1.69)	(-1.47)	(1.29)	(2.95)	[0.00]	
China	r_{ME}	1.05	0.19	-0.03	0.87	0.29	-0.06	-0.27	2.17	79.34
		(4.01)	(1.48)	(-1.45)	(15.02)	(5.93)	(-0.70)	(-4.17)	[0.14]	
	$r_{I/A}$	-0.18	0.28	-0.02	-0.06	-0.02	0.04	0.75	8.72	77.20
		(-1.50)	(2.87)	(-2.36)	(-1.51)	(-0.63)	(0.73)	(16.45)	[0.00]	
	r_{ROE}	1.67	1.24	-0.03	-0.14	-0.16	0.76	-0.21	9.69	68.52
		(7.10)	(6.66)	(-1.10)	(-2.33)	(-3.07)	(6.80)	(-1.46)	[0.00]	
	r_{EG}	0.23	-0.50	0.00	0.19	0.04	0.55	0.54	2.22	48.95
		(0.52)	(-2.00)	(-0.07)	(2.22)	(0.63)	(6.87)	(4.53)	[0.14]	
India	r_{ME}	2.42	0.95	-0.07	0.89	0.50	-0.01	-0.22	1.87	85.84
		(4.69)	(4.25)	(-2.22)	(17.64)	(10.15)	(-0.13)	(-2.57)	[0.17]	
	$r_{I/A}$	-1.17	0.30	-0.02	0.09	-0.06	0.03	0.81	3.58	71.75
		(-4.92)	(1.34)	(-0.70)	(2.97)	(-1.16)	(1.08)	(17.44)	[0.06]	
	r_{ROE}	2.80	2.86	-0.14	-0.01	-0.28	0.16	-0.01	103.14	30.64
		(9.15)	(8.91)	(-3.46)	(-0.09)	(-3.35)	(4.06)	(-0.11)	[0.00]	
	r_{EG}	-0.46	0.13	-0.11	-0.14	-0.21	0.07	0.11	136.20	14.13

		(-1.55)	(0.44)	(-3.06)	(-2.32)	(-3.68)	(2.63)	(1.66)	[0.00]	
Malaysia	r_{ME}	0.83	0.70	-0.02	0.85	0.32	0.07	-0.09	5.06	87.60
		(3.16)	(5.44)	(-0.76)	(26.37)	(7.33)	(2.32)	(-1.85)	[0.02]	
	$r_{I/A}$	-0.24	0.41	-0.08	0.00	0.09	0.05	0.83	1.45	62.74
		(-1.34)	(1.65)	(-3.79)	(-0.02)	(2.13)	(1.25)	(12.05)	[0.23]	
	r_{ROE}	2.37	2.36	-0.25	-0.26	-0.25	0.16	-0.05	134.74	46.91
		(10.66)	(9.15)	(-4.35)	(-3.24)	(-3.36)	(2.48)	(-0.57)	[0.00]	
	r_{EG}	0.14	-0.11	-0.14	-0.11	-0.12	0.15	0.03	68.52	24.16
		(0.74)	(-0.48)	(-4.34)	(-2.09)	(-2.31)	(2.46)	(0.50)	[0.00]	
Pakistan	r_{ME}	1.62	0.91	0.01	1.02	0.43	0.26	-0.27	5.78	79.43
		(2.42)	(3.43)	(0.12)	(14.83)	(5.90)	(3.55)	(-4.47)	[0.02]	
	$r_{I/A}$	-0.69	0.56	-0.14	0.01	0.01	-0.04	0.79	5.41	52.01
		(-1.89)	(1.91)	(-2.85)	(0.12)	(0.10)	(-0.56)	(10.58)	[0.02]	
	r_{ROE}	3.85	3.04	-0.13	0.02	0.01	0.34	-0.31	14.66	24.39
		(8.32)	(6.83)	(-1.91)	(0.17)	(0.16)	(2.91)	(-3.68)	[0.00]	
	r_{EG}	-0.49	-0.84	-0.12	-0.10	-0.03	0.35	0.03	20.04	14.27
		(-1.13)	(-2.13)	(-2.02)	(-1.62)	(-0.66)	(3.97)	(0.29)	[0.00]	
Taiwan	r_{ME}	1.31	0.35	-0.05	0.85	0.28	0.07	-0.23	0.15	71.29
		(4.77)	(2.30)	(-2.21)	(16.61)	(4.08)	(1.05)	(-3.56)	[0.70]	
	$r_{I/A}$	-0.36	0.38	-0.03	-0.07	-0.01	0.19	0.86	0.27	71.50
		(-1.58)	(3.00)	(-1.34)	(-1.73)	(-0.44)	(4.17)	(20.08)	[0.60]	
	r_{ROE}	2.89	2.34	-0.09	-0.30	-0.03	0.61	-0.03	22.31	48.98
		(10.56)	(7.66)	(-2.62)	(-4.68)	(-0.46)	(7.64)	(-0.51)	[0.00]	
	r_{EG}	-0.30	-0.55	-0.01	-0.12	-0.08	0.43	0.14	21.58	23.70
		(-1.39)	(-1.69)	(-0.18)	(-2.11)	(-0.73)	(6.15)	(1.71)	[0.00]	
Thailand	r_{ME}	0.65	0.36	-0.05	0.74	0.28	0.05	-0.06	0.20	81.48
		(2.81)	(2.59)	(-1.72)	(21.74)	(7.65)	(1.07)	(-1.46)	[0.65]	
	$r_{I/A}$	-0.38	0.02	0.02	0.07	0.01	0.10	0.75	0.18	62.88
		(-2.11)	(0.16)	(1.11)	(1.49)	(0.20)	(2.05)	(17.44)	[0.67]	
	r_{ROE}	2.19	1.78	-0.08	-0.07	-0.14	0.53	0.07	9.24	26.54
		(9.46)	(7.15)	(-1.60)	(-0.86)	(-1.75)	(7.12)	(0.60)	[0.00]	
	r_{EG}	0.03	-0.77	-0.13	-0.01	0.17	0.58	0.23	0.14	19.48
		(0.10)	(-2.80)	(-2.05)	(-0.06)	(1.41)	(5.87)	(2.33)	[0.71]	
Turkey	r_{ME}	1.37	0.33	0.03	0.81	0.23	0.20	-0.06	5.39	77.27
		(4.33)	(2.11)	(2.50)	(25.31)	(5.04)	(6.33)	(-1.07)	[0.02]	
	$r_{I/A}$	-0.45	0.19	0.02	-0.02	0.00	-0.03	0.76	3.87	59.99
		(-1.62)	(0.98)	(1.02)	(-0.30)	(0.03)	(-0.47)	(14.57)	[0.05]	
	r_{ROE}	2.01	1.60	-0.04	-0.12	-0.07	0.40	0.18	12.24	15.81
		(5.70)	(3.43)	(-1.06)	(-2.00)	(-0.34)	(4.95)	(0.92)	[0.05]	
	r_{EG}	-0.37	-0.97	0.01	0.11	-0.11	0.38	-0.08	8.24	22.52
		(-0.80)	(-2.33)	(0.25)	(1.67)	(-1.29)	(3.49)	(-0.62)	[0.00]	
Other EMs	r_{ME}	1.10	0.81	-0.03	0.88	0.31	0.06	-0.13	0.48	74.21
		(4.94)	(6.09)	(-0.84)	(18.27)	(6.75)	(1.69)	(-3.53)	[0.49]	
	$r_{I/A}$	0.50	0.55	0.01	0.02	-0.02	0.06	0.88	0.18	79.13
		(1.87)	(3.17)	(0.34)	(0.50)	(-0.43)	(1.15)	(30.86)	[0.67]	
	r_{ROE}	3.33	3.28	-0.14	-0.19	-0.20	0.27	0.28	18.16	18.01
		(12.36)	(9.74)	(-2.19)	(-1.77)	(-2.14)	(3.10)	(3.46)	[0.00]	
	r_{EG}	-0.05	-0.17	-0.03	-0.17	-0.10	0.31	0.22	25.81	19.74
		(-0.18)	(-0.75)	(-0.70)	(-3.07)	(-1.58)	(5.18)	(3.90)	[0.00]	
DMs	r_{ME}	0.62	0.28	-0.02	0.93	0.21	0.12	-0.06	10.29	86.15
		(5.12)	(4.64)	(-0.99)	(45.24)	(7.93)	(5.22)	(-2.98)	[0.00]	
	$r_{I/A}$	-0.24	0.30	-0.04	-0.05	0.01	0.10	0.93	1.34	93.19
		(-1.66)	(6.68)	(-2.68)	(-3.49)	(0.95)	(6.39)	(59.89)	[0.25]	
	r_{ROE}	2.07	1.64	-0.11	-0.08	-0.10	0.81	0.08	7.12	72.04
		(11.89)	(12.95)	(-3.39)	(-1.66)	(-2.35)	(12.09)	(1.72)	[0.01]	
	r_{EG}	0.03	-0.24	-0.06	0.00	-0.12	0.57	0.03	13.69	45.18
		(0.25)	(-1.43)	(-2.11)	(0.02)	(-1.69)	(7.48)	(0.39)	[0.00]	

EMs	r_{ME}	1.02	0.45	-0.05	0.95	0.36	0.06	-0.11	6.65	85.67
		(4.78)	(4.62)	(-2.09)	(20.72)	(9.73)	(1.65)	(-2.98)	[0.01]	
	$r_{I/A}$	0.02	0.42	0.02	0.09	0.05	0.07	0.89	4.52	86.26
		(0.10)	(4.64)	(0.93)	(2.67)	(2.07)	(2.29)	(26.77)	[0.03]	
	r_{ROE}	2.63	2.07	-0.11	0.07	-0.09	0.59	-0.04	20.56	34.22
		(12.20)	(9.64)	(-2.11)	(1.32)	(-1.28)	(7.02)	(-0.60)	[0.00]	
	r_{EG}	0.13	0.04	-0.06	0.00	0.11	0.10	0.23	12.81	9.79
		(0.56)	(0.15)	(-1.39)	(-0.06)	(1.82)	(1.53)	(1.91)	[0.00]	
Non-US	r_{ME}	0.80	0.34	0.00	0.93	0.21	0.07	-0.05	8.80	88.12
		(6.74)	(5.73)	(0.06)	(46.29)	(7.12)	(2.93)	(-1.95)	[0.00]	
	$r_{I/A}$	-0.01	0.35	-0.03	-0.03	-0.01	0.10	0.92	2.66	94.00
		(-0.05)	(7.12)	(-3.95)	(-1.99)	(-0.53)	(6.52)	(66.23)	[0.10]	
	r_{ROE}	2.02	1.61	-0.13	0.07	-0.05	0.68	-0.09	9.41	47.51
		(12.24)	(9.18)	(-3.86)	(1.31)	(-0.95)	(9.65)	(-1.77)	[0.00]	
	r_{EG}	-0.02	-0.22	-0.13	0.04	-0.03	0.42	0.03	13.33	18.12
		(-0.08)	(-0.84)	(-3.24)	(0.53)	(-0.39)	(5.10)	(0.45)	[0.00]	
Global	r_{ME}	0.76	0.32	-0.02	0.94	0.24	0.08	-0.09	8.76	87.59
		(6.44)	(5.51)	(-0.86)	(45.21)	(8.58)	(3.38)	(-4.32)	[0.00]	
	$r_{I/A}$	-0.15	0.37	-0.04	-0.03	0.02	0.10	0.92	1.52	94.21
		(-1.14)	(9.54)	(-5.38)	(-2.52)	(1.14)	(7.73)	(60.77)	[0.22]	
	r_{ROE}	2.11	1.63	-0.13	0.01	-0.04	0.71	-0.01	8.70	60.66
		(13.29)	(11.68)	(-3.76)	(0.24)	(-0.84)	(10.04)	(-0.29)	[0.00]	
	r_{EG}	0.03	-0.28	-0.05	0.05	-0.08	0.56	0.06	10.12	44.07
		(0.22)	(-1.91)	(-1.71)	(1.07)	(-1.30)	(8.10)	(1.14)	[0.00]	

Table 17. Spanning Test: q5 vs Fama–French Six-Factor Models

Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). r_{ME}, $r_{I/A}$, and $r_{ROE,}$ are the size, investment, and profitability factors from the q-factor model. r_{EG} is the expected growth factor from the q5 model. MKT, SMB, HML, RMW, CMA and UMD are the market, size, value, profitability, investment, and momentum factors from Fama–French's six-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	UMD	CMA	RMW	χ2	R^2
Australia	r_{ME}	1.20	0.65	-0.11	0.74	0.22	0.12	-0.16	0.15	0.12	69.93
		(5.74)	(2.10)	(-5.43)	(21.02)	(3.33)	(3.62)	(-3.47)	(2.48)	[0.72]	
	$r_{I/A}$	-2.03	-0.84	-0.10	-0.29	0.14	0.04	0.74	-0.03	16.14	54.61
		(-7.21)	(-2.39)	(-2.66)	(-3.41)	(1.98)	(0.89)	(12.99)	(-1.07)	[0.00]	
	r_{ROE}	3.18	1.84	-0.13	-0.29	0.15	0.26	-0.04	0.22	19.13	50.52
		(10.11)	(4.21)	(-3.45)	(-4.36)	(1.82)	(4.95)	(-0.53)	(3.03)	[0.00]	
	r_{EG}	-0.24	-0.15	-0.08	-0.28	-0.07	0.10	0.13	0.05	18.06	19.86
		(-0.79)	(-0.36)	(-2.03)	(-3.08)	(-1.13)	(1.78)	(1.20)	(1.92)	[0.00]	
Canada	r_{ME}	0.72	0.20	-0.01	0.86	0.23	-0.02	-0.08	0.17	1.56	68.05
		(2.79)	(1.34)	(-0.36)	(17.74)	(5.73)	(-0.58)	(-1.68)	(4.72)	[0.21]	
	$r_{I/A}$	-1.07	0.21	-0.05	0.01	-0.04	0.02	0.89	0.04	2.61	78.52
		(-3.92)	(1.39)	(-2.09)	(0.15)	(-0.90)	(0.55)	(17.97)	(1.03)	[0.10]	
	r_{ROE}	1.85	1.96	-0.07	-0.32	-0.18	0.19	0.16	0.33	30.84	56.73
		(5.59)	(8.01)	(-1.20)	(-3.73)	(-2.64)	(3.23)	(2.56)	(8.31)	[0.00]	
	r_{EG}	-0.97	-0.68	-0.08	-0.06	-0.07	-0.12	0.14	0.34	28.29	28.34
		(-3.09)	(-2.79)	(-1.33)	(-1.43)	(-1.06)	(-2.57)	(1.91)	(8.82)	[0.00]	
France	r_{ME}	0.21	0.17	-0.11	0.78	0.25	0.04	-0.02	0.00	0.40	77.37
		(1.15)	(1.75)	(-4.36)	(16.57)	(5.05)	(0.98)	(-0.44)	(0.01)	[0.52]	
	$r_{I/A}$	-0.46	0.27	-0.01	-0.02	0.02	0.03	0.87	0.00	2.05	70.59
		(-2.55)	(2.43)	(-0.75)	(-0.46)	(0.60)	(1.25)	(18.13)	(0.10)	[0.15]	
	r_{ROE}	2.20	1.69	-0.11	-0.14	0.08	0.35	-0.09	0.07	42.83	30.39
		(11.33)	(9.83)	(-3.08)	(-2.28)	(1.15)	(5.39)	(-1.42)	(2.05)	[0.00]	
	r_{EG}	0.06	-0.04	-0.05	-0.02	-0.07	-0.02	-0.10	0.07	64.33	5.35
		(0.36)	(-0.22)	(-1.42)	(-0.27)	(-1.15)	(-0.33)	(-1.07)	(3.14)	[0.00]	
Germany	r_{ME}	0.44	0.27	-0.05	0.83	0.23	0.12	-0.08	0.10	2.88	77.87
		(2.46)	(2.54)	(-2.54)	(19.45)	(6.03)	(4.53)	(-2.16)	(4.18)	[0.08]	
	$r_{I/A}$	-0.21	0.40	-0.02	0.03	-0.01	0.02	0.88	0.05	0.25	71.72
		(-1.18)	(4.47)	(-0.87)	(0.89)	(-0.27)	(0.88)	(26.35)	(1.72)	[0.61]	
	r_{ROE}	2.51	1.91	-0.01	0.00	0.03	0.33	-0.07	0.21	13.05	33.4
		(11.69)	(10.55)	(-0.30)	(0.01)	(0.48)	(8.55)	(-1.22)	(4.61)	[0.00]	
	r_{EG}	-0.19	-0.11	-0.07	-0.04	-0.15	-0.05	0.00	0.12	75.65	7.95
		(-1.16)	(-0.66)	(-2.02)	(-0.77)	(-2.84)	(-1.29)	(0.00)	(3.01)	[0.00]	
Hong Kong	r_{ME}	1.47	0.90	-0.06	0.89	0.32	0.06	-0.15	0.04	0.43	84.24
		(4.82)	(5.77)	(-1.91)	(21.01)	(7.01)	(1.41)	(-1.91)	(1.06)	[0.51]	
	$r_{I/A}$	-0.85	-0.14	-0.05	0.00	0.02	0.02	0.73	0.15	0.88	53.05
		(-3.64)	(-0.74)	(-1.20)	(-0.03)	(0.28)	(0.26)	(8.70)	(4.57)	[0.34]	
	r_{ROE}	2.84	2.14	-0.18	-0.29	0.03	0.20	0.11	0.35	15.73	59.85
		(7.79)	(5.89)	(-3.46)	(-4.14)	(0.37)	(3.00)	(1.05)	(3.81)	[0.00]	
	r_{EG}	-0.37	-0.24	-0.20	-0.14	-0.08	-0.04	-0.09	0.12	46.55	28.42
		(-1.39)	(-1.12)	(-3.32)	(-2.54)	(-1.24)	(-1.02)	(-0.62)	(1.77)	[0.00]	
Japan	r_{ME}	0.55	0.12	0.02	0.99	0.25	0.01	-0.12	0.01	3.26	93.27
		(3.32)	(2.40)	(1.94)	(63.99)	(8.35)	(0.47)	(-3.40)	(0.42)	[0.07]	
	$r_{I/A}$	-0.18	0.24	-0.01	-0.01	-0.03	0.05	0.89	0.07	0.12	88.03
		(-1.80)	(6.25)	(-1.14)	(-0.46)	(-2.21)	(4.89)	(32.19)	(2.79)	[0.72]	
	r_{ROE}	1.23	1.05	-0.04	0.00	-0.12	0.23	-0.10	0.52	14.92	59.41
		(9.33)	(11.31)	(-3.15)	(-0.07)	(-3.75)	(8.35)	(-1.34)	(9.19)	[0.00]	
	r_{EG}	-0.17	-0.17	-0.14	-0.13	-0.17	-0.08	-0.04	0.27	12.73	12.9

		(-1.11)	(-1.32)	(-2.87)	(-3.06)	(-2.36)	(-0.97)	(-0.28)	(2.50)	[0.00]	
South Korea	r_{ME}	1.77	0.65	-0.07	0.88	0.33	0.01	-0.07	-0.02	0.19	85.65
		(4.40)	(3.97)	(-3.84)	(31.06)	(8.22)	(0.18)	(-1.83)	(-0.73)	[0.66]	
	$r_{I/A}$	-0.19	0.48	0.01	-0.01	-0.01	0.03	0.83	0.05	0.66	51.25
		(-0.58)	(2.28)	(0.27)	(-0.10)	(-0.29)	(0.64)	(16.48)	(1.31)	[0.41]	
	r_{ROE}	2.36	2.13	-0.05	0.00	0.01	0.16	-0.03	0.40	11.32	33.27
		(8.49)	(7.72)	(-1.85)	(0.02)	(0.18)	(3.13)	(-0.49)	(7.29)	[0.00]	
	r_{EG}	-0.53	-0.43	0.00	-0.01	0.02	0.01	0.23	0.31	11.08	19.39
		(-1.97)	(-1.74)	(-0.03)	(-0.29)	(0.42)	(0.14)	(2.94)	(4.17)	[0.00]	
UK	r_{ME}	0.47	0.41	-0.06	0.93	0.20	0.05	-0.05	0.11	5.71	81.53
		(2.52)	(3.72)	(-3.01)	(33.80)	(5.63)	(1.90)	(-1.48)	(3.53)	[0.01]	
	$r_{I/A}$	-0.45	0.25	-0.02	-0.01	0.00	-0.04	0.84	0.11	1.21	63.98
		(-3.09)	(2.17)	(-0.54)	(-0.47)	(0.00)	(-1.04)	(18.49)	(2.98)	[0.27]	
	r_{ROE}	2.50	1.69	-0.07	-0.12	-0.14	0.25	0.05	0.45	14.96	47.82
		(10.90)	(8.69)	(-1.94)	(-2.06)	(-2.65)	(5.02)	(1.02)	(8.81)	[0.00]	
	r_{EG}	-0.35	-0.69	-0.16	-0.14	-0.04	-0.10	-0.17	0.31	22.30	8.54
		(-1.04)	(-1.59)	(-1.42)	(-1.23)	(-0.33)	(-1.65)	(-1.22)	(4.30)	[0.00]	
US	r_{ME}	0.68	0.61	-0.06	0.94	0.25	0.06	-0.01	0.21	39.11	89.67
		(3.83)	(8.15)	(-3.15)	(50.63)	(9.09)	(4.36)	(-0.22)	(7.76)	[0.00]	
	$r_{I/A}$	-0.39	0.39	-0.06	-0.03	0.00	0.01	1.00	0.13	0.55	81.16
		(-2.50)	(4.26)	(-1.81)	(-1.00)	(0.13)	(0.55)	(29.69)	(4.14)	[0.45]	
	r_{ROE}	2.38	1.93	-0.08	-0.15	0.01	0.17	0.18	0.60	4.54	63.97
		(12.85)	(15.84)	(-1.80)	(-3.01)	(0.32)	(3.73)	(3.28)	(9.71)	[0.03]	
	r_{EG}	0.19	0.05	-0.01	-0.08	-0.06	-0.01	-0.02	0.23	34.52	14.49
		(1.50)	(0.34)	(-0.27)	(-1.72)	(-1.13)	(-0.67)	(-0.35)	(3.43)	[0.00]	
Other DMs	r_{ME}	0.56	0.40	-0.03	0.91	0.29	0.05	-0.05	0.08	8.46	79.57
		(4.55)	(5.02)	(-2.00)	(32.04)	(8.31)	(1.93)	(-1.50)	(2.28)	[0.00]	
	$r_{I/A}$	0.03	0.24	0.00	-0.04	0.06	0.04	0.81	0.10	0.18	74.14
		(0.28)	(3.14)	(-0.09)	(-1.41)	(2.14)	(2.53)	(21.02)	(4.10)	[0.67]	
	r_{ROE}	2.36	1.96	-0.12	-0.24	-0.02	0.27	0.01	0.17	32.31	29.8
		(14.64)	(10.87)	(-3.13)	(-3.16)	(-0.34)	(4.94)	(0.11)	(3.58)	[0.00]	
	r_{EG}	-0.14	0.06	-0.08	-0.13	-0.15	-0.06	0.30	0.21	32.55	12.85
		(-0.97)	(0.38)	(-2.75)	(-1.74)	(-1.93)	(-1.60)	(3.13)	(3.46)	[0.00]	
Brazil	r_{ME}	0.62	0.52	0.00	0.77	0.18	0.07	-0.01	0.04	0.25	81.37
		(2.32)	(3.18)	(0.22)	(20.32)	(6.10)	(2.62)	(-0.25)	(1.07)	[0.62]	
	$r_{I/A}$	-0.36	0.43	-0.02	-0.10	-0.01	0.04	0.82	0.06	3.52	60.34
		(-1.38)	(2.48)	(-0.97)	(-2.43)	(-0.27)	(0.80)	(20.58)	(1.49)	[0.06]	
	r_{ROE}	2.33	1.90	-0.04	0.00	-0.09	0.21	-0.16	0.20	13.73	15.81
		(7.64)	(6.65)	(-1.02)	(-0.02)	(-1.08)	(3.09)	(-1.37)	(2.78)	[0.00]	
	r_{EG}	-0.58	-0.33	-0.08	-0.10	-0.09	0.07	0.25	0.10	37.45	11.91
		(-2.16)	(-1.22)	(-2.45)	(-1.75)	(-1.30)	(1.39)	(3.08)	(1.32)	[0.00]	
China	r_{ME}	1.05	0.20	-0.03	0.87	0.30	0.03	-0.26	-0.07	1.06	79.39
		(4.01)	(1.56)	(-1.37)	(14.82)	(5.79)	(0.54)	(-3.97)	(-0.78)	[0.30]	
	$r_{I/A}$	-0.18	0.30	-0.02	-0.05	0.00	0.07	0.77	0.02	4.89	78.3
		(-1.50)	(3.02)	(-1.85)	(-1.37)	(0.11)	(2.31)	(19.33)	(0.35)	[0.02]	
	r_{ROE}	1.67	1.28	-0.02	-0.12	-0.12	0.15	-0.15	0.71	4.02	70.32
		(7.10)	(6.99)	(-0.80)	(-2.07)	(-2.26)	(2.70)	(-0.99)	(6.31)	[0.04]	
	r_{EG}	0.23	-0.52	-0.01	0.18	0.01	-0.10	0.54	0.60	1.11	49.4
		(0.52)	(-2.21)	(-0.24)	(2.20)	(0.16)	(-0.76)	(4.37)	(5.76)	[0.29]	
India	r_{ME}	2.42	0.97	-0.06	0.89	0.50	0.04	-0.19	-0.01	3.96	85.93
		(4.69)	(4.44)	(-1.80)	(17.59)	(10.42)	(1.10)	(-2.44)	(-0.28)	[0.05]	
	$r_{I/A}$	-1.17	0.30	-0.02	0.09	-0.06	-0.01	0.81	0.03	2.65	71.76
		(-4.92)	(1.40)	(-0.62)	(2.87)	(-1.30)	(-0.16)	(15.60)	(1.02)	[0.10]	
	r_{ROE}	2.80	2.79	-0.12	-0.01	-0.25	0.11	0.01	0.15	51.96	31.91
		(9.15)	(9.15)	(-2.43)	(-0.17)	(-3.30)	(1.49)	(0.14)	(3.67)	[0.00]	
	r_{EG}	-0.46	0.06	-0.08	-0.14	-0.19	0.10	0.13	0.06	57.89	15.21
		(-1.55)	(0.22)	(-2.05)	(-2.23)	(-3.40)	(1.65)	(1.93)	(2.25)	[0.00]	

Malaysia	r_{ME}	0.83	0.67	0.00	0.88	0.34	0.09	-0.07	0.08	10.64	88.41
		(3.16)	(5.94)	(0.13)	(29.09)	(6.95)	(2.93)	(-1.49)	(2.87)	[0.00]	
	$r_{I/A}$	-0.24	0.38	-0.05	0.04	0.12	0.12	0.85	0.07	0.65	65.57
		(-1.34)	(1.82)	(-2.70)	(0.53)	(2.42)	(2.46)	(12.28)	(1.84)	[0.42]	
	r_{ROE}	2.37	2.28	-0.19	-0.16	-0.17	0.29	0.01	0.19	18.90	56.73
		(10.66)	(11.85)	(-4.94)	(-2.39)	(-1.81)	(4.14)	(0.11)	(3.75)	[0.00]	
	r_{EG}	0.14	-0.11	-0.15	-0.12	-0.12	-0.01	0.03	0.15	71.12	24.2
		(0.74)	(-0.48)	(-4.73)	(-2.31)	(-2.42)	(-0.34)	(0.43)	(2.48)	[0.00]	
Pakistan	r_{ME}	1.62	0.86	0.05	1.00	0.43	0.16	-0.26	0.21	9.46	80.56
		(2.42)	(3.35)	(1.04)	(18.54)	(6.45)	(2.07)	(-4.21)	(2.38)	[0.00]	
	$r_{I/A}$	-0.69	0.54	-0.11	-0.01	0.00	0.11	0.80	-0.09	4.20	53.13
		(-1.89)	(1.96)	(-2.19)	(-0.12)	(0.00)	(1.57)	(11.31)	(-0.89)	[0.04]	
	r_{ROE}	3.85	3.00	-0.10	0.01	0.01	0.12	-0.30	0.31	11.06	25.42
		(8.32)	(6.57)	(-1.27)	(0.09)	(0.16)	(1.41)	(-3.66)	(2.69)	[0.00]	
	r_{EG}	-0.49	-0.83	-0.13	-0.11	-0.04	-0.05	0.02	0.35	22.24	14.43
		(-1.13)	(-2.13)	(-2.18)	(-1.70)	(-0.78)	(-0.68)	(0.24)	(3.83)	[0.00]	
Taiwan	r_{ME}	1.31	0.36	-0.04	0.86	0.28	0.04	-0.21	0.07	0.00	71.52
		(4.77)	(2.41)	(-1.78)	(19.79)	(3.91)	(0.93)	(-3.58)	(1.04)	[1.00]	
	$r_{I/A}$	-0.36	0.39	-0.02	-0.07	-0.01	0.00	0.86	0.19	0.14	71.5
		(-1.58)	(2.89)	(-1.18)	(-1.68)	(-0.45)	(0.10)	(16.66)	(4.17)	[0.70]	
	r_{ROE}	2.89	2.36	-0.07	-0.27	-0.03	0.13	0.02	0.59	12.69	50.19
		(10.56)	(7.87)	(-1.90)	(-4.55)	(-0.43)	(2.30)	(0.26)	(7.11)	[0.00]	
	r_{EG}	-0.30	-0.56	-0.01	-0.12	-0.07	-0.02	0.13	0.43	15.07	23.73
		(-1.39)	(-1.81)	(-0.23)	(-2.15)	(-0.73)	(-0.27)	(1.81)	(6.35)	[0.00]	
Thailand	r_{ME}	0.65	0.32	-0.04	0.73	0.30	0.04	-0.07	0.04	0.01	81.78
		(2.81)	(2.43)	(-1.42)	(21.39)	(9.01)	(1.32)	(-1.56)	(0.82)	[0.90]	
	$r_{I/A}$	-0.38	-0.02	0.03	0.07	0.03	0.04	0.74	0.09	0.00	63.33
		(-2.11)	(-0.20)	(1.44)	(1.33)	(0.72)	(1.24)	(17.86)	(1.81)	[0.95]	
	r_{ROE}	2.19	1.63	-0.04	-0.11	-0.06	0.16	0.06	0.49	5.87	30.73
		(9.46)	(6.34)	(-0.95)	(-1.29)	(-0.83)	(2.51)	(0.50)	(6.97)	[0.02]	
	r_{EG}	0.03	-0.72	-0.14	-0.01	0.14	-0.06	0.23	0.60	0.27	20
		(0.10)	(-2.49)	(-2.39)	(-0.03)	(1.20)	(-0.90)	(2.38)	(6.52)	[0.60]	
Turkey	r_{ME}	1.37	0.26	0.01	0.80	0.25	-0.09	-0.10	0.21	0.58	78.05
		(4.33)	(1.71)	(0.78)	(24.05)	(5.85)	(-1.89)	(-1.72)	(6.94)	[0.447]	
	$r_{I/A}$	-0.45	0.21	0.02	-0.02	0.00	0.01	0.77	-0.03	2.50	60.01
		(-1.62)	(1.01)	(1.11)	(-0.30)	(-0.02)	(0.19)	(10.36)	(-0.48)	[0.11]	
	r_{ROE}	2.01	1.73	-0.01	-0.12	-0.09	0.16	0.25	0.38	4.18	17.48
		(5.70)	(3.79)	(-0.42)	(-2.05)	(-0.44)	(2.93)	(1.26)	(4.74)	[0.04]	
	r_{EG}	-0.37	-1.04	-0.01	0.09	-0.10	-0.15	-0.12	0.40	8.39	23.43
		(-0.80)	(-2.51)	(-0.22)	(1.35)	(-1.16)	(-1.16)	(-0.89)	(3.53)	[0.00]	
Other EMs	r_{ME}	1.10	0.79	-0.03	0.88	0.31	0.01	-0.13	0.06	0.65	74.22
		(4.94)	(5.46)	(-0.72)	(18.40)	(6.91)	(0.30)	(-3.59)	(1.72)	[0.41]	
	$r_{I/A}$	0.50	0.49	0.03	0.03	-0.02	0.05	0.89	0.05	0.09	79.34
		(1.87)	(3.02)	(0.74)	(0.61)	(-0.30)	(1.27)	(31.86)	(1.02)	[0.76]	
	r_{ROE}	3.33	3.09	-0.07	-0.18	-0.18	0.16	0.30	0.25	8.54	20.3
		(12.36)	(9.96)	(-1.28)	(-1.92)	(-2.11)	(2.32)	(3.65)	(2.81)	[0.00]	
	r_{EG}	-0.05	-0.14	-0.03	-0.18	-0.11	-0.02	0.22	0.31	18.43	19.79
		(-0.18)	(-0.61)	(-0.86)	(-3.17)	(-1.58)	(-0.40)	(3.63)	(5.17)	[0.00]	
DMs	r_{ME}	0.62	0.27	-0.01	0.93	0.22	0.04	-0.05	0.11	14.93	86.41
		(5.12)	(4.31)	(-0.58)	(45.13)	(8.34)	(2.45)	(-1.92)	(4.54)	[0.00]	
	$r_{I/A}$	-0.24	0.29	-0.03	-0.05	0.02	0.04	0.95	0.09	0.11	93.42
		(-1.66)	(6.32)	(-2.09)	(-3.28)	(1.45)	(2.85)	(55.78)	(5.74)	[0.74]	
	r_{ROE}	2.07	1.57	-0.06	-0.08	-0.07	0.18	0.17	0.74	0.73	76.62
		(11.89)	(12.65)	(-1.98)	(-1.90)	(-1.93)	(6.61)	(3.70)	(11.95)	[0.39]	
	r_{EG}	0.03	-0.24	-0.06	0.00	-0.12	0.00	0.03	0.57	13.63	45.18
		(0.25)	(-1.45)	(-2.13)	(0.02)	(-1.72)	(0.01)	(0.38)	(7.39)	[0.00]	
EMs	r_{ME}	1.02	0.43	-0.04	0.95	0.36	0.02	-0.10	0.05	7.19	85.75

		(4.78)	(4.63)	(-1.60)	(20.95)	(10.37)	(0.90)	(-2.37)	(1.48)	[0.01]	
	$r_{I/A}$	0.02	0.40	0.03	0.10	0.05	0.03	0.90	0.06	6.57	86.39
		(0.10)	(4.50)	(1.30)	(2.81)	(2.30)	(1.81)	(27.22)	(2.17)	[0.01]	
	r_{ROE}	2.63	1.94	-0.07	0.11	-0.06	0.14	0.03	0.55	5.03	38.01
		(12.20)	(10.27)	(-1.42)	(2.03)	(-0.76)	(2.27)	(0.38)	(7.00)	[0.02]	
	r_{EG}	0.13	0.13	-0.07	0.00	0.09	-0.09	0.19	0.11	13.95	11.04
		(0.56)	(0.54)	(-1.71)	(-0.01)	(1.50)	(-1.79)	(1.52)	(1.59)	[0.00]	
Non-US	r_{ME}	0.80	0.32	0.01	0.93	0.21	0.03	-0.04	0.06	13.84	88.29
		(6.74)	(5.36)	(0.69)	(45.84)	(7.21)	(2.47)	(-1.40)	(2.63)	[0.00]	
	$r_{I/A}$	-0.01	0.33	-0.02	-0.03	0.00	0.03	0.93	0.09	0.01	94.25
		(-0.05)	(7.27)	(-3.25)	(-1.89)	(-0.27)	(2.68)	(56.66)	(6.10)	[0.92]	
	r_{ROE}	2.02	1.49	-0.08	0.09	-0.03	0.20	0.01	0.63	1.23	54.38
		(12.24)	(9.04)	(-2.58)	(1.59)	(-0.54)	(3.88)	(0.25)	(9.49)	[0.27]	
	r_{EG}	-0.02	-0.20	-0.14	0.04	-0.03	-0.04	0.01	0.42	16.08	18.32
		(-0.08)	(-0.78)	(-3.70)	(0.51)	(-0.47)	(-0.72)	(0.20)	(5.24)	[0.00]	
Global	r_{ME}	0.76	0.31	-0.01	0.94	0.25	0.03	-0.08	0.07	10.69	87.72
		(6.44)	(5.05)	(-0.48)	(44.95)	(8.71)	(1.86)	(-3.39)	(2.99)	[0.00]	
	$r_{I/A}$	-0.15	0.35	-0.03	-0.03	0.02	0.04	0.94	0.09	1.37	94.53
		(-1.14)	(9.34)	(-3.99)	(-2.39)	(1.89)	(3.64)	(55.62)	(7.16)	[0.24]	
	r_{ROE}	2.11	1.52	-0.07	0.02	0.00	0.19	0.08	0.65	0.85	66.39
		(13.29)	(11.36)	(-2.35)	(0.39)	(-0.10)	(4.54)	(1.53)	(10.52)	[0.36]	
	r_{EG}	0.03	-0.28	-0.05	0.05	-0.08	0.00	0.06	0.56	9.54	44.07
		(0.22)	(-1.94)	(-1.71)	(1.07)	(-1.34)	(-0.04)	(1.11)	(8.29)	[0.00]	

Table 18. Spanning Test: q5 vs Stambaugh–Yuan Models

Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). r_{ME}, $r_{I/A}$, and $r_{ROE,}$ are the size, investment, and profitability factors from the q-factor model. r_{EG} is the expected growth factor from Hou-Mo–Xue–Zhang's q5 model. MKT, SMB*, MGMT are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB*	MGMT	PERF	χ2	R^2
Australia	r_{ME}	1.20	1.21	-0.08	0.63	0.10	-0.11	41.32	58.41
		(5.74)	(6.29)	(-2.91)	(15.01)	(2.35)	(-2.17)	[0.00]	
	$r_{I/A}$	-2.03	-1.92	-0.07	-0.28	0.12	0.04	90.81	17.47
		(-7.21)	(-6.02)	(-1.33)	(-2.82)	(1.21)	(0.64)	[0.00]	
	r_{ROE}	3.18	2.09	-0.08	-0.14	0.12	-0.40	476.29	51.69
		(10.11)	(8.77)	(-2.19)	(-2.23)	(3.11)	(-7.57)	[0.00]	
	r_{EG}	-0.24	-0.83	-0.02	0.01	-0.03	-0.30	63.22	14.43
		(-0.79)	(-2.20)	(-0.42)	(0.06)	(-0.44)	(-3.35)	[0.00]	
Canada	r_{ME}	0.72	0.40	-0.13	0.65	-0.18	-0.09	21.30	59.95
		(2.79)	(2.76)	(-3.08)	(8.79)	(-2.31)	(-3.44)	[0.00]	
	$r_{I/A}$	-1.07	-0.69	-0.09	0.05	0.41	0.08	16.06	28.44
		(-3.92)	(-2.97)	(-1.51)	(0.63)	(5.38)	(1.87)	[0.00]	
	r_{ROE}	1.85	1.73	-0.09	-0.39	-0.06	-0.33	99.80	46.3
		(5.59)	(7.06)	(-1.38)	(-4.35)	(-0.70)	(-6.30)	[0.00]	
	r_{EG}	-0.97	-0.72	-0.02	-0.22	0.26	-0.07	17.70	16
		(-3.09)	(-2.59)	(-0.19)	(-1.97)	(2.03)	(-1.33)	[0.00]	
France	r_{ME}	0.21	0.26	-0.12	0.71	0.01	-0.04	46.80	74.91
		(1.15)	(2.59)	(-5.22)	(23.97)	(0.13)	(-1.60)	[0.00]	
	$r_{I/A}$	-0.46	-0.08	0.01	0.09	0.24	0.21	19.56	17.17
		(-2.55)	(-0.49)	(0.18)	(1.54)	(3.36)	(3.73)	[0.00]	
	r_{ROE}	2.20	1.71	-0.13	-0.14	0.13	-0.38	296.84	34.57
		(11.33)	(10.14)	(-3.97)	(-3.12)	(2.21)	(-6.25)	[0.00]	
	r_{EG}	0.06	-0.04	-0.05	-0.10	0.05	-0.09	54.46	4.02
		(0.36)	(-0.23)	(-1.20)	(-1.66)	(0.55)	(-2.15)	[0.00]	
Germany	r_{ME}	0.44	0.44	-0.12	0.69	0.02	-0.16	82.52	73.7
		(2.46)	(3.96)	(-6.05)	(19.67)	(0.55)	(-4.69)	[0.00]	
	$r_{I/A}$	-0.21	0.01	0.03	0.16	0.26	0.08	26.11	11.71
		(-1.18)	(0.07)	(0.93)	(3.29)	(4.30)	(1.48)	[0.00]	
	r_{ROE}	2.51	1.95	-0.04	-0.09	0.07	-0.43	182.78	31
		(11.69)	(9.64)	(-1.20)	(-1.24)	(1.10)	(-9.14)	[0.00]	
	r_{EG}	-0.19	-0.32	-0.01	0.03	0.09	-0.13	99.24	6.17
		(-1.16)	(-1.97)	(-0.15)	(0.58)	(1.65)	(-3.06)	[0.00]	
Hong Kong	r_{ME}	1.47	1.21	-0.07	0.78	-0.09	-0.10	39.93	81.84
		(4.82)	(7.99)	(-2.25)	(26.48)	(-2.07)	(-3.55)	[0.00]	
	$r_{I/A}$	-0.85	-0.58	-0.01	0.11	0.48	0.07	5.77	26.59
		(-3.64)	(-2.56)	(-0.14)	(2.68)	(4.54)	(1.39)	[0.01]	
	r_{ROE}	2.84	2.15	-0.07	-0.22	0.26	-0.46	205.33	56.02
		(7.79)	(7.32)	(-1.75)	(-4.37)	(4.07)	(-7.83)	[0.00]	
	r_{EG}	-0.37	-0.35	-0.23	-0.17	0.14	-0.12	81.98	28.47
		(-1.39)	(-1.74)	(-4.73)	(-3.87)	(1.46)	(-2.25)	[0.00]	
Japan	r_{ME}	0.55	0.26	0.01	0.91	0.05	-0.09	4.13	90.88
		(3.32)	(4.52)	(1.13)	(55.78)	(1.12)	(-6.05)	[0.04]	
	$r_{I/A}$	-0.18	-0.13	-0.02	0.02	0.08	0.24	167.36	35.38
		(-1.80)	(-1.89)	(-1.24)	(0.80)	(2.04)	(9.78)	[0.00]	
	r_{ROE}	1.23	1.17	-0.01	-0.05	-0.02	-0.44	592.75	59.29
		(9.33)	(13.38)	(-0.78)	(-2.02)	(-0.36)	(-16.64)	[0.00]	
	r_{EG}	-0.17	-0.14	-0.09	-0.16	-0.06	-0.12	28.31	12.11

		(-1.11)	(-0.95)	(-1.64)	(-4.05)	(-0.23)	(-1.72)	[0.00]	
South Korea	r_{ME}	1.77	0.87	-0.05	0.85	0.05	0.01	3.67	80.53
		(4.40)	(5.43)	(-2.05)	(24.13)	(0.89)	(0.28)	[0.05]	
	$r_{I/A}$	-0.19	0.13	0.01	-0.13	0.36	0.08	39.74	14.58
		(-0.58)	(0.43)	(0.37)	(-2.93)	(4.65)	(1.51)	[0.00]	
	r_{ROE}	2.36	2.11	-0.02	-0.06	0.03	-0.42	236.43	39.8
		(8.49)	(9.53)	(-0.83)	(-1.51)	(0.49)	(-8.71)	[0.00]	
	r_{EG}	-0.53	-0.33	0.03	-0.07	0.26	-0.15	98.87	18.73
		(-1.97)	(-1.72)	(1.03)	(-2.41)	(3.93)	(-3.39)	[0.00]	
UK	r_{ME}	0.47	0.55	-0.10	0.83	0.01	-0.14	65.08	76.98
		(2.52)	(4.91)	(-4.07)	(27.41)	(0.43)	(-6.38)	[0.00]	
	$r_{I/A}$	-0.45	-0.08	0.02	0.01	0.33	0.16	30.62	19.59
		(-3.09)	(-0.50)	(0.63)	(0.19)	(5.13)	(3.60)	[0.00]	
	r_{ROE}	2.50	1.94	-0.12	-0.21	0.22	-0.44	448.71	41.47
		(10.90)	(11.71)	(-3.96)	(-4.46)	(4.04)	(-9.91)	[0.00]	
	r_{EG}	-0.35	-0.05	-0.22	-0.41	0.13	0.08	13.37	14.23
		(-1.04)	(-0.28)	(-1.49)	(-1.51)	(1.09)	(0.59)	[0.00]	
US	r_{ME}	0.68	0.80	-0.11	0.80	0.00	-0.14	106.96	83.81
		(3.83)	(8.71)	(-5.35)	(26.56)	(0.01)	(-4.77)	[0.00]	
	$r_{I/A}$	-0.39	0.23	-0.05	-0.05	0.61	0.26	5.90	36.71
		(-2.50)	(1.59)	(-1.61)	(-0.71)	(10.81)	(5.80)	[0.01]	
	r_{ROE}	2.38	1.92	-0.12	-0.30	0.22	-0.38	456.16	52.8
		(12.85)	(11.41)	(-3.32)	(-3.29)	(2.91)	(-5.54)	[0.00]	
	r_{EG}	0.19	0.10	0.01	-0.11	0.20	-0.08	18.86	12.3
		(1.50)	(0.63)	(0.33)	(-3.28)	(1.20)	(-2.04)	[0.00]	
Other DMs	r_{ME}	0.56	0.51	-0.07	0.77	-0.02	-0.09	35.19	72.19
		(4.55)	(5.11)	(-4.43)	(25.24)	(-0.68)	(-2.41)	[0.00]	
	$r_{I/A}$	0.03	0.07	-0.02	0.01	0.21	0.09	38.89	9.85
		(0.28)	(0.52)	(-0.58)	(0.11)	(3.36)	(1.79)	[0.00]	
	r_{ROE}	2.36	1.80	-0.06	-0.13	0.10	-0.43	215.89	41.71
		(14.64)	(10.62)	(-1.71)	(-2.29)	(1.67)	(-7.31)	[0.00]	
	r_{EG}	-0.14	-0.11	-0.06	0.02	0.11	0.00	37.58	4.13
		(-0.97)	(-0.79)	(-1.84)	(0.26)	(1.02)	(0.00)	[0.00]	
Brazil	r_{ME}	0.62	0.58	-0.06	0.64	0.00	-0.12	47.21	67.81
		(2.32)	(3.72)	(-3.13)	(15.22)	(-0.13)	(-3.32)	[0.00]	
	$r_{I/A}$	-0.36	-0.13	-0.01	0.11	0.11	0.25	17.56	13.92
		(-1.38)	(-0.39)	(-0.18)	(1.68)	(1.57)	(3.71)	[0.00]	
	r_{ROE}	2.33	1.88	-0.04	-0.18	0.05	-0.33	212.09	18.82
		(7.64)	(6.75)	(-1.05)	(-2.41)	(0.96)	(-6.47)	[0.00]	
	r_{EG}	-0.58	-0.50	-0.08	-0.14	0.24	0.01	53.87	13.25
		(-2.16)	(-1.96)	(-2.16)	(-2.50)	(3.33)	(0.11)	[0.00]	
China	r_{ME}	1.05	0.59	-0.04	0.79	0.15	0.01	1.24	80.88
		(4.01)	(5.98)	(-1.84)	(17.67)	(2.04)	(0.15)	[0.26]	
	$r_{I/A}$	-0.18	0.12	-0.06	-0.11	0.12	0.18	50.71	22.84
		(-1.50)	(0.98)	(-3.72)	(-2.89)	(1.27)	(4.11)	[0.00]	
	r_{ROE}	1.67	1.60	-0.05	-0.26	0.15	-0.48	158.27	61.41
		(7.10)	(9.35)	(-1.96)	(-4.36)	(1.12)	(-10.23)	[0.00]	
	r_{EG}	0.23	-0.26	-0.05	-0.04	0.42	-0.21	31.90	18.12
		(0.52)	(-0.96)	(-1.69)	(-0.50)	(2.53)	(-2.85)	[0.00]	
India	r_{ME}	2.42	0.77	-0.01	0.76	-0.11	-0.20	79.88	79.56
		(4.69)	(4.40)	(-0.34)	(15.14)	(-2.47)	(-4.14)	[0.00]	
	$r_{I/A}$	-1.17	-0.72	-0.01	0.22	0.25	0.10	25.44	26.68
		(-4.92)	(-2.77)	(-0.19)	(4.57)	(4.67)	(1.53)	[0.00]	
	r_{ROE}	2.80	2.26	-0.12	-0.11	-0.03	-0.30	263.48	31.66
		(9.15)	(8.97)	(-2.28)	(-1.64)	(-0.59)	(-4.60)	[0.00]	
	r_{EG}	-0.46	-0.40	-0.06	-0.15	0.09	-0.17	329.81	15.68
		(-1.55)	(-1.44)	(-1.70)	(-3.04)	(1.67)	(-3.79)	[0.00]	

Malaysia	r_{ME}	0.83	0.71	-0.01	0.78	-0.06	-0.09	42.21	83.99
		(3.16)	(6.27)	(-0.21)	(24.44)	(-1.35)	(-2.38)	[0.00]	
	$r_{I/A}$	-0.24	-0.22	-0.01	0.15	0.18	0.01	53.25	11.46
		(-1.34)	(-1.35)	(-0.29)	(1.87)	(2.59)	(0.15)	[0.00]	
	r_{ROE}	2.37	2.05	-0.09	-0.08	0.07	-0.37	181.33	49.66
		(10.66)	(12.39)	(-2.57)	(-1.41)	(0.94)	(-7.66)	[0.00]	
	r_{EG}	0.14	0.15	-0.07	-0.13	0.28	-0.08	89.13	31.76
		(0.74)	(0.98)	(-2.77)	(-2.33)	(5.50)	(-2.01)	[0.00]	
Pakistan	r_{ME}	1.62	1.12	-0.12	0.70	0.02	-0.26	30.62	65.73
		(2.42)	(3.47)	(-1.69)	(9.66)	(0.39)	(-4.78)	[0.00]	
	$r_{I/A}$	-0.69	-0.13	-0.01	0.11	0.11	0.25	17.56	13.92
		(-1.89)	(-0.39)	(-0.18)	(1.68)	(1.57)	(3.71)	[0.00]	
	r_{ROE}	3.85	2.83	-0.11	0.00	-0.01	-0.39	168.65	29.82
		(8.32)	(6.10)	(-1.74)	(0.09)	(-0.25)	(-7.18)	[0.00]	
	r_{EG}	-0.49	-0.63	-0.03	-0.04	0.23	-0.16	66.82	15.02
		(-1.13)	(-1.65)	(-0.58)	(-0.89)	(4.65)	(-2.78)	[0.00]	
Taiwan	r_{ME}	1.31	0.83	-0.05	0.73	-0.04	-0.14	41.73	67.79
		(4.77)	(5.45)	(-2.04)	(19.52)	(-0.46)	(-2.46)	[0.00]	
	$r_{I/A}$	-0.36	0.04	-0.09	0.01	0.16	0.23	56.93	26.27
		(-1.58)	(0.22)	(-2.13)	(0.19)	(1.63)	(3.40)	[0.00]	
	r_{ROE}	2.89	2.56	-0.13	-0.31	-0.08	-0.33	371.08	46.25
		(10.56)	(10.17)	(-3.19)	(-5.01)	(-1.09)	(-5.61)	[0.00]	
	r_{EG}	-0.30	-0.22	-0.08	-0.18	0.02	-0.06	250.32	9.68
		(-1.39)	(-0.98)	(-1.69)	(-3.36)	(0.20)	(-0.84)	[0.00]	
Thailand	r_{ME}	0.65	0.63	-0.05	0.61	-0.02	-0.07	28.44	77.5
		(2.81)	(4.76)	(-1.24)	(12.72)	(-0.72)	(-2.32)	[0.00]	
	$r_{I/A}$	-0.38	-0.39	0.10	0.14	0.25	-0.04	14.81	17.58
		(-2.11)	(-2.29)	(1.67)	(1.54)	(5.91)	(-1.09)	[0.00]	
	r_{ROE}	2.19	1.79	0.02	-0.14	-0.05	-0.31	103.58	24.42
		(9.46)	(7.94)	(0.33)	(-1.83)	(-0.52)	(-4.81)	[0.00]	
	r_{EG}	0.03	-0.07	0.05	0.04	0.33	-0.16	10.68	17.22
		(0.10)	(-0.26)	(0.68)	(0.30)	(4.11)	(-1.86)	[0.00]	
Turkey	r_{ME}	1.37	0.70	0.00	0.63	-0.04	-0.08	89.87	66.15
		(4.33)	(4.10)	(-0.24)	(17.18)	(-1.20)	(-2.27)	[0.00]	
	$r_{I/A}$	-0.45	-0.42	0.00	0.12	0.25	0.15	21.14	23.47
		(-1.62)	(-1.78)	(0.17)	(2.39)	(3.85)	(3.10)	[0.00]	
	r_{ROE}	2.01	1.82	0.03	-0.15	-0.14	-0.47	75.78	31.13
		(5.70)	(6.31)	(0.83)	(-2.84)	(-0.98)	(-5.13)	[0.00]	
	r_{EG}	-0.37	-0.47	-0.02	-0.11	0.24	-0.13	53.81	7.46
		(-0.80)	(-1.28)	(-0.41)	(-1.07)	(2.25)	(-1.25)	[0.00]	
Other EMs	r_{ME}	1.10	0.93	-0.08	0.71	-0.07	-0.10	29.44	61.94
		(4.94)	(5.26)	(-2.37)	(16.27)	(-1.85)	(-1.68)	[0.00]	
	$r_{I/A}$	0.50	0.00	0.11	0.29	0.48	-0.04	0.67	30.5
		(1.87)	(-0.01)	(1.66)	(3.42)	(8.39)	(-0.37)	[0.41]	
	r_{ROE}	3.33	2.64	0.02	0.03	0.20	-0.29	50.34	15.69
		(12.36)	(10.53)	(0.42)	(0.35)	(2.57)	(-3.65)	[0.00]	
	r_{EG}	-0.05	-0.55	0.10	-0.09	0.27	-0.15	65.10	17.42
		(-0.18)	(-1.82)	(2.24)	(-1.31)	(5.60)	(-2.40)	[0.00]	
DMs	r_{ME}	0.62	0.41	-0.08	0.83	-0.11	-0.10	47.1	81.41
		(5.12)	(7.26)	(-3.85)	(37.77)	(-1.93)	(-4.28)	[0.00]	
	$r_{I/A}$	-0.24	0.16	-0.06	0.02	0.36	0.25	5.5	9.56
		(-1.66)	(0.98)	(-1.35)	(0.39)	(2.87)	(4.10)	[0.02]	
	r_{ROE}	2.07	1.67	-0.20	-0.24	-0.15	-0.49	143.96	46.18
		(11.89)	(8.28)	(-3.76)	(-3.16)	(-1.18)	(-5.63)	[0.00]	
	r_{EG}	0.03	0.09	-0.21	-0.22	-0.17	-0.07	87.98	19.65
		(0.25)	(0.59)	(-3.86)	(-2.77)	(-1.61)	(-1.33)	[0.00]	
EMs	r_{ME}	1.02	0.38	0.00	0.92	-0.01	-0.18	5.99	85.43

		(4.78)	(4.09)	(-0.04)	(14.61)	(-0.30)	(-6.55)	[0.01]	
	$r_{I/A}$	0.02	0.25	-0.04	0.32	0.15	0.21	1.74	19.25
		(0.10)	(1.40)	(-0.95)	(2.91)	(1.21)	(3.38)	[0.19]	
	r_{ROE}	2.63	1.81	-0.03	0.15	-0.04	-0.48	119.74	29.9
		(12.20)	(8.45)	(-0.59)	(2.08)	(-0.38)	(-6.45)	[0.00]	
	r_{EG}	0.13	0.14	0.00	-0.02	0.37	-0.09	27.42	9.62
		(0.56)	(0.54)	(0.01)	(-0.31)	(3.74)	(-1.09)	[0.00]	
Non-US	r_{ME}	0.80	0.39	-0.02	0.84	-0.06	-0.11	31.58	79.93
		(6.74)	(4.36)	(-0.89)	(28.08)	(-1.15)	(-2.95)	[0.00]	
	$r_{I/A}$	-0.01	0.33	-0.08	-0.03	0.09	0.24	32.26	6.31
		(-0.05)	(1.87)	(-2.29)	(-0.38)	(1.23)	(4.13)	[0.00]	
	r_{ROE}	2.02	1.49	-0.13	0.07	-0.14	-0.53	203.63	39.26
		(12.24)	(7.39)	(-3.10)	(1.10)	(-1.90)	(-6.19)	[0.00]	
	r_{EG}	-0.02	0.00	-0.19	-0.03	-0.03	-0.05	44.6	10.07
		(-0.08)	(0.00)	(-4.25)	(-0.39)	(-0.21)	(-0.68)	[0.00]	
Global	r_{ME}	0.76	0.40	-0.06	0.86	-0.08	-0.10	33.93	82.41
		(6.44)	(7.19)	(-2.72)	(36.05)	(-1.43)	(-3.95)	[0.00]	
	$r_{I/A}$	-0.15	0.27	-0.08	0.01	0.32	0.24	9.37	10.14
		(-1.14)	(1.64)	(-2.23)	(0.21)	(2.66)	(4.07)	[0.00]	
	r_{ROE}	2.11	1.61	-0.16	-0.05	-0.10	-0.50	136.32	38.54
		(13.29)	(7.78)	(-3.10)	(-0.68)	(-0.84)	(-5.47)	[0.00]	
	r_{EG}	0.03	0.06	-0.14	-0.06	0.03	-0.07	81.76	11.94
		(0.22)	(0.41)	(-3.14)	(-0.77)	(0.34)	(-1.38)	[0.00]	

Table 19. Spanning Test: Stambaugh–Yuan vs Fama–French Five-Factor Models

Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB*, MGMT, and PERF are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. UMO is a mispricing factor from Stambaugh–Yuan's three-factor model. MKT, SMB, HML, RMW, CMA are the market size, value, profitability, and investment factors from Fama–French's five-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	RMW	CMA	$\chi 2$	R^2
Australia	SMB*	0.02	0.31	0.01	1.08	0.19	0.04	0.05	7.63	79.1
		(0.04)	(0.83)	(0.32)	(17.48)	(1.89)	(1.06)	(0.79)	[0.00]	
	MGMT	0.15	1.28	-0.17	0.15	0.10	0.00	0.48	6.87	14.86
		(0.39)	(2.10)	(-3.16)	(2.42)	(1.00)	(0.13)	(4.68)	[0.01]	
	PERF	-1.60	-1.81	0.38	0.52	0.09	-0.14	0.18	0.02	35.66
		(-3.82)	(-2.67)	(4.03)	(6.01)	(0.89)	(-2.21)	(1.26)	[0.88]	
	UMO	-0.26	0.69	-0.07	0.37	0.23	-0.05	0.51	0.00	22.61
		(-0.66)	(1.14)	(-0.85)	(4.36)	(2.20)	(-1.33)	(5.06)	[0.97]	
Canada	SMB*	0.62	0.09	0.10	0.84	0.29	-0.04	0.06	2.90	59.5
		(2.31)	(0.54)	(1.98)	(13.57)	(5.64)	(-1.36)	(1.27)	[0.08]	
	MGMT	-0.85	-0.14	-0.36	-0.17	-0.12	-0.07	0.46	66.63	24.19
		(-2.91)	(-0.50)	(-6.49)	(-3.43)	(-1.75)	(-1.00)	(5.37)	[0.00]	
	PERF	-1.81	-2.06	0.41	0.08	0.17	-0.24	0.07	3.20	20.89
		(-4.35)	(-5.69)	(3.18)	(1.03)	(1.57)	(-2.96)	(0.71)	[0.07]	
	UMO	-1.25	-0.66	-0.10	-0.07	0.02	-0.13	0.58	12.98	20.83
		(-3.88)	(-2.20)	(-1.27)	(-1.84)	(0.25)	(-2.30)	(6.36)	[0.00]	
France	SMB*	-0.01	-0.02	-0.02	0.95	0.27	-0.02	0.12	12.26	80.6
		(-0.08)	(-0.27)	(-0.96)	(27.33)	(6.26)	(-1.27)	(2.25)	[0.00]	
	MGMT	-0.32	-0.02	-0.13	0.01	0.02	0.03	0.27	49.12	12.38
		(-1.67)	(-0.08)	(-3.65)	(0.28)	(0.28)	(0.87)	(3.25)	[0.00]	
	PERF	-1.63	-1.14	0.19	-0.01	0.15	-0.18	0.45	1.63	15.88
		(-5.66)	(-3.54)	(1.81)	(-0.09)	(1.12)	(-1.92)	(3.82)	[0.20]	
	UMO	-0.83	-0.44	-0.04	0.02	0.07	-0.03	0.40	9.93	14.89
		(-4.57)	(-2.11)	(-0.67)	(0.27)	(1.21)	(-0.72)	(5.39)	[0.00]	
Germany	SMB*	-0.27	-0.12	0.04	0.96	0.19	0.01	0.01	8.28	74.03
		(-1.69)	(-1.08)	(1.77)	(25.08)	(3.61)	(0.43)	(0.22)	[0.00]	
	MGMT	-0.36	-0.12	-0.09	-0.02	0.03	0.03	0.31	27.05	11.06
		(-2.00)	(-0.59)	(-2.77)	(-0.26)	(0.45)	(0.49)	(4.20)	[0.00]	
	PERF	-1.46	-1.27	0.22	0.02	0.12	-0.23	0.20	12.10	19.92
		(-6.53)	(-5.00)	(3.57)	(0.29)	(1.56)	(-3.08)	(2.22)	[0.00]	
	UMO	-1.20	-0.93	0.03	0.02	0.18	-0.11	0.37	10.28	18.42
		(-5.77)	(-4.10)	(0.64)	(0.34)	(3.26)	(-2.27)	(5.14)	[0.00]	
Hong Kong	SMB*	-0.18	-0.31	0.01	1.04	0.42	-0.01	0.02	36.93	93.77
		(-0.49)	(-2.05)	(0.34)	(41.60)	(9.89)	(-0.58)	(0.36)	[0.00]	
	MGMT	-0.47	0.10	-0.23	-0.19	0.06	0.13	0.54	32.67	46.55
		(-1.89)	(0.45)	(-6.91)	(-4.03)	(0.94)	(4.38)	(8.91)	[0.00]	
	PERF	-1.67	-0.87	0.37	0.21	0.14	-0.32	0.51	0.10	58.17
		(-4.98)	(-2.72)	(4.85)	(2.04)	(1.90)	(-4.01)	(4.10)	[0.75]	
	UMO	-0.54	-0.01	0.12	0.00	0.15	0.08	0.84	0.48	31.14
		(-1.68)	(-0.02)	(2.13)	(0.03)	(0.98)	(1.01)	(7.67)	[0.48]	
Japan	SMB*	0.24	-0.05	0.02	1.00	0.25	-0.08	0.00	3.01	86.7
		(1.31)	(-0.59)	(1.83)	(42.64)	(6.14)	(-1.51)	(0.08)	[0.08]	
	MGMT	-0.05	0.00	-0.02	-0.07	0.19	-0.15	0.12	24.60	8.98
		(-0.39)	(-0.03)	(-0.46)	(-1.97)	(3.21)	(-1.66)	(1.49)	[0.00]	
	PERF	-0.34	0.17	0.14	0.03	0.15	-0.38	1.01	0.02	57.31
		(-1.60)	(1.16)	(4.62)	(0.50)	(1.99)	(-3.22)	(7.58)	[0.88]	

	UMO	-0.23	0.11	0.08	-0.06	0.31	-0.34	0.68	2.44	45.93
		(-1.38)	(1.11)	(2.94)	(-1.37)	(5.18)	(-3.80)	(7.21)	[0.12]	
South Korea	SMB*	1.18	0.18	-0.07	0.94	0.16	-0.26	0.02	0.56	64.58
		(2.36)	(0.58)	(-2.84)	(11.70)	(1.03)	(-3.71)	(0.21)	[0.46]	
	MGMT	-0.25	-0.13	-0.09	-0.04	0.09	0.12	0.43	14.19	25.8
		(-0.84)	(-0.47)	(-4.17)	(-0.91)	(1.93)	(2.10)	(7.17)	[0.00]	
	PERF	-0.80	-0.34	0.20	-0.09	-0.09	-0.66	0.08	16.16	33.26
		(-1.95)	(-0.94)	(3.44)	(-0.80)	(-0.48)	(-7.45)	(0.67)	[0.00]	
	UMO	-0.61	-0.47	0.06	-0.04	0.12	-0.14	0.35	20.27	12.06
		(-2.14)	(-1.85)	(1.70)	(-0.55)	(1.75)	(-1.80)	(3.28)	[0.00]	
UK	SMB*	0.21	0.31	0.01	0.92	0.20	-0.10	0.09	0.70	74.37
		(0.85)	(1.64)	(0.42)	(16.66)	(3.24)	(-2.03)	(1.71)	[0.40]	
	MGMT	-0.59	-0.46	-0.10	-0.02	0.12	0.10	0.33	6.82	10.86
		(-3.03)	(-1.70)	(-2.34)	(-0.44)	(1.11)	(1.52)	(3.37)	[0.01]	
	PERF	-1.54	-0.89	0.02	-0.03	0.31	-0.52	0.23	17.92	34.01
		(-5.72)	(-3.37)	(0.53)	(-0.47)	(3.26)	(-5.65)	(2.49)	[0.00]	
	UMO	-0.91	-0.51	-0.04	0.03	0.26	-0.13	0.43	5.26	17.11
		(-3.96)	(-1.58)	(-1.10)	(0.46)	(2.43)	(-1.43)	(4.47)	[0.02]	
US	SMB*	-0.30	-0.07	0.02	1.02	0.20	-0.01	0.06	30.24	94.38
		(-1.35)	(-0.99)	(1.52)	(55.87)	(6.56)	(-0.37)	(2.76)	[0.00]	
	MGMT	-0.34	0.02	-0.17	-0.10	0.04	0.04	0.39	63.65	36.8
		(-2.96)	(0.15)	(-7.18)	(-3.69)	(0.98)	(0.85)	(8.09)	[0.00]	
	PERF	-1.42	-0.90	0.25	0.15	0.09	-0.35	0.61	1.01	48.67
		(-7.16)	(-5.05)	(4.95)	(2.55)	(1.05)	(-3.48)	(7.30)	[0.32]	
	UMO	-0.84	-0.22	-0.06	-0.11	0.05	-0.26	0.56	14.81	29
		(-5.04)	(-1.06)	(-3.05)	(-2.02)	(0.89)	(-2.51)	(11.19)	[0.00]	
Other DMs	SMB*	0.07	-0.20	0.03	0.98	0.34	0.04	0.07	43.50	71.06
		(0.43)	(-2.12)	(1.92)	(26.33)	(7.17)	(1.41)	(1.71)	[0.00]	
	MGMT	0.22	0.57	-0.12	-0.02	0.00	0.01	0.51	4.58	14.96
		(1.14)	(2.91)	(-2.84)	(-0.17)	(-0.01)	(0.07)	(3.28)	[0.03]	
	PERF	-1.49	-1.50	0.20	0.14	0.13	-0.17	0.36	2.50	18.38
		(-6.26)	(-5.72)	(3.14)	(1.76)	(1.22)	(-1.92)	(2.94)	[0.11]	
	UMO	-0.75	-0.41	-0.04	-0.08	0.13	-0.14	0.65	4.84	23.9
		(-3.46)	(-1.89)	(-0.77)	(-0.86)	(1.82)	(-1.85)	(5.57)	[0.02]	
Brazil	SMB*	-0.27	0.19	-0.02	0.82	0.21	-0.17	0.01	1.18	77.19
		(-0.89)	(1.06)	(-0.63)	(17.09)	(4.58)	(-4.22)	(0.29)	[0.27]	
	MGMT	-0.05	0.69	-0.06	-0.05	-0.15	0.11	0.62	6.32	24.71
		(-0.14)	(1.76)	(-1.13)	(-0.67)	(-1.79)	(1.34)	(5.66)	[0.01]	
	PERF	-1.40	-0.93	0.09	-0.24	-0.07	-0.09	0.31	7.02	17.54
		(-3.71)	(-1.90)	(1.18)	(-1.60)	(-0.54)	(-1.09)	(2.93)	[0.00]	
	UMO	-0.92	-0.29	0.06	-0.08	-0.07	0.11	0.73	1.62	29.38
		(-2.23)	(-0.77)	(1.27)	(-1.23)	(-1.00)	(1.29)	(6.76)	[0.20]	
China	SMB*	1.17	0.12	0.03	0.93	0.23	-0.15	0.00	0.21	73.94
		(3.62)	(0.81)	(1.73)	(14.57)	(7.00)	(-2.82)	(-0.09)	[0.64]	
	MGMT	-0.20	0.10	-0.04	-0.11	0.16	-0.26	0.08	22.25	11.14
		(-0.74)	(0.32)	(-0.74)	(-0.95)	(2.95)	(-2.19)	(0.62)	[0.00]	
	PERF	-1.07	0.00	0.02	-0.19	0.40	-1.05	0.12	55.25	57.67
		(-2.54)	(-0.01)	(0.55)	(-2.14)	(6.21)	(-11.60)	(1.31)	[0.00]	
	UMO	-0.68	-0.17	-0.01	-0.15	0.41	-0.60	0.13	18.97	37
		(-2.16)	(-0.58)	(-0.26)	(-1.24)	(6.98)	(-5.23)	(0.73)	[0.00]	
India	SMB*	0.98	0.43	0.05	0.95	0.50	-0.06	0.16	67.23	81.12
		(2.08)	(1.84)	(1.71)	(29.04)	(10.54)	(-2.93)	(3.27)	[0.00]	
	MGMT	-1.50	-0.70	-0.16	-0.23	0.02	0.03	0.44	71.76	20.61
		(-4.19)	(-2.17)	(-4.54)	(-4.10)	(0.27)	(1.05)	(5.68)	[0.00]	
	PERF	-2.21	-2.16	0.29	-0.01	0.22	-0.08	0.28	2.69	27.05
		(-5.51)	(-4.59)	(4.16)	(-0.12)	(2.80)	(-1.87)	(2.00)	[0.10]	
	UMO	-1.88	-1.37	0.00	-0.20	0.24	-0.06	0.44	33.01	25.09

		(-4.80)	(-3.80)	(-0.06)	(-3.59)	(3.29)	(-1.59)	(5.68)	[0.00]	
Malaysia	SMB*	0.24	-0.07	0.03	1.09	0.48	-0.04	-0.08	66.17	90.28
		(0.82)	(-0.36)	(2.14)	(25.58)	(10.77)	(-1.17)	(-1.45)	[0.00]	
	MGMT	0.02	0.26	-0.14	0.02	-0.14	-0.05	0.23	52.11	13.83
		(0.09)	(0.68)	(-2.81)	(0.15)	(-1.62)	(-0.73)	(2.56)	[0.00]	
	PERF	-0.89	-1.37	0.35	0.16	0.47	0.02	0.23	1.15	48.23
		(-2.98)	(-3.44)	(4.10)	(1.37)	(4.97)	(0.18)	(2.39)	[0.28]	
	UMO	-0.75	-1.13	0.09	-0.11	0.20	0.11	0.23	14.41	14.82
		(-3.16)	(-3.33)	(1.41)	(-0.95)	(2.14)	(1.45)	(2.79)	[0.00]	
Pakistan	SMB*	0.26	0.27	-0.04	0.90	0.45	-0.03	0.05	4.64	69.86
		(0.46)	(0.85)	(-0.75)	(16.07)	(7.70)	(-0.41)	(0.87)	[0.03]	
	MGMT	0.08	-0.15	-0.17	-0.10	-0.08	0.36	0.15	16.79	12.12
		(0.18)	(-0.32)	(-2.38)	(-1.38)	(-1.35)	(3.82)	(1.47)	[0.00]	
	PERF	-1.55	-0.78	0.29	0.08	0.10	-0.42	0.23	22.60	27.29
		(-2.97)	(-2.01)	(4.06)	(1.32)	(1.80)	(-4.17)	(2.97)	[0.00]	
	UMO	-1.18	-0.81	0.15	0.10	0.06	-0.13	0.37	4.90	13.05
		(-2.50)	(-1.63)	(1.72)	(1.19)	(1.03)	(-1.29)	(3.56)	[0.02]	
Taiwan	SMB*	0.14	-0.15	-0.03	0.90	0.27	-0.09	0.00	0.13	69.53
		(0.45)	(-0.64)	(-1.16)	(11.10)	(3.91)	(-1.74)	(0.02)	[0.72]	
	MGMT	-0.66	-0.49	-0.24	0.00	0.37	-0.04	0.43	2.85	38.52
		(-2.44)	(-1.31)	(-4.48)	(0.00)	(2.97)	(-0.30)	(2.76)	[0.09]	
	PERF	-1.39	-0.64	0.15	0.06	0.23	-0.46	0.43	5.06	50.37
		(-3.82)	(-1.87)	(3.18)	(0.66)	(2.20)	(-4.15)	(5.12)	[0.02]	
	UMO	-1.07	-0.48	-0.10	0.11	0.41	-0.29	0.62	0.65	48.95
		(-2.74)	(-1.18)	(-1.70)	(1.45)	(3.60)	(-2.25)	(3.84)	[0.41]	
Thailand	SMB*	-0.11	-0.39	-0.10	0.93	0.44	0.02	0.04	3.95	84.02
		(-0.35)	(-2.69)	(-2.41)	(17.99)	(7.06)	(0.26)	(0.69)	[0.04]	
	MGMT	-0.31	-0.54	-0.04	0.30	0.22	0.23	0.44	0.55	24.6
		(-0.96)	(-2.05)	(-0.71)	(3.36)	(2.86)	(3.43)	(4.20)	[0.4568]	
	PERF	-0.96	-1.07	0.39	-0.08	0.27	-0.66	-0.22	10.02	38.11
		(-2.41)	(-2.91)	(3.92)	(-0.37)	(2.57)	(-5.73)	(-1.92)	[0.0015]	
	UMO	-0.57	-0.76	0.14	0.28	0.35	-0.20	0.33	0.16	26.04
		(-1.54)	(-2.60)	(1.60)	(2.15)	(4.45)	(-2.25)	(3.34)	[0.6873]	
Turkey	SMB*	1.12	0.75	-0.02	0.96	0.35	-0.08	0.18	10.60	73.53
		(2.11)	(2.20)	(-1.06)	(21.16)	(5.53)	(-1.60)	(2.48)	[0.00]	
	MGMT	-0.58	-0.51	-0.05	0.05	0.00	0.14	0.43	1.96	7.97
		(-1.01)	(-0.89)	(-0.74)	(0.57)	(0.04)	(0.93)	(2.60)	[0.16]	
	PERF	-1.08	-0.63	0.04	-0.01	-0.07	-0.10	0.30	12.50	8.68
		(-2.11)	(-1.40)	(0.86)	(-0.11)	(-0.85)	(-0.79)	(2.87)	[0.00]	
	UMO	-0.91	-0.52	0.01	0.10	-0.04	-0.12	0.43	3.10	10.71
		(-1.69)	(-0.81)	(0.17)	(1.16)	(-0.34)	(-0.62)	(2.68)	[0.07]	
Other EMs	SMB*	0.53	-0.01	-0.07	0.68	0.13	0.01	0.21	0.02	47.53
		(1.42)	(-0.06)	(-1.32)	(5.11)	(0.84)	(0.14)	(3.02)	[0.89]	
	MGMT	0.52	0.97	-0.25	-0.17	-0.05	-0.02	0.40	18.35	19.43
		(1.60)	(2.96)	(-3.67)	(-1.49)	(-0.58)	(-0.25)	(4.22)	[0.00]	
	PERF	-1.62	-1.69	0.23	0.02	0.13	-0.37	0.09	19.72	18.68
		(-5.10)	(-6.08)	(2.94)	(0.23)	(1.31)	(-5.96)	(0.88)	[0.00]	
	UMO	-0.74	-0.09	-0.06	-0.03	0.00	-0.22	0.40	19.37	14.62
		(-2.01)	(-0.29)	(-0.81)	(-0.37)	(-0.02)	(-2.69)	(4.15)	[0.00]	
DMs	SMB*	0.15	-0.10	0.03	0.99	0.25	-0.02	-0.01	12.51	89.37
		(1.07)	(-1.88)	(2.19)	(44.17)	(10.29)	(-0.78)	(-0.55)	[0.00]	
	MGMT	-0.26	-0.10	-0.18	-0.17	0.05	-0.09	0.03	285.13	32.01
		(-3.22)	(-1.18)	(-9.24)	(-5.71)	(1.81)	(-2.15)	(1.04)	[0.00]	
	PERF	-1.08	-0.97	0.19	0.06	0.17	-0.35	0.18	21.00	36.24
		(-7.11)	(-6.39)	(3.73)	(0.75)	(2.59)	(-5.21)	(3.37)	[0.00]	
	UMO	-0.76	-0.63	-0.07	-0.18	0.22	-0.32	0.06	256.58	25.62
		(-7.48)	(-5.81)	(-3.35)	(-4.33)	(5.01)	(-8.17)	(1.42)	[0.00]	

EMs	SMB*	0.71	-0.07	-0.07	1.01	0.36	-0.17	-0.12	0.01	68.04
		(2.00)	(-0.33)	(-1.32)	(14.80)	(4.03)	(-1.36)	(-0.95)	[0.94]	
	MGMT	-0.19	-0.15	-0.15	-0.12	0.02	0.04	0.07	91.80	8.98
		(-0.98)	(-0.80)	(-4.02)	(-2.26)	(0.34)	(0.74)	(1.00)	[0.00]	
	PERF	-1.09	-1.47	0.26	0.06	0.09	-0.12	0.23	10.72	24.89
		(-3.89)	(-7.56)	(4.61)	(0.89)	(1.53)	(-2.57)	(4.10)	[0.00]	
	UMO	-0.95	-0.67	0.02	-0.08	-0.08	0.00	0.17	52.20	4.63
		(-4.88)	(-2.78)	(0.34)	(-0.77)	(-0.81)	(0.05)	(2.36)	[0.00]	
Non-US	SMB*	0.40	-0.05	0.01	0.91	0.31	-0.06	0.01	6.15	81.47
		(3.03)	(-0.67)	(0.96)	(25.83)	(9.64)	(-1.69)	(0.44)	[0.01]	
	MGMT	-0.25	-0.10	-0.15	-0.14	0.06	-0.11	0.03	230.40	12.34
		(-2.43)	(-1.04)	(-6.22)	(-2.97)	(1.68)	(-2.69)	(0.85)	[0.00]	
	PERF	-1.13	-1.05	0.18	0.08	0.19	-0.44	0.22	32.16	39.09
		(-7.27)	(-7.08)	(4.05)	(1.22)	(3.18)	(-7.14)	(5.34)	[0.00]	
	UMO	-0.78	-0.74	-0.03	-0.16	0.22	-0.29	0.06	176.55	12.8
		(-5.91)	(-5.31)	(-0.82)	(-2.92)	(4.57)	(-4.29)	(1.29)	[0.00]	
Global	SMB*	0.30	-0.06	0.03	0.98	0.26	-0.05	-0.04	9.32	88.32
		(2.28)	(-0.94)	(1.90)	(45.94)	(8.77)	(-1.64)	(-1.35)	[0.00]	
	MGMT	-0.28	-0.12	-0.17	-0.12	0.04	-0.04	0.06	267.30	27.42
		(-3.47)	(-1.52)	(-9.14)	(-4.10)	(1.10)	(-1.06)	(1.63)	[0.00]	
	PERF	-1.19	-1.11	0.20	0.06	0.19	-0.34	0.21	20.33	36.66
		(-8.19)	(-7.54)	(3.99)	(0.84)	(2.95)	(-5.48)	(4.51)	[0.00]	
	UMO	-0.85	-0.75	-0.06	-0.14	0.24	-0.29	0.10	225.76	25.93
		(-8.58)	(-7.06)	(-2.84)	(-3.48)	(4.91)	(-6.77)	(2.61)	[0.00]	

Table 20. Spanning Test: Stambaugh–Yuan vs Fama–French Six-Factor Models

Int is the intercept from a spanning regression, $\chi^2$is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB*, MGMT, and PERF are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. UMO is a mispricing factor from Stambaugh–Yuan's three-factor model. MKT, SMB, HML, UMD, RMW, CMA are the market size, value, momentum, profitability, and investment factors from Fama–French's six-factor model. The numbers in parentheses are robust GMM-based t-statistics, while p-values are in brackets.

Group		Mean	int	MKT	SMB	HML	UMD	RMW	CMA	χ2	R^2
Australia	SMB*	0.02	0.23	0.03	1.10	0.20	0.11	0.08	0.03	9.34	79.55
		(0.04)	(0.61)	(1.03)	(16.97)	(2.08)	(2.63)	(1.21)	(0.85)	[0.00]	
	MGMT	0.15	1.30	-0.17	0.14	0.09	-0.03	0.47	0.01	6.56	14.93
		(0.39)	(2.17)	(-3.16)	(2.30)	(0.95)	(-0.57)	(4.45)	(0.23)	[0.01]	
	PERF	-1.60	-1.39	0.29	0.41	-0.01	-0.57	0.02	-0.10	27.75	46.46
		(-3.82)	(-2.04)	(3.45)	(5.67)	(-0.10)	(-6.17)	(0.15)	(-1.83)	[0.00]	
	UMO	-0.26	0.90	-0.12	0.32	0.18	-0.29	0.42	-0.02	2.89	26.83
		(-0.66)	(1.54)	(-1.41)	(3.72)	(1.69)	(-4.23)	(4.24)	(-0.77)	[0.09]	
Canada	SMB*	0.62	0.05	0.11	0.84	0.30	0.03	0.07	-0.04	2.81	59.61
		(2.31)	(0.31)	(2.09)	(13.72)	(5.44)	(0.84)	(1.39)	(-1.44)	[0.09]	
	MGMT	-0.85	-0.17	-0.36	-0.17	-0.11	0.02	0.47	-0.08	46.41	24.23
		(-2.91)	(-0.63)	(-6.93)	(-3.52)	(-1.65)	(0.33)	(5.19)	(-1.00)	[0.00]	
	PERF	-1.81	-1.18	0.18	0.11	0.07	-0.70	-0.13	-0.21	36.40	45.41
		(-4.35)	(-3.67)	(1.61)	(1.62)	(0.72)	(-11.91)	(-1.65)	(-3.65)	[0.00]	
	UMO	-1.25	-0.32	-0.19	-0.06	-0.02	-0.26	0.51	-0.11	26.58	25.50
		(-3.88)	(-1.16)	(-2.23)	(-1.59)	(-0.30)	(-5.67)	(5.76)	(-1.97)	[0.00]	
France	SMB*	-0.01	-0.08	-0.01	0.95	0.28	0.05	0.13	-0.02	40.16	80.90
		(-0.08)	(-0.84)	(-0.50)	(26.87)	(6.55)	(1.49)	(2.91)	(-1.47)	[0.00]	
	MGMT	-0.32	-0.10	-0.11	0.01	0.03	0.09	0.30	0.02	20.16	13.38
		(-1.67)	(-0.53)	(-3.28)	(0.30)	(0.50)	(1.58)	(3.70)	(0.76)	[0.00]	
	PERF	-1.63	-0.30	0.00	0.00	0.01	-0.80	0.17	-0.14	100.14	43.40
		(-5.66)	(-1.16)	(0.02)	(-0.01)	(0.16)	(-13.50)	(2.56)	(-1.89)	[0.00]	
	UMO	-0.83	-0.07	-0.12	0.02	0.01	-0.36	0.25	-0.02	52.20	30.19
		(-4.57)	(-0.37)	(-2.84)	(0.26)	(0.17)	(-6.47)	(4.55)	(-0.46)	[0.00]	
Germany	SMB*	-0.27	-0.08	0.03	0.96	0.19	-0.05	0.00	0.02	2.66	74.42
		(-1.69)	(-0.67)	(0.97)	(24.57)	(3.59)	(-2.01)	(-0.07)	(0.73)	[0.10]	
	MGMT	-0.36	-0.18	-0.06	-0.01	0.03	0.08	0.33	0.01	14.12	12.05
		(-2.00)	(-0.85)	(-1.83)	(-0.10)	(0.52)	(1.51)	(4.61)	(0.28)	[0.00]	
	PERF	-1.46	-0.72	-0.01	-0.08	0.09	-0.67	0.06	-0.13	148.58	58.31
		(-6.53)	(-3.81)	(-0.30)	(-1.37)	(1.61)	(-16.20)	(1.10)	(-3.55)	[0.00]	
	UMO	-1.20	-0.75	-0.04	-0.01	0.17	-0.21	0.33	-0.07	32.84	24.11
		(-5.77)	(-3.16)	(-0.93)	(-0.08)	(2.86)	(-3.71)	(5.37)	(-1.42)	[0.00]	
Hong Kong	SMB*	-0.18	-0.31	0.02	1.04	0.42	0.04	0.04	-0.01	55.18	93.85
		(-0.49)	(-2.06)	(1.16)	(43.30)	(9.80)	(1.33)	(0.93)	(-0.73)	[0.00]	
	MGMT	-0.47	0.10	-0.21	-0.19	0.06	0.05	0.58	0.12	21.32	46.85
		(-1.89)	(0.45)	(-5.75)	(-4.02)	(0.95)	(1.29)	(9.55)	(4.30)	[0.00]	
	PERF	-1.67	-0.88	0.09	0.17	0.12	-0.66	0.08	-0.27	79.67	79.83
		(-4.98)	(-4.02)	(2.27)	(2.77)	(2.13)	(-15.14)	(0.99)	(-3.96)	[0.00]	
	UMO	-0.54	-0.02	-0.05	-0.02	0.14	-0.41	0.57	0.11	7.83	40.67
		(-1.68)	(-0.04)	(-1.02)	(-0.24)	(0.97)	(-7.44)	(4.83)	(1.41)	[0.01]	
Japan	SMB*	0.24	-0.04	0.02	1.00	0.26	0.01	0.01	-0.08	3.48	86.71
		(1.31)	(-0.52)	(1.97)	(45.61)	(6.27)	(0.47)	(0.23)	(-1.47)	[0.06]	
	MGMT	-0.05	0.05	0.00	-0.05	0.20	0.12	0.24	-0.15	8.73	11.12
		(-0.39)	(0.48)	(0.03)	(-1.21)	(3.47)	(2.09)	(3.34)	(-1.57)	[0.00]	
	PERF	-0.34	-0.04	0.06	-0.08	0.10	-0.60	0.48	-0.47	111.23	84.50
		(-1.60)	(-0.36)	(3.32)	(-3.03)	(2.39)	(-18.32)	(7.41)	(-6.68)	[0.00]	

	UMO	-0.23	0.02	0.06	-0.10	0.30	-0.18	0.50	-0.37	13.90	49.69
		(-1.38)	(0.21)	(1.77)	(-2.59)	(5.27)	(-2.67)	(5.90)	(-4.56)	[0.00]	
South Korea	SMB*	1.18	0.06	-0.10	0.92	0.17	-0.15	-0.01	-0.22	1.23	65.36
		(2.36)	(0.21)	(-2.64)	(11.57)	(1.21)	(-1.58)	(-0.10)	(-3.37)	[0.27]	
	MGMT	-0.25	-0.05	-0.06	-0.03	0.08	0.10	0.45	0.09	6.63	27.09
		(-0.84)	(-0.16)	(-2.58)	(-0.77)	(1.68)	(2.45)	(7.61)	(1.58)	[0.01]	
	PERF	-0.80	-0.87	0.05	-0.13	-0.06	-0.63	-0.01	-0.49	53.11	53.52
		(-1.95)	(-3.05)	(1.21)	(-1.68)	(-0.49)	(-6.88)	(-0.09)	(-7.28)	[0.00]	
	UMO	-0.61	-0.64	0.02	-0.06	0.13	-0.20	0.32	-0.09	23.07	15.63
		(-2.14)	(-2.36)	(0.34)	(-0.83)	(1.99)	(-2.10)	(2.90)	(-1.24)	[0.00]	
UK	SMB*	0.21	0.33	0.01	0.92	0.19	-0.04	0.07	-0.08	0.22	74.52
		(0.85)	(1.82)	(0.24)	(17.05)	(3.28)	(-1.35)	(1.18)	(-1.38)	[0.64]	
	MGMT	-0.59	-0.45	-0.11	-0.02	0.12	-0.02	0.32	0.11	6.95	10.88
		(-3.03)	(-1.78)	(-2.24)	(-0.46)	(1.15)	(-0.20)	(3.06)	(1.37)	[0.01]	
	PERF	-1.54	-0.54	-0.05	-0.09	0.19	-0.66	-0.04	-0.25	130.40	64.40
		(-5.72)	(-3.64)	(-1.45)	(-1.60)	(3.21)	(-12.77)	(-0.58)	(-4.83)	[0.00]	
	UMO	-0.91	-0.41	-0.07	0.01	0.21	-0.23	0.34	-0.02	17.70	21.05
		(-3.96)	(-1.45)	(-1.78)	(0.19)	(2.30)	(-3.04)	(3.62)	(-0.29)	[0.00]	
US	SMB*	-0.30	-0.07	0.02	1.02	0.20	0.00	0.06	-0.01	22.63	94.38
		(-1.35)	(-0.96)	(1.31)	(54.27)	(6.53)	(-0.36)	(2.56)	(-0.33)	[0.00]	
	MGMT	-0.34	-0.01	-0.14	-0.09	0.05	0.07	0.43	0.03	36.39	37.94
		(-2.96)	(-0.09)	(-6.87)	(-3.42)	(1.15)	(2.64)	(8.02)	(0.61)	[0.00]	
	PERF	-1.42	-0.61	0.02	0.07	0.03	-0.61	0.16	-0.24	267.90	81.91
		(-7.16)	(-5.55)	(1.07)	(2.26)	(0.81)	(-23.49)	(4.08)	(-5.97)	[0.00]	
	UMO	-0.84	-0.12	-0.15	-0.14	0.03	-0.21	0.40	-0.23	38.88	34.81
		(-5.04)	(-0.57)	(-5.53)	(-2.58)	(0.62)	(-6.43)	(7.82)	(-2.28)	[0.00]	
Other DMs	SMB*	0.07	-0.20	0.03	0.98	0.34	0.00	0.07	0.04	37.87	71.06
		(0.43)	(-2.10)	(1.75)	(26.22)	(7.12)	(-0.09)	(1.68)	(1.30)	[0.00]	
	MGMT	0.22	0.50	-0.11	-0.02	0.01	0.06	0.53	-0.01	4.01	15.37
		(1.14)	(2.47)	(-2.36)	(-0.17)	(0.10)	(0.78)	(3.55)	(-0.13)	[0.05]	
	PERF	-1.49	-0.57	0.04	0.15	0.10	-0.74	0.18	-0.02	104.89	65.12
		(-6.26)	(-3.92)	(1.11)	(2.60)	(1.98)	(-16.03)	(2.55)	(-0.54)	[0.00]	
	UMO	-0.75	0.06	-0.14	-0.08	0.06	-0.43	0.52	-0.01	23.60	39.95
		(-3.46)	(0.37)	(-2.91)	(-0.97)	(0.89)	(-4.43)	(6.14)	(-0.21)	[0.00]	
Brazil	SMB*	-0.27	0.20	-0.02	0.82	0.21	-0.01	0.01	-0.17	1.36	77.21
		(-0.89)	(1.22)	(-0.67)	(17.51)	(4.90)	(-0.25)	(0.27)	(-4.21)	[0.24]	
	MGMT	-0.05	0.61	-0.05	-0.06	-0.14	0.08	0.63	0.12	2.75	25.27
		(-0.14)	(1.55)	(-0.97)	(-0.75)	(-1.58)	(0.94)	(5.60)	(1.39)	[0.10]	
	PERF	-1.40	-0.47	0.05	-0.21	-0.15	-0.44	0.29	-0.09	19.49	33.93
		(-3.71)	(-1.04)	(0.86)	(-1.75)	(-1.20)	(-4.95)	(2.52)	(-1.28)	[0.00]	
	UMO	-0.92	-0.13	0.05	-0.07	-0.09	-0.15	0.72	0.10	3.47	31.11
		(-2.23)	(-0.37)	(1.03)	(-1.11)	(-1.51)	(-2.55)	(6.52)	(1.27)	[0.06]	
China	SMB*	1.17	0.17	0.04	0.94	0.28	0.16	0.00	-0.22	3.82	75.49
		(3.62)	(1.04)	(2.07)	(14.49)	(8.62)	(3.13)	(0.01)	(-3.53)	[0.05]	
	MGMT	-0.20	0.00	-0.05	-0.12	0.07	-0.28	0.04	-0.13	37.15	19.26
		(-0.74)	(0.00)	(-1.16)	(-1.10)	(0.95)	(-2.24)	(0.41)	(-1.12)	[0.00]	
	PERF	-1.07	-0.17	-0.01	-0.21	0.23	-0.57	0.11	-0.79	134.66	70.70
		(-2.54)	(-0.80)	(-0.42)	(-2.89)	(4.40)	(-10.84)	(1.48)	(-8.60)	[0.00]	
	UMO	-0.68	-0.38	-0.04	-0.17	0.22	-0.57	0.05	-0.35	78.96	56.77
		(-2.16)	(-2.01)	(-0.97)	(-1.74)	(3.75)	(-5.84)	(0.38)	(-3.70)	[0.00]	
India	SMB*	0.98	0.42	0.05	0.95	0.50	0.02	0.16	-0.06	29.80	81.13
		(2.08)	(1.90)	(1.70)	(29.77)	(10.71)	(0.23)	(2.99)	(-2.74)	[0.00]	
	MGMT	-1.50	-0.78	-0.13	-0.23	0.04	0.11	0.46	0.02	26.38	21.70
		(-4.19)	(-2.39)	(-3.43)	(-4.05)	(0.64)	(2.24)	(5.71)	(0.71)	[0.00]	
	PERF	-2.21	-1.76	0.15	-0.02	0.09	-0.60	0.18	-0.04	35.34	46.85
		(-5.51)	(-4.76)	(3.94)	(-0.38)	(1.72)	(-11.54)	(1.30)	(-0.93)	[0.00]	
	UMO	-1.88	-1.13	-0.08	-0.21	0.16	-0.35	0.38	-0.04	62.65	33.21

		(-4.80)	(-3.51)	(-1.78)	(-3.92)	(2.35)	(-5.92)	(5.33)	(-1.06)	[0.00]	
Malaysia	SMB*	0.24	-0.07	0.02	1.07	0.47	-0.04	-0.09	-0.04	15.91	90.38
		(0.82)	(-0.37)	(1.19)	(25.59)	(9.99)	(-1.59)	(-1.58)	(-1.28)	[0.00]	
	MGMT	0.02	0.26	-0.15	0.01	-0.15	-0.02	0.22	-0.05	29.04	13.89
		(0.09)	(0.69)	(-3.39)	(0.09)	(-1.67)	(-0.26)	(2.35)	(-0.76)	[0.00]	
	PERF	-0.89	-1.35	0.19	-0.08	0.31	-0.68	0.06	-0.03	152.55	74.89
		(-2.98)	(-4.52)	(5.11)	(-0.98)	(4.39)	(-12.43)	(0.88)	(-0.51)	[0.00]	
	UMO	-0.75	-1.12	0.00	-0.24	0.11	-0.38	0.14	0.08	84.44	31.62
		(-3.16)	(-3.26)	(-0.04)	(-1.99)	(1.36)	(-7.45)	(1.74)	(1.11)	[0.00]	
Pakistan	SMB*	0.26	0.27	-0.03	0.90	0.45	0.01	0.05	-0.03	3.49	69.87
		(0.46)	(0.84)	(-0.65)	(15.82)	(7.70)	(0.15)	(0.90)	(-0.44)	[0.06]	
	MGMT	0.08	-0.15	-0.17	-0.11	-0.08	-0.01	0.15	0.36	13.11	12.12
		(0.18)	(-0.32)	(-2.33)	(-1.38)	(-1.36)	(-0.10)	(1.48)	(3.94)	[0.00]	
	PERF	-1.55	-0.69	0.19	0.04	0.05	-0.51	0.19	-0.35	59.15	38.26
		(-2.97)	(-1.88)	(3.17)	(0.61)	(0.80)	(-5.18)	(2.27)	(-3.86)	[0.00]	
	UMO	-1.18	-0.78	0.11	0.08	0.04	-0.19	0.35	-0.11	7.45	14.49
		(-2.50)	(-1.58)	(1.20)	(1.00)	(0.75)	(-2.17)	(3.42)	(-1.06)	[0.01]	
Taiwan	SMB*	0.14	-0.14	-0.03	0.90	0.27	0.01	0.01	-0.09	0.22	69.54
		(0.45)	(-0.62)	(-1.13)	(11.05)	(3.93)	(0.39)	(0.08)	(-1.79)	[0.64]	
	MGMT	-0.66	-0.43	-0.23	0.03	0.37	0.11	0.46	-0.06	1.13	39.27
		(-2.44)	(-1.20)	(-4.55)	(0.30)	(3.13)	(1.19)	(3.03)	(-0.52)	[0.29]	
	PERF	-1.39	-0.99	0.10	-0.09	0.23	-0.64	0.24	-0.32	50.62	71.05
		(-3.82)	(-4.00)	(2.48)	(-1.52)	(2.93)	(-10.54)	(3.98)	(-3.67)	[0.00]	
	UMO	-1.07	-0.60	-0.12	0.06	0.41	-0.21	0.55	-0.24	2.50	50.82
		(-2.74)	(-1.46)	(-2.06)	(0.83)	(3.35)	(-2.23)	(3.30)	(-1.79)	[0.11]	
Thailand	SMB*	-0.11	-0.34	-0.12	0.93	0.41	-0.06	0.04	0.03	2.54	84.36
		(-0.35)	(-2.45)	(-2.85)	(16.91)	(6.82)	(-1.71)	(0.74)	(0.55)	[0.11]	
	MGMT	-0.31	-0.53	-0.04	0.30	0.22	-0.01	0.44	0.23	0.59	24.61
		(-0.96)	(-1.97)	(-0.82)	(3.29)	(2.88)	(-0.14)	(4.19)	(3.37)	[0.44]	
	PERF	-0.96	-0.55	0.23	-0.02	0.04	-0.61	-0.20	-0.48	32.40	60.77
		(-2.41)	(-2.08)	(3.38)	(-0.14)	(0.36)	(-7.47)	(-1.97)	(-5.37)	[0.00]	
	UMO	-0.57	-0.40	0.03	0.32	0.20	-0.41	0.33	-0.08	8.09	42.57
		(-1.54)	(-1.44)	(0.49)	(3.05)	(2.47)	(-7.46)	(3.33)	(-1.01)	[0.00]	
Turkey	SMB*	1.12	0.72	-0.03	0.95	0.36	-0.06	0.17	-0.08	4.59	73.66
		(2.11)	(2.11)	(-1.42)	(20.79)	(5.64)	(-0.96)	(2.10)	(-1.48)	[0.03]	
	MGMT	-0.58	-0.68	-0.10	0.01	0.05	-0.35	0.33	0.17	7.63	11.99
		(-1.01)	(-1.21)	(-1.51)	(0.06)	(0.42)	(-2.51)	(2.16)	(1.20)	[0.01]	
	PERF	-1.08	-0.96	-0.05	-0.10	0.02	-0.69	0.10	-0.04	49.30	30.63
		(-2.11)	(-2.86)	(-1.14)	(-1.55)	(0.20)	(-6.64)	(1.00)	(-0.33)	[0.00]	
	UMO	-0.91	-0.85	-0.08	0.01	0.05	-0.67	0.24	-0.05	19.81	23.57
		(-1.69)	(-1.44)	(-1.24)	(0.11)	(0.44)	(-3.92)	(1.76)	(-0.31)	[0.00]	
Other Ems	SMB*	0.53	0.05	-0.08	0.68	0.13	-0.05	0.20	0.01	0.13	47.70
		(1.42)	(0.19)	(-1.48)	(5.14)	(0.81)	(-1.11)	(2.94)	(0.25)	[0.72]	
	MGMT	0.52	1.00	-0.25	-0.17	-0.05	-0.02	0.40	-0.02	14.42	19.45
		(1.60)	(3.22)	(-3.52)	(-1.51)	(-0.60)	(-0.25)	(3.97)	(-0.22)	[0.00]	
	PERF	-1.62	-0.74	-0.03	-0.04	0.07	-0.72	0.00	-0.31	67.11	46.42
		(-5.10)	(-3.46)	(-0.59)	(-0.43)	(0.84)	(-10.72)	(0.01)	(-5.37)	[0.00]	
	UMO	-0.74	0.55	-0.24	-0.08	-0.04	-0.49	0.34	-0.18	40.55	24.12
		(-2.01)	(1.69)	(-3.46)	(-0.89)	(-0.54)	(-5.42)	(3.77)	(-2.08)	[0.00]	
DMs	SMB*	0.15	-0.10	0.03	0.99	0.24	-0.02	-0.02	-0.02	7.20	89.44
		(1.07)	(-1.76)	(1.66)	(45.08)	(10.07)	(-1.33)	(-0.89)	(-0.54)	[0.01]	
	MGMT	-0.26	-0.12	-0.16	-0.17	0.07	0.06	0.07	-0.11	229.61	34.14
		(-3.22)	(-1.53)	(-9.85)	(-5.71)	(2.13)	(2.74)	(1.85)	(-2.74)	[0.00]	
	PERF	-1.08	-0.80	0.06	0.06	0.08	-0.44	-0.06	-0.18	134.87	67.83
		(-7.11)	(-7.72)	(2.32)	(1.49)	(1.78)	(-10.83)	(-1.26)	(-3.35)	[0.00]	
	UMO	-0.76	-0.56	-0.12	-0.18	0.18	-0.18	-0.04	-0.25	412.56	37.17
		(-7.48)	(-5.94)	(-7.26)	(-5.60)	(4.76)	(-6.53)	(-0.99)	(-5.68)	[0.00]	

EMs	SMB*	0.71	-0.06	-0.07	1.01	0.36	-0.01	-0.13	-0.16	0.00	68.05
		(2.00)	(-0.28)	(-1.33)	(15.00)	(4.11)	(-0.25)	(-1.01)	(-1.33)	[0.98]	
	MGMT	-0.19	-0.16	-0.15	-0.12	0.02	0.01	0.07	0.04	65.38	9.00
		(-0.98)	(-0.85)	(-4.02)	(-2.27)	(0.38)	(0.20)	(0.97)	(0.73)	[0.00]	
	PERF	-1.09	-1.21	0.22	0.07	0.03	-0.24	0.13	-0.11	22.04	34.43
		(-3.89)	(-6.45)	(4.29)	(0.97)	(0.54)	(-5.37)	(2.11)	(-2.29)	[0.00]	
	UMO	-0.95	-0.52	0.00	-0.07	-0.11	-0.14	0.12	0.01	44.95	7.97
		(-4.88)	(-2.26)	(0.00)	(-0.73)	(-1.17)	(-3.00)	(1.52)	(0.21)	[0.00]	
Non-US	SMB*	0.40	-0.04	0.01	0.91	0.30	-0.02	0.00	-0.05	2.83	81.58
		(3.03)	(-0.51)	(0.49)	(25.86)	(9.53)	(-1.75)	(0.00)	(-1.52)	[0.09]	
	MGMT	-0.25	-0.13	-0.13	-0.14	0.07	0.04	0.06	-0.12	96.05	13.00
		(-2.43)	(-1.40)	(-5.05)	(-2.89)	(1.77)	(1.22)	(1.16)	(-2.86)	[0.00]	
	PERF	-1.13	-0.83	0.07	0.05	0.14	-0.38	0.03	-0.35	168.89	65.71
		(-7.27)	(-6.88)	(3.14)	(1.26)	(3.02)	(-13.00)	(0.64)	(-7.09)	[0.00]	
	UMO	-0.78	-0.61	-0.08	-0.17	0.19	-0.19	-0.04	-0.25	155.57	22.09
		(-5.91)	(-5.10)	(-2.49)	(-3.66)	(4.60)	(-4.36)	(-0.77)	(-3.80)	[0.00]	
Global	SMB*	0.30	-0.04	0.02	0.98	0.26	-0.02	-0.05	-0.05	4.35	88.40
		(2.28)	(-0.74)	(1.34)	(46.50)	(8.63)	(-1.32)	(-1.62)	(-1.48)	[0.04]	
	MGMT	-0.28	-0.16	-0.15	-0.12	0.05	0.07	0.10	-0.07	209.82	30.07
		(-3.47)	(-2.09)	(-9.75)	(-4.01)	(1.48)	(3.18)	(2.48)	(-1.52)	[0.00]	
	PERF	-1.19	-0.87	0.08	0.05	0.11	-0.41	-0.01	-0.22	154.76	67.24
		(-8.19)	(-8.32)	(3.57)	(1.21)	(2.43)	(-11.44)	(-0.18)	(-4.87)	[0.00]	
	UMO	-0.85	-0.66	-0.11	-0.14	0.21	-0.16	0.02	-0.24	358.92	34.71
		(-8.58)	(-6.88)	(-6.56)	(-4.66)	(4.78)	(-5.60)	(0.57)	(-5.60)	[0.00]	

Table 21. Spanning Test: Stambaugh–Yuan vs q-Factor Models

Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB*, MGMT, and PERF are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. UMO is a mispricing factor from Stambaugh–Yuan's three-factor model. MKT, r_{ME}, $r_{I/A}$, and r_{ROE} are the market, size, investment, profitability factors from Hou–Xue–Zhang's q-factor model. The numbers in parentheses are robust GMM-based t-statistics, while p-values are in brackets.

Group		Mean	Int	MKT	r_{ME}	$r_{I/A}$	r_{ROE}	χ^2	R^2
Australia	SMB*	0.02	0.19	0.05	0.95	0.09	-0.49	10.80	72.73
		(0.04)	(0.61)	(2.22)	(15.41)	(1.66)	(-8.51)	[0.00]	
	MGMT	0.15	0.23	-0.06	0.17	0.22	0.05	15.27	6.27
		(0.39)	(0.38)	(-1.27)	(2.36)	(1.09)	(0.46)	[0.00]	
	PERF	-1.60	0.23	0.21	0.39	0.29	-0.94	40.18	54.85
		(-3.82)	(0.49)	(4.11)	(3.93)	(2.68)	(-11.93)	[0.00]	
	UMO	-0.26	0.91	0.05	0.24	0.40	-0.32	10.97	10.90
		(-0.66)	(1.43)	(0.97)	(2.92)	(2.02)	(-2.47)	[0.00]	
Canada	SMB*	0.62	0.59	0.03	0.84	0.13	-0.41	11.46	76.25
		(2.31)	(2.14)	(1.03)	(15.00)	(2.71)	(-6.12)	[0.00]	
	MGMT	-0.85	0.58	-0.34	-0.31	0.55	-0.07	31.22	42.25
		(-2.91)	(1.24)	(-4.82)	(-2.87)	(5.62)	(-0.60)	[0.00]	
	PERF	-1.81	0.07	0.51	0.16	0.22	-0.68	9.34	51.03
		(-4.35)	(0.14)	(4.30)	(1.49)	(2.11)	(-6.26)	[0.00]	
	UMO	-1.25	0.24	-0.01	-0.05	0.75	-0.35	25.89	42.84
		(-3.88)	(0.93)	(-0.32)	(-0.54)	(10.67)	(-5.72)	[0.00]	
France	SMB*	-0.01	0.26	-0.01	0.95	0.05	-0.22	8.38	75.26
		(-0.08)	(2.08)	(-0.19)	(27.81)	(0.89)	(-5.19)	[0.00]	
	MGMT	-0.32	-0.10	-0.12	-0.01	0.21	0.08	38.49	11.24
		(-1.67)	(-0.58)	(-2.99)	(-0.08)	(2.86)	(1.57)	[0.00]	
	PERF	-1.63	0.14	0.06	-0.09	0.54	-0.69	46.14	42.31
		(-5.66)	(0.41)	(1.00)	(-1.24)	(4.17)	(-6.31)	[0.00]	
	UMO	-0.83	0.12	-0.06	0.00	0.35	-0.32	57.07	18.17
		(-4.57)	(0.51)	(-1.53)	(-0.07)	(5.41)	(-4.43)	[0.00]	
Germany	SMB*	-0.27	0.12	0.01	0.90	0.12	-0.29	13.07	73.16
		(-1.69)	(0.89)	(0.38)	(17.42)	(2.44)	(-7.28)	[0.00]	
	MGMT	-0.36	-0.39	-0.08	-0.01	0.27	0.05	47.73	9.12
		(-2.00)	(-1.41)	(-2.12)	(-0.12)	(3.51)	(0.70)	[0.00]	
	PERF	-1.46	0.04	0.17	-0.10	0.22	-0.58	58.50	39.29
		(-6.53)	(0.14)	(3.95)	(-1.34)	(2.31)	(-7.80)	[0.00]	
	UMO	-1.20	-0.15	0.02	-0.03	0.37	-0.31	77.82	21.10
		(-5.77)	(-0.61)	(0.55)	(-0.43)	(4.81)	(-5.63)	[0.00]	
Hong Kong	SMB*	-0.18	0.01	-0.01	0.92	0.20	-0.38	16.12	88.94
		(-0.49)	(0.08)	(-0.52)	(34.46)	(4.53)	(-11.58)	[0.00]	
	MGMT	-0.47	0.25	-0.19	-0.21	0.45	0.07	59.59	39.09
		(-1.89)	(0.95)	(-4.62)	(-4.67)	(4.17)	(1.30)	[0.00]	
	PERF	-1.67	0.39	0.16	0.00	0.39	-0.72	84.12	56.91
		(-4.98)	(1.20)	(2.84)	(0.03)	(5.61)	(-10.55)	[0.00]	
	UMO	-0.54	0.97	0.01	-0.21	0.71	-0.28	36.18	35.40
		(-1.68)	(2.85)	(0.12)	(-2.97)	(5.97)	(-5.59)	[0.00]	
Japan	SMB*	0.24	-0.08	0.00	0.98	0.14	-0.12	0.00	86.42
		(1.31)	(-0.93)	(-0.05)	(43.33)	(2.17)	(-3.28)	[0.97]	
	MGMT	-0.05	0.10	-0.05	-0.03	0.28	-0.04	17.35	4.05
		(-0.39)	(0.63)	(-1.34)	(-0.93)	(2.87)	(-0.35)	[0.00]	
	PERF	-0.34	0.99	0.07	0.02	0.79	-1.00	100.70	69.28
		(-1.60)	(6.87)	(3.14)	(0.41)	(10.89)	(-15.11)	[0.00]	

	UMO	-0.23	0.67	0.00	-0.03	0.69	-0.57	21.51	40.66
		(-1.38)	(3.80)	(0.07)	(-0.64)	(6.62)	(-5.83)	[0.00]	
South Korea	SMB*	1.18	0.03	0.00	0.93	0.01	-0.22	6.43	82.40
		(2.36)	(0.16)	(0.10)	(24.11)	(0.15)	(-4.09)	[0.01]	
	MGMT	-0.25	-0.09	-0.09	-0.01	0.40	0.07	12.94	21.80
		(-0.84)	(-0.25)	(-2.49)	(-0.21)	(5.10)	(0.72)	[0.00]	
	PERF	-0.80	0.26	0.18	0.24	0.21	-0.72	48.16	51.35
		(-1.95)	(0.71)	(4.33)	(3.16)	(2.12)	(-8.40)	[0.00]	
	UMO	-0.61	0.04	0.01	0.16	0.30	-0.34	32.51	14.09
		(-2.14)	(0.12)	(0.10)	(1.36)	(3.41)	(-2.82)	[0.00]	
UK	SMB*	0.21	0.10	0.03	0.89	0.06	-0.31	26.85	81.12
		(0.85)	(0.81)	(1.46)	(30.64)	(1.59)	(-9.67)	[0.00]	
	MGMT	-0.59	-0.45	-0.03	-0.07	0.38	0.11	38.72	15.58
		(-3.03)	(-2.02)	(-0.81)	(-1.25)	(4.05)	(2.35)	[0.00]	
	PERF	-1.54	0.30	0.09	-0.07	0.46	-0.64	113.02	41.98
		(-5.72)	(0.97)	(1.79)	(-1.16)	(6.07)	(-8.71)	[0.00]	
	UMO	-0.91	0.05	0.00	-0.08	0.58	-0.23	38.00	28.24
		(-3.96)	(0.23)	(0.10)	(-1.09)	(6.67)	(-3.83)	[0.00]	
US	SMB*	-0.30	0.05	0.05	0.97	0.10	-0.42	35.30	91.63
		(-1.35)	(0.48)	(3.42)	(55.29)	(4.50)	(-13.47)	[0.00]	
	MGMT	-0.34	-0.14	-0.16	-0.09	0.36	0.05	120.33	39.26
		(-2.96)	(-0.98)	(-6.28)	(-3.24)	(8.42)	(1.07)	[0.00]	
	PERF	-1.42	0.16	0.19	0.04	0.59	-0.65	24.14	55.38
		(-7.16)	(0.72)	(3.56)	(0.96)	(8.65)	(-7.67)	[0.00]	
	UMO	-0.84	0.07	-0.09	-0.11	0.55	-0.27	118.85	41.63
		(-5.04)	(0.48)	(-4.01)	(-3.62)	(14.29)	(-5.76)	[0.00]	
Other DMs	SMB*	0.07	-0.01	0.01	0.90	0.06	-0.24	11.51	73.74
		(0.43)	(-0.10)	(0.69)	(21.39)	(1.30)	(-7.88)	[0.00]	
	MGMT	0.22	0.14	-0.12	-0.05	0.38	0.04	47.87	19.81
		(1.14)	(0.84)	(-4.19)	(-0.83)	(5.89)	(0.76)	[0.00]	
	PERF	-1.49	0.16	0.19	0.09	0.36	-0.78	26.52	46.39
		(-6.26)	(0.71)	(3.53)	(0.94)	(2.81)	(-9.96)	[0.00]	
	UMO	-0.75	0.19	0.01	0.03	0.54	-0.34	20.14	28.05
		(-3.46)	(1.14)	(0.37)	(0.45)	(5.27)	(-5.79)	[0.00]	
Brazil	SMB*	-0.27	-0.09	-0.02	0.91	0.00	-0.22	15.52	66.99
		(-0.89)	(-0.39)	(-0.61)	(17.83)	(-0.03)	(-4.65)	[0.00]	
	MGMT	-0.05	0.05	-0.10	-0.05	0.26	0.09	23.18	9.17
		(-0.14)	(0.12)	(-1.79)	(-0.50)	(3.06)	(1.39)	[0.00]	
	PERF	-1.40	-0.76	0.19	-0.05	0.17	-0.42	51.27	30.18
		(-3.71)	(-2.16)	(3.94)	(-0.57)	(2.03)	(-5.26)	[0.00]	
	UMO	-0.92	-0.21	0.04	-0.06	0.45	-0.22	21.97	16.84
		(-2.23)	(-0.56)	(0.97)	(-0.71)	(5.33)	(-3.27)	[0.00]	
China	SMB*	1.17	0.20	0.04	0.90	0.02	-0.29	14.24	87.05
		(3.62)	(1.36)	(2.51)	(22.17)	(0.36)	(-5.55)	[0.00]	
	MGMT	-0.20	-0.45	-0.07	0.20	0.27	0.00	12.35	21.37
		(-0.74)	(-2.97)	(-2.38)	(2.68)	(2.85)	(0.04)	[0.00]	
	PERF	-1.07	0.32	-0.01	0.26	0.53	-0.76	13.02	58.38
		(-2.54)	(0.87)	(-0.19)	(2.65)	(3.70)	(-6.23)	[0.00]	
	UMO	-0.68	-0.23	-0.04	0.27	0.44	-0.37	6.46	37.46
		(-2.16)	(-0.77)	(-0.86)	(2.92)	(2.40)	(-3.25)	[0.01]	
India	SMB*	0.98	0.20	0.00	0.97	0.27	-0.36	0.53	80.82
		(2.08)	(0.69)	(0.05)	(38.32)	(3.38)	(-4.38)	[0.46]	
	MGMT	-1.50	-0.44	-0.14	-0.20	0.64	-0.10	41.63	25.74
		(-4.19)	(-1.36)	(-4.62)	(-3.71)	(7.12)	(-1.63)	[0.00]	
	PERF	-2.21	-0.10	0.27	-0.16	0.35	-0.64	32.70	53.25
		(-5.51)	(-0.17)	(4.34)	(-2.77)	(3.35)	(-4.66)	[0.00]	
	UMO	-1.88	0.21	0.05	-0.18	0.76	-0.55	28.55	35.00

		(-4.80)	(0.47)	(1.40)	(-3.14)	(7.62)	(-6.03)	[0.00]	
Malaysia	SMB*	0.24	-0.06	-0.01	1.05	0.02	-0.33	10.37	87.53
		(0.82)	(-0.31)	(-0.50)	(26.92)	(0.41)	(-5.22)	[0.00]	
	MGMT	0.02	-0.15	-0.10	-0.07	0.23	0.07	25.01	13.85
		(0.09)	(-0.54)	(-2.34)	(-1.08)	(1.94)	(0.85)	[0.00]	
	PERF	-0.89	0.57	0.20	0.17	0.13	-0.74	81.32	58.03
		(-2.98)	(1.67)	(4.87)	(2.10)	(1.27)	(-7.43)	[0.00]	
	UMO	-0.75	0.40	0.01	-0.01	0.22	-0.49	143.17	31.53
		(-3.16)	(1.79)	(0.37)	(-0.28)	(3.00)	(-7.66)	[0.00]	
Pakistan	SMB*	0.26	0.07	0.02	0.93	0.13	-0.41	4.61	66.84
		(0.46)	(0.18)	(0.30)	(16.47)	(1.57)	(-5.03)	[0.03]	
	MGMT	0.08	-0.06	-0.25	-0.21	0.14	0.07	22.75	6.55
		(0.18)	(-0.11)	(-1.93)	(-2.44)	(1.13)	(0.62)	[0.00]	
	PERF	-1.55	-0.19	0.21	-0.10	0.35	-0.57	60.86	44.87
		(-2.97)	(-0.37)	(2.84)	(-1.03)	(3.00)	(-6.89)	[0.00]	
	UMO	-1.18	-0.48	0.08	-0.19	0.15	-0.21	55.85	14.36
		(-2.50)	(-0.79)	(0.86)	(-2.70)	(1.67)	(-1.82)	[0.00]	
Taiwan	SMB*	0.14	0.48	-0.01	0.93	0.20	-0.43	22.38	86.56
		(0.45)	(4.15)	(-0.42)	(22.86)	(3.64)	(-16.20)	[0.00]	
	MGMT	-0.66	0.53	-0.13	0.10	0.50	-0.29	20.25	33.27
		(-2.44)	(1.67)	(-3.41)	(0.75)	(4.71)	(-3.71)	[0.00]	
	PERF	-1.39	0.48	0.14	0.16	0.59	-0.63	11.17	51.92
		(-3.82)	(1.21)	(2.35)	(1.17)	(4.59)	(-7.91)	[0.00]	
	UMO	-1.07	0.79	0.00	0.13	0.72	-0.49	7.79	46.47
		(-2.74)	(2.45)	(-0.06)	(0.77)	(7.71)	(-6.60)	[0.01]	
Thailand	SMB*	-0.11	-0.09	-0.15	0.96	0.15	-0.24	1.75	80.58
		(-0.35)	(-0.63)	(-2.81)	(11.62)	(1.82)	(-4.54)	[0.19]	
	MGMT	-0.31	0.23	-0.11	0.12	0.51	-0.10	27.54	23.40
		(-0.96)	(0.70)	(-2.14)	(1.30)	(6.28)	(-1.00)	[0.00]	
	PERF	-0.96	0.12	0.46	0.00	0.00	-0.68	26.93	43.44
		(-2.41)	(0.40)	(4.57)	(-0.02)	(-0.02)	(-6.61)	[0.00]	
	UMO	-0.57	0.44	0.04	0.08	0.42	-0.52	36.09	25.26
		(-1.54)	(1.48)	(0.56)	(0.77)	(3.96)	(-5.94)	[0.00]	
Turkey	SMB*	1.12	0.45	-0.02	1.01	0.22	-0.34	1.08	75.21
		(2.11)	(2.13)	(-1.21)	(11.86)	(3.47)	(-9.00)	[0.30]	
	MGMT	-0.58	0.04	-0.02	-0.09	0.32	0.09	46.94	8.10
		(-1.01)	(0.11)	(-0.56)	(-1.51)	(4.35)	(1.34)	[0.00]	
	PERF	-1.08	-0.01	0.16	0.02	0.31	-0.39	39.36	33.10
		(-2.11)	(-0.02)	(4.33)	(0.37)	(3.53)	(-5.32)	[0.00]	
	UMO	-0.91	-0.41	0.01	0.07	0.35	-0.18	15.56	10.26
		(-1.69)	(-1.22)	(0.35)	(0.53)	(3.62)	(-2.26)	[0.00]	
Other EMs	SMB*	0.53	-0.02	-0.09	0.72	0.24	-0.22	7.35	70.23
		(1.42)	(-0.09)	(-2.27)	(11.65)	(4.71)	(-5.06)	[0.01]	
	MGMT	0.52	0.30	-0.20	-0.19	0.48	0.16	23.30	32.80
		(1.60)	(0.93)	(-3.30)	(-1.86)	(6.75)	(1.66)	[0.00]	
	PERF	-1.62	-0.88	0.23	0.05	0.14	-0.35	30.14	18.06
		(-5.10)	(-2.23)	(3.29)	(0.51)	(1.10)	(-3.27)	[0.00]	
	UMO	-0.74	-0.08	-0.03	0.00	0.49	-0.18	17.19	15.57
		(-2.01)	(-0.20)	(-0.32)	(0.00)	(4.15)	(-1.36)	[0.00]	
DMs	SMB*	0.15	0.01	0.03	0.94	0.09	-0.21	8.41	84.56
		(1.07)	(0.10)	(1.42)	(24.62)	(2.84)	(-7.34)	[0.00]	
	MGMT	-0.26	-0.02	-0.18	-0.13	0.08	-0.01	293.60	29.97
		(-3.22)	(-0.17)	(-9.14)	(-4.50)	(2.46)	(-0.27)	[0.00]	
	PERF	-1.08	-0.06	0.12	0.01	0.26	-0.50	98.35	44.52
		(-7.11)	(-0.39)	(2.91)	(0.12)	(4.97)	(-8.35)	[0.00]	
	UMO	-0.76	0.02	-0.11	-0.14	0.16	-0.28	291.25	21.85
		(-7.48)	(0.15)	(-5.12)	(-3.13)	(3.68)	(-7.52)	[0.00]	

EMs	SMB*	0.71	0.05	-0.02	0.91	0.24	-0.23	3.91	90.82
		(2.00)	(0.42)	(-1.42)	(24.48)	(5.93)	(-6.79)	[0.05]	
	MGMT	-0.19	0.16	-0.13	-0.11	0.08	-0.04	199.48	11.37
		(-0.98)	(0.85)	(-4.06)	(-2.58)	(1.63)	(-0.66)	[0.00]	
	PERF	-1.09	-0.54	0.20	0.03	0.26	-0.47	54.58	40.88
		(-3.89)	(-3.11)	(3.26)	(0.40)	(6.12)	(-10.18)	[0.00]	
	UMO	-0.95	-0.13	0.01	-0.04	0.14	-0.26	140.95	14.14
		(-4.88)	(-0.60)	(0.23)	(-0.89)	(3.39)	(-2.96)	[0.00]	
Non-US	SMB*	0.40	-0.15	-0.01	0.92	0.09	-0.09	1.42	73.55
		(3.03)	(-1.47)	(-0.38)	(18.81)	(2.08)	(-2.49)	[0.23]	
	MGMT	-0.25	0.10	-0.15	-0.08	0.06	-0.09	207.93	11.34
		(-2.43)	(0.81)	(-5.96)	(-1.94)	(1.23)	(-2.28)	[0.00]	
	PERF	-1.13	-0.30	0.12	0.12	0.24	-0.49	60.63	41.53
		(-7.27)	(-1.71)	(2.60)	(2.21)	(4.79)	(-7.91)	[0.00]	
	UMO	-0.78	-0.09	-0.06	-0.07	0.11	-0.29	197.27	12.26
		(-5.91)	(-0.58)	(-1.92)	(-1.34)	(2.26)	(-5.20)	[0.00]	
Global	SMB*	0.30	-0.08	0.02	0.96	0.05	-0.17	6.09	83.46
		(2.28)	(-1.02)	(1.08)	(21.99)	(1.90)	(-4.60)	[0.01]	
	MGMT	-0.28	-0.05	-0.16	-0.11	0.09	-0.01	265.09	27.37
		(-3.47)	(-0.42)	(-8.66)	(-3.65)	(2.52)	(-0.25)	[0.00]	
	PERF	-1.19	-0.29	0.14	0.05	0.24	-0.47	69.63	41.99
		(-8.19)	(-1.66)	(2.98)	(0.80)	(5.43)	(-7.59)	[0.00]	
	UMO	-0.85	-0.13	-0.09	-0.11	0.18	-0.26	259.72	20.11
		(-8.58)	(-1.03)	(-3.85)	(-2.38)	(4.26)	(-6.55)	[0.00]	

Table 22. Spanning Test: Stambaugh–Yuan vs q5 Models

Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). SMB*, MGMT, and PERF are the market, size, and two mispricing factors from Stambaugh–Yuan's four-factor model. UMO is a mispricing factor from Stambaugh–Yuan's three-factor model. MKT, r_{ME}, $r_{I/A}$, r_{ROE} and r_{EG} are the market, size, investment, profitability, and expected growth factors from Hou-Mo–Xue–Zhang's q5 model. The numbers in parentheses are robust GMM-based t-statistics, while p-values are in brackets.

Group		Mean	Int	MKT	r_{ME}	$r_{I/A}$	r_{ROE}	r_{EG}	$\chi 2$	R^2
Australia	SMB*	0.02	0.17	0.05	0.95	0.09	-0.49	-0.03	8.56	72.76
		(0.04)	(0.53)	(1.99)	(14.69)	(1.52)	(-7.84)	(-0.46)	[0.00]	
	MGMT	0.15	0.35	-0.05	0.21	0.24	0.01	0.19	3.26	7.45
		(0.39)	(0.56)	(-0.90)	(2.75)	(1.21)	(0.10)	(1.93)	[0.07]	
	PERF	-1.60	0.14	0.20	0.37	0.27	-0.91	-0.13	26.53	55.24
		(-3.82)	(0.30)	(3.78)	(3.42)	(2.43)	(-11.49)	(-1.28)	[0.00]	
	UMO	-0.26	0.90	0.05	0.24	0.40	-0.32	-0.01	6.91	10.90
		(-0.66)	(1.40)	(0.90)	(2.72)	(1.98)	(-2.35)	(-0.06)	[0.01]	
Canada	SMB*	0.62	0.30	0.03	0.82	0.14	-0.32	-0.19	15.21	79.47
		(2.31)	(2.09)	(1.08)	(15.43)	(3.03)	(-8.61)	(-2.70)	[0.00]	
	MGMT	-0.85	0.35	-0.34	-0.33	0.56	0.00	-0.15	24.76	43.53
		(-2.91)	(1.04)	(-4.97)	(-3.04)	(5.58)	(-0.06)	(-1.09)	[0.00]	
	PERF	-1.81	0.13	0.51	0.17	0.22	-0.69	0.04	6.97	51.07
		(-4.35)	(0.26)	(4.31)	(1.44)	(2.10)	(-5.96)	(0.25)	[0.01]	
	UMO	-1.25	0.29	-0.01	-0.05	0.75	-0.36	0.03	21.71	42.91
		(-3.88)	(1.15)	(-0.31)	(-0.52)	(10.76)	(-6.32)	(0.39)	[0.00]	
France	SMB*	-0.01	0.27	0.00	0.95	0.05	-0.23	0.02	5.46	75.27
		(-0.08)	(2.17)	(-0.17)	(27.72)	(0.92)	(-5.31)	(0.35)	[0.02]	
	MGMT	-0.32	-0.02	-0.12	-0.01	0.21	0.06	0.20	17.01	13.60
		(-1.67)	(-0.09)	(-2.92)	(-0.11)	(3.09)	(1.08)	(2.78)	[0.00]	
	PERF	-1.63	0.07	0.06	-0.09	0.54	-0.67	-0.15	69.54	42.93
		(-5.66)	(0.20)	(0.95)	(-1.22)	(4.44)	(-5.90)	(-1.27)	[0.00]	
	UMO	-0.83	0.13	-0.06	-0.01	0.35	-0.32	0.02	42.92	18.19
		(-4.57)	(0.55)	(-1.51)	(-0.07)	(5.38)	(-4.42)	(0.26)	[0.00]	
Germany	SMB*	-0.27	0.14	0.02	0.90	0.11	-0.30	0.12	2.66	73.97
		(-1.69)	(1.05)	(0.64)	(18.08)	(2.32)	(-7.93)	(3.19)	[0.10]	
	MGMT	-0.36	-0.36	-0.07	0.01	0.27	0.04	0.18	15.45	11.19
		(-2.00)	(-1.32)	(-1.84)	(0.10)	(3.52)	(0.53)	(2.13)	[0.00]	
	PERF	-1.46	0.00	0.16	-0.12	0.22	-0.56	-0.23	52.96	41.10
		(-6.53)	(-0.01)	(3.30)	(-1.64)	(2.39)	(-7.97)	(-2.21)	[0.00]	
	UMO	-1.20	-0.16	0.02	-0.03	0.37	-0.31	-0.07	53.56	21.34
		(-5.77)	(-0.67)	(0.43)	(-0.50)	(4.84)	(-5.75)	(-0.95)	[0.00]	
Hong Kong	SMB*	-0.18	0.02	-0.01	0.92	0.20	-0.38	0.01	8.61	88.94
		(-0.49)	(0.11)	(-0.46)	(32.48)	(4.50)	(-10.89)	(0.11)	[0.00]	
	MGMT	-0.47	0.29	-0.18	-0.20	0.45	0.05	0.05	32.87	39.25
		(-1.89)	(1.08)	(-4.26)	(-4.24)	(4.13)	(0.99)	(0.69)	[0.00]	
	PERF	-1.67	0.33	0.14	-0.01	0.39	-0.70	-0.10	72.76	57.21
		(-4.98)	(0.93)	(2.37)	(-0.09)	(5.50)	(-9.30)	(-1.20)	[0.00]	
	UMO	-0.54	0.97	0.01	-0.21	0.71	-0.28	0.00	32.27	35.40
		(-1.68)	(3.17)	(0.15)	(-2.65)	(5.94)	(-4.33)	(0.00)	[0.00]	
Japan	SMB*	0.24	-0.08	0.00	1.00	0.12	-0.13	0.02	0.00	92.28
		(1.31)	(-1.17)	(0.12)	(48.77)	(2.31)	(-4.14)	(0.62)	[0.99]	
	MGMT	-0.05	0.04	-0.06	-0.05	0.24	-0.05	-0.04	11.13	5.03
		(-0.39)	(0.23)	(-1.97)	(-0.92)	(2.33)	(-0.47)	(-0.18)	[0.00]	
	PERF	-0.34	1.13	0.07	0.00	0.80	-1.02	-0.06	57.49	69.52
		(-1.60)	(7.15)	(2.98)	(-0.03)	(8.49)	(-13.43)	(-1.34)	[0.00]	

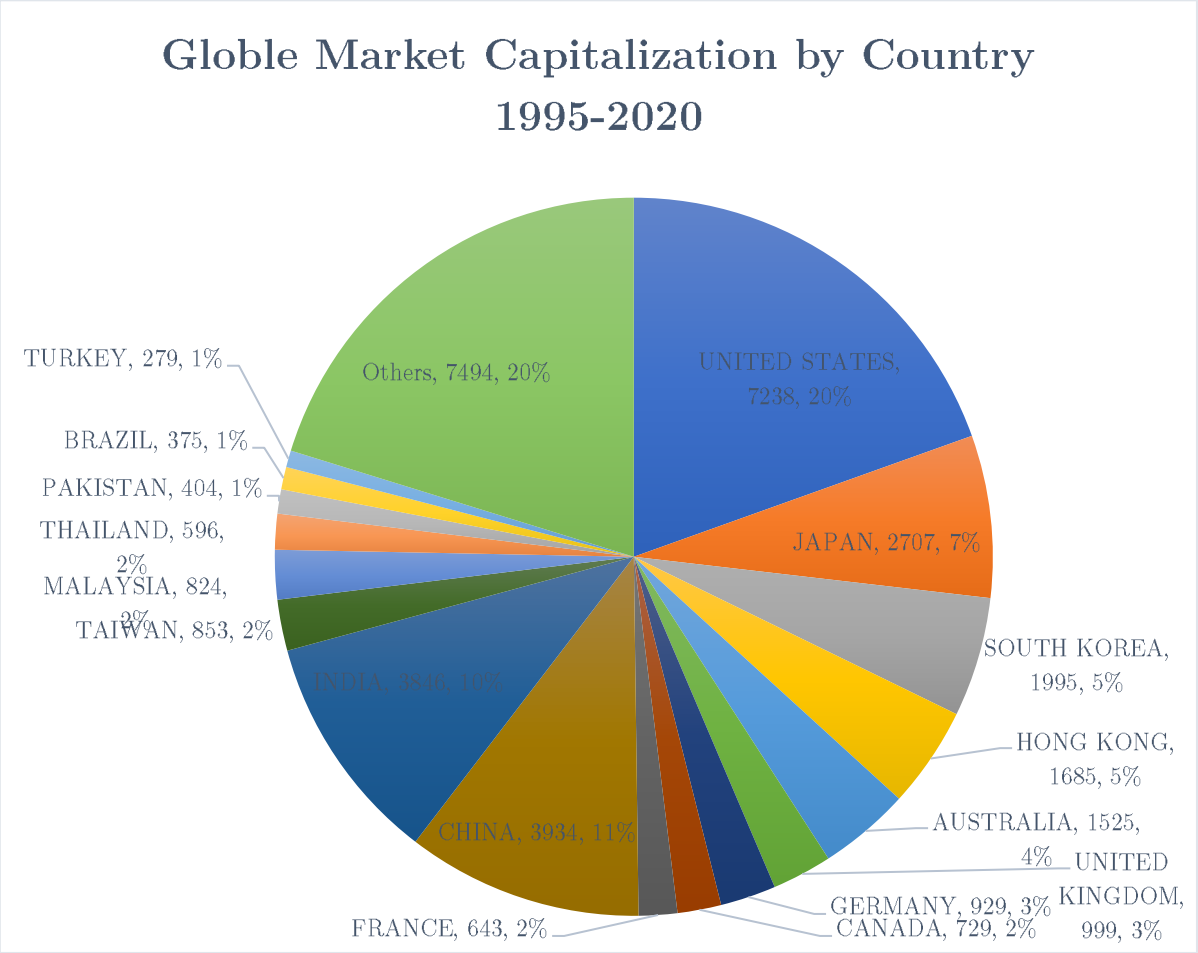
	UMO	-0.23	0.63	-0.01	-0.04	0.66	-0.58	-0.01	28.70	43.77
		(-1.38)	(3.47)	(-0.37)	(-0.98)	(7.79)	(-6.13)	(-0.08)	[0.00]	
South Korea	SMB*	1.18	-0.12	0.00	0.92	0.04	-0.18	-0.15	10.84	83.27
		(2.36)	(-0.58)	(-0.03)	(26.87)	(0.61)	(-3.70)	(-2.23)	[0.00]	
	MGMT	-0.25	0.22	-0.09	0.00	0.34	0.00	0.30	5.55	28.63
		(-0.84)	(0.62)	(-2.70)	(0.06)	(4.43)	(-0.02)	(3.01)	[0.02]	
	PERF	-0.80	0.11	0.18	0.23	0.23	-0.69	-0.14	46.28	52.06
		(-1.95)	(0.29)	(4.39)	(3.13)	(2.60)	(-7.20)	(-1.41)	[0.00]	
	UMO	-0.61	0.50	0.01	0.18	0.22	-0.45	0.44	11.91	23.74
		(-2.14)	(1.43)	(0.31)	(1.74)	(2.45)	(-3.34)	(3.33)	[0.00]	
UK	SMB*	0.21	0.12	0.03	0.89	0.06	-0.32	0.05	19.73	81.19
		(0.85)	(0.95)	(1.52)	(31.15)	(1.42)	(-9.74)	(1.15)	[0.00]	
	MGMT	-0.59	-0.35	-0.03	-0.07	0.35	0.05	0.29	9.56	19.70
		(-3.03)	(-1.73)	(-0.77)	(-1.25)	(4.06)	(1.20)	(3.12)	[0.00]	
	PERF	-1.54	0.25	0.09	-0.08	0.47	-0.61	-0.16	103.50	42.63
		(-5.72)	(0.80)	(1.75)	(-1.20)	(6.60)	(-8.17)	(-1.85)	[0.00]	
	UMO	-0.91	0.11	0.01	-0.08	0.57	-0.26	0.16	17.40	29.25
		(-3.96)	(0.49)	(0.16)	(-1.09)	(6.80)	(-4.64)	(1.63)	[0.00]	
US	SMB*	-0.30	0.04	0.05	0.97	0.11	-0.43	0.03	14.98	91.79
		(-1.35)	(0.43)	(3.30)	(54.76)	(4.67)	(-15.66)	(0.56)	[0.00]	
	MGMT	-0.34	-0.11	-0.16	-0.10	0.37	0.04	-0.02	104.72	39.20
		(-2.96)	(-0.73)	(-6.07)	(-3.50)	(8.25)	(0.89)	(-0.28)	[0.00]	
	PERF	-1.42	0.13	0.19	0.05	0.60	-0.64	-0.04	21.13	55.54
		(-7.16)	(0.56)	(3.44)	(1.09)	(8.52)	(-7.17)	(-0.61)	[0.00]	
	UMO	-0.84	0.02	-0.09	-0.10	0.54	-0.24	-0.09	101.42	41.42
		(-5.04)	(0.13)	(-3.74)	(-3.42)	(13.61)	(-4.88)	(-1.84)	[0.00]	
Other DMs	SMB*	0.07	0.03	0.01	0.92	0.06	-0.25	-0.01	7.37	74.87
		(0.43)	(0.29)	(0.75)	(20.41)	(1.33)	(-7.92)	(-0.26)	[0.01]	
	MGMT	0.22	0.19	-0.11	-0.01	0.36	0.01	0.21	18.61	22.08
		(1.14)	(1.09)	(-3.67)	(-0.11)	(5.38)	(0.17)	(3.12)	[0.00]	
	PERF	-1.49	0.19	0.17	0.04	0.38	-0.77	-0.17	32.70	49.35
		(-6.26)	(0.82)	(3.23)	(0.44)	(2.99)	(-9.69)	(-2.01)	[0.00]	
	UMO	-0.75	0.21	0.02	0.05	0.54	-0.35	0.09	12.91	28.35
		(-3.46)	(1.28)	(0.49)	(0.67)	(5.13)	(-6.09)	(1.31)	[0.00]	
Brazil	SMB*	-0.27	-0.12	-0.02	0.90	0.00	-0.22	-0.07	17.81	67.31
		(-0.89)	(-0.55)	(-0.81)	(18.34)	(0.08)	(-4.88)	(-1.26)	[0.00]	
	MGMT	-0.05	0.22	-0.08	-0.04	0.23	0.09	0.32	7.01	15.28
		(-0.14)	(0.58)	(-1.38)	(-0.37)	(2.84)	(1.31)	(3.81)	[0.01]	
	PERF	-1.40	-0.84	0.18	-0.05	0.18	-0.41	-0.15	59.26	31.39
		(-3.71)	(-2.35)	(3.75)	(-0.65)	(2.25)	(-5.56)	(-1.99)	[0.00]	
	UMO	-0.92	-0.10	0.05	-0.05	0.43	-0.22	0.19	10.03	19.18
		(-2.23)	(-0.30)	(1.31)	(-0.62)	(5.36)	(-3.35)	(2.11)	[0.00]	
China	SMB*	1.17	0.11	0.04	0.90	0.05	-0.26	-0.12	18.26	87.46
		(3.62)	(0.69)	(2.17)	(23.67)	(0.86)	(-5.31)	(-1.83)	[0.00]	
	MGMT	-0.20	-0.29	-0.06	0.21	0.22	-0.06	0.22	6.40	26.15
		(-0.74)	(-1.96)	(-2.03)	(2.67)	(2.35)	(-0.87)	(3.43)	[0.01]	
	PERF	-1.07	0.47	0.00	0.27	0.48	-0.81	0.21	9.61	59.37
		(-2.54)	(1.25)	(0.06)	(2.72)	(3.31)	(-6.73)	(1.64)	[0.00]	
	UMO	-0.68	0.03	-0.03	0.29	0.36	-0.46	0.34	3.27	42.02
		(-2.16)	(0.09)	(-0.54)	(3.04)	(2.08)	(-4.45)	(3.19)	[0.07]	
India	SMB*	0.98	0.18	0.00	0.97	0.28	-0.35	-0.04	0.76	80.87
		(2.08)	(0.62)	(-0.21)	(33.54)	(3.46)	(-4.38)	(-0.53)	[0.38]	
	MGMT	-1.50	-0.40	-0.13	-0.19	0.63	-0.11	0.10	24.82	26.32
		(-4.19)	(-1.25)	(-3.97)	(-3.39)	(6.78)	(-1.86)	(1.94)	[0.00]	
	PERF	-2.21	-0.19	0.23	-0.19	0.38	-0.61	-0.21	37.94	55.19
		(-5.51)	(-0.35)	(3.82)	(-3.38)	(4.01)	(-4.72)	(-2.23)	[0.00]	
	UMO	-1.88	0.15	0.03	-0.20	0.78	-0.53	-0.12	34.76	35.62

		(-4.80)	(0.34)	(0.87)	(-3.30)	(8.49)	(-5.78)	(-1.81)	[0.00]	
Malaysia	SMB*	0.24	-0.08	-0.03	1.03	0.04	-0.31	-0.15	21.37	87.99
		(0.82)	(-0.45)	(-1.13)	(24.73)	(0.70)	(-4.88)	(-2.44)	[0.00]	
	MGMT	0.02	-0.10	-0.06	-0.02	0.20	0.03	0.34	12.87	21.30
		(0.09)	(-0.34)	(-1.44)	(-0.31)	(1.88)	(0.30)	(4.38)	[0.00]	
	PERF	-0.89	0.56	0.18	0.16	0.14	-0.72	-0.09	48.40	58.23
		(-2.98)	(1.64)	(4.60)	(1.73)	(1.32)	(-7.29)	(-1.01)	[0.00]	
	UMO	-0.75	0.42	0.03	0.00	0.21	-0.51	0.12	80.78	32.22
		(-3.16)	(1.83)	(0.79)	(0.03)	(2.96)	(-7.44)	(1.63)	[0.00]	
Pakistan	SMB*	0.26	-0.10	0.01	0.92	0.13	-0.42	-0.16	9.37	68.11
		(0.46)	(-0.25)	(0.10)	(16.97)	(1.63)	(-5.49)	(-1.92)	[0.00]	
	MGMT	0.08	0.36	-0.21	-0.18	0.15	0.10	0.40	5.74	14.53
		(0.18)	(0.65)	(-1.58)	(-2.31)	(1.33)	(1.08)	(3.57)	[0.02]	
	PERF	-1.55	-0.39	0.19	-0.12	0.35	-0.58	-0.20	64.92	46.62
		(-2.97)	(-0.78)	(2.52)	(-1.29)	(3.13)	(-7.68)	(-1.86)	[0.00]	
	UMO	-1.18	-0.23	0.10	-0.17	0.15	-0.19	0.24	17.59	17.37
		(-2.50)	(-0.39)	(1.12)	(-2.58)	(1.74)	(-1.76)	(2.16)	[0.00]	
Taiwan	SMB*	0.14	0.39	-0.02	0.92	0.19	-0.42	-0.09	31.92	86.90
		(0.45)	(3.37)	(-0.87)	(23.70)	(3.58)	(-15.98)	(-2.65)	[0.00]	
	MGMT	-0.66	0.59	-0.12	0.10	0.50	-0.31	0.06	14.69	33.48
		(-2.44)	(1.89)	(-3.13)	(0.77)	(4.73)	(-4.00)	(0.77)	[0.00]	
	PERF	-1.39	0.35	0.12	0.15	0.58	-0.60	-0.13	12.18	52.41
		(-3.82)	(0.84)	(2.15)	(1.14)	(4.54)	(-7.28)	(-1.19)	[0.00]	
	UMO	-1.07	0.91	0.01	0.13	0.73	-0.52	0.12	4.08	47.02
		(-2.74)	(2.93)	(0.20)	(0.79)	(7.66)	(-7.21)	(1.44)	[0.04]	
Thailand	SMB*	-0.11	-0.08	-0.14	0.96	0.14	-0.25	0.08	0.90	80.92
		(-0.35)	(-0.56)	(-2.52)	(12.83)	(1.96)	(-4.64)	(1.41)	[0.34]	
	MGMT	-0.31	0.27	-0.08	0.13	0.47	-0.14	0.33	3.21	32.73
		(-0.96)	(0.82)	(-1.53)	(1.15)	(5.99)	(-1.31)	(4.46)	[0.07]	
	PERF	-0.96	0.08	0.44	-0.01	0.03	-0.65	-0.26	27.05	46.16
		(-2.41)	(0.28)	(5.08)	(-0.04)	(0.16)	(-6.18)	(-1.50)	[0.00]	
	UMO	-0.57	0.47	0.06	0.09	0.39	-0.54	0.22	20.85	28.69
		(-1.54)	(1.58)	(0.83)	(0.75)	(3.96)	(-5.67)	(1.52)	[0.00]	
Turkey	SMB*	1.12	0.46	-0.02	1.01	0.22	-0.35	0.02	0.84	75.23
		(2.11)	(2.17)	(-1.20)	(12.11)	(3.36)	(-8.93)	(0.37)	[0.36]	
	MGMT	-0.58	0.09	-0.01	-0.06	0.29	0.07	0.28	13.08	14.12
		(-1.01)	(0.29)	(-0.43)	(-0.94)	(4.46)	(1.07)	(3.78)	[0.00]	
	PERF	-1.08	-0.04	0.16	0.00	0.33	-0.38	-0.16	41.85	34.71
		(-2.11)	(-0.10)	(4.27)	(-0.01)	(4.12)	(-5.19)	(-2.38)	[0.00]	
	UMO	-0.91	-0.42	0.01	0.06	0.36	-0.17	-0.05	15.76	10.43
		(-1.69)	(-1.28)	(0.33)	(0.48)	(3.63)	(-2.29)	(-0.53)	[0.00]	
Other Ems	SMB*	0.53	-0.07	-0.09	0.71	0.24	-0.20	-0.07	9.78	70.59
		(1.42)	(-0.32)	(-2.20)	(11.73)	(4.98)	(-4.13)	(-1.40)	[0.00]	
	MGMT	0.52	0.54	-0.22	-0.14	0.45	0.05	0.37	8.65	37.88
		(1.60)	(1.77)	(-3.78)	(-1.33)	(6.32)	(0.55)	(3.62)	[0.00]	
	PERF	-1.62	-1.05	0.23	0.01	0.16	-0.27	-0.26	31.02	20.79
		(-5.10)	(-2.68)	(3.64)	(0.12)	(1.35)	(-2.27)	(-1.95)	[0.00]	
	UMO	-0.74	-0.04	-0.03	0.01	0.49	-0.20	0.06	11.74	15.69
		(-2.01)	(-0.11)	(-0.35)	(0.10)	(4.04)	(-1.45)	(0.45)	[0.00]	
DMs	SMB*	0.15	0.02	0.02	0.95	0.09	-0.23	0.03	4.03	86.25
		(1.07)	(0.22)	(1.03)	(21.88)	(2.77)	(-5.40)	(0.51)	[0.04]	
	MGMT	-0.26	-0.06	-0.18	-0.14	0.07	0.01	-0.05	266.81	29.77
		(-3.22)	(-0.43)	(-8.94)	(-4.46)	(2.01)	(0.27)	(-1.14)	[0.00]	
	PERF	-1.08	0.11	0.15	0.03	0.27	-0.62	0.28	56.23	49.27
		(-7.11)	(0.57)	(3.83)	(0.54)	(5.08)	(-9.27)	(4.26)	[0.00]	
	UMO	-0.76	0.11	-0.10	-0.13	0.17	-0.32	0.09	211.54	22.57
		(-7.48)	(0.74)	(-4.72)	(-2.85)	(3.66)	(-6.77)	(1.83)	[0.00]	

EMs	SMB*	0.71	0.03	-0.02	0.91	0.25	-0.22	-0.03	4.16	90.87
		(2.00)	(0.23)	(-1.39)	(23.89)	(6.21)	(-6.11)	(-0.81)	[0.04]	
	MGMT	-0.19	0.29	-0.13	-0.12	0.03	-0.10	0.18	201.77	17.10
		(-0.98)	(1.76)	(-3.98)	(-2.73)	(0.68)	(-1.89)	(3.45)	[0.00]	
	PERF	-1.09	-0.47	0.20	0.02	0.23	-0.50	0.09	47.38	41.51
		(-3.89)	(-2.51)	(3.37)	(0.33)	(4.39)	(-9.84)	(1.43)	[0.00]	
	UMO	-0.95	-0.02	0.01	-0.05	0.10	-0.31	0.16	137.87	17.00
		(-4.88)	(-0.09)	(0.24)	(-1.06)	(2.15)	(-3.58)	(2.86)	[0.00]	
Non-US	SMB*	0.40	-0.19	-0.01	0.94	0.05	-0.10	0.03	1.38	77.95
		(3.03)	(-1.78)	(-0.47)	(20.14)	(1.22)	(-2.37)	(0.58)	[0.24]	
	MGMT	-0.25	0.11	-0.15	-0.08	0.06	-0.09	0.01	209.01	11.36
		(-2.43)	(0.81)	(-5.84)	(-2.00)	(1.20)	(-2.13)	(0.21)	[0.00]	
	PERF	-1.13	-0.26	0.14	0.12	0.20	-0.51	0.11	44.78	43.37
		(-7.27)	(-1.45)	(2.94)	(2.27)	(4.34)	(-8.31)	(1.98)	[0.00]	
	UMO	-0.78	-0.12	-0.07	-0.07	0.11	-0.27	-0.04	113.63	12.47
		(-5.91)	(-0.55)	(-2.04)	(-1.28)	(2.28)	(-2.95)	(-0.32)	[0.00]	
Global	SMB*	0.30	-0.08	0.01	0.96	0.04	-0.18	0.02	3.96	85.34
		(2.28)	(-0.81)	(0.74)	(20.98)	(1.52)	(-3.71)	(0.51)	[0.05]	
	MGMT	-0.28	-0.02	-0.16	-0.11	0.08	-0.03	0.03	248.22	26.56
		(-3.47)	(-0.13)	(-8.16)	(-3.51)	(2.07)	(-0.59)	(0.64)	[0.00]	
	PERF	-1.19	-0.18	0.17	0.06	0.23	-0.55	0.23	47.35	45.75
		(-8.19)	(-0.97)	(3.63)	(0.91)	(4.88)	(-8.41)	(3.67)	[0.00]	
	UMO	-0.85	-0.04	-0.08	-0.11	0.18	-0.30	0.10	212.55	20.80
		(-8.58)	(-0.31)	(-3.58)	(-2.20)	(4.02)	(-6.16)	(2.18)	[0.00]	

Figure 1 Global equity market firm sample by country, 1981-2020

The figure shows the distribution of our sample stocks by country. Next to each country name is the total number of sample stocks from that country that qualify for analysis and the percentage of the total number of stocks in that country that this count represents.



APPENDIX

A. ANOMALIES COMPUTATION

Net stock issues: Net stock issues are the annual change in the log of split-adjusted share outstanding. The split-adjusted share outstanding is computed as share outstanding times the adjustment factor. We use the share outstanding (code WC05301) directly here since the Datastream date is already adjusted.

Composite equity issuance: We compute this measure by subtracting the 12-month cumulative stock return from the 12-month growth in equity market capitalization.

Accruals: the annual change in noncash working capital minus depreciation and amortization expense (Code WC01151), divided by average total assets (Code WC02999) for the previous two fiscal years. We measure non-cash working capital as the change in current assets (Code WC02201) minus the change in cash and short-term investment (Code WC02001), minus the change in current liabilities (Code WC03101), plus the change in debt included in current liabilities (Code WC03051), plus the change in income taxes payable (Code WC03063).

Net Operating Assets: the new operating assets is equal to operating assets minus operating liabilities, divided by lagged total assets (Code WC02999). Operating assets equal total assets (Code WC02999) minus cash and short-term investment (WC02001). Operating liabilities equal total assets (Code WC02999) minus debt included in current liabilities (Code WC03051), minus long-term debt (WC03251), minus common equity (WC03501), minus minority interests (WC03426), minus common equity (WC03501).

Asset growth: Asset growth is computed as the annual change in total assets divided by one year lagged total assets (code WC02999).

Change in property, plant and equipment and Inventory-to-assets: We measure this as the annual change in gross property, plant, and equipment (code WC02301) plus the annual change in inventory (WC02101) divided by one year lagged total assets.

Momentum: We measure momentum as the cumulative returns from month t-12 to month t-2, and skip the month t-1.

Gross profitability Premium: The gross profitability premium is equal to the total revenue (WC01001) minus the cost of goods sold (WC01051) divided by total assets (WC02999).

Return-on-assets: we measure this as net income (WC01551) divided by total assets (WC02999).

Ohlson's O-score: O-score is constructed as:

$$\begin{aligned} \text{O}-\text{score} = &-1.32 - 0.407 \log \text{TA} + 6.03\text{TLTA} - 1.43\text{WCTA} + \\ &0.076\text{CLCA} - 1.72\text{OENEG} - 2.37\text{NITA} - 1.83\text{FUTL} + 0.285\text{INTWO} - 0.521\text{CHIN}, \end{aligned} \tag{1}$$

where TA is the total assets (WC02999); TLTA is the leverage ratio equal to short-term debt (WC03051) plus long-term debt (WC03251) divided by total assets; WCTA is working capital divided by total assets, working capital computed as current assets (WC02201) minus current liability (WC03101) divided by total assets; CLCA is current liability (WC03101) divided by current assets (WC02201); OENEG is equal to one if total liability (WC03351) larger than total assets, otherwise is zero; NITA is net income (WC01551) divided by total assets; FUTL is pre-tax income (WC01401) divided by total liability (WC03351); INTWO is one if the net income (WC01551) of the previous two years is negative and zero otherwise. and CHIN is $(NI_t - NI_{t-1})/(|NI_t| + |NI_{t-1}|)$, where NI is net income.

For all the anomalies, we lagged four quantity months.

B. SUPPLEMENTARY RESULTS

Table A1. Spanning Test Within the Fama–French Three-Factor Model

The table presents the results from the spanning test within the Fama–French three-factor model. Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, SMB, and HML are the market, size, and value factors from Fama–French's three-factor model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	χ^2	R^2
Australia	MKT	0.64	0.76		0.02	-0.06	97.86	0.23
		(1.87)	(1.85)		(0.28)	(-0.80)	[0.00]	
	SMB	-0.99	-0.41	0.02		-0.33	95.97	4.73
		(-2.41)	(-0.83)	(0.28)		(-3.02)	[0.00]	
	HML	1.73	1.69	-0.02	-0.14		312.95	4.87
		(7.49)	(7.10)	(-0.79)	(-2.49)		[0.00]	
Canada	MKT	0.62	0.64		0.01	-0.08	102.81	0.70
		(2.34)	(2.37)		(0.11)	(-0.98)	[0.00]	
	SMB	0.42	0.49	0.01		-0.24	298.71	5.68
		(1.39)	(1.65)	(0.11)		(-4.97)	[0.00]	
	HML	0.32	0.47	-0.08	-0.23		131.67	6.28
		(1.06)	(1.56)	(-0.98)	(-3.01)		[0.00]	
France	MKT	0.87	0.78		-0.53	0.01	93.98	10.90
		(3.05)	(2.50)		(-5.16)	(0.06)	[0.00]	
	SMB	-0.16	0.14	-0.19		-0.16	249.60	14.18
		(-0.92)	(0.73)	(-5.49)		(-1.99)	[0.00]	
	HML	0.78	0.74	0.00	-0.22		58.48	4.23
		(3.59)	(3.50)	(0.06)	(-1.87)		[0.00]	
Germany	MKT	0.65	0.49		-0.81	-0.04	132.36	21.40
		(2.22)	(1.68)		(-8.30)	(-0.44)	[0.00]	
	SMB	-0.24	0.10	-0.25		-0.24	422.20	27.54
		(-1.55)	(0.61)	(-8.59)		(-3.86)	[0.00]	
	HML	0.71	0.65	-0.02	-0.32		91.31	9.10
		(3.89)	(3.54)	(-0.42)	(-3.09)		[0.00]	
Hong Kong	MKT	0.63	0.51		-0.18	0.09	50.26	3.31
		(1.67)	(1.34)		(0.90)	(0.88)	[0.00]	
	SMB	-0.30	0.08	-0.13		-0.27	222.03	0.07
		(-0.92)	(0.26)	(-2.10)		(-3.43)	[0.00]	
	HML	1.05	1.03	0.04	-0.16		288.94	5.13
		(4.27)	(4.40)	(0.89)	(-3.48)		[0.00]	
Japan	MKT	0.51	0.86		0.14	-0.57	72.36	9.27
		(1.79)	(0.26)		(0.10)	(0.12)	[0.00]	
	SMB	0.15	0.15	0.05		-0.03	119.96	0.96
		(0.96)	(0.92)	(1.42)		(-0.49)	[0.00]	
	HML	0.64	0.72	-0.14	-0.02		388.21	8.74
		(4.28)	(4.94)	(-5.43)	(-0.49)		[0.00]	
South Korea	MKT	0.83	1.27		0.01	-0.37	65.46	4.27
		(1.45)	(2.25)		(0.11)	(0.16)	[0.00]	
	SMB	1.17	1.19	0.00		-0.02	38.14	0.03
		(2.88)	(3.12)	(0.11)		(-0.12)	[0.00]	
	HML	1.20	1.31	-0.11	-0.01		144.13	4.29
		(3.84)	(4.74)	(-2.59)	(-0.12)		[0.00]	
UK	MKT	0.78	0.83		-0.17	-0.01	72.04	1.72

		(3.13)	(2.87)		(-2.20)	(-0.12)	[0.00]	
	SMB	-0.06	0.30	-0.09		-0.39	369.23	0.11
		(-0.30)	(1.35)	(-2.05)		(-6.05)	[0.00]	
	HML	0.75	0.70	0.00	-0.24		434.03	9.36
		(4.52)	(3.85)	(0.12)	(-5.29)		[0.00]	
US	MKT	0.84	1.25		-0.12	-0.43	79.20	5.64
		(3.77)	(5.12)		(0.07)	(0.13)	[0.00]	
	SMB	-0.39	0.40	-0.08		-0.68	87.91	22.42
		(-1.75)	(1.29)	(-1.47)		(-4.49)	[0.00]	
	HML	1.06	1.04	-0.13	-0.33		349.20	26.10
		(6.15)	(5.92)	(-2.74)	(-6.64)		[0.00]	
Other DMs	MKT	0.74	0.72		-0.55	-0.01	124.41	8.20
		(2.75)	(2.59)		(-5.05)	(-0.15)	[0.00]	
	SMB	-0.04	0.14	-0.15		-0.09	524.57	9.59
		(-0.33)	(0.98)	(-4.94)		(-1.70)	[0.00]	
	HML	0.85	0.85	-0.01	-0.17		103.47	1.55
		(4.73)	(4.74)	(-0.15)	(-1.73)		[0.00]	
Brazil	MKT	1.11	0.24		-1.09	0.18	122.16	37.50
		(1.81)	(0.41)		(-10.71)	(1.65)	[0.00]	
	SMB	-0.57	-0.21	-0.33		0.01	292.07	36.70
		(-1.75)	(-0.68)	(-8.40)		(0.16)	[0.00]	
	HML	1.37	1.30	0.07	0.02		48.26	1.74
		(4.68)	(4.59)	(1.63)	(0.16)		[0.00]	
China	MKT	0.63	0.75		0.03	-0.25	22.06	5.48
		(1.17)	(1.30)		(0.14)	(-2.46)	[0.00]	
	SMB	0.89	0.96	0.01		-0.14	220.18	6.91
		(3.08)	(3.19)	(0.14)		(-2.86)	[0.00]	
	HML	0.57	1.10	-0.20	-0.46		90.25	11.52
		(1.37)	(2.57)	(-2.69)	(-2.92)		[0.00]	
India	MKT	0.68	0.26		-0.29	0.38	48.33	12.48
		(1.28)	(0.48)		(-3.29)	(3.95)	[0.00]	
	SMB	0.30	0.39	-0.19		0.03	122.03	5.62
		(0.78)	(1.13)	(-4.14)		(0.29)	[0.00]	
	HML	1.33	1.20	0.19	0.02		60.92	7.48
		(3.91)	(3.66)	(3.96)	(0.29)		[0.00]	
Malaysia	MKT	0.55	0.22		0.32	0.41	2.35	10.20
		(1.23)	(0.52)		(2.60)	(3.62)	[0.13]	
	SMB	-0.11	-0.31	0.14		0.13	36.49	6.77
		(-0.39)	(1.08)	(2.86)		(1.02)	[0.00]	
	HML	0.91	0.86	0.11	0.08		126.29	6.92
		(4.23)	(4.00)	(2.76)	(1.11)		[0.00]	
Pakistan	MKT	0.76	0.72		-0.44	-0.21	199.05	20.34
		(1.42)	(1.31)		(-5.60)	(-3.20)	[0.00]	
	SMB	-0.74	-0.07	-0.44		-0.26	233.31	22.43
		(-1.66)	(-0.14)	(-6.35)		(-2.74)	[0.00]	
	HML	1.29	1.24	-0.20	-0.26		92.63	7.83
		(3.16)	(2.89)	(-3.19)	(-2.27)		[0.00]	
Taiwan	MKT	0.37	0.38		-0.04	0.00	29.22	0.07
		(0.82)	(0.82)		(-0.26)	(-0.03)	[0.00]	
	SMB	0.14	0.20	-0.02		-0.06	199.64	0.40
		(0.50)	(0.70)	(-0.26)		(-0.77)	[0.00]	
	HML	1.10	1.11	0.00	-0.06		109.61	0.34
		(3.92)	(4.14)	(-0.03)	(-0.81)		[0.00]	
Thailand	MKT	0.47	0.07		-1.01	-0.01	199.48	50.85
		(1.15)	(0.21)		(-14.32)	(-0.14)	[0.00]	
	SMB	-0.42	0.00	-0.49		-0.11	367.94	52.32
		(-1.59)	(-0.02)	(-9.57)		(-1.48)	[0.00]	

	HML	1.57	1.46	-0.01	-0.25		25.76	5.34
		(4.46)	(4.47)	(-0.14)	(-1.54)		[0.00]	
Turkey	MKT	1.19	1.09		-0.42	0.05	47.90	6.54
		(1.70)	(1.42)		(-3.75)	(0.41)	[0.00]	
	SMB	0.01	0.55	-0.13		-0.19	215.84	10.91
		(0.04)	(1.48)	(-3.68)		(-3.06)	[0.00]	
	HML	1.94	1.92	0.02	-0.25		172.04	5.56
		(3.53)	(3.62)	(0.40)	(-3.17)		[0.00]	
Other EMs	MKT	0.64	0.28		-0.54	0.10	79.60	20.73
		(1.74)	(0.72)		(-4.33)	(1.49)	[0.00]	
	SMB	-0.32	0.18	-0.33		-0.16	289.61	22.58
		(-1.19)	(0.65)	(-7.54)		(-2.06)	[0.00]	
	HML	1.96	1.73	0.08	-0.20		60.98	6.22
		(3.60)	(5.84)	(1.37)	(-1.97)		[0.00]	
Developed	MKT	0.67	1.06		-0.01	-0.41	76.42	7.20
		(2.92)	(4.72)		(-0.06)	(-3.83)	[0.00]	
	SMB	0.01	0.08	0.00		-0.07	83.31	0.78
		(0.06)	(0.44)	(-0.06)		(-0.75)	[0.00]	
	HML	0.95	1.07	-0.17	-0.10		89.79	7.88
		(5.72)	(6.36)	(-3.44)	(-0.77)		[0.00]	
Emerging	MKT	0.49	0.40		-0.23	0.10	212.31	5.75
		(1.44)	(1.10)		(-2.75)	(1.55)	[0.00]	
	SMB	0.37	0.18	-0.23		0.17	88.55	7.18
		(1.15)	(0.55)	(-3.23)		(1.95)	[0.00]	
	HML	1.73	1.62	0.10	0.17		27.24	30.34
		(6.13)	(5.74)	(1.54)	(1.74)		[0.00]	
Non-US	MKT	0.59	1.04		-0.46	-0.33	118.22	9.95
		(2.24)	(3.53)		(-3.73)	(-2.56)	[0.00]	
	SMB	0.16	0.08	-0.11		0.12	163.32	8.53
		(1.44)	(0.59)	(-2.96)		(1.84)	[0.00]	
	HML	1.15	1.19	-0.11	0.17		88.19	7.17
		(7.58)	(7.91)	(-2.57)	(1.74)		[0.00]	
Global	MKT	0.64	1.01		-0.22	-0.33	84.23	4.79
		(2.75)	(4.10)		(-1.88)	(-2.89)	[0.00]	
	SMB	0.07	0.16	-0.06		-0.05	98.21	1.38
		(0.62)	(0.91)	(-1.65)		(-0.48)	[0.00]	
	HML	1.09	1.16	-0.11	-0.06		83.11	3.83
		(7.18)	(7.60)	(-2.53)	(-0.49)		[0.00]	

Table A2. Spanning Test Within Carhart's Four-Factor Model

The table presents the results from the spanning test within Carhart's four-factor model. Int is the intercept from a spanning regression, χ^2 is the Wald test, and R^2 measures the goodness-of-fit (in percent). MKT, SMB, and HML are the market, size, and value factors from Fama–French's three-factor model. UMD is the momentum factor from Carhart's model. The numbers in parentheses are robust GMM-based *t*-statistics, while *p*-values are in brackets.

Group		Mean	Int	MKT	SMB	HML	UMD	$\chi 2$	R^2
Australia	MKT	0.64	1.05		-0.02	-0.09	-0.27	106.99	4.8
		(1.87)	(2.59)		(-0.35)	(-1.17)	(-3.29)	[0.00]	
	SMB	-0.99	-0.14	-0.02		-0.34	-0.21	106.16	7.16
		(-2.41)	(-0.30)	(-0.34)		(-3.11)	(-2.69)	[0.00]	
	HML	1.73	1.77	-0.15	-0.04		-0.07	143.42	5.53
		(7.49)	(7.34)	(-2.57)	(-1.15)		(-1.26)	[0.00]	
	UMD	0.91	1.20	-0.10	-0.12	-0.02		133.08	5.94
		(3.26)	(3.78)	(-2.08)	(-2.43)	(-0.21)		[0.00]	
Canada	MKT	0.62	1.01		0.00	-0.11	-0.29	194.42	10.45
		(2.34)	(3.98)		(-0.01)	(-1.62)	(-4.41)	[0.00]	
	SMB	0.42	0.51	0.00		-0.24	-0.01	168.62	5.7
		(1.39)	(1.69)	(-0.01)		(-5.06)	(-0.31)	[0.00]	
	HML	0.32	0.66	-0.23	-0.12		-0.13	165.61	7.98
		(1.06)	(2.29)	(-2.97)	(-1.62)		(-2.34)	[0.00]	
	UMD	1.25	1.42	-0.38	0.02	-0.10		191.07	10.44
		(3.90)	(4.80)	(-5.06)	(0.38)	(-1.78)		[0.00]	
France	MKT	0.87	1.15		-0.49	-0.03	-0.26	74.61	14.95
		(3.05)	(3.77)		(-5.00)	(-0.28)	(-2.66)	[0.00]	
	SMB	-0.16	0.08	-0.18		-0.16	0.83	193.17	14.43
		(-0.92)	(0.41)	(-4.86)		(-2.04)	(0.04)	[0.00]	
	HML	0.78	0.91	-0.21	-0.02		-0.11	36.27	5.97
		(3.59)	(4.39)	(-1.97)	(-0.27)		(-1.24)	[0.00]	
	UMD	1.28	1.42	-0.16	0.00	-0.22		45.89	7.96
		(5.05)	(6.34)	(-2.26)	(0.05)	(-1.77)		[0.00]	
Germany	MKT	0.65	0.89		-0.77	-0.07	-0.39	150.69	30.82
		(2.22)	(3.41)		(-9.02)	(-0.70)	(-4.98)	[0.00]	
	SMB	-0.24	0.17	-0.27		-0.25	-0.07	287.42	28.25
		(-1.55)	(1.09)	(-8.47)		(-3.86)	(-1.88)	[0.00]	
	HML	0.71	0.69	-3.10	-0.03		-0.04	70.66	9.36
		(3.89)	(3.75)	(-0.33)	(-0.64)		(-0.91)	[0.00]	
	UMD	0.95	1.21	-0.25	-0.11	-0.05		85.67	12.39
		(4.48)	(6.76)	(-3.40)	(-1.49)	(-0.64)		[0.00]	
Hong Kong	MKT	0.63	0.85		-0.24	0.07	-0.39	49.47	11.69
		(1.67)	(2.20)		(-2.31)	(0.61)	(-3.66)	[0.00]	
	SMB	-0.30	0.31	-0.18		-0.27	-0.24	142.66	11.02
		(-0.92)	(0.96)	(-2.65)		(-3.47)	(-3.21)	[0.00]	
	HML	1.05	1.07	-0.16	0.03		-0.04	104.39	5.29
		(4.27)	(4.74)	(-3.44)	(0.62)		(-0.68)	[0.00]	
	UMD	0.93	1.18	-0.17	-0.14	-0.01		78.91	10.12
		(3.10)	(4.48)	(-2.26)	(-2.25)	(-0.15)		[0.00]	
Japan	MKT	0.51	0.87		0.04	-0.64	-0.33	104.23	14.85
		(1.79)	(3.28)		(0.47)	(-5.67)	(-3.76)	[0.00]	
	SMB	0.15	0.17	0.01		-0.08	-0.17	186.61	5.74
		(0.96)	(1.13)	(0.47)		(-1.40)	(-3.14)	[0.00]	
	HML	0.64	0.72	-0.06	-0.17		-0.14	267.87	12.46
		(4.28)	(4.93)	(-1.42)	(-6.47)		(-2.45)	[0.00]	
	UMD	-0.15	0.36	-0.11	-0.17	-0.29		49.00	10.34
		(-0.69)	(1.76)	(-2.14)	(-1.64)	(-2.27)		[0.00]	
South Korea	MKT	0.83	0.76		-0.09	-0.27	-0.68	59.64	20.8
		(1.45)	(1.42)		(-0.92)	(-1.60)	(-5.88)	[0.00]	

	SMB	1.17	1.05	-0.05		0.00	-0.21	20.36	3.16
		(2.88)	(2.71)	(-0.91)		(-0.02)	(-1.73)	[0.00]	
	HML	1.20	1.33	0.00	-0.10		0.06	16.52	4.66
		(3.84)	(4.68)	(-0.02)	(-2.10)		(0.44)	[0.00]	
	UMD	-0.74	-0.49	-0.25	-0.15	0.05		38.87	21.14
		(-2.08)	(-1.41)	(5.28)	(-1.77)	(0.36)		[0.00]	
UK	MKT	0.78	1.36		-0.22	-0.14	-0.36	98.80	10.33
		(3.13)	(4.59)		(-3.15)	(-1.52)	(-4.32)	[0.00]	
	SMB	-0.06	0.56	-0.13		-0.44	-0.16	193.61	13.53
		(-0.30)	(2.29)	(-2.91)		(-6.09)	(-2.74)	[0.00]	
	HML	0.75	0.96	-0.25	-0.05		-0.18	247.73	15.22
		(4.52)	(5.47)	(-5.64)	(-1.40)		(-4.16)	[0.00]	
	UMD	1.24	1.62	-0.17	-0.17	-0.31		64.46	13.52
		(4.99)	(7.11)	(-2.26)	(-1.93)	(-3.25)		[0.00]	
US	MKT	0.84	1.60		-0.20	-0.46	-0.41	221.22	22.61
		(3.77)	(7.85)		(-3.43)	(-4.46)	(-5.25)	[0.00]	
	SMB	-0.39	0.63	-0.15		-0.70	-0.17	142.84	25.78
		(-1.75)	(2.18)	(-2.78)		(-4.56)	(-2.38)	[0.00]	
	HML	1.06	1.15	-0.34	-0.16		-0.09	405.33	27.89
		(6.15)	(7.06)	(-7.46)	(-4.09)		(-1.74)	[0.00]	
	UMD	0.87	1.43	-0.27	-0.23	-0.25		51.02	17.12
		(3.60)	(5.80)	(-2.80)	(-1.81)	(-1.46)		[0.00]	
Other DMs	MKT	0.74	1.17		-0.54	-0.06	-0.32	127.87	14.64
		(2.75)	(3.86)		(-4.93)	(-0.86)	(-2.99)	[0.00]	
	SMB	-0.04	0.17	-0.15		-0.09	-0.02	334.07	9.72
		(-0.33)	(1.14)	(-4.90)		(-1.80)	(-0.67)	[0.00]	
	HML	0.85	1.02	-0.17	-0.03		-0.12	106.93	3.45
		(4.73)	(6.06)	(-1.83)	(-0.83)		(-1.84)	[0.00]	
	UMD	1.28	1.64	-0.22	-0.06	-0.16		73.80	8.85
		(5.66)	(8.51)	(-2.79)	(-0.72)	(-1.90)		[0.00]	
Brazil	MKT	1.11	0.43		-1.07	0.15	-0.16	81.65	38.36
		(1.81)	(0.69)		(-10.81)	(1.31)	(-1.38)	[0.00]	
	SMB	-0.57	-0.24	-0.33		0.02	0.03	84.35	36.78
		(-1.75)	(-0.72)	(-8.67)		(0.20)	(0.45)	[0.00]	
	HML	1.37	1.43	0.02	0.06		-0.13	49.46	4.03
		(4.68)	(4.89)	(0.20)	(1.32)		(-1.87)	[0.00]	
	UMD	0.81	1.10	-0.08	0.07	-0.17		56.37	6.13
		(2.18)	(2.84)	(-1.19)	(0.59)	(-1.68)		[0.00]	
China	MKT	0.63	0.82		-0.01	-0.33	-0.38	17.68	9.04
		(1.17)	(1.47)		(-0.09)	(-2.69)	(-2.26)	[0.00]	
	SMB	0.89	0.98	0.00		-0.16	-0.11	101.31	8
		(3.08)	(3.32)	(-0.09)		(-3.35)	(-1.04)	[0.00]	
	HML	0.57	1.10	-0.46	-0.24		-0.66	98.05	25.63
		(1.37)	(2.70)	(-3.58)	(-2.97)		(-4.51)	[0.00]	
	UMD	-0.04	0.22	-0.10	-0.13	-0.24		158.65	16.95
		(-0.13)	(0.80)	(-2.06)	(-1.37)	(-5.90)		[0.00]	
India	MKT	0.68	0.72		-0.27	0.22	-0.42	34.98	21.3
		(1.28)	(1.33)		(-3.21)	(2.23)	(-2.98)	[0.00]	
	SMB	0.30	0.45	-0.20		0.01	-0.06	42.03	5.85
		(0.78)	(1.33)	(-3.68)		(0.10)	(-0.61)	[0.00]	
	HML	1.33	1.41	0.01	0.12		-0.26	72.88	14.1
		(3.91)	(4.29)	(0.12)	(2.23)		(-2.70)	[0.00]	
	UMD	0.61	1.24	-0.19	-0.08	-0.30		140.74	19.99
		(1.61)	(3.80)	(-1.79)	(-1.20)	(-3.87)		[0.00]	
Malaysia	MKT	0.55	0.42		0.21	0.30	-0.36	5.87	15.41
		(1.23)	(0.97)		(1.74)	(2.10)	(-1.88)	[0.00]	
	SMB	-0.11	-0.14	0.09		0.06	-0.23	62.65	12.36
		(-0.39)	(-0.52)	(1.65)		(0.62)	(-2.27)	[0.00]	
	HML	0.91	0.91	0.04	0.09		-0.14	60.04	10
		(4.23)	(4.63)	(0.63)	(1.72)		(-2.16)	[0.00]	
	UMD	0.33	0.68	-0.13	-0.15	-0.17		52.01	18.02

		(1.16)	(2.77)	(-1.43)	(-1.39)	(-1.66)		[0.00]	
Pakistan	MKT	0.76	0.84		-0.44	-0.24	-0.39	238.00	28.02
		(1.42)	(1.61)		(-7.07)	(-3.75)	(-5.24)	[0.00]	
	SMB	-0.74	0.02	-0.47		-0.28	-0.18	100.51	23.9
		(-1.66)	(0.03)	(-6.76)		(-3.03)	(-1.22)	[0.00]	
	HML	1.29	1.31	-0.28	-0.25		-0.21	68.02	10.29
		(3.16)	(3.08)	(-2.48)	(-3.67)		(-1.77)	[0.00]	
	UMD	0.21	0.45	-0.27	-0.14	-0.15		137.91	10.24
		(0.59)	(1.47)	(-4.11)	(-1.89)	(-2.49)		[0.00]	
Taiwan	MKT	0.37	0.45		-0.14	-0.05	-0.30	3.55	25.14
		(0.82)	(1.00)		(-0.083)	(-0.40)	(-2.04)	[0.00]	
	SMB	0.14	0.28	-0.05		-0.10	-0.30	160.08	10.49
		(0.50)	(0.98)	(-0.91)		(-1.45)	(-4.41)	[0.00]	
	HML	1.10	1.13	-0.12	-0.02		-0.18	79.75	3.25
		(3.92)	(4.27)	(-1.80)	(-0.40)		(-1.73)	[0.00]	
	UMD	0.04	0.57	-0.07	-0.33	-0.21		124.93	14.34
		(0.12)	(1.95)	(-1.23)	(-3.42)	(-1.81)		[0.00]	
Thailand	MKT	0.47	0.33		-0.95	-0.10	-0.20	267.70	53.76
		(1.15)	(1.06)		(-12.94)	(-1.25)	(-2.94)	[0.00]	
	SMB	-0.42	-0.01	-0.49		-0.12	0.00	230.58	52.32
		(-1.59)	(-0.04)	(-10.08)		(-1.42)	(0.08)	[0.00]	
	HML	1.57	-0.22	-0.22	-0.10		-0.30	60.32	18
		(4.46)	(-1.39)	(-1.39)	(-1.32)		(-2.87)	[0.00]	
	UMD	0.46	1.32	-0.27	0.02	-0.46		59.29	25.54
		(1.19)	(4.43)	(-2.91)	(0.13)	(-3.65)		[0.00]	
Turkey	MKT	1.19	0.96		-0.49	0.10	-0.65	50.16	16.07
		(1.70)	(1.37)		(-4.31)	(1.16)	(-3.71)	[0.00]	
	SMB	0.01	0.51	-0.17		-0.16	-0.25	180.11	14.96
		(0.04)	(1.39)	(-3.73)		(-2.52)	(-3.04)	[0.00]	
	HML	1.94	1.90	-0.22	0.05		0.17	27.23	6.93
		(3.53)	(3.60)	(-2.74)	(1.06)		(1.09)	[0.00]	
	UMD	-0.06	-0.02	-0.07	-0.13	0.07		139.39	10.53
		(-0.15)	(-0.06)	(-1.47)	(-2.68)	(0.83)		[0.00]	
Other EMs	MKT	0.64	0.66		-0.53	0.08	-0.31	48.64	29.7
		(1.74)	(1.63)		(-5.24)	(0.95)	(-2.60)	[0.00]	
	SMB	-0.32	0.05	-0.33		-0.14	0.03	88.50	24.86
		(-1.19)	(0.16)	(-6.47)		(-1.83)	(0.41)	[0.00]	
	HML	1.96	1.80	-0.20	0.07		-0.08	39.42	7.56
		(3.60)	(6.11)	(-1.77)	(0.96)		(-1.24)	[0.00]	
	UMD	0.65	1.53	-0.24	0.04	-0.07		47.01	13.33
		(2.20)	(5.82)	(-2.43)	(0.36)	(-1.09)		[0.00]	
DMs	MKT	0.67	1.36		-0.07	-0.43	-0.40	162.42	22.68
		(2.92)	(6.71)		(-0.74)	(-5.51)	(-6.14)	[0.00]	
	SMB	0.01	0.14	-0.03		-0.08	-0.06	95.02	1.67
		(0.06)	(0.81)	(-0.72)		(-0.88)	(-1.26)	[0.00]	
	HML	0.95	1.17	-0.12	-0.22		-0.11	79.95	10.11
		(5.72)	(7.75)	(-0.92)	(-4.66)		(-1.88)	[0.00]	
	UMD	0.68	0.97	-0.32	-0.01	-0.02		34.36	14.69
		(2.93)	(3.96)	(-3.76)	(-0.05)	(-0.15)		[0.00]	
EMs	MKT	0.49	0.53		-0.23	0.07	-0.10	82.10	6.75
		(1.44)	(1.43)		(-2.69)	(1.00)	(-1.19)	[0.00]	
	SMB	0.37	0.16	-0.23		0.18	0.01	41.09	7.58
		(1.15)	(0.50)	(-3.11)		(1.91)	(0.14)	[0.00]	
	HML	1.73	1.86	0.16	0.06		-0.28	67.38	11.96
		(6.13)	(6.35)	(1.77)	(0.99)		(-3.99)	[0.00]	
	UMD	0.78	1.46	-0.12	0.03	-0.33		109.25	10.15
		(2.69)	(5.34)	(-1.31)	(0.47)	(-5.03)		[0.00]	
Non-US	MKT	0.59	1.33		-0.44	-0.37	-0.38	255.53	20.7
		(2.24)	(5.04)		(-4.39)	(-3.61)	(-4.94)	[0.00]	
	SMB	0.16	0.11	-0.12		0.11	-0.03	134.07	8.79
		(1.44)	(0.77)	(-3.60)		(1.68)	(-0.75)	[0.00]	

	HML	1.15	1.27	0.16	-0.14		-0.09	60.51	8.9
		(7.58)	(8.14)	(1.57)	(-3.57)		(-1.87)	[0.00]	
	UMD	0.65	1.05	-0.23	-0.05	-0.07		31.26	10.76
		(2.72)	(4.14)	(-2.55)	(-0.38)	(-0.59)		[0.00]	
Global	MKT	0.64	1.37		-0.23	-0.37	-0.40	180.17	17.94
		(2.75)	(5.98)		(-2.42)	(-4.27)	(-5.40)	[0.00]	
	SMB	0.07	0.20	-0.07		-0.05	-0.03	93.39	1.7
		(0.62)	(1.10)	(-2.10)		(-0.55)	(-0.79)	[0.00]	
	HML	1.09	1.26	-0.07	-0.15		-0.10	71.25	5.9
		(7.18)	(8.60)	(-0.57)	(-3.59)		(-2.02)	[0.00]	
	UMD	0.78	1.20	-0.28	-0.04	-0.11		31.94	13.23
		(3.44)	(4.95)	(-3.10)	(-0.29)	(-0.93)		[0.00]	