Anomalies in Emerging Markets:

The Case of Mexico*

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Abstract

In this paper we explore the relationship between 19 of the most common anomalies reported for the US market and the cross-section of Mexican stock returns. We find that one-month stock returns in Mexico are only predicted by 5 of the 19 anomalies: size, momentum, idiosyncratic volatility, lottery-effect, and profitability. Size, momentum and profitability have a positive relation with future 1-month returns, while idiosyncratic volatility and the lottery effect have a negative relation. For longer horizons of 3 and 6 months, only size (with a negative sign) and momentum continue to predict returns.

Keywords: Cross section of stock returns, anomalies, asset pricing, market efficiency

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1. Introduction

Harvey, Liu, and Zhu (2016) document that over 400 different anomalies explain the cross section of expected stock returns in the United States. The literature documents the predictability of some of these anomalies on international stock returns and other papers focus on countries or group of countries to understand how these anomalies are priced locally. However, to the best of our knowledge, there is no study on how these anomalies jointly predict stock returns in Mexico. The goal of this paper is to document the predictability of 19 of the most common anomalies on the Mexican stock market by analyzing 25 years of monthly returns and financial statements from 1994 to 2017 for stocks listed in the Mexican Stock Exchange (or the Bolsa Mexicana de Valores in Spanish).[1] The Mexican market is the second largest in Latin America and 30% of its market capitalization is held by foreign institutional investors. This is the first comprehensive study of the Mexican market exploring the most popular anomalies documented for other markets. This paper provides valuable information for (foreign) investors and academics on the Mexican stock exchange and the factors that drive stock returns.

We analyze 19 of the most common anomalies that reliably predict stock returns in the US market. These anomalies are grouped into 9 categories as follows: 1) market betas from the CAPM model, 2) market capitalization (Banz 1981, Jegadeesh and Titman 1993, and Fama and

[1] An anomaly refers to a situation in which the stock market performs contrary to the notion of efficient markets, where prices supposedly reflect all available information at any point in time. For example, market capitalization or firm size is negatively related with future stock returns in the United States (Fama and French 1993). Market capitalization is publicly available so its impact should already be incorporated in the stock price and no excess return from small firms versus big firms should be observed. Since the empirical evidence reports that small firms earn higher future returns than big firms, size is an anomaly.

French 1993), 3) idiosyncratic volatility (Ang, Hodrick, Xing, and Zhang 2006), 4) lottery effect (Bali, Cakici, and Whitelaw 2011), 5) value-growth effect (Book-to-market ratio from Asness 1997 and Daniel and Titman 2006; earnings-to-price ratio from Basu 1983; and cash flow-to-price ratio from Lakonishok, Shleifer, and Vishny 1994), 6) momentum (Jegadeesh and Titman 1993) and reversal (Jegadeesh 1990 and Lehman 1990), 7) investment (Share issuance from Pontiff and Woodgate 2008 and accounting accruals from Sloan 1996), 8) profitability (Profitability from Fama and French 2006 and gross-profit from Novy-Marx 2013), and 9) trading frictions (Shares turnover from Datar, Naik, and Radcliffe 1998 and illiquidity from Amihud 2002).

We analyze the predictability power of each of the 19 anomalies using portfolio sorts and Fama-MacBeth (1973) regressions. Each month, we sort firms by each anomaly and form three portfolios. We examine the 1-month future returns of equal- and value-weighted portfolios. To assess the predictability power of an anomaly, we compute the long-short return, which is the portfolio that buys tercile 3 and sells tercile 1. A statistically significant long-short return means that the anomaly predicts future stock returns. We confirm this predictability with Fama-MacBeth regressions of the 1-month returns on each anomaly individually.

In the univariate analysis we find that 4 anomalies predict stock returns in the cross-section for Mexico: momentum, profitability, lottery effect, and idiosyncratic volatility. Out of these 4 measures, momentum is the only one that robustly predicts stock returns. The other 3 measures–profitability, lottery, and idiosyncratic volatility–predict returns for equal-weighted but not for value-weighted portfolios. Also their predictability is robust in univariate Fama-MacBeth regressions. We include these 4 anomalies along with beta, size, and book-to-market in the multivariate analysis.

The multivariate analysis confirms the predictability of momentum, profitability, lottery effect, and idiosyncratic volatility. Using Fama-MacBeth regressions and double sorted portfolios, size, momentum, and profitability have positive and significant relationships with future 1-month stock returns while lottery effect, and idiosyncratic volatility have a negative and significant relation. Surprisingly, when relevant, size has a positive relationship (not negative, as in Fama-French 1993) with stock returns. Moreover, the positive size predictability is concentrated on stocks with low ROA and low momentum, and size predicts returns for any book-to-market level.

Our paper complements Herrera and Lockwood (1994), who study the Mexican stock market from 1987 to 1992. They find that beta and size predict stock returns. Blitz, Pang, and Van Vliet (2013) study whether volatility predicts stock returns. For Mexico, they show that volatility does not predict future 1-month returns. Hou, Karolyi, and Kho (2011) study 6 anomalies for international stock markets that include Mexico from 1988 to 2003. They report an average annual factor returns (without t-statistics) of 0.4% for size, 0.8% for book-to-market, 1.0% for momentum, -0.3% for cash flow-to-price, 1.0% for dividend to price, and -0.3% for earnings-to-price. Other studies that use Mexican stock return data are Agrawal and Tandon (1994); Bialkowski, Gootschalk, and Wisniewski (2008); Blitz, Pang, and van Vliet (2013); Dutt and Humphery-Jenner (2013); and Chaieb, Langlois, and Scaillet (2018).

The main contribution of our paper is to document the relationship between Mexican stock returns and market anomalies in the cross-section. We find that only momentum, lottery effect, idiosyncratic volatility, and profitability predict future 1-month returns. Size is necessary as a control variable and the value-weighting analysis since it kills the predictability of some characteristics. While momentum, and profitability have positive and significant relationships with future 1-month stock returns, lottery effect, and idiosyncratic volatility have a negative and significant relation. A second contribution is to show that size and returns have a positive relationship. This is puzzling given that Banz (1981), Fama-French (1993), and many others find a negative relationship in the US market and in many international markets. A third contribution is that for longer return horizons of 3 and 6 months, only size, book-to-market, and momentum predict returns. Size has a negative relation with future returns as in Fama-French (1993), while momentum has a positive relation. Book-to-market only predicts returns for longer horizons; the relation between book-to-market and returns for longer horizons is positive and significant.

The rest of the paper is organized as follows. Section 2 describes the Mexican Stock Market and compares it with the US market. Data and the definition of the anomalies are reported in Section 3, and Section 4 documents individual predictability of each anomaly. In Section 5 we perform multivariate analysis with those variables that predict 1-month stock returns, and in Section 6 we study the predictability of 3- and 6-month returns. Section 7 concludes the paper.

2. The Mexican stock market

The Mexican Stock Exchange is the second largest market in Latin America, after the Brazil Stock Exchange, accounting for 21.8% of Latin America's market capitalization and 0.5% of the world market cap. At the end of 2017, the Mexican Stock Exchange had 149 listed companies (including 7 foreign companies) and a market cap of USD 426.4 billion. The value of share trading over 2017 is USD 106 billion. On average 36% of the market capitalization corresponds to foreign investments. In 2017, foreign investors accounted for 11% of share trading.

To provide some background, Figure 1 shows the evolution in compounded returns of S&P/BMV IPC index, the most used market benchmark in Mexico, against the S&P 500 market index and the MSCI World Price Index from 1994 to 2017. The Mexican stock market grew from a base level of 100 in 1994 to more than 500 in 2007. After the US economic crisis in 2008, the Mexican index sharply declined to a level of 200. The Mexican index recovered part of its value in the following years attaining a maximum of 620 in 2012. After 2014, the Mexican index declined due to threats of NAFTA (North American Free-Trade Agreement) dissolution. In terms of performance, before 2014, the cumulative return of the Mexican stock market beat that of the United States and the world indexes. Compared with the US and the world indexes, the Mexican index is more volatile.

Table 1 reports summary statistics and the correlation matrix of average annual returns for the MSCI World Price Index, the S&P 500, and the S&P/BMV IPC indexes from 1994 to 2017. Overall, the Mexican IPC index reports the highest average annual return of 11.52% over the sample period. The world and the US indexes have an average annual return of 7.51% and 9.06%, respectively. The riskiest market in terms of volatility is the Mexican market with an annual volatility of 35%. These volatility numbers confirm the high variation in the Mexican stock price observed in Figure 1. The US and the world market report a much lower volatility of 17%. Finally the highest Sharpe ratio is that of the US market with a value of 0.51, while the lowest is that of the Mexican market with a value of 0.331.

Table 1 also reports the correlations among the three indexes using yearly returns. The Mexican stock market and the US stock market report a correlation of 94.3%.[2] The correlation

[2] Using daily returns, the correlation between the Mexican stock market and the US stock market drops to 65%

between US to World Index is 58% and Mexican stock market to World index is 52%. These numbers confirm that the Mexican economy is highly correlated with the US market.

Figure 2 plots the evolution of the total market capitalization, the total value of stocks traded, and the turnover ratio for the Mexican stock market from 1991 to 2017. Turnover ratio is defined as the value of shares traded divided by their market capitalization. The market capitalization of the Mexican stock market increased from 100 USD billion in 1991 to a maximum of 500 USD billion in 2013. In 2015, the market capitalization of the Mexican stock market decreased to 350 USD billion. The value of stocks traded presents a similar pattern as the one of market capitalization, with the value of stocks traded increasing from 40 USD billion in 1991 to over 100 USD billion in 2015. Finally, the turnover ratio is between 20% and 45% over the sample period.

Figure 2 also plots the same variables for the Mexican market as a fraction of the values in the US market. The pattern of the plots for the three variables is very similar. For example, the market capitalization of the Mexican stock market as a fraction of that of the US market is between 3% and 4% in the period 1991-1994, decreases to 1% between 1997 and 2003, increases to 3% in 2012, and finally decreases to 1% in 2015. The value of stocks traded in Mexico as a fraction of that of the US market reached a maximum of 1.7% in 1994, but most of the time it is below 0.5%. The turnover of Mexico as a fraction of that of the US market also reached its maximum in 1994 with a value of 0.6 and since 2000 it has ranged between 0.1 and 0.3. Overall, our three variables show that the Mexican stock market has not grown in comparison to the US market. Its market capitalization, the value of stocks traded, and the turnover ratio were high in the 90s but significantly decreased in the 2000s.

Finally, Figure 2 presents the market capitalization as a percentage of the GDP for Mexico and the US. The US market has higher numbers than those of the Mexican market. While in the United States the ratio is above 100% for most of the sample, in Mexico the ratio is below 40%.

3. Data

Our sample contains stocks listed in the Mexican Stock Exchange between 1994 and 2017. In 1994, the stock market was fully open to international capitals and several Mexican stocks were already recognized as "ready market" by the SEC. We obtain data from Compustat Global security daily files.[3] Daily returns are adjusted security prices for stock splits and dividends and are computed as (PRCCD/AJEXDI)*TRFD. PRCCD is the daily closing price, AJEXDI is the cumulative adjustment factor, and TRFD is the total daily return factor that includes cash equivalent distributions along with reinvestment of dividends and the compounding effect of dividends paid on reinvested dividends. We compute monthly returns as the percent change of the last daily adjusted security price available on each month (variable MONTHEND=1).

We apply the following filters following Hou, Karolyi, and Kho (2011) and the WRDS world index methodology. We only include common ordinary shares (Issue type code TCPI=0); securities listed in the Mexican stock exchange (Stock exchange code EXCHG=208); companies' with the country ISO code for Mexico (Country International Organization for Standardization country code, ISO = "MEX"); and companies whose current company incorporation ISO country code is equal to the country ISO code (FIC=ISO). For companies with

[3] We also use Datastream. We compare the number of stocks and the monthly and daily returns and find no significant difference between the two datasets.

multiple issues we select the one with the largest market capitalization (MV=CSHOC*PRCCD). An observation is removed if the market capitalization is not positive. Daily (monthly) returns are set to missing when the return is greater than 50% (500%), or when the return is greater than 35% (300%) and rebounds within one day to less than -25% (-200%), or when the return is lower than -35% (-300%) and rebounds to more than 50% (400%).

We verify the validity of our data by constructing a value weighted index that we compare with the WRDS Mexican Index. The WRDS Mexican Index is a portfolio independently constructed by WRDS. The correlation between our index and the WRDS Index is 98.4% for monthly returns and 95.5% for the daily returns. Note that our index has many more stocks than the one constructed by WRDS since they require securities to belong to the top 50% of the market capitalization of Mexico to be included in the WRDS Mexican Index.

3.1. Definitions of Anomalies

The main goal of our paper is to test if the anomalies found for the US market also exist in the Mexican market. Our selection is based on the papers by Chordia, Subrahmanyam, and Tong (2014) and Hou, Karolyi, and Kho (2011). The anomalies we analyze can be grouped in the following nine categories: market betas, volatility, lottery, market capitalization, value-growth effect, momentum-and-reversal, investment, profitability, and trading frictions. Below we define the 19 variables for the nine different groups. Accounting data is from the Global Fundamental Annual File of Compustat.

i. Betas (β_{1M}, β_{12M}): 1- and 12-month betas obtained from the standard CAPM using daily data for the corresponding 1-month and 12-month periods.

ii. Volatility: we compute idiosyncratic volatility (IVOL) defined as the root mean squared residuals from the standard CAPM regression using daily returns over one month.

iii. Lottery: maximum daily return (MAX) over the previous month.

iv. Market capitalization: firm size (SIZE) is based on Banz (1981) and is defined as the natural logarithm of the market value of the firm's equity. We multiply shares outstanding (CSHOC) times the daily closing price (PRCCD) to obtain the market value of equity.

v. Value-growth effect

- Book-to-market (BM) is defined as book equity divided by the corresponding market equity of each month. To obtain book equity we use total shareholders' equity (TEQ) plus deferred taxes and investment tax credit (TXDITC) minus preferred stock value (PSTK).
- Earnings-to-price (EP) is defined as operating income after depreciation (OIADP) divided by market equity (Basu 1983).
- Cash flow-to-price (CP) is defined as net cash flow from operating activities (OANCF) divided by market equity (Lakonishok, Shleifer, and Vishny 1994).

vi. Momentum and reversal

- R_{1M} is the lagged 1-month return (Jegadeesh 1990).
- R_{6M} is the cumulative return on the stock over the 6 months ending at the beginning of the previous month (Jegadeesh and Titman 1993).
- R_{12M} is the cumulative return of 11 months ending at the beginning of the previous month (Jegadeesh and Titman 1993).

vii. Investment

- Share issuance (ISSUE) is measured as the monthly log change of adjusted shares outstanding (CSHOC/AJEXDI*TRFD) as in Pontiff and Woodgate (2008). Shares are adjusted for distribution events like splits and stock dividends.
- Asset growth (AG) is the year-on-year percentage change in total assets (AT) (Cooper, Gulen, and Schill 2008).
- Accounting accruals (ACC) is net income (NICOM) minus net cash flow from operating activities (OANCF). This is equivalent to the change in non-cash current assets less the change in current liabilities (exclusive of short-term debt and taxes payable), less depreciation expense, divided by average total assets, as defined by Sloan (1996).

viii. Profitability

- Profitability (PROFIT) is earnings divided by book equity, where earnings are defined as income before extraordinary items (IB) (Fama and French 2006).
- Return on assets (ROA) is income before extraordinary items (IB) divided by total assets (AT) (Balakrishnan, Bartov, and Faurel 2010).
- Gross profits (GPROFIT) is total revenue (REVT) minus cost of goods sold (COGS) divided by total assets (AT) as in Novy-Marx (2013).

ix. Trading frictions

- Shares turnover (TURN) is the logarithm of the firm's share turnover estimated as the trading volume (CSHTRD) divided by the total number of shares outstanding (CSHOC) as in Datar, Naik, and Radcliffe (1998).

- Illiquidity (ILLIQ) is computed as the absolute price change per dollar of daily trading volume (Amihud, 2002):

$$ILLIQ_{it} = \frac{1}{D_{it}} \sum_{d=1}^{D_{it}} \frac{[R_{itd}]}{DVOL_{itd}} \times 10^6$$

where R_{itd} is the return for stock *i* on day *d* of month *t*, $DVOL_{itd}$ is the dollar trading volume of stock *i* on day *d* of month *t*, and D_{it} is the number of trading days for stock *i* in month *t*.

To ensure that we only use information available to the investor at the time of trading, we match accounting data from year end *T-1* with monthly returns from July of year *T* to June of year *T+1*. Market equity is the value at the end of December of year *T-1*. In Mexico, the fiscal year ends in December for all companies.

3.2 Summary statistics

Table 2 presents summary statistics of the 19 anomalies: beta 1 and 12 month (β_{1M}, β_{12M}); idiosyncratic volatility (IVOL); size (SIZE); book-to-market (BM); earnings-to-price (EP); cash flow-to- price ratio (CP); lagged 1-, 6-, and 12-month returns (R_{1M} , R_{6M}, and R_{12M}); maximum daily return over the previous month (MAX); Amihud's illiquidity (ILLIQ); new issues (ISSUE); monthly share trading volume divided by shares outstanding (TURN); accrual assets (ACC); asset growth (AG), profitability (PROFIT); gross profit (GPROFIT); and return on assets (ROA). The sample period is from 1994 to 2017 for a total of 282 months, and almost all anomalies are populated for the whole period. The means of the 1-month and the 12-month betas are below 1.0 at 0.79 and 0.75, respectively, with a maximum of 1.24 and a minimum of 0.37. Our numbers are in line with the betas reported by Hou, Karolyi, and Kho

(2011) of 0.83 and 0.77 using global and local indexes. The standard deviations of the 1- and 12-month betas are low. Idiosyncratic volatility is on average 2%, which is similar to the mean IVOL of NYSE/AMEX and lower than the mean IVOL of NASDAQ (0.033) (Chordia, Subrahmanyam, and Tong 2014).

Table 2 also shows that the size of the companies varies between 3.7 and 59.2 billion MXN. The biggest company is about 20 times larger than the smallest one. The average book-to-market is 1.1 which is larger than the one reported in Hou, Karolyi, and Kho (2011). The mean 1-, 6-, and 12-month returns are all positive at 1%, 8%, and 17%, respectively. The returns for 1-month and 6-month lagged returns are negative below the 25th percentile. The maximum and minimum 12-month returns are bounded between -45% and 94%. The average illiquidity is 0.12, which corresponds to the 75th percentile pointing that the distribution of illiquidity in Mexico is highly skewed to the right. The mean liquidity value is higher than the one reported by Chordia, Subrahmanyam, and Tong (2014) for the NYSE/AMEX but lower than the illiquidity for NASDAQ of 0.218. Mean annual issuance (ISSUE) is 0.03, which is smaller than the one reported by Pontiff and Woodgate (2008) of 0.04 for the United States, but the median firm in the Mexican market has more new equity issues (median of 0.008) than the US counterpart (median of zero). The PROFIT measure is on average 8%, GPROFIT is 29%, and ROA is 4%. GPROFIT is the less disperse measure of profitability.

Table 3 reports yearly mean values for each anomaly from 1994 to 2017. Betas are almost 1.0 in 1994 and monotonically decrease to levels close to 0.55 in 2000. Betas in 2017 are about 0.7. Annual mean estimates of idiosyncratic volatility range between 2% and 3%. Book-to-market spikes between 2000 and 2004 reaching values of around 2.0, but its level in 2017 is 0.72. We observe the same pattern for EP and CP ratios. During the same period, the average firm size in the Mexican market doubled, which could be a sign that the growth of firm fundamentals was even larger. The annual asset-growth rate in Mexico spiked in 1996, in the aftermath of the banking crisis of 1994-1995, and has fluctuated between 10% and 20% between 2008 and 2017. The variable new-issues reports the highest value of 11% in 1994 and significantly dropped after the year 2000 to nearly 1%. Profitability variables reached their highest values between 2006 and 2009.

3.3 Correlation matrix

Table 4 reports the correlation matrix among the 19 anomalies. The correlation between 1-month and 12-month betas is 56.1%. The betas are positively correlated with size, maximum return, and share turnover, and negatively correlated with book-to-market and illiquidity. Because of the positive correlation between firm size and beta, we conclude that the average beta in the Mexican market is driven by small firm betas. Idiosyncratic volatility has a positive correlation with book-to-market, cash flow-to-price ratio, maximum return, and illiquidity. The correlation between idiosyncratic volatility and maximum return is 72.5%, one of the highest in the correlation matrix. Pairs of variables that are highly correlated are earnings-to-price ratio with cash flow-to-price ratio and profitability with ROA. Among value-growth measures, book-to-market is the only measure that correlates with the other variables; it has a negative correlation with betas, asset growth, and profitability and a positive correlation with idiosyncratic volatility, trading frictions, and all the other measures of value. Size is also positively correlated with profitability, gross profit, and ROA, and negatively correlated with book-to-market. The profitability measures are negatively correlated with idiosyncratic volatility, book-to-market, illiquidity, and new issues. Finally, illiquidity is positively correlated with all three value measures.

4. Univariate analysis of anomalies and stock returns

In this section we analyze the relation between each of the 19 anomalies and future stock returns in the Mexican stock market. We work with stock returns denominated in Mexican pesos. To understand the relations we perform univariate portfolio sorts and Fama-MacBeth regressions on each anomaly individually. We test the predictability of each anomaly on 1-month future returns. The anomalies we analyze are the most popular anomalies documented for the US market. These 19 anomalies are beta for 1 and 12 months (β_{1M}, β_{12M}); idiosyncratic volatility (IVOL); size; book-to-market (BM); earnings-to-price (EP); cash flow-to-price ratio (CP); lagged 1-month, 6-month, and 12-month returns (R_{1M} , R_{6M}, and R_{12M}); maximum return over the previous month (MAX); Amihud's illiquidity (ILLIQ); new issues (ISSUE); monthly share trading volume divided by shares outstanding (TURN); accrual assets (ACC); asset growth (AG); profitability (PROFIT); gross profit (GPROFIT); and return on assets (ROA).

We analyze stock returns of portfolios sorted by each anomaly. For each anomaly, we group firms in three portfolios (low, medium, high) on month *t*, and we report the average return in month $t + 1$ for equal- and value-weighted portfolios. We also report the return of the high-minus-low portfolio, which is the portfolio that buys the high portfolio (Tercile 3) and sells the low portfolio (Tercile 1).

To confirm our results, we perform univariate Fama-MacBeth regressions of the 1-month stock returns on each anomaly. The two-stage Fama-MacBeth (1973) regression has the advantage that it does not impose breakpoints for portfolio formation but allows for an evaluation of the interaction among anomalies and is defined as:

$$r_{i,t+1} = \gamma_{0,t+1} + \gamma_{1,t+1} ANOMALY_{i,t} + \varepsilon_{i,t+1},$$

where $r_{i,t+1}$ is the stock return for company *i* in month *t+1*, and $ANOMALY_{i,t}$ is the anomaly value for each firm *i* in month *t*. In the first stage, for each month *t*, a cross-sectional regression is run with the stock return on the left hand side and the anomaly on the right hand side to estimate $\hat{\gamma}_{0,t+1}$ and $\hat{\gamma}_{1,t+1}$. From stage one, we obtain a time series of coefficients $\hat{\gamma}_{0,t+1}$ and $\hat{\gamma}_{1,t+1}$ that are averaged in the second stage to obtain an estimator for each coefficient. We evaluate the coefficient's significance using the Newey-West t-statistics with 3 lags. We report the average coefficients for each anomaly and the Newey-West t-statistics from the Fama-MacBeth (1973) regressions in Table 6. We now report the predictability results for each of the 19 anomalies. Table 11 provides a summary of the results from Tables 5 and 6.

4.1. Betas

CAPM beta is the most widely known concept in asset pricing relating the stock return with the market return. Ever since Black, Jensen, and Scholes (1972) we know that the security market line for US stocks is too flat relative to the CAPM. Hou, Karolyi, and Kho (2011) find that global and country betas do not explain the cross-section stock returns, and the average slopes are negative but insignificant. For the Mexican market, Herrera and Lockwood (1994) report a positive relationship between average returns and market betas with a sample from 1987 to 1992.

Table 5 reports univariate portfolios for 1- and 12-month betas (β_{1M} and β_{12M}) computed from the traditional CAPM model using daily returns over the previous 1 and 12 months. We report 1-month equal-weighted returns for low, medium, and high betas. The 1-month returns decrease from portfolio 1 to portfolio 3 for both betas. The returns of the high-minus-low portfolio, the one that buys tercile 3 and sells tercile 1, are negative but insignificant for both betas. For value-weighted portfolios, the high-minus-low return is positive and insignificant for both betas. From univariate portfolio sorts, we conclude that the traditional CAPM does not hold for the Mexican stock market. There is no relation between betas and stock returns.

Table 6 contains Fama-MacBeth regression coefficients from regressing 1-month returns on 1-month and 12-month betas. The coefficients are negative but insignificant in the two regressions. For example, the coefficient for the 12-month beta is -0.0111 with an insignificant t-statistic of -1.161. Overall, we conclude that betas do not predict expected stock returns in the Mexican market.

4.2. Idiosyncratic volatility

Empirical research finds that the relation between idiosyncratic volatility and stock returns contradicts theory. According to theory, idiosyncratic volatility should have a positive relationship with expected returns (Merton 1987, Barberis and Huang 2001, Malkiel and Xu 2002, and Jones and Rhodes-Kropf 2003). However Ang, Hodrick, Xing, and Zhang (2006) find that stocks with high idiosyncratic volatility have lower subsequent returns.

Table 5 reports the returns of three portfolios sorted by idiosyncratic volatility. We find a negative and significant relationship between idiosyncratic volatility and 1-month returns. The lowest (highest) idiosyncratic volatility portfolio reports a return of 1.49% (0.88%). The long-short portfolio return is -0.61% with a significant t-statistic of -2.44. Value-weighted long-short returns are negative but insignificant.

Table 6 reports the coefficient from the Fama-MacBeth regression of 1-month returns on idiosyncratic volatility. The regression coefficient for idiosyncratic volatility confirms the conclusion from Tables 5. In the Mexican stock market, idiosyncratic volatility predicts stock returns at the 1-month horizon. The results hold for equal-weighted portfolios and are supported by Fama-MacBeth regressions.

4.3. Size

Banz (1981) and Fama-French (1993) find that small stocks yield higher returns than big stocks. Based on this empirical finding, Fama-French (1993) create the SMB (small-minus-big) factor that explains the cross-section of stock returns in the United States. The size anomaly exists for other markets but we find no size anomaly for the Mexican stock market.

Table 5 reports portfolio returns for different levels of size measured with the market capitalization of the firm. For equal-weighted returns, we find that the portfolio with small firms has a lower return than that for big firms. The high-minus-low return is positive but insignificant. The same pattern is observed for value-weighted portfolios. Table 6 reports Fama-MacBeth regression results for size in the fourth row and partially confirms the results from univariate sorts. The coefficient of size is positive but insignificant. We conclude that univariate analyses show no evidence of a size effect in Mexico.

4.4. Value vs. growth

To analyze the value-growth effect we use three different measures: book-to-market (BM), earnings-to-price (EP), and cash flow-to-price (CP) ratios. These three variables contain distinct information and are not perfect substitutes according to the correlations reported in Table 4. Lakonishok, Shleifer, and Vishny (1994) propose alternative measures, namely CP and EP, to capture the value-growth effect inspired by the Gordon model that explicitly takes into account expected growth rates of firms. In their results they show that both CP and EP produce larger differences between returns on value and growth portfolios than BM. Hou, Karolyi, and Kho

(2011) also find that these measures of value-growth exhibit different patterns when predicting stock returns.

In Table 5, we report the returns of portfolios sorted by each value-growth measure. For the three variables, portfolio returns increase from tercile 1 to tercile 3. The difference between tercile 3 and tercile 1 is positive but insignificant. This result holds for equal- and value-weighted portfolios. Table 6 reports Fama-MacBeth coefficients of univariate regressions of future 1-month returns on each of the three value-growth variables. In 2 out of the 3 regressions the coefficients of the value-growth variables are positive and significant. For example, EP predicts 1-month returns with a coefficient of 0.00936, significant at the 1% level. We conclude that the value-growth effect is partially present in the Mexican market.

4.5. Momentum and reversal

Momentum and reversal trading strategies refer to the relation between past and future returns. Short-term reversal in the stock market means that the previous monthly (or weekly) returns are negatively related to the next month (or week) return (Jegadeesh 1990 and Lehmann 1990). Jegadeesh (1990) documents profits of about 2% per month over 1934-1987 in the United States using a reversal strategy that buys and sells stocks on the basis of their prior-month returns and holds them for one month. The momentum trading strategy documents that past 12-month winners outperform past 12-month losers over the next month (Jegadeesh and Titman 1993). This positive relation holds when sorting by 6-month and 3-month lagged returns.

To assess the presence of the reversal strategy in Mexico, we form portfolios based on the previous 1-month return. To assess the presence of the momentum strategy, we form portfolios based on lagged 6- and 12-month returns skipping the previous month.

Table 5 reports univariate portfolios sorted by lagged 1-month returns. For equal-weighted portfolios, there is no relation between the previous and next month returns. For value-weighted portfolios there is a negative and significant relation indicating the existence of return reversal when more weight is given to large firms. While the 1-month return of tercile 1 is 1.81%, the return of tercile 3 decreases to 1.17%. The long-short portfolio return is -0.64% with a t-statistic of -2.22. Table 6 reports Fama-MacBeth regressions for the reversal trading strategy. The coefficient for lagged 1-month return is positive but statistically insignificant. We conclude that the reversal effect is only present for value-weighted portfolios in the Mexican stock market.

We now analyze the momentum strategy by forming portfolios based on lagged 6- and 12-month returns. Table 5 shows that the momentum effect exists for both variables and for equal- and value-weighted portfolios. For example, when sorting by lagged 12-month returns, the equal-weighted return for tercile 1 is 0.67% and increases to 1.59% for tercile 3. The long-short portfolio return is 0.92% with a t-statistic of 3.58. These results hold for equal-weighted and value-weighted portfolios and for both variables. The high-minus-low returns for value-weighted portfolios are smaller than those for equal-weighted portfolios, and they are also significant.

Table 6 presents the Fama-MacBeth coefficients when regressing future stock returns on lagged 6- and 12-month returns. The coefficients of lagged 6-month returns are significant when predicting 1-month future returns. The regression of the 1-month return on the lagged 6-month return is 0.0177 with a t-statistic of 4.074. The lagged 12-month returns predict 1-month returns and report a coefficient of 0.0107 significant at the 1% level.

Our overall conclusion is that the momentum effect is present in the Mexican stock market. The lagged 6-month return performs better than the 12-month return when predicting future returns.

4.6. Lottery effect

Bali, Cakici, and Whitelaw (2011) document that the maximum daily return over the previous month is negatively related with the return on the following month. This is known as the lottery effect and is explained by the lottery-like preferences of investors. Investors choose stocks that have reported very large returns, or lottery like stocks, and they experience the lowest returns in the next month.

Tables 5 reports the results for univariate sorts by MAX or the maximum daily return over the previous month. When predicting 1-month returns, there is partial evidence of a negative relation between MAX and future stock returns. Both equal- and value-weighted returns decrease from tercile 1 to tercile 3. The long-short returns are negative in both cases, but only the equal-weighted return is significant. The long-short MAX spread is equal to -0.43% with a t-statistic of -1.92.

Fama-MacBeth regressions in Table 6 confirm the results from univariate portfolio sorts. The MAX return coefficient is negative and significant when the dependent variable is the 1-month return. We conclude that the lottery effect in the Mexican market is present in equal-weighted portfolios and Fama-MacBeth regressions.

4.7. Trading frictions

In this subsection we analyze the relation between stock returns and market trading frictions, namely illiquidity (ILLIQ) and shares turnover (TURN). Table 5 reports univariate portfolios for illiquidity computed as in Amihud (2002). We find weak evidence of a negative relation between 1-month returns and illiquidity. The return of the equal-weighted long-short portfolio (long in tercile 3 and short in tercile 1) is -0.44% with a t-stat of -1.94, but returns of value-weighted long-short portfolios are not significantly different from zero.

The second trading friction that we analyze is firm's share turnover defined by Datar and Radcliffe (1998). They propose this measure as an alternative proxy for liquidity, finding that stock returns are a decreasing function of turnover rates after controlling by size, book-to-market, and beta.

The univariate portfolios of Table 5 indicate that the equal-weighted returns of the tercile 3 portfolio are lower than the returns of tercile 1; however, the long-short portfolio return is not different from zero. For value-weighted portfolios there is no evidence of a relation between turnover and 1-month returns. Results of Fama-MacBeth regressions in Table 6 confirm the findings from univariate portfolios.

In sum there is weak evidence of a relation between trading frictions and stock returns. We find that less liquid stocks deliver higher returns but share turnover does not predict returns in the Mexican market.

4.8. Investment

To analyze the investment anomalies we use measures of share issuances (ISSUE), operating accruals (ACC), and asset growth (AG). We first report the share issuance measure used by Pontiff and Woodgate (2008). They assert that seasoned equity offerings, repurchases, and merger effects need to be considered to measure the impact of growth in shares on expected returns. Their results show that annual share issuance is negatively related to future stock returns. The results for univariate sorts in Table 5 for 1-month returns provide no evidence that share issuances predict stock returns. Tercile 1 portfolios deliver the highest return for equal- and value-weighted portfolios; however, the high-minus-low portfolio returns are not significantly different from zero. These results seem to be in line with the idea that managers issue equity when they perceive that shares are overvalued by investors. Fama-MacBeth regressions in Table 6 confirm that there is no relation between returns and share issuance.

The operating accruals (ACC) anomaly analyzes how the information content of the "accrual" component of earnings is reflected in stock prices. According to Sloane (1996), one should expect that firms with high levels of accruals deliver future negative abnormal returns. The profitable trading strategy would be to take a long position in stocks with low levels of accruals and a short position in stocks with high levels of accruals.

Table 5 reports 1-month returns for univariate sorts for operating accruals (ACC). We observe that there is no relation between returns and the accrual component of earnings for equal- and value-weighted portfolios. Fama-MacBeth coefficients reported in Table 6 are not different from zero. We conclude that there is not an anomaly based on accruals.

We now study the asset growth effect. Cooper, Gulen, and Schill (2008) report that the annual asset growth is a strong predictor of the cross-section of stock returns in the United States. Using that same asset growth measure to analyze this empirical effect in Mexico, we find mixed and not significant results. Results for 1-month returns of univariate portfolios in Table 5 are not conclusive about the relation between asset growth and future returns. Although the equal weighted high-minus-low portfolio has a weak significant return of 0.32% (t-statistic of 1.65), tercile 2 reports the highest average returns. Value-weighted 1-month returns decrease from tercile 1 to tercile 3, but the returns of high-minus-low portfolio returns are not different from zero. This positive relation is opposite to what Cooper, Gullen, and Schill (2008) report.

Fama-MacBeth regressions in Table 6 show a positive and significant coefficient for asset growth using 1-month returns. We conclude that asset growth (AG) predicts 1-month returns for equal-weighted portfolios.

4.9. Profitability

Haugen and Baker (1996) document a positive relation between profitability and future stock returns. They assume that more profitable firms have higher growth potential for earnings and dividends, so these firms should also have greater expected future returns. Their results show that, controlling for book-to-market, stock returns and profitability are positively related. Fama and French (2006) dissect the Gordon dividend model (valuation equation) to explain why more profitable firms, or firms with higher expected earnings relative to book equity, have higher expected returns given the book-to-market ratio and the expected growth rate. Their empirical findings confirm this idea.

The results in Table 5 (univariate portfolios over 1-month horizon) provide evidence of a positive relation between expected returns and profitability. First, profitability measured as in Fama and French (2006) shows a positive but insignificant relation with 1-month returns. Conversely, gross-profit (GPROFIT) and ROA are positively and significantly related to future stock returns. Univariate long-short portfolios based on ROA and GPROFIT deliver positive and significant returns for equal-weighted portfolios. For value-weighted portfolios, the long-short returns are insignificant for the three measures. Fama-MacBeth coefficients in Table 6 report a positive and significant relation between 1-month returns and the three measures of profitability. We conclude that the three measures of profitability provide mixed results when predicting 1-month returns. Only Fama-MacBeth regressions and equal-weighted portfolios support a positive and significant relation of profitability and future returns.

4.10. Conclusion of univariate analysis

Table 11 reports a summary of the results that are significant along with the sign of relationship with future 1-month returns. We perform univariate portfolio sorts and Fama-MacBeth regressions of 19 anomalies. After analyzing each anomaly individually, we now conclude which anomalies predict stock returns at the 1-month horizon. We clearly observe that there is a momentum effect in the Mexican stock market. MAX and idiosyncratic volatility predict future 1-month stock returns according to univariate portfolio sorts and Fama-MacBeth regressions. Finally, the measures of profitability predict returns under Fama-MacBeth regressions and for equal-weighted portfolios. The profitability measure that better works is ROA. In the next section, we proceed to include these variables in multivariate Fama-MacBeth regressions and double sorted portfolios to conclude which ones robustly predict 1-month returns in Mexico.

5. Multivariate analysis of anomalies and stock returns

In this section, we run multivariate regressions and double sorts using anomalies that predict 1-month returns in univariate analyses. Using the results of the univariate portfolios and Fama-MacBeth regressions, we select the variables that predict stock returns and further analyze them in multivariate Fama-MacBeth regressions and double sorted portfolios to conclude which variables robustly predict stock returns in Mexico. The anomalies we include are lagged 6-month return, idiosyncratic volatility, maximum return, profitability, and return-on-assets. We include size given that some anomalies predict returns for equal-weighted portfolios but do not predict returns for value-weighted ones. For completeness, we also include 12-month beta and book-to-market.

5.1 Fama-MacBeth regressions

Multivariate Fama-MacBeth (1973) regressions include control variables in the regression as in

$$r_{i,t+1} = \gamma_{0,t+1} + \gamma_{1,t+1} ANOMALY_{i,t} + \gamma'_{2,t+1} CONTROLS_{i,t} + \varepsilon_{i,t+1},$$

where $r_{i,t+1}$ is the stock return for company *i* in month *t+1*, $ANOMALY_{i,t}$ is the anomaly value for each firm *i* in month *t*, $\hat{\gamma}_{0,t+1}$ is the slope coefficient, $\hat{\gamma}_{1,t+1}$ is the coefficient of the analyzed anomaly, $CONTROLS_{i,t}$ is a vector of control variables, and $\hat{\gamma}_{2,t+1}$ is a vector of the coefficients of the control variables included in the regression. The two step estimations are the same as in the univariate regression.

Table 7 reports the results of multivariate Fama-MacBeth regressions of 1-month returns on the anomalies that predict stock returns independently. In the first regression, we include the most widely used variables that predict stock returns in the United States: beta, size, book-to-market, and momentum. The coefficients of the 4 variables are significant. The relation with future one month returns is negative for beta (weakly significant), and positive for size, book-to-market, and momentum.

In regression (2), we add idiosyncratic volatility to the multivariate regression, and its coefficient is negative and significant. This result supports the findings of Ang, Hodrick, Xing, and Zhang. (2006) for the US market. In this regression, beta is not significant anymore and size, book-to-market, and momentum are all positive and statistically significant.

In regression (3), we drop idiosyncratic volatility and add maximum return to the regression given that they are highly correlated. The relation between MAX and future returns is negative and significant as in Bali, Cakici, and Whitelaw (2011). Only book-to-market and momentum remain significant in this regression, and size and beta are insignificant. In regression (4), we add profitability and we replace MAX with idiosyncratic volatility. Only book-to-market, momentum, and idiosyncratic volatility are significant and preserve the signs from previous regressions.

Finally, regression (6) includes returns-on-assets (ROA) instead of profitability. In this multivariate regression, ROA has a positive relation with future 1-month returns but is only significant at the 10% level. The coefficient of size is positive and significant at the 10% level. More importantly book-to-market, momentum, MAX, and idiosyncratic volatility continue to significantly predict future 1-month returns. Book-to-market and momentum have a positive relation with 1-month returns while idiosyncratic volatility and MAX are negatively related.

In the next section we perform double sorts on the 6 variables that best perform so far in univariate and multivariate analyzes. These variables are size, book-to-market, momentum, and idiosyncratic volatility, MAX, and ROA.

5.2 Double sorted portfolios

The portfolio double sorting methodology has two stages. In the first stage, we rank stocks by one anomaly and form two portfolios. Portfolio 1 (2) contains stocks with low (high) values of the anomaly. In the second stage, we sort stocks independently into two portfolios using a second anomaly. Then we compute the average future stock return for each level of the first and the second anomaly and report the high-minus-low portfolio returns.

Table 8 reports double sorted portfolios using five variables: size, book-to-market, momentum, idiosyncratic volatility, and ROA. We perform independent sorts by each variable and form 2 portfolios with low and high values of each anomaly. We report the high-minus-low portfolio return, which is the portfolio that buys the portfolio high and sells the portfolio low. We report t-statistics in parentheses.

To conclude on the robustness of an anomaly, we compare the sign and significance of the high-minus-low return with the ones in the previous analyses. When double sorting by size, the high-minus-low portfolio returns are positive and significant for both levels of book-to-market. For low book-to-market, the small size portfolio has a return of 0.79% and the high size portfolio has a return of 1.37%. The high-minus-low size effect for low BM reports a return of 0.57% with a t-statistic of 1.86 and return of 0.56% for high BM stocks with a t-statistic above

2.0. The high-minus-low return is also positive and significant for low momentum and low ROA. Only for idiosyncratic volatility, the size effect is not present and the high-minus-low return is positive but insignificant.

The momentum effect yields a positive and significant high-minus-low return for low and high size, high book-to-market, high idiosyncratic volatility, and low ROA. That means that the long-short returns are significant in 5 out of 10 possible cases. Idiosyncratic volatility is present in stocks with high size, high book-to-market, and low momentum. For ROA, the idiosyncratic volatility long-short returns are insignificant. The lottery effect yields negative and significant long-short returns for low ROA, low momentum, high BM, and both size portfolios. Finally, ROA long-short returns are positive and significant for low size, low book-to-market, and low momentum. Surprisingly, stocks with low idiosyncratic volatility report a long-short return for ROA of -0.77% with a t-statistic of -2.30.

As reported in the summary Table 11, from the univariate and multivariate analyses, we conclude that the variables that best predict stock returns at the 1-month horizon are size, momentum, idiosyncratic volatility, MAX, and ROA. Idiosyncratic volatility and MAX report a negative relation with future returns. The relation between stock returns and size, momentum and ROA is positive.

6. Long-term predictability

In this section we study the predictability of the 19 anomalies for longer holding periods of 3 and 6 months. At the 1-month horizon we conclude that market capitalization, momentum, idiosyncratic volatility, lottery effect, and profitability predict future stock returns. Note that the returns are non-overlapping. For the 3-month (6-month) return, portfolios are sorted by beta at the end of March, June, September, and December (June and December) and we examine the returns over the following quarter (semester).

Table 9 reports 3- and 6-month equal- and value-weighted returns of portfolios grouped by terciles based on the level of each of the 19 anomalies. We also report the high-minus-low portfolio return, which is the portfolio that buys tercile 3 and sells tercile 1. At the 3-month horizon (Panel A), returns are predicted by size, book-to-market, cash-to-price ratio, and lagged 6-month return for equal weighted portfolios. The high-minus-low portfolio returns report a negative and significant relation with size contrary to the positive relation with 1-month returns. This negative relation is in line with the Fama-French (1993) results for the United States. The relation between 3-month returns and book-to-market, cash-to-price ratio, and lagged 6-month return is positive and significant as reported by the high-minus-low portfolio returns. For value-weighted portfolios the results are only confirmed for size and book-to-market. Cash-to-price ratio and lagged 6-month returns report positive high-minus-low returns but with insignificant t-statistics of 1.22 and 1.59. Panel B of Table 9 reports 6-month portfolio returns. The long-short 6-month returns confirm the predictability of size, book-to-market, and lagged 6-month return for equal- and value-weighted portfolios.

Table 10 reports Fama-MacBeth regression results of 3-month and 6-month future returns on the 19 anomalies in Panel A and B. The results for both horizons confirm the negative relation between size and future 3- and 6-month returns and the positive relation between book-to-market, cash-to-price ratio, and lagged 6-month return and future 3- and 6-month returns.

We conclude that size, book-to-market, and momentum predict stock returns in Mexico for longer horizons of 3 and 6 months as reported in the summary Table 11. The relation between

3- and 6-month returns with size is negative as reported by Fama-French (1993) for the US market, whereas the relation between 3- and 6-month returns with book-to-market and momentum is positive.

7. Summary and concluding remarks

This paper is the first comprehensive study on the cross-section of stock returns in the Mexican Stock Market. Using data from 1994 to 2017, we study 19 of the most common anomalies reported for the US market. These anomalies are grouped into the following 9 categories: 1) market betas from the CAPM model, 2) market capitalization, 3) idiosyncratic volatility, 4) lottery stocks, 5) value-growth effect, 6) momentum and reversal, 7) investment, 8) profitability, and 9) trading frictions.

We find that five anomalies predict the cross-section of stock returns in Mexico: size, momentum, profitability, lottery effect, and idiosyncratic volatility. Out of these five measures, momentum (lagged 6-month return) robustly predicts stock returns using portfolio sorts and Fama-MacBeth regressions. The other 3 measures—profitability, lottery effect, and idiosyncratic volatility—predict returns for equal-weighted but not for value-weighted portfolios. However, their predictability is robust in univariate Fama-MacBeth regressions. Even though size does not predict returns in univariate analyses, it kills the predictability of many characteristics in the value-weighted portfolio sorts and predicts returns in double sorts and long-term horizons.

The multivariate analysis confirms the predictability of momentum, lottery effect, idiosyncratic volatility, and profitability. In addition, size predicts stock returns. Surprisingly, size has a positive (not a negative relation as in Fama-French 1993) relation with stock returns. In the multivariate anaylisis, we use Fama-MacBeth regressions and double sorted portfolios to find that size, momentum, idiosyncratic volatility, lottery effect, and profitability have a significant relation with future 1-month stock returns.

For long-term horizons of 3 and 6 months, size, book-to-market, and momentum predict returns. The relation of size and future 3- and 6-month returns turns negative as expected according to the findings by Fama-French (1993); the relation between 3- and 6-month returns with the value-growth effect and momentum is positive.

We conclude that five five anomalies must be included in an empirical asset pricing of the Mexican stock market: size, momentum, idiosyncratic volatility, lottery effect, and profitability. While momentum, idiosyncratic volatility, lottery effect, and profitability robustly predicts future stock returns at the 1-month, size is necessary for the value-weighted analysis since it kills the predictability of several characteristics. Size, momentum and profitability have a positive relation with future 1-month returns, while idiosyncratic volatility and the lottery effect have a negative relation. For longer horizons of 3 and 6 months, only size and momentum continue to predict returns. Overall our study contributes to the literature on the cross-section of stock returns in emerging markets.

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Figure 1
Stock market cumulative returns

This figure shows the cumulative monthly return for the MSCI World Price Index, the United States S&P 500 index (USA), and the Mexican S&P/BMV IPC index (MEX) from 1992 to 2017, setting December 1992 as 100. The lines represent the cumulative return of the corresponding index at each point in time. Returns are in US dollars.

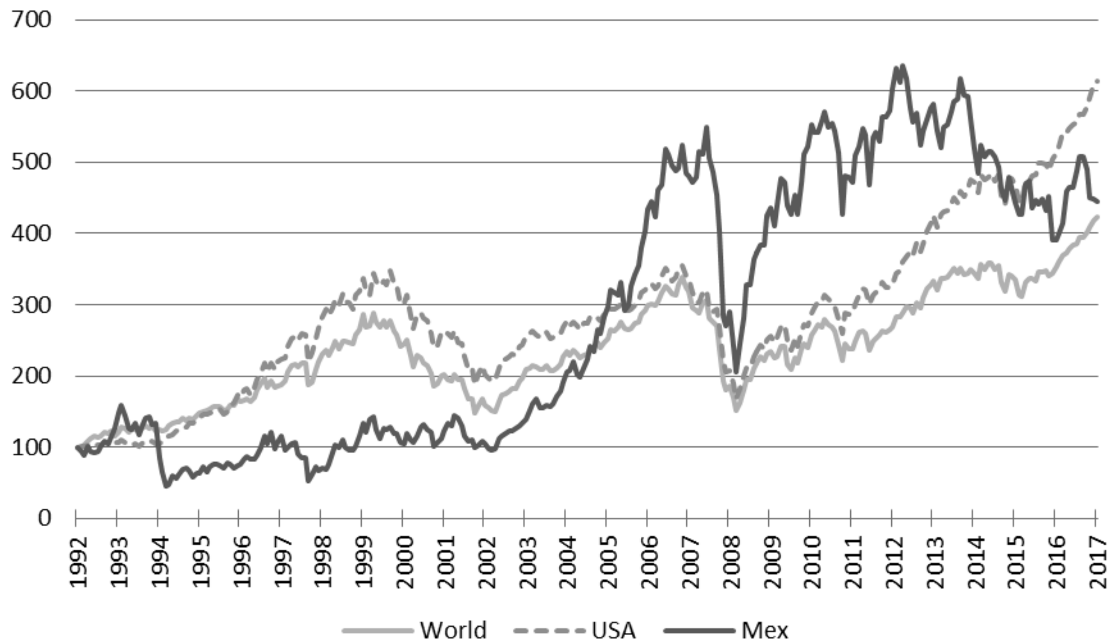

Figure 2
Trading and market capitalization

These figures report basic statistics of the Mexican Stock Exchange from 1991 to 2015 and are based on the annual World Development Indicators database (World Bank, http://wdi.worldbank.org/tables). We report the evolution of the total market capitalization, the total value of stocks traded, turnover ratio that refers to the value in US dollars (USA) of stocks traded as percentage of the total value of domestic shares, the market capitalization as a fraction of the US market capitalization, the value of stocks traded as a fraction of the value of stocks traded in the United States, turnover ratio as a fraction of the US turnover ratio, and the market capitalization as a percentage of GDP in Mexico and in the United States.

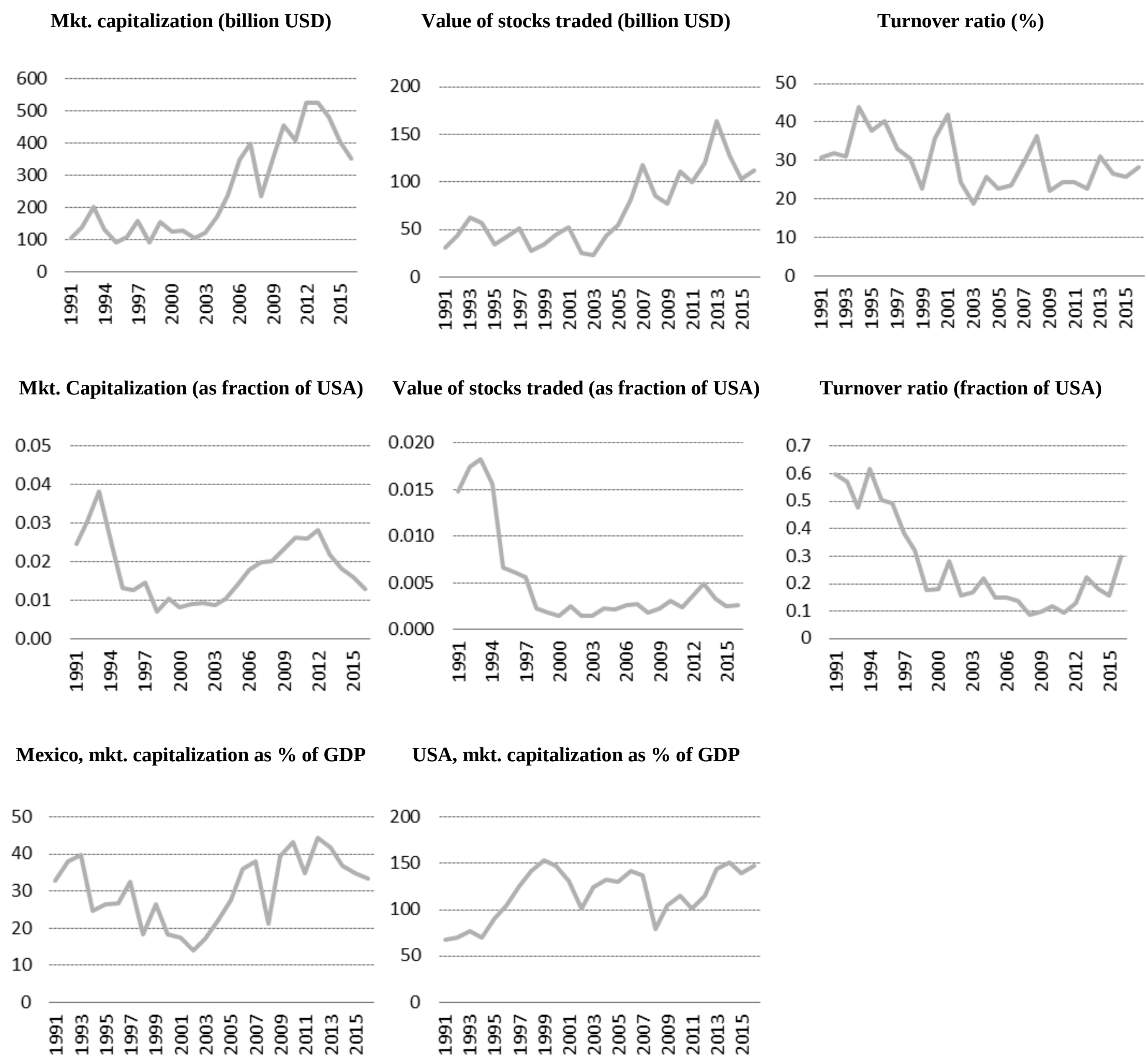

Table 1
Market statistics

This table reports market statistics of average annual returns for the MSCI World Price Index, the United States S&P 500 index (USA), and the Mexican S&P/BMV IPC index (Mexico) from 1994 to 2017. All returns are in US dollars. We compute the Sharpe ratio using the 10-year T-Note yield.

	World	**USA**	**Mexico**
Mean return (%)	7.51	9.06	11.52
Std. Deviation (%)	17.24	17.42	34.68
Sharpe Ratio	0.433	0.518	0.331
Returns cross-correlation			
World	1.000		
USA	0.580	1.000	
Mexico	0.517	0.943	1.000

Table 2
Summary statistics

The table reports summary statistics for the cross-section of stocks in the Mexican Stock market from 1994 to 2017. We report summary statistics for the following variables: β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. MAX is the maximum daily return over the previous month. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010).

								Percentile				
	Nb. Months	Mean	Std. Dev.	Skew	Kurt	Min	Max	10th	25th	Median	75th	90th
β_{1M}	281	0.79	0.15	0.16	-0.08	0.37	1.24	0.61	0.68	0.78	0.89	0.99
β_{12M}	281	0.75	0.09	0.55	0.03	0.59	1.05	0.65	0.69	0.75	0.80	0.86
IVOL	281	0.02	0.01	1.42	2.49	0.01	0.05	0.01	0.02	0.02	0.02	0.03
SIZE	282	27,987	18,336	0.21	-1.54	3,752	59,217	6,375	10,232	27,275	45,235	53,444
BM	282	1.10	0.44	1.10	0.21	0.64	2.29	0.67	0.77	0.94	1.34	1.84
EP	282	0.21	0.09	1.26	1.65	0.11	0.49	0.12	0.15	0.21	0.24	0.31
CP	282	0.18	0.19	1.04	4.06	-0.27	0.84	0.09	0.13	0.16	0.23	0.39
R_{1M}	282	0.01	0.05	-0.62	3.03	-0.21	0.14	-0.04	-0.01	0.01	0.04	0.07
R_{6M}	282	0.08	0.17	0.12	0.74	-0.41	0.64	-0.11	-0.01	0.07	0.18	0.30
R_{12M}	282	0.17	0.26	0.33	0.33	-0.45	0.94	-0.15	0.03	0.14	0.30	0.52
MAX	281	0.05	0.02	1.72	4.84	0.02	0.14	0.03	0.03	0.04	0.05	0.07
ILLIQ	258	0.12	0.23	7.34	67.58	0.01	2.59	0.02	0.04	0.06	0.12	0.27
ISSUE	282	0.03	0.03	1.92	4.18	-0.02	0.20	0.00	0.01	0.02	0.03	0.08
TURN	246	-5.30	0.55	-0.09	-0.07	-6.41	-4.09	-6.21	-5.57	-5.27	-4.96	-4.54
ACC	270	0.01	0.02	-0.07	0.75	-0.08	0.07	-0.02	0.00	0.01	0.03	0.04
AG	270	0.15	0.11	1.45	2.11	-0.05	0.49	0.06	0.09	0.13	0.18	0.34
PROFIT	282	0.08	0.05	-0.09	-0.25	-0.01	0.19	0.02	0.06	0.09	0.11	0.14
GROFIT	282	0.29	0.03	-0.22	-1.06	0.22	0.34	0.25	0.26	0.30	0.32	0.33
ROA	282	0.04	0.02	-0.44	-0.21	0.00	0.07	0.02	0.03	0.04	0.05	0.06

Table 3
Summary statistics per year

The table reports annual averages of time series of monthly cross-sectional averages from 1994 to 2017. β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1-month and 1-year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 1-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. MAX is the maximum daily return over the previous month. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010).

Year	Nb. Firms	β_{1M}	β_{12M}	IVOL	SIZE	BM	EP	CP	R_{1M}	R_{6M}	R_{12M}	MAX	ILLIQ	ISSUE	TURN	ACC	AG	PROFIT	GROFIT	ROA
1994	71	0.93	0.95	0.02	5,138	0.93	0.18	0.09	0.02	0.09	0.41	0.05	.	0.11	.	.	.	0.08	0.29	0.06
1995	85	1.00	0.90	0.03	4,362	0.96	0.22	0.00	0.02	0.12	0.04	0.07	.	0.09	.	0.06	0.39	0.03	0.27	0.03
1996	113	0.91	0.81	0.02	5,037	1.09	0.35	-0.22	0.02	0.18	0.45	0.05	0.09	0.08	.	0.04	0.44	0.03	0.26	0.03
1997	116	0.79	0.81	0.03	6,703	1.05	0.23	0.43	0.04	0.26	0.38	0.05	0.15	0.09	-4.23	0.03	0.30	0.12	0.27	0.06
1998	111	0.81	0.81	0.03	7,019	0.82	0.18	0.25	-0.02	-0.11	-0.02	0.07	0.14	0.03	-4.53	0.04	0.17	0.16	0.26	0.06
1999	103	0.77	0.79	0.03	8,100	1.20	0.33	0.20	0.02	0.06	-0.01	0.07	0.25	0.01	-4.77	0.03	0.25	0.10	0.25	0.04
2000	96	0.55	0.65	0.03	11,293	1.57	0.35	0.28	-0.01	0.06	0.12	0.06	0.12	0.06	-4.89	0.02	0.24	0.09	0.31	0.05
2001	103	0.61	0.61	0.03	9,871	1.76	0.32	0.37	0.01	-0.07	-0.14	0.06	1.24	0.01	-5.17	0.01	0.13	0.10	0.31	0.05
2002	101	0.79	0.70	0.03	9,330	2.12	0.34	0.42	0.00	0.09	0.13	0.05	0.15	0.02	-5.57	-0.02	0.05	0.08	0.32	0.04
2003	104	0.65	0.77	0.02	10,086	2.20	0.29	0.31	0.03	0.16	0.06	0.05	0.15	0.04	-6.15	-0.02	0.04	0.04	0.31	0.02
2004	103	0.66	0.74	0.02	15,220	1.95	0.27	0.14	0.04	0.27	0.61	0.04	0.55	0.03	-6.46	0.00	0.07	0.02	0.30	0.01
2005	107	0.62	0.73	0.02	19,106	1.37	0.21	0.17	0.01	0.14	0.26	0.04	0.31	0.02	-5.90	0.02	0.09	0.06	0.32	0.03
2006	109	0.61	0.63	0.02	26,851	1.16	0.23	0.22	0.04	0.17	0.26	0.04	0.13	0.01	-5.53	0.01	0.09	0.12	0.33	0.05
2007	113	0.74	0.69	0.02	38,109	0.98	0.20	0.17	0.02	0.31	0.61	0.04	0.07	0.02	-5.47	0.01	0.09	0.12	0.33	0.06
2008	109	0.69	0.66	0.02	31,385	0.82	0.17	0.15	-0.03	-0.07	0.00	0.06	0.21	0.01	-5.44	0.02	0.14	0.12	0.32	0.06
2009	106	0.86	0.81	0.03	28,960	0.94	0.18	0.14	0.03	0.07	-0.11	0.05	0.95	0.01	-5.94	0.01	0.17	0.06	0.32	0.04
2010	110	0.67	0.73	0.02	39,174	1.02	0.19	0.19	0.01	0.11	0.36	0.03	0.34	0.02	-5.60	0.00	0.12	0.03	0.31	0.03
2011	116	0.73	0.67	0.02	43,327	0.83	0.16	0.16	0.00	0.04	0.11	0.03	0.29	0.01	-5.35	0.00	0.08	0.07	0.31	0.04
2012	117	0.73	0.71	0.02	44,909	0.85	0.15	0.13	0.02	0.07	0.09	0.03	0.08	0.01	-5.88	0.02	0.12	0.09	0.30	0.04
2013	120	0.73	0.71	0.02	49,378	0.87	0.15	0.14	0.01	0.09	0.20	0.03	0.11	0.03	-5.82	0.01	0.14	0.10	0.28	0.04
2014	119	0.76	0.72	0.02	51,942	0.71	0.12	0.11	0.00	0.09	0.14	0.03	0.11	0.02	-5.22	-0.02	0.10	0.10	0.28	0.04
2015	125	0.69	0.68	0.02	52,215	0.65	0.11	0.10	0.00	0.02	0.06	0.03	0.14	0.01	-5.24	0.00	0.11	0.09	0.26	0.04
2016	127	0.63	0.64	0.02	51,014	0.67	0.11	0.11	0.00	0.04	0.07	0.03	0.06	0.01	-5.42	-0.01	0.13	0.08	0.25	0.03
2017	130	0.67	0.70	0.02	55,268	0.72	0.14	0.14	0.00	0.02	0.03	0.03	0.10	0.01	-5.25	-0.01	0.16	0.08	0.26	0.03

Table 4
Correlation matrix

The table reports time-series average of monthly cross-sectional correlations from 1994 to 2017. β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. MAX is the maximum daily return over the previous month. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010).

	β_{1M}	β_{12M}	IVOL	SIZE	BM	EP	CP	R_{1M}	R_{6M}	R_{12M}	MAX	ILLIQ	ISSUE	TURN	ACC	AG	PROFIT	GROFIT	ROA
β_{1M}	1.000																		
β_{12M}	0.561	1.000																	
IVOL	0.033	-0.043	1.000																
SIZE	0.231	0.306	-0.262	1.000															
BM	-0.102	-0.155	0.249	-0.314	1.000														
EP	-0.040	-0.054	0.033	-0.102	0.488	1.000													
CP	-0.060	-0.064	0.162	-0.060	0.430	0.632	1.000												
R_{1M}	0.016	-0.036	0.099	0.033	0.022	0.000	-0.008	1.000											
R_{6M}	0.016	-0.049	-0.075	0.076	0.072	0.055	0.038	0.049	1.000										
R_{12M}	0.021	-0.039	-0.089	0.108	0.059	0.071	0.060	0.036	0.721	1.000									
MAX	0.261	0.103	0.727	-0.132	0.149	0.004	0.096	0.340	-0.041	-0.047	1.000								
ILLIQ	-0.163	-0.266	0.382	-0.052	0.194	0.107	0.185	-0.025	-0.066	-0.085	0.184	1.000							
ISSUE	-0.009	-0.007	0.080	-0.101	0.146	0.030	0.004	-0.011	-0.007	0.004	0.057	0.039	1.000						
TURN	0.215	0.365	-0.105	0.104	-0.005	0.010	0.004	-0.023	-0.023	-0.032	-0.019	-0.275	0.061	1.000					
ACC	-0.015	-0.008	0.002	-0.092	0.006	0.044	-0.191	-0.001	-0.035	-0.048	0.009	-0.010	0.027	-0.004	1.000				
AG	0.059	0.085	-0.116	0.086	-0.157	-0.071	-0.148	0.003	0.016	0.040	-0.070	-0.108	0.075	0.021	0.234	1.000			
PROFIT	0.042	0.069	-0.269	0.300	-0.424	0.096	0.002	0.004	0.018	0.065	-0.184	-0.110	-0.126	0.045	0.116	0.176	1.000		
GROFIT	-0.011	-0.054	-0.199	0.222	-0.298	0.051	-0.005	0.009	0.027	0.047	-0.142	-0.096	-0.108	-0.018	-0.045	0.042	0.335	1.000	
ROA	-0.002	-0.043	-0.313	0.288	-0.323	0.038	-0.150	0.018	0.047	0.099	-0.234	-0.162	-0.138	0.015	0.153	0.186	0.782	0.432	1.000

Table 5
Portfolio sorts: one-month returns

The table reports average 1-month equal- and value-weighted portfolio returns (in %) from 1994 to 2017. We construct 3 portfolios based on the value of the characteristic on month *t* and report average portfolio returns on month *t+1*. The characteristics are the following. β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. MAX is the maximum daily return over the previous month. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). The t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

	Equal-weighted portfolios					Value-weighted portfolios				
	Low	Mid	High	High - Low	t-stat	Low	Mid	High	High - Low	t-stat
β_{1M}	1.34	1.22	1.22	-0.12	(-0.46)	1.32	1.22	1.32	0.01	(0.03)
β_{12M}	1.32	1.34	1.07	-0.19	(-0.66)	1.29	1.32	1.71	0.42	(1.33)
IVOL	1.49	1.41	0.88	–0.61**	(–2.44)	1.58	1.61	1.09	–0.48	(–1.60)
SIZE	1.14	1.40	1.48	0.34	(1.51)	1.24	1.40	1.43	0.19	(0.69)
BM	1.20	1.21	1.37	0.17	(0.91)	1.32	1.48	1.87	0.55	(1.85)
EP	1.07	1.37	1.33	0.26	(1.25)	1.30	1.44	1.44	0.14	(0.56)
CP	0.72	1.13	0.99	0.30	(0.92)	0.91	1.14	1.04	0.16	(0.42)
R_{1M}	1.43	1.26	1.46	0.03	(0.14)	1.81	1.46	1.17	-0.64**	(-2.22)
R_{6M}	0.82	1.42	1.66	0.85***	(3.44)	1.07	1.38	1.78	0.71**	(2.06)
R_{12M}	0.67	1.31	1.59	0.92***	(3.58)	0.96	1.44	1.65	0.70**	(2.04)
MAX	1.59	1.55	1.15	-0.43*	(-1.92)	1.39	1.55	1.30	-0.09	(-0.29)
ILLIQ	1.54	1.18	1.10	-0.44*	(-1.94)	1.28	1.27	1.03	-0.25	(-0.93)
ISSUE	1.31	1.23	1.07	-0.24	(-1.18)	1.44	1.34	1.06	-0.38	(-1.37)
TURN	1.16	1.01	1.07	-0.09	(-0.36)	1.32	1.22	1.26	-0.07	(-0.21)
ACC	1.15	1.27	1.10	-0.05	(-0.22)	1.26	1.47	1.18	-0.08	(-0.30)
AG	0.96	1.41	1.28	0.32*	(1.65)	1.49	1.32	1.30	-0.18	(-0.76)
PROFIT	0.94	1.54	1.29	0.35	(1.64)	1.40	1.57	1.20	-0.20	(-0.70)
GROFIT	0.83	1.37	1.40	0.57**	(2.28)	1.34	1.39	1.40	0.06	(0.19)
ROA	0.88	1.40	1.49	0.61***	(3.03)	1.69	1.29	1.38	-0.31	(-1.14)

Table 6
Univariate Fama-MacBeth regressions

The table reports the time-series average coefficients from monthly Fama-MacBeth cross-sectional regressions of individual 1-month stock returns on firm characteristics from 1994 to 2017. The characteristics are the following. β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). The t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

	Coefficient		Intercept		Adj. R^2
β_{1M}	-0.000709	(-0.317)	0.0127***	(3.802)	0.020
β_{12M}	-0.0111	(-1.161)	0.0178***	(3.560)	0.026
IVOL	-0.315***	(-2.861)	0.0185***	(4.897)	0.035
SIZE	0.000761	(1.416)	-0.00419	(-0.369)	0.018
BM	0.00170	(1.369)	0.0104***	(3.140)	0.006
EP	0.00936***	(2.634)	0.0103***	(3.297)	0.007
CP	0.00706*	(1.685)	0.0119***	(4.023)	0.027
R_{1M}	0.00338	(0.357)	0.0122***	(4.283)	0.012
R_{6M}	0.0177***	(4.074)	0.00958***	(3.260)	0.022
R_{12M}	0.0107***	(3.208)	0.00752**	(2.487)	0.024
MAX	-0.0916***	(-2.844)	0.0186***	(6.395)	0.019
ILLIQ	-0.00769	(-0.609)	0.0126***	(3.329)	0.015
ISSUE	-0.0170	(-1.405)	0.0117***	(3.984)	0.002
TURN	7.53e-05	(0.127)	0.0105*	(1.908)	0.023
ACC	-0.00961	(-0.912)	0.0119***	(3.953)	0.005
AG	0.0123**	(2.435)	0.0104***	(3.258)	0.004
PROFIT	0.0156**	(2.220)	0.0115***	(3.691)	0.016
GROFIT	0.0174**	(2.456)	0.00744*	(1.822)	0.012
ROA	0.0529***	(3.314)	0.0100***	(3.053)	0.011

Table 7
Multivariate Fama-MacBeth regressions

The table reports the time-series average coefficients from monthly Fama-MacBeth cross-sectional regressions of 1-month stock returns on firm characteristics from 1994 to 2017. The characteristics are the following. β_{12M} is the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. MAX is the maximum daily return over the previous month. PROFIT reports profitability measured as in Fama and French (2006), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). The t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)
β_{12M}	-0.00726*	-0.00614	-0.00467	-0.00509	-0.00553
	(-1.927)	(-1.446)	(-1.130)	(-1.195)	(-1.246)
SIZE	0.00270***	0.00219**	0.00151	0.00160	0.00191*
	(3.238)	(2.008)	(1.644)	(1.449)	(1.676)
BM	0.00434***	0.00418**	0.00426**	0.00496**	0.00557***
	(2.642)	(2.343)	(2.501)	(2.515)	(2.718)
R_{6M}	0.0107**	0.0117**	0.0126**	0.0119**	0.0130**
	(2.185)	(2.121)	(2.478)	(2.152)	(2.221)
IVOL		-0.249**		-0.227*	-0.217*
		(-2.060)		(-1.837)	(-1.741)
MAX			-0.0895**		
			(-2.244)		
PROFIT				0.0156	
				(1.337)	
ROA					0.0418*
					(1.868)
Intercept	-0.0510**	-0.0353	-0.0208	-0.0241	-0.0330
	(-2.580)	(-1.319)	(-0.953)	(-0.899)	(-1.185)
Observations	16,422	13,565	16,050	13,565	13,565
Adj. R^2	0.070	0.097	0.083	0.112	0.105
Number of groups	281	281	281	281	281

Table 8
Double sorted portfolios

The table reports 1-month returns (in %) of portfolios sorted on two characteristics independently from 1994 to 2017. At the end of each month we independently sort into bivariate portfolios by the two characteristics and report average portfolios returns. The characteristics are: SIZE is the market capitalization; BM is the book-to-market, which is the ratio of book value divided by market equity; R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$; Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression; and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). The t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

	ROA		
IVol	Low	High	High - Low
Low	1.74	0.97	-0.77**
	(4.05)	(2.07)	(-2.30)
High	1.49	1.34	-0.15
	(4.45)	(3.25)	(-0.68)
High - Low	-0.25	0.37	
	(-0.96)	(1.23)	

	ROA			IVol		
Ret_{6M}	Low	High	High - Low	Low	High	High - Low
Low	0.73	1.34	0.61**	1.29	0.73	-0.56**
	(1.82)	(3.68)	(2.55)	(3.22)	(1.63)	(-2.33)
High	1.53	1.44	-0.09	1.62	1.30	-0.33
	(4.59)	(3.01)	(-1.20)	(4.59)	(3.01)	(-1.20)
High - Low	0.79***	0.10		0.33	0.57**	
	(2.75)	(0.44)		(1.27)	(1.97)	

	ROA			IVol			R_{6M}		
BM	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low
Low	0.91	1.45	0.54**	1.50	1.18	-0.32	1.07	1.44	0.38
	(2.37)	(4.74)	(2.39)	(4.24)	(2.90)	(-1.30)	(2.84)	(4.59)	(1.57)
High	1.17	1.43	0.27	1.69	1.11	-0.59*	0.98	1.56	0.58**
	(3.39)	(3.97)	(1.08)	(4.30)	(2.33)	(-1.76)	(2.50)	(4.53)	(2.24)
High - Low	0.25	-0.02		0.19	-0.08		-0.09	0.12	
	(1.00)	(-0.12)		(0.71)	(-0.28)		(-0.40)	(0.50)	

	ROA			IVol			R_{6M}			BM		
Size	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low
Low	0.61	1.58	0.97***	1.23	0.84	-0.45	0.78	1.39	0.60**	0.79	1.03	0.24
	(1.64)	(4.72)	(3.12)	(2.40)	(1.77)	(-1.04)	(2.15)	(4.38)	(2.37)	(2.18)	(3.07)	(0.81)
High	1.45	1.41	-0.04	1.53	1.13	-0.40**	1.26	1.67	0.41*	1.37	1.59	0.22
	(3.86)	(4.29)	(-0.18)	(4.44)	(2.68)	(-1.99)	(3.23)	(5.12)	(1.90)	(4.09)	(4.24)	(1.07)
High - Low	0.84***	-0.17		0.21	0.31		0.47*	0.28		0.57*	0.56**	
	(2.82)	(-0.71)		(0.58)	(0.96)		(1.91)	(1.22)		(1.86)	(2.12)	

	ROA			IVol			R_{6M}			BM			Size		
MAX	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low	Low	High	High - Low
Low	1.46	1.57	0.11	1.47	1.22	-0.27	1.48	1.75	0.27	1.37	1.75	0.37	1.67	1.74	0.07
	(4.10)	(5.02)	(0.46)	(4.37)	(2.65)	(-0.82)	(4.10)	(5.70)	(1.28)	(4.31)	(5.04)	(1.58)	(4.63)	(5.43)	(0.28)
High	1.02	1.35	0.33	1.54	0.99	-0.49*	0.72	1.70	0.98***	1.24	1.06	-0.18	1.09	1.25	0.16
	(2.40)	(3.54)	(1.35)	(3.77)	(2.30)	(-1.77)	(1.72)	(4.35)	(3.73)	(3.19)	(2.51)	(-0.77)	(2.52)	(3.25)	(0.58)
High - Low	-0.44*	-0.22		-0.01	-0.21		-0.76***	-0.05		-0.13	-0.68**		-0.58*	-0.50***	
	(-1.65)	(-1.15)		(-0.04)	(-0.64)		(-3.41)	(-0.21)		(-0.62)	(-2.49)		(-1.81)	(-2.93)	

Table 9
Long term predictability – Portfolio sorts

The table reports average 3- (Panel A) and 6-month (Panel B) equal- and value- weighted portfolio returns (in %) from 1994 to 2017. We construct 3 portfolios based on the value of the characteristic on month t and report portfolio returns from month $t+3$ and $t+6$. The characteristics are the following. β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. MAX is the maximum daily return over the previous month. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). The t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Panel A. 3-month returns

	Equal-weighted portfolios					Value-weighted portfolios				
	Low	Mid	High	High - Low	t-stat	Low	Mid	High	High - Low	t-stat
β_{1M}	4.36	4.87	5.02	0.67	(0.71)	3.17	4.61	5.04	1.87*	(1.80)
β_{12M}	5.13	5.24	4.50	-0.41	(-0.37)	4.02	4.60	4.70	0.91	(0.77)
IVOL	5.22	4.70	4.26	-0.96	(-0.97)	4.56	4.57	3.60	-0.96	(-0.92)
SIZE	7.69	5.47	4.83	-2.86***	(-3.77)	6.41	4.64	4.45	-1.96*	(-1.82)
BM	4.27	3.92	5.79	1.52*	(1.85)	4.10	4.70	6.11	2.01*	(1.88)
EP	4.31	4.82	4.78	0.47	(0.60)	4.19	4.52	4.45	0.26	(0.28)
CP	1.97	3.69	4.71	2.44*	(1.80)	1.60	3.69	3.76	1.86	(1.22)
R_{1M}	4.67	5.68	6.03	1.36	(1.45)	4.28	4.47	4.98	0.70	(0.69)
R_{6M}	4.11	4.85	6.30	2.19**	(2.07)	3.97	4.03	5.44	1.47	(1.59)
R_{12M}	4.00	4.65	5.30	1.30	(1.15)	4.06	4.44	4.43	0.37	(0.34)
MAX	5.43	4.81	5.63	0.20	(0.22)	3.62	4.85	4.61	0.99	(0.96)
ILLIQ	4.25	4.77	4.97	0.72	(0.58)	3.98	5.20	4.58	0.60	(0.72)
ISSUE	4.50	5.05	4.40	-0.10	(-0.12)	4.43	4.43	3.14	-1.29	(-1.47)
TURN	4.62	4.15	4.29	-0.34	(-0.35)	3.84	3.99	3.86	0.02	(0.02)
ACC	4.71	4.53	3.92	-0.79	(-0.83)	4.17	4.54	3.45	-0.72	(-0.79)
AG	4.90	4.50	4.28	-0.62	(-0.75)	5.02	3.64	4.43	-0.60	(-0.71)
PROFIT	4.48	5.01	4.38	-0.10	(-0.10)	3.98	4.82	3.92	-0.05	(-0.05)
GROFIT	3.95	4.99	4.45	0.50	(0.44)	3.95	4.54	4.46	0.51	(0.45)
ROA	4.62	4.49	4.70	0.08	(0.08)	5.15	4.11	4.26	-0.89	(-0.81)

Panel B. 6-month returns

	Equal-weighted portfolios					Value-weighted portfolios				
	Low	Mid	High	High - Low	t-stat	Low	Mid	High	High - Low	t-stat
β_{1M}	9.02	9.39	8.50	-0.52	(-0.25)	6.06	9.49	9.42	3.36	(1.52)
β_{12M}	10.94	10.84	8.40	-2.54	(-1.16)	8.59	9.99	9.50	0.91	(0.37)
IVOL	9.46	10.36	7.07	-2.40	(-1.34)	8.47	9.33	9.30	0.84	(0.44)
SIZE	15.36	11.56	9.97	-5.39***	(-4.81)	14.52	9.01	9.31	-5.20*	(-1.95)
BM	8.75	7.87	12.02	3.26*	(1.66)	8.48	9.57	12.42	3.94*	(1.68)
EP	8.87	9.72	9.63	0.77	(0.48)	9.12	8.61	9.53	0.41	(0.22)
CP	4.92	8.47	8.22	3.31	(1.64)	4.80	7.79	7.26	2.45	(1.15)
R_{1M}	9.07	10.39	12.31	3.24*	(1.79)	8.89	9.90	9.98	1.09	(0.58)
R_{6M}	7.14	8.42	12.40	5.26***	(3.02)	6.59	7.15	11.09	4.50**	(2.50)
R_{12M}	8.31	8.43	11.16	2.85	(1.36)	7.71	8.33	9.56	1.85	(0.90)
MAX	9.45	10.83	10.12	0.67	(0.36)	8.13	9.31	9.13	1.00	(0.56)
ILLIQ	8.30	9.35	9.18	0.89	(0.43)	7.91	10.02	9.39	1.48	(0.91)
ISSUE	9.40	9.73	8.24	-1.17	(-0.67)	10.22	7.96	6.18	-4.05**	(-2.30)
TURN	8.63	9.36	8.61	-0.02	(-0.01)	7.21	8.57	7.72	0.51	(0.20)
ACC	8.60	9.53	7.81	-0.79	(-0.46)	8.00	9.94	6.05	-1.94	(-0.99)
AG	8.66	10.26	8.04	-0.63	(-0.37)	9.48	8.50	7.46	-2.02	(-1.08)
PROFIT	8.75	10.15	9.42	0.67	(0.29)	7.86	9.75	8.35	0.49	(0.20)
GROFIT	6.76	10.18	9.97	3.21	(1.42)	6.75	9.42	9.64	2.89	(1.38)
ROA	8.98	8.83	10.24	1.25	(0.54)	10.10	7.88	9.16	-0.94	(-0.44)

Table 10
Long-term predictability – Fama-MacBeth regressions

The table reports the time-series average coefficients from monthly Fama-MacBeth cross-sectional regressions of individual stock returns on firm characteristics from 1994 to 2017. Returns are over 3- (Panel A) and 6-month (Panel B) horizons. The characteristics are the following. β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill. (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). The t-statistics are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10%, respectively.

Panel A. 3-month returns

	Coefficient		Intercept		Adj. R^2
β_{1M}	0.00592	(0.757)	0.0411***	(3.314)	0.019
β_{12M}	-0.0449	(-1.294)	0.0716***	(3.763)	0.028
IVOL	-0.537	(-1.013)	0.0524***	(3.562)	0.056
SIZE	-0.00591**	(-2.465)	0.183***	(3.169)	0.014
BM	0.0172**	(2.612)	0.0280**	(2.547)	0.010
EP	0.0237	(1.454)	0.0407***	(3.412)	0.009
CP	0.0750***	(3.622)	0.0400***	(3.637)	0.027
R_{1M}	0.0711	(1.505)	0.0504***	(4.321)	0.015
R_{6M}	0.0500**	(2.054)	0.0341***	(3.060)	0.028
R_{12M}	0.0156	(0.825)	0.0270**	(2.413)	0.030
MAX	0.0953	(0.563)	0.0492***	(4.055)	0.018
ILLIQ	-0.00889	(-0.0993)	0.0442***	(3.245)	0.031
ISSUE	0.00866	(0.103)	0.0461***	(4.081)	0.005
TURN	0.000857	(0.379)	0.0457**	(2.203)	0.016
ACC	-0.0769	(-1.493)	0.0454***	(4.215)	0.016
AG	0.00354	(0.158)	0.0430***	(3.730)	0.005
PROFIT	0.00730	(0.170)	0.0459***	(3.356)	0.032
GROFIT	0.0171	(0.533)	0.0416**	(2.444)	0.018
ROA	-0.0102	(-0.118)	0.0456***	(3.216)	0.024

Panel B. 6-month returns

	Coefficient		Intercept		Adj. R^2
β_{1M}	-0.000177	(-0.0130)	0.0862***	(3.634)	0.020
β_{12M}	-0.0450*	(-1.720)	0.130***	(4.464)	0.029
IVOL	-2.000**	(-2.021)	0.124***	(5.133)	0.045
SIZE	-0.00966*	(-1.780)	0.318**	(2.379)	0.017
BM	0.0248**	(2.409)	0.0639***	(2.716)	0.016
EP	0.0647**	(2.291)	0.0810***	(3.553)	0.007
CP	0.0945**	(2.249)	0.0827***	(3.423)	0.013
R_{1M}	0.180	(1.622)	0.104***	(4.112)	0.015
R_{6M}	0.122***	(3.010)	0.0671***	(3.237)	0.030
R_{12M}	0.0352	(1.072)	0.0652***	(2.815)	0.033
MAX	0.0825	(0.239)	0.0959***	(3.954)	0.014
ILLIQ	0.00505	(0.0469)	0.0864***	(3.306)	0.019
ISSUE	-0.102	(-0.872)	0.0889***	(4.091)	0.008
TURN	0.00446	(1.139)	0.104***	(2.833)	0.007
ACC	-0.0967	(-1.080)	0.0908***	(3.948)	0.011
AG	0.00369	(0.0838)	0.0887***	(3.688)	0.007
PROFIT	-0.00971	(-0.104)	0.0978***	(3.905)	0.039
GROFIT	0.102	(1.568)	0.0664**	(2.074)	0.020
ROA	0.157	(0.845)	0.0821***	(3.192)	0.031

Table 11
Summary of results

The table reports the summary of the significant anomalies on Tables 5 to 10. For the univariate analysis a "+" ("–") indicates a positive (negative) significant return of the high-minus-low portfolio on Tables 5 and 9. For Fama-MacBeth (FM) regressions a "+" ("–") indicates a positive (negative) significant coefficient on Tables 6, 7, and 10. For the case of double sorted portfolios the figure represents the number of times out of 10 possible cases that the high-minus-low portfolio return is significantly different from zero on Table 8. The characteristics are: β_{1M} and β_{12M} are the market betas from the standard CAPM model using 1 month and 1 year daily excess returns. Idiosyncratic volatility (IVOL) is the root mean squared residuals from the CAPM regression. SIZE (in MXN million) is the market capitalization. BM is the book-to-market, which is the ratio of book value divided by market equity. EP is the earnings-to-price ratio and CP is cash flow-to-price ratio. R_{1M} is the lagged 1-month return, R_{6M} is cumulative 6-month return from month $t-2$ to month $t-7$, and R_{12M} is cumulative 11-month return from month $t-2$ to month $t-12$. ILLIQ is Amihud (2002) measure, ISSUE is new issues defined by Pontiff and Woodgate (2008), TURN is the monthly share trading volume divided by shares outstanding, ACC are accrual assets estimated as in Sloan (1996), AG is asset growth calculated as Cooper, Gulen, and Schill. (2008), PROFIT reports profitability measured as in Fama and French (2006), GPROFIT is revenue minus COGS divided by total assets proposed by Novy-Marx (2013), and ROA is return on assets following Balakrishnan, Bartov, and Faurel (2010). EW and VW stand for equal- and value-weighted portfolio sorts.

	1-Month returns					3-Month returns			6-Month returns		
	Univariate Analysis		FM-regressions		Double sorts	Univariate Analysis		FM-regressions	Univariate Analysis		FM-regressions
	EW	VW	Univariate	Multivariate	EW	EW	VW	Univariate	EW	VW	Univariate
β_{1M}							+				
β_{12M}											–
Ivol	–		–	–	4						–
Size				+	4	–	–	–	–	–	–
BM				+	0	+	+	+	+	+	+
EP			+								+
CP						+		+			+
R_{1M}		–							+		
R_{6M}	+	+	+	+	5	+		+	+	+	+
R_{12M}	+	+	+								
Max	–		–	–	5						
Illiq	–		+								
Issue										–	
Turn											
ACC											
AG	+		+								
Profit			+								
GProfit	+		+								
ROA	+		+	+	4						