

# Portfolio Choice in Mexico

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## Abstract

We study a comprehensive dataset of more than 25,000 portfolios from 28 different banks or investment banks in Mexico during the period from September 2008 – August 2009. Some of these portfolios are administered by an external advisor and/or contain motivated assets – assets bought by a bank’s client for whom the bank is also the underwriter. We find that portfolios containing motivated assets underperform. These assets usually are allocated to wealthy retail investors, who are less likely to have an external advisor since their account services generally include an internal advisor. Mexican investors’ portfolios are underdiversified and have a significant home bias. External advisors do not seem to improve the performance of a portfolio during the period studied. However, they do help to reduce the home bias and increase a portfolio’s diversification.

**Key Words:** portfolio choice, financial advice, motivated assets, home bias, emerging markets.

**JEL Classification:** G10, G11, G15

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## 1. Introduction

Financial decisions can have a large impact on households' lifetime utility. However, a large body of research on investors in developed countries finds that many retail investors make mistakes that significantly reduce their lifetime wealth (Odean, 1998, Grinblatt and Keloharju, 2000, Campbell, 2006, Malmendier and Shanthikumar, 2007, Goetzmann and Kumar, 2008, Barber et al., 2012, Badarinza et al., 2016).

For example, it is reported that investors hold under-diversified portfolios, hold under-performing assets for too long, pay little attention to relevant information, and over invest in local relative to foreign assets (Cooper and Kaplanis, 1994, Odean, 1998, Grinblatt and Keloharju, 2000, Goetzmann and Kumar, 2008, Barber and Odean, 2013). It also seems that investors are often over-confident with respect to their own skills (Barber and Odean, 2001).

Further, it seems that receiving expert advice does not necessarily improve portfolios' performance. Although there is some evidence suggesting that external advisors improve portfolios' diversification, external advice often does not improve portfolio performance (Foerster et al. 2014, Foerster et al., Forthcoming). Indeed, in some cases, it seems that financial advice can have a negative effect on the returns and Sharpe Ratios, especially when the advisors' interests differ from those of the clients (Cain et al., 2005, Bergstresser et al., 2009, Hoechle et al., 2015, Anagol et al., 2017).

Less is known, however, about the choices of retail investors in developing countries. In these countries, investors' financial literacy is lower than that of their counterparts in developed countries (Xu and Zia, 2012). Also, it is likely that the regulation on external advisors in developing countries is less strict than in developed countries.

It can therefore be expected that investors in developing countries will have greater home bias and greater tendency to hold under-diversified portfolios than investors in developed countries. It is also likely that in developing countries, external advice will be less efficient in improving portfolios' performance than in developed countries (Duarte and Hastings, 2012).

In this paper we study a comprehensive dataset of more than 25,000 portfolios from 28 different banks and investment banks in Mexico. We have data on the portfolio size of each investor, investor's wealth class (assigned by the type of banking service they have access to), whether the investor is a retail (person) investor or a company, and the investor's risk profiles.

Our data covers the period September 2008 – August 2009. We are therefore able to study, at the micro level, the portfolio choices of different types of investors in a developing country at a time of a market bust followed by a recovery: From September 2008 to February 2009, the Mexican Stock Exchange index (IPC) dropped by around 30 percent. From March 2009 to the end of August 2009, the index rose by almost 60 percent.

We use this dataset to describe the behavior of retail investors in Mexico. We study the diversification, returns and home bias of different types of Mexican investors. We also study the effect of using external advisors on portfolios' performance, and the characteristics of investors that are likely to employ an external advisor, buy foreign assets and have better diversified portfolios.

We find that Mexican investors hold under-diversified portfolios. We also find that there is a strong home bias, with a large share of investors holding mostly Mexican Debt Investment Societies and Mexican Government Bonds (local fixed income securities). Consistent with results reported in studies of investors in developed countries, we find that companies and high income retail investors tend to hold more diversified portfolios and earn higher returns than the average retail investor (Grinblatt and Keloharju, 2000, Barber et al., 2012).

However, because of the special time period that we study, we find that holding an under-diversified portfolio had only a small effect on the investors' portfolios' performances. In the market crash that occurred in the first part of our dataset, holding Mexican bonds yielded higher returns than foreign stocks. Thus, in the time period that we study, holding an undiversified portfolio of fixed-income local securities paid off.

In addition, about 600 of the investors in our dataset used an external advisor. We find that wealthy retail (person) investors, as classified by the service type they have access to, are less likely than other investors to employ an external advisor. This is because those special accounts (Private Banking and High Net Worth Client accounts) include the services of a financial advisor assigned by the bank. This notwithstanding, we find that retail investors with large portfolios are more likely to employ an external advisor. Consistent with findings on retail investors in developed countries, we find that having an external advisor does not improve portfolios performance (Foerster et al. 2014, Foerster et al. Forthcoming, Hoechle et al. 2015), but does not harm the performance either. We also find that Mexican external advisors reduce the home bias and improve the diversification of the portfolios they manage.

Finally, we use the term *motivated assets* to describe assets that a bank's client hold and for which the bank serves as part of the underwriting syndicate. We find that the higher the share of motivated assets in an

investor's portfolio, the lower the portfolio's performance. Our evidence suggests that banks that are part of an underwriting syndicate of an issued asset sell this asset to their clients even when the asset reduces the clients' portfolio's performance.

The rest of the paper is organized as follows. In Section 2 we review the literature on household finance in developing countries. In Section 3 we describe the dataset we use and present some basic stylized facts. In Section 4 we report the results of our main quantitative tests. We conclude in Section 5.

## **2. Literature Review**

Household finance studies how households use financial instruments and markets to achieve their objectives (Campbell, 2006, Guiso and Sodini, 2013). Some key findings are that households in developed countries are prone to investment mistakes: They tend to sell winning assets too quickly and hold losing assets too long (Shefrin and Statman, 1985, Odean, 1998, Grinblatt and Keloharju, 2001), hold under-diversified portfolios (Goetzmann and Kumar, 2008, Guiso and Sodini, 2013, Barber and Odean, 2013), over invest in local assets relative to foreign assets (Cooper and Kaplanis 1994, Guiso and Sodini, 2013, Barber and Odean, 2013, Cooper et al., 2013), make mistakes due to overconfidence (Barber and Odean, 2001, Graham et al., 2009), ignore relevant information about the incentives of analysts and advisors (Cain et al., 2005, Malmendier and Shanthikumar, 2007) and pay to advisors although advised portfolios do not yield better expected returns than unadvised portfolios (Gennaioli et al., 2015, Foerster et al., Forthcoming).

Furthermore, the evidence suggests that education and financial sophistication reduce the likelihood that investors make investment mistakes (Grinblatt and Keloharju, 2000, Dhar and Zhu, 2006). There is also evidence that the institutions that determine financial regulations have a large effect on households' returns and welfare (Campbell, 2016). Particularly, it seems that in the absence of efficient regulation, firms take advantage of investors' naivety: Firms intentionally sell complex financial products that mislead consumers into paying high fees (Gabaix and Laibson, 2006, Gennaioli et al., 2015, Zingales, 2015).

The typical consumer in a developing country is likely to be less educated and less financially sophisticated than the typical investor in a developed country (Xu, and Ziu, 2012). It is therefore likely that consumers in developing countries are more susceptible to make mistakes than consumers in developed countries. Although evidence on consumers in developing countries is relatively rare, it seems that this is indeed the case.

First, Sercu and Vanpée (2007) and Mishra (2013), using macro data, find that the home bias of investors in developing countries is significantly greater than the home bias of investors in developed countries. For example, according to Sercu and Vanpée (2007), in 2005, the average percentage of domestic assets in the portfolios of investors in 20 developing countries was 94.5%, compared to 68.3% in the portfolios of investors in 21 developed countries.<sup>1</sup>

Second, a number of papers find that differences in education and financial sophistication have a significant effect on the performances of investors in developing countries. For example, Liivamägi (2016) finds that in Latvia, investors with academic degrees trade more often than investors without higher education and that experienced traders earn higher returns than less experienced traders. Duarte and Hastings (2012) find that many Mexican investors are not sensitive to fees. Campbell et al. (2015), find that, *ceteris paribus*, education reduces the likelihood that Indian homebuyers default on their mortgages. Vissing-Jorgensen (2012) shows that income and education have a negative effect on the probability that a Mexican consumer default on her consumer credit.

Third, research shows that firms in developing countries are aware of consumers' lack of financial sophistication. A number of papers find that firms in developing countries often sell complex products that increase the probability that consumers buy the products that maximize the firms' revenues rather than the products that minimize the consumers' costs. Duarte and Hastings (2012), for example, find that Mexican consumers pay high management fees for their social security programs, although the number of competing firms is large. Furthermore, they find that when the Mexican government introduced a new index to make the fees salient to consumers, the firms responded by utilizing the new index to their advantage. The firms introduced new products that had low values of the index, but nevertheless charged high fees. Eventually, because the consumers followed the index and ignored the other costs, many consumers paid higher fees than before the index was introduced. Similarly, Anagol et al. (2017) find that life insurance agents in India tend to recommend to the consumers unsuitable products that provide high commissions to the agents.

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<sup>11</sup> The list of developed countries includes: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, South Korea, the Netherlands, Norway, Portugal, Sweden, Switzerland, the United Kingdom, and the United States. The list of developing countries includes: Argentina, Brazil, Chile, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Malaysia, Mexico, Philippines, Poland, Russia, Singapore, South Africa, Thailand, and Turkey.

Taken together, this evidence suggests that investors in developing countries are indeed less financially sophisticated than investors in developed countries. Below we add to the knowledge on the behavior of investors in developing countries by studying the portfolios of individual Mexican investors.

### **3. Data and Stylized Facts**

The data we use was compiled by the Comisión Nacional Bancaria y de Valores de México (CNBV). It contains monthly data on individual portfolios from September 2008 to August 2009. The original database contains a total of 100,040 contracts selected randomly by the CNVB from data provided by 24 different Banks and 25 different Brokerage firms.<sup>2</sup> After a thorough cleaning process, we ended up with 27,466 contracts for which we have data for the entire period.

For each contract we observe the end of the month assets' position. Table 1 presents the summary statistics on the variables in the dataset, which we separate into three categories:

#### (i) Portfolio Characteristics:

*Portfolio value:* The average market value of the portfolio in Mexican Pesos during the sample period.

*Number of assets in the portfolio:* The monthly average quantity of different securities in a portfolio during the sample period.

*Standard deviation of the number of assets in the portfolio:* Calculated over the entire period. We use it as a proxy for portfolio rebalancing.

*Annualized returns:* The portfolios' cumulative annualized returns.

*Average monthly returns:* The portfolios' average monthly returns.

*Standard deviation of average monthly returns:* proxy for portfolio volatility.

*Sharpe Ratio:* The portfolios' average monthly returns divided by the Standard deviation of the average monthly returns.

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<sup>2</sup> The names of the different institutions are confidential but the CNBV let us know that they requested the data from the major firms in the Mexican financial market. The provision of the data was mandatory.

*Sum of Squared Portfolio Weights (SSPW)*: A measure of portfolios' diversification. Following Goetzmann and Kumar (2008), we define the SSPW as follows: Let  $N$  be the total number of securities in a portfolio. Let  $w_{it}$  be the weight of security  $i$  in portfolio  $j$  at time  $t$ , defined as the value of security  $i$  over the total value of portfolio  $j$  at time  $t$ . Then  $SSPW_{jt} = \sum_{i=1}^N w_{it}^2$ . Finally,  $SSPW_j = T^{-1} \sum_{t=1}^T SSPW_{jt}$ . The value of the SSPW lies between 0 and 1. A value of 1 corresponds to a portfolio that contains only one asset in every period. The smaller the value of SSPW, the more diversified is a portfolio.

*Portfolios with motivated assets*: The percentage of portfolio containing motivated assets in our sample. We define motivated assets as assets in a bank's client portfolio for which the bank is either the underwriter or a member of the underwriting syndicate.

*Motivated Assets to Total Value*: total market price of Motivated Assets in a portfolio divided by the value of the portfolio.

(ii) Investor Characteristics:

*External advisor*: a person (whether natural or legal) not in the payroll of the bank that manages the client's account.

*Investor profile: aggressive, moderate or conservative*: the clients' risk tolerance, as assigned by the Bank or Brokerage (not mandatory at the time of retrieving the data).

*Investor: institutional, qualified, or none of the previous*: institutional investors are legal persons affected by financial regulatory laws.<sup>3</sup> Qualified investors are investors (person or company) who hold investment greater or equal to 1.5 million UDIs (approx. 600,000 USD) during the last twelve months or that have had revenues greater or equal to 500,000 UDIs (approx. 200,000 USD) in the last two years.<sup>4</sup>

*Service: private banking, high net worth or office*: type of service given to the client depending on his/her wealth. Each Bank/Brokerage company has its own rules to assign clients to different types of services and also has different benefits for each type of services. Usually, High Net Worth clients require higher income than Private Banking clients, and the later requires higher income than Office clients.

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<sup>3</sup> Societies controlling financial groups, brokerage firms, banks, insurance companies, wealth management companies, etc.

<sup>4</sup> An UDI (Unidad de Inversion) is an inflation-adjusted unit of value created to adjust mortgages and other commercial loans.

*Client: person or company:* whether the account owner is a retail (person) investor or a company.

(iii) Market Characteristics: number of contracts (number of portfolios in the database), number of firms (number of banks and brokerage companies in the dataset) and number of contracts per firm.

Importantly, we had to eliminate from our sample portfolios with short positions because of problems in the database compilation.

[Insert Table 1]

The average portfolio value is 4.9 million of Mexican Pesos (around 340,000 USD during the time period analyzed). The median portfolio value is 744,444 Mexican Pesos (around 51,655 USD). The average number of assets per portfolio is 3.07 and the average annualized returns are 0.4%. During that period, the Índice de Precios y Cotizaciones (IPC, main Mexican stock index) had a positive return of 13% (in Mexican Pesos), while the S&P 500 had a negative return of 20%. At the same time, the Mexican Peso depreciated 27% with respect the US Dollar (it went from 10.32 Mexican Pesos per US Dollar to 13.13). The average monthly return in our sample is 0.15% and the average standard deviation of the monthly returns is 8.50%. The average yearly Sharpe Ratio in our sample is 0.31 and the standard deviation of the Sharpe Ratio is 0.88. The median Sharpe Ratio is 0.14.

We find some support for the hypothesis that investors in developing countries have less diversified portfolios than investors in developed countries. The average value of our diversification measure, the Sum of Squared Portfolio Weights (SSPW), is 0.76. Goetzmann and Kumar (2008) find that the average SSPW for the US in the period 1991–1996 was 0.50, and that the SSPW tended to decrease over time. They conclude that portfolios of US consumers at that time were under-diversified. Given that low values of the SSPW indicate greater diversification, Mexican investors' portfolios in 2008 were less diversified than US investors' portfolios in 1991, by a large margin.

We also find evidence of a significant home bias. The assets held by investors in our database can be broadly divided into the following categories: Foreign Stock, Foreign Bond, ETFs tracking foreign assets, Mexican Stock, Mexican Bond and other. We further divide Mexican Bond into Mexican Debt Investment Societies (intermediaries that invest in fixed income securities, mostly government bonds), Mexican Private Bond (corporate bonds) and Mexican Government Bond. Figure 1 depicts the overall distribution of the assets in



the data. Domestic fixed income securities have the largest proportion in the portfolios, around 75 percent. The total percentage of foreign stocks and bonds in the portfolios is 6.5 percent.

[Insert Figure 1]

In a comprehensive study of the home bias in portfolio allocation, Sercu and Vampée (2007) report that in 2005 Mexican investors held only 2 percent of their portfolios in foreign assets. It therefore seems that the home bias in our database is smaller than in theirs. However, our findings still suggest that Mexican investors invest significantly less in foreign assets than investors in developed countries. For example, Sercu and Vampée (2007) report that foreign assets compose 18 percent of US portfolios, 35 percent of UK portfolios, 43 percent of German portfolios and 32 percent of French portfolios.

Regarding the investor characteristics, 2.1% of the portfolios are managed by an external advisor who has authorization to perform trades on behalf of the investor. Regarding the investors' risk-profiles, 16% of the investors define themselves as aggressive, 15% as moderate and 28% as conservative. 41% of the investors do not provide their risk profile. 1% of the investors are institutional, 11% are qualified, and 88% are neither. Regarding the types of service that investors receive: 15% are private banking clients, 10% are high net worth clients, 21% are office branch clients, and 53% are not assigned. Finally, 59% of the investors are retail (physical persons) investors, 4% are companies and 37% are not disclosed.

The total number of different banks and brokerage companies in the sample is 28. The average number of contracts per brokerage firm is 980, with a minimum of 37 and a maximum of 11,102 contracts.

Figure 2 depicts the evolution of the IPC and three hypothetical portfolios. Each of the portfolios corresponds to one of the three investors' risk-tolerance profiles: conservative, moderate and aggressive. The monthly return on each of these hypothetical portfolios is calculated as the average monthly return on all the portfolios that belong to investors with this risk tolerance.

[Insert Figure 2]

As may be expected, the higher the risk-tolerance, the higher the volatility of the portfolio. Interestingly, the returns on the aggressive investors' portfolio show less volatility than the IPC. This is because although aggressive investors hold a higher proportion of equity than moderate and conservative ones, they still hold some fixed income assets. Figure 3 shows the average distribution of assets for each of the four investors' risk profiles separately.

[Insert Figure 3]

As expected, we find that the lower the risk tolerance of the investors, the lower the proportion of variable income in the portfolio. Investors that do not disclose their risk profile seem to have portfolios similar to those that disclose a conservative attitude towards risk.

Finally, Figure 4 shows that the average Sharpe Ratios vary across portfolio characteristics. Conservative investors obtained higher Sharpe Ratios than moderate investors, while moderate investors obtained higher Sharpe Ratios than aggressive investors. These results can be explained by the large volatility and relative under performance of variable income assets during the period we study (subprime mortgage crisis). Further, Companies obtained higher Sharpe Ratios than retail investors. Among the retail investors, High Net Worth investors obtained the lowest Sharpe Ratios, while Private Banking clients obtained the highest (except for the Moderate risk profiles).

[Insert Figure 4]

## **4. Results**

### **4.1 General Results**

We begin with a first study of the effects of investors' characteristics on their portfolios and on their portfolios' performance. Table 2 summarizes the results of four benchmark regressions that study portfolios' volatility and performance.

In each of the regressions, we use the same independent variables: The log of the Portfolio Value; External Advisor; Investor Profile: Aggressive, Moderate or NA (relative to Conservative); Investor: Institutional or Qualified (relative to Not Institutional nor Qualified); Service: Private Banking, High Net Worth or NA (relative to Office); Client: Retail (person) or NA (relative to Company); SSPW (proxy for portfolios' diversification) and Motivated Assets over Portfolio Value.

The dependent variables are Annualized Returns, Standard deviations of the Monthly Returns (proxy for volatility), Sharpe Ratio and Standard deviation of the number of Assets over Number of Assets (proxy for turnover).

[Insert Table 2]

We can summarize the results as follows: A portfolio's size does not seem to have an effect on the realized returns ( $\beta = 0.00, p > 0.10$ ). In addition, the coefficients of the portfolio size are also not statistically significant in the volatility column ( $\beta = -0.005, p > 0.10$ ), nor in the Sharpe Ratio regressions ( $\beta = 0.017, p > 0.10$ ). The portfolios' size, however, does have a significant effect on the portfolios' turnover ( $\beta = 0.035, p < 0.01$ ). It therefore seems that the number of transactions tends to increase with the size of the portfolios.

An External Advisor is associated with higher turnover ( $\beta = 0.06, p < 0.10$ ). At the same time, the coefficients in the other regressions are insignificant, suggesting that external advisors, in principle, have no effect on portfolios' performances.

As might be expected, investors that defined themselves as Aggressive achieved higher realized returns than Conservative investors ( $\beta = 0.06, p < 0.01$ ). However, the volatility of the returns of Aggressive investors is also greater than the volatility of Conservative investors ( $\beta = 0.03, p < 0.01$ ). Consequently, when returns are adjusted by risk (Sharpe Ratio), we find that aggressive investors do not outperform Conservative investors ( $\beta = 0.023, p > 0.10$ ). In fact, the Sharpe Ratios of the portfolios are not significantly affected by any of the investor's risk profiles.<sup>5</sup>

Institutional investors have higher realized returns than investors that are neither institutional nor qualified ( $\beta = 0.114, p < 0.05$ ), and they also have lower volatility ( $\beta = -0.015, p < 0.10$ ). Nevertheless, their Sharpe Ratios are not statistically different than those of investors that are neither institutional nor qualified ( $\beta = 0.055, p > 0.10$ ). Qualified investors do not have higher returns than investors that are neither institutional nor qualified ( $\beta = 0.001, p > 0.10$ ), but they do have greater realized Sharpe Ratios ( $\beta = 0.273, p < 0.01$ ).

Private Banking investors have higher Sharpe Ratios than standard (Office) investors ( $\beta = 0.141, p < 0.05$ ). It could be expected that High Net Worth investors will also outperform Office investors. Interestingly, however, High Net Worth investors have lower realized returns ( $\beta = -0.216, p < 0.10$ ) and lower Sharpe Ratios than standard investors ( $\beta = -0.073, p > 0.10$ ), although the difference in the Sharpe Ratios is not statistically significant. Below we show that most of this under-performance can be explained by the share of motivated

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<sup>5</sup> Investors that do not provide information about their risk profile have a significant higher Sharpe Ratio than conservative investors. We cannot draw conclusions from this finding, however, because the group of investors that do not provide information about their risk profile is likely composed of a mixture of Aggressive, Moderate and Conservative investors.

assets held in investors' portfolios: This share is higher in the portfolios of High Net Worth investors than in the portfolios of Office investors.

Retail (person) investors have lower expected Sharpe Ratios than companies ( $\beta = -0.229, p < 0.05$ ). They also have greater turnover ( $\beta = 0.057, p < 0.01$ ). These results are consistent with findings on investors in developed countries that show that company investors tend to earn higher returns than retail investors (Grinblatt and Keloharju, 2000, 2001).

The coefficient of SSPW in the monthly standard deviation regressions is negative ( $\beta = -0.049, p < 0.01$ ). Since lower SSPW values indicate greater diversification, this result suggests that greater diversification is associated with greater variance of the returns. As a result, greater diversification is correlated with lower Sharpe Ratios ( $\beta = 0.527, p < 0.01$ ). A possible explanation is that more diversified portfolios usually contain relatively large shares of variable income assets, and in the time period we study, such assets had low returns and high volatility as a result of the 2008 market crash.

Finally, portfolios' performances are negatively affected by the proportion of Motivated Assets: When banks' clients own assets for which the bank is part of the underwriting syndicate, they tend to have lower realized returns ( $\beta = -0.207, p < 0.01$ ) and lower Sharpe Ratios ( $\beta = -0.362, p < 0.01$ ) than clients who do not own such assets. This is a first evidence that banks in Mexico sell to their clients assets that are profitable for the bank rather than for the client.

Next, we turn to study the effects of investors' characteristics on their portfolio choices. We study the effects of the investors' characteristics on the diversifications of their portfolios, on their investment in foreign relative to local assets, on the likelihood that they employ an external advisor and on the shares of motivated assets they buy.

## **4.2 Diversification**

In this section we study the effect of investors' characteristics on portfolios' diversification. The dependent variable is SSPW. We use the same independent variables as in the previous benchmark regressions. The results are summarized in Table 3.

[Insert Table 3]

As expected, the size of the portfolio has a positive effect on diversification: The regression results suggest that the SSPW index tends to decrease when a portfolio's value increases ( $\beta = -0.043, p < 0.01$ ). In addition, we find that External Advisors increase diversification ( $\beta = -0.133, p < 0.01$ ). This suggests that although we do not find that advisors have a positive effect on returns or on Sharpe Ratios, it is possible that this is, in part, an outcome of the period we study. As a result of the subprime crisis in 2008, diversification was not necessarily the best ex-post strategy. Indeed, in the period we study, portfolios containing only a few low-risk bonds were able to outperform better diversified portfolios containing several variable income securities.

Therefore, although we do not observe that External Advisors improve portfolios' returns and/or Sharpe Ratios, we cannot rule out the possibility that we would observe some benefits if we were able to analyze performance over a longer period. However, the result that external advisors do not add value but do add to diversification is consistent with findings on advisors in developed countries, suggesting that advisors in developing countries play a similar role to advisors in developed countries (Foerster et al. 2014 and Hoechle et al. 2015).

Aggressive ( $\beta = -0.25, p < 0.01$ ) and Moderate ( $\beta = -0.151, p < 0.01$ ) investors tend to hold more diversified portfolios than Conservative investors. This likely reflects the fact that Aggressive and Moderate investors hold more types of assets, especially variable income ones, than Conservative investors and, consequently, hold better diversified portfolios.

The type of service also has an effect on diversification. Both Private Banking investors ( $\beta = -0.104, p < 0.01$ ) and High Net Worth investors ( $\beta = -0.087, p < 0.01$ ) are better diversified than Office investors. It therefore seems that wealth has a positive effect on diversification even when controlling for portfolio size.

Although we previously reported that companies have higher returns and Sharpe Ratios than retail (person) investors, we find that person investors are better diversified than Company ones ( $\beta = -0.109, p < 0.01$ ). Additionally, we find that Company's portfolios weigh heavily on fixed income securities. Thus, the result is consistent with the fact that during this period of high volatility, fixed income securities provided higher Sharpe Ratios than variable income securities. It is also consistent with the possibility that company investors have information advantage over retail investors, and that this advantage enables them to cherry pick assets with high expected returns (Grinblatt and Keloharju, 2000, Goetzmann and Kumar, 2008).

Finally, we find evidence suggesting that investors who hold motivated assets also have less diversified portfolios. The coefficient of motivated assets is positive ( $\beta = 0.079, p > 0.10$ ), suggesting that investors that

buy motivated assets also have less diversified portfolios. The coefficient is not statistically significant, however, suggesting that the difference in diversification between investors that hold motivated assets and other investors is not statistically significant.

To summarize: It seems that similar to the findings on investors in developed countries, we find that in Mexico, investors' wealth and portfolio size tend to have a positive effect on diversification. At the same time, it seems that company investors are less diversified than retail investors. Yet, we find above that company investors earn higher returns and higher Sharpe Ratios than retail investors. This might be due to the special time period we study, because in 2008 holding fixed income securities yielded higher returns than holding variable income assets. It might also be due to companies investors having information advantage over retail investors. One more finding is that investors who hold motivated assets also tend to hold less diversified portfolios. This suggests the possibility that banks sell motivated assets to clients that are relatively less financially sophisticated.

### **4.3 Home Bias**

In this section we study the effect of the investors' characteristics on the proportion of foreign assets held in an investor portfolio. We define the proportion of foreign assets held in a portfolio as the average value of the monthly proportion of foreign assets in a portfolio, which is calculated by taking the sum of the values of Foreign Stocks, Foreign Bonds (private and governmental) and ETF, all divided by the total value of the portfolio. Our independent variables are the same as those used in our benchmark regression. The results are summarized in Table 4.

[Insert Table 4]

We find that portfolio size has a negative effect on the proportion of foreign assets, but the effect is not statistically significant ( $\beta = -0.032, p > 0.10$ ). Interestingly, investors with higher tolerance to risk (Aggressive investors) hold more foreign assets than conservative investors ( $\beta = 0.033, p < 0.01$ ), even though foreign assets from developed countries are historically less risky (have lower volatility) than Mexican ones. It seems that investors in our database perceive domestic assets as safer than external ones even if the historical volatility of the domestic assets is much larger. A possible explanation for this result is ambiguity aversion (Epstein, 1999): It is possible that a large share of the Mexican investors has insufficient information about

foreign assets and, therefore, they perceive investing in foreign assets as riskier than investing in domestic ones.

Institutional ( $\beta = 0.083, p < 0.05$ ) and Qualified ( $\beta = 0.030, p < 0.05$ ) investors have a larger exposure to foreign assets than those owned by investors that are neither institutional nor qualified. These findings suggest again that wealth and greater investment experience have a positive effect on investment skills.

As another test for the effect of investors' characteristics on the strength of the home bias, we use a logit regression to estimate the likelihood that an investor holds any amount of foreign assets in her portfolio. Indeed, Figure 3 suggests that many investors do not hold any amount of foreign assets in their portfolios. There is an interest, therefore, to study the differences between investors that hold foreign assets in their portfolios and those that do not.

The dependent variable in the regression is a dummy variable that equals 1 if a portfolio contains a positive amount of at least one foreign asset, and 0 otherwise. The independent variables are the same as in the baseline regressions. The results are summarized in Table 5.

[Insert Table 5]

We find that portfolio size does not have a statistically significant effect on the likelihood that an investor holds foreign assets ( $\beta = -0.062, p > 0.10$ ). External advisors have a positive and statistically significant effect on the likelihood that an investor holds foreign assets ( $\beta = 1.02, p < 0.01$ ). Therefore, although we find in Table 4 that external advisors do not have a statistically significant effect on the share of foreign assets in an investor's portfolio, they do have a positive effect on the likelihood that the investor holds a positive amount of foreign assets in her portfolio. Thus, it seems that external advisors tend to buy foreign assets on behalf of their clients.

Aggressive ( $\beta = 2.84, p < 0.01$ ) and moderate investors ( $\beta = 1.98, p < 0.01$ ) are significantly more likely to hold foreign assets in their portfolios than conservative investors. This suggests, again, that Mexican investors perceive foreign assets as more risky than local ones, although, historically, foreign assets have higher returns and lower variance than Mexican assets.

Institutional ( $\beta = 2.08, p < 0.01$ ), Qualified ( $\beta = 1.52, p < 0.01$ ), Private Banking ( $\beta = 1.68, p < 0.01$ ) and High Net Worth ( $\beta = 0.876, p < 0.01$ ) investors are all more likely to hold foreign assets than an average standard (office) investor. This is another indication that wealth and financial sophistication have a positive effect on

investors' choices, as it shows that financial sophistication has a positive effect on the probability that investors hold internationally diversified portfolios.

#### **4.4 External Advisors**

In the previous Section we show that external advisors do not add value to a portfolio but do have a positive effect on portfolios' diversification and on home bias. To further analyze the impact of external advisors on their clients' portfolios we focus on the sample of institutions that have at least one portfolio managed by an external advisor. The number of institutions in this sample diminishes from 28 to 9, and the number of contracts diminishes from 24,466 to 17,036. The summary statistics for this set of portfolios is given in Table 6.

[Insert Table 6]

We focus on institutions that have at least one account managed by an external advisor because using the full sample might bias the results on the effects of having an external advisor. Indeed, if clients choose institutions according to unobserved characteristics, then there might be systematic differences between investors that are captured by the institution that they choose. Comparing portfolios only from institutions where at least some investor use an external advisor can assist in removing some of these unobserved differences in the investors' characteristics.

Using this subset of the data, we estimate again the initial four benchmark regressions. The results are summarized in Table 7.

[Insert Table 7]

The results are qualitatively similar to those obtained using the full sample. We find that although external advisors might have a slight positive effect on the returns ( $\beta = 0.008$ ,  $p > 0.10$ ) and on the Sharpe Ratios ( $\beta = 0.113$ ,  $p > 0.10$ ), the effect is not statistically significant. Thus, it seems that, similar to the findings reported by Hoechle et al. (2015) and Foerster et al. (2014) for developed countries, Mexican external advisors do not have a significant positive effect on portfolios' performance.

Another important question concerning external advisors is the characteristics of a typical investor that employs the services of an external advisor. To study this question, we estimate a logit regression of the



likelihood that an investor employs an external advisor. The dependent variable is a dummy variable that equals 1 if the investor employs an external advisor and 0 otherwise. Again, to minimize the effects of unobserved heterogeneity, we restrict the sample to the sample of institutions that have at least one portfolio managed by an external advisor. The results are summarized in Table 8.

[Insert Table 8]

Portfolio size has a positive effect on the probability that an investor uses an external advisor ( $\beta = 0.190$ ,  $p < 0.05$ ). Qualified investors are also more likely than other investors to employ an external advisor ( $\beta = 1.35$ ,  $p < 0.01$ ). These two results are consistent with findings on investors in developed countries because they suggest that income has a positive effect on the likelihood that investors receive expert advice (Bhattacharya et al., 2012).

The banks assign Private Banking and High Net Worth investors an internal advisor. The results suggest that these types of investors are usually satisfied with the advisors they are assigned by the banks. Both Private Banking ( $\beta = -6.33$ ,  $p < 0.01$ ) and High Net Worth investors ( $\beta = -6.23$ ,  $p < 0.01$ ) are less likely than standard (Office) investors to employ an external advisor.

Thus, it seems that the typical investor who uses an external advisor is an investor with a relatively large portfolio that does not use premium services that assign an internal advisor. Further, we find no statistically significant differences in the likelihood of using an external advisor between retail and company investors.

#### **4.5 Motivated Assets**

In our original benchmark regressions and follow up analysis, we already show that motivated assets are associated with lower portfolio performance. In this section, we further study the effects of motivated assets on portfolios' performance, as well as which type of investor tend to hold this type of assets. Motivated assets are assets for which the bank is a part of the underwriting syndicate. Selling these assets is particularly profitable for a bank because when a bank is an underwriter, the bank earns additional commissions when the assets are sold. Therefore, banks have an incentive to sell motivated assets to their clients even when the assets are expected to underperform.

We start our study of the effects of motivated assets with a robustness test: To minimize the difference between clients that buy motivated assets and those who do not, we create a new subsample in which we leave only the institutions that sold motivated assets to their clients. The number of institutions in this sample diminishes from 28 to 11, and the number of contracts decreases from 24,466 to 22,746. The summary statistics for this set of portfolios is given in Table 9.

[Insert Table 9]

Table 10 summarizes the results of the robustness test. It gives the results of regressions similar to the benchmark regressions using the subsample of the data containing only the institutions that sold motivated assets to their client.

[Insert Table 10]

The results are qualitatively similar to our benchmark regressions (Table 2). A larger proportion of motivated assets in a portfolio is correlated with lower performance. The higher the share of motivated assets in a portfolio, the lower are the annualized returns ( $\beta = -0.185$ ,  $p < 0.01$ ) and the Sharpe Ratios ( $\beta = -0.335$ ,  $p < 0.01$ ).

Next, we study which investors are more likely to hold motivated assets in their portfolios. For this purpose, we regress the share of Average Motivated Assets to Portfolio Value against the investors' characteristics variables. The results are summarized in Table 11 below.

[Insert Table 11]

The results suggest that portfolio size has a positive effect on the share of motivated assets in an investor's portfolio ( $\beta = 0.003$ ,  $p < 0.05$ ). Private Banking investors also tend to hold more motivated assets than other investors ( $\beta = 0.022$ ,  $p < 0.01$ ). In addition, retail (person) investors hold more motivated assets in their portfolios than company investors ( $\beta = 0.01$ ,  $p < 0.05$ ). Taken together, these results suggest that high income retail investors hold more motivated assets than standard (Office) and company investors.

Further, portfolios with external advisors seem to have a marginally higher proportion of motivated assets than portfolios without external advisors ( $\beta = 0.009$ ,  $p < 0.10$ ). This seems in contrast with our findings above, suggesting that having an external advisor has no, or even a positive, effect on portfolios' performance. Two possible explanations are that, first, not all motivated assets underperform. If this is the case, it could be that

external advisors are able to distinguish good motivated assets from bad ones. Second, it is possible that external advisors buy a negligible share of motivated assets and, consequently, the motivated assets that they buy do not affect the portfolios' performance.

The data suggest that the first explanation is more likely than the second. Out of the 577 portfolios managed by external advisors, only 24 contain motivated assets, with an average of 37% of the portfolio invested in these assets. The average annualized return of these 24 portfolios is 2%, compared to a sample average of 0.4%. Further, the average Sharpe Ratio for these 24 portfolios is 0.30, compared to a sample average of 0.31. Therefore, it seems that these 24 portfolios do not underperform relative to the average portfolio in the sample. Thus, it seems that when external advisors pick motivated assets, these assets do not have a significant effect on the performance of the portfolios relative to portfolios that do not contain motivated assets.

To summarize our findings on holders of motivated assets, we present in Table 12 the average proportions of motivated assets' value with respect to total assets' value held by Service type (Private Banking clients, High Net Worth clients and Office clients) and Client type (companies and retail (person) investors). For this table we use the restricted sample that contains only institutions that sold motivated assets to their clients. To simplify the presentation, we use as numeraire the proportion of motivated assets held by Private Banking retail investors, because they hold the largest average percentage of motivated assets in their portfolios.

From the table, it can be observed that high income retail (person) investors (Private Banking and High Net Worth investors) buy more motivated assets on average than companies. Thus, it seems that underwriting banks sell motivated assets mostly to retail investors, perhaps because companies' investors have better information about the banks' incentives (Malmendier and Shanthikumar, 2007). Further, it seems that high income investors do not have better understanding of the banks' incentives than standard (Office) investors, because high income investors hold larger shares of these assets in their portfolios than standard investors.

[Insert Table 12]

As another test for the characteristics of investors that hold motivated assets in their portfolios, we use a logit regression to estimate the likelihood that an investor holds any amount of motivated assets in her portfolio. The dependent variable is a dummy variable that equals 1 if the investor holds positive amounts of at least one motivated assets in her portfolio and 0 otherwise. The results are summarized in Table 13.

[Insert Table 13]

Consistent with the results above, we find that a portfolio's size has a positive effect on the likelihood that an investor will hold motivated assets in her portfolio ( $\beta = 0.454, p < 0.01$ ). Both Private Banking ( $\beta = 1.67, p < 0.01$ ) and High Net Worth investors ( $\beta = 1.49, p < 0.09$ ) are more likely than standard (Office) investors to hold motivated assets in their portfolios. Retail (person) investors are more likely to hold motivated assets than company investors ( $\beta = 1.33, p < 0.01$ ). Finally, investors that employ external advisors are more likely than other investors to hold motivated assets in their portfolios ( $\beta = 1.29, p < 0.01$ ).

Therefore, the results of the logit test of the likelihood that an investor holds motivated assets support the results of the regression of the shares of motivated assets in an investor's portfolios: Both tests suggest that high income retail investors are more likely than standard (Office) and company investors to hold motivated assets in their portfolios. Thus, it seems that company investors understand the banks' incentives to sell motivated assets, while retail investors, including high income investors, do not. Thus, whereas Malmendier and Shanthikumar (2007) find that in the US large investors understand the incentives facing analysts, it seems that in Mexico high income retail investors fail to understand these incentives.

## 5. Conclusions

We study a comprehensive dataset of more than 25,000 portfolios from 28 different banks or investment banks in Mexico. Our data covers the period September 2008 – August 2009, a period of a market bust followed by a recovery.

We find that Mexican investors hold under diversified portfolios and have a significant home bias. Consistent with the literature that finds that investors from developing countries have lower financial literacy, we find that the portfolios in our sample are less diversified than in developed countries and that the home bias is more significant than in developed countries.

Also consistent with the hypothesis that investment mistakes are caused by lack of financial sophistication, we find that companies earn higher returns and have higher Sharpe Ratios than retail (person) investors. Further, we find evidence suggesting that companies have information advantage over retail investors because they achieve a higher risk adjusted returns despite having, on average, less diversified portfolios. Companies also have lower home bias than retail investors.

Another evidence for investors' lack of financial sophistication is our findings on motivated assets. Motivated assets are assets for which a client's bank is part of the underwriting syndicate, and, therefore, the bank has an additional incentive to sell them. We find that when investors hold motivated assets, their portfolios tend to underperform. This suggests that banks sell such motivated assets to their clients even when this hurts the clients' portfolio performance. It also seems that company investors have better understanding than person investors of the banks' incentives, because company investors hold fewer motivated assets than person investors. Among retail (person) investors, however, it seems that high net worth and private banking investors hold more motivated assets than office investors. It therefore seems that in Mexico, most investors, including high net worth investors, do not understand the banks' incentives when selling motivated assets.

Nevertheless, it seems that wealth does have a positive effect on portfolio choices. Among retail (person) investors, high-income investors and investors with large portfolios hold better diversified portfolios that have lower home bias than other retail investors.

We also find that some investors employ external advisors. The employment of external advisors seem to depend on investors' characteristics: Our results suggest that retail (person) investors with large portfolios who do not opt for a bank's account with premium services are more likely to employ external advisors than any other investors.

When investors employ external advisors, their portfolios are better diversified and show less home bias. However, we find that employing an external advisor does not have a significantly beneficial effect on portfolios' performances. The evidence therefore suggests that advisors in developing countries do not add any more value to portfolios than advisors in developed countries (Foerster et al., 2014, Hoechle et al., 2015).

This work is only a first survey of the characteristics of Mexican investors. Further work needs to be done to understand the effect of sophistication on the performances of Mexican investors' portfolios. There is also a need to study the effects of the subprime crisis on the home bias of Mexican investors. It needs to be seen whether a period of local and international market busts leads to changes in investors' tendency to hold foreign assets and in their preferences for diversification.

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**Table 1:** Summary Statistics using portfolio with available data for the full sample

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Potfolio Characteristics</b>				
Portfolio Value	\$4,931,404	\$31,000,000	\$9,867	\$930,000,000
# Assets per portfolio	3.07	3.99	1	166
Standard deviation in assets within a portfolio	0.83	3.13	0.00	301
<i>Annualized Returns</i>	<i>0.40%</i>	<i>37.32%</i>	<i>-87.29%</i>	<i>181.90%</i>
Average Monthly Returns	0.15%	3.30%	-14.81%	18.73%
Standard deviation of Average Monthly Returns	8.50%	8.61%	0.00%	54.55%
Sharpe Ratio	0.31	0.88	-1.41	3.73
Sum of Squared Portfolio weights (SSPW)	0.76	0.27	0.03	1
Portfolios with Motivated Assets	1.72%			
Motivated Assets to Total Value (MA2V)	0.97%	7.82%	0.00%	100%
Observations per portfolio (months)	11	0.00	11	11
<b>Investor Characteristics</b>				
External Advisor	2.10%			
Inv. Profile Aggressive	16%			
Inv. Profile Moderate	15%			
Inv. Profile Conservative	28%			
Inv. Profile NA	41%			
Investor: Institutional	1%			
Investor: Qualified	11%			
Investor: Not institutional or qualified	88%			
Service: Private Banking	15%			
Service: High Net Worth	10%			
Service: Office	21%			
Service: NA	53%			
Client: Person	59%			
Client: Company	4%			
Client: NA	37%			
<b>Market Chracteristics</b>				
Number of Contracts	27466			
Number of Firms	28			
Number of Contracts Per Firm	980	2049	37	11102

Table 2: Benchmark Regressions

<b>Dependent Variable</b>	<b>Annualized Returns</b>	<b>Stdev monthly returns</b>	<b>Sharpe Ratio</b>	<b>Stdev assets/# assets</b>
ln(Portfolio Value)	0.000	-0.005	0.017	0.035***
External Advisor	-0.020	0.000	0.036	0.060*
Inv. Profile Aggressive	0.060***	0.030***	0.023	0.018
Inv. Profile Moderate	-0.002	0.017**	0.007	0.037**
Inv. Profile NA	0.075**	-0.003	0.205*	-0.04
Investor: Institutional	0.114**	-0.015*	0.055	-0.025
Investor: Qualified	0.001	0.012***	0.273***	-0.072
Service: Private Banking	0.015	0.001	0.141**	0.088
Service: High Net Worth	-0.216*	0.036	-0.073	0.050*
Service: NA	-0.011	0.017**	0.061	0.114**
Client: Person	-0.008	-0.002	-0.229**	0.057***
Client: NA	-0.063	0.010	-0.230	0.350***
SSPW	-0.038	-0.049***	0.527***	0.085
Motivated Asset / Pflio Value	-0.207***	0.013	-0.362***	0.045
R2	0.038	0.061	0.050	0.238
N	27466	27466	27466	27466

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

Table 3: Diversification

<b>Dependent Variable</b>	<b>Average SSPW (Year)</b>
ln(Portfolio Value)	-0.043***
External Advisor	-0.133***
Inv. Profile Aggressive	-0.250***
Inv. Profile Moderate	-0.151***
Inv. Profile NA	-0.048
Investor: Institutional	0.061
Investor: Qualified	0.005
Service: Private Banking	-0.104***
Service: High Net Worth	-0.087**
Service: NA	-0.061*
Client: Person	-0.109***
Client: NA	-0.087
Motivated Asset / Pflio Value	0.079
R2	0.276
N	27466

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

Table 4: Home Bias

	<b>Foreign Assets</b>
ln(Portfolio Value)	-0.032
External Advisor	0.013
Inv. Profile Aggressive	0.033**
Inv. Profile Moderate	0.038
Inv. Profile NA	0.001
Investor: Institutional	0.083**
Investor: Qualified	0.030**
Service: Private Banking	0.052
Service: High Net Worth	0.02
Service: NA	0.023
Client: Person	-0.034
Client: NA	0.056***
SSPW	-0.084***
Motivated Asset / Pflio Value	-0.007
R2	0.143
N	27466

\*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

Table 5: The likelihood that an investor holds foreign assets

	<b>Foreign Asset (dummy)</b>
ln(Portfolio Value)	-0.062
External Advisor	1.02***
Inv. Profile Aggressive	2.84***
Inv. Profile Moderate	1.98***
Inv. Profile NA	0.872*
Investor: Institutional	2.08***
Investor: Qualified	1.52***
Service: Private Banking	1.68***
Service: High Net Worth	0.876**
Service: NA	1.35***
Client: Person	0.249
Client: NA	1.98***
R <sup>2</sup>	0.122
N	27466

Notes: the results of a logit regression of the probability that an investor holds a positive amount of at least one foreign asset in her portfolio. The dependent variable is a dummy that equals 1 if the investor holds a positive amount of at least one foreign asset in her portfolio and 0 otherwise.

\*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

**Table 6: Summary Statistics using institutions with at least one account managed by an external advisor**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Potfolio Characteristics</b>				
Portfolio Value	\$4,785,085	\$28,800,000	\$10,256	\$930,000,000
# Assets per portfolio	3.34	4.47	1	166
Standard deviation in assets within a portfolio	1.20	3.91	0.00	301
<i>Annualized Returns</i>	<i>-0.60%</i>	<i>38.19%</i>	<i>-87.29%</i>	<i>181.90%</i>
Average Monthly Returns	0.10%	3.42%	-14.07%	17.98%
Standard deviation of Average Monthly Returns	9.18%	8.78%	0.00%	54.55%
Sharpe Ratio	0.31	0.94	-1.41	3.73
Sum of Squared Portfolio weights (SSPW)	0.73	0.27	0.03	1
Portfolios with Motivated Assets	1.57%			
Motivated Assets to Total Value (MA2V)	0.82%	6.92%	0.00%	100%
Observations per portfolio (months)	11	0.00	11	11
<b>Investor Characteristics</b>				
External Advisor	3.39%			
Inv. Profile Aggressive	14%			
Inv. Profile Moderate	15%			
Inv. Profile Conservative	11%			
Inv. Profile NA	60%			
Investor: Institutional	1%			
Investor: Qualified	3%			
Investor: Not institutional or qualified	96%			
Service: Private Banking	12%			
Service: High Net Worth	8%			
Service: Office	5%			
Service: NA	75%			
Client: Person	39%			
Client: Company	3%			
Client: NA	58%			
<b>Market Characteristics</b>				
Number of Contracts	17036			
Number of Firms	9			
Number of Contracts Per Firm	1892	3475	111	11102

Table 7: Benchmark Regressions using institutions with at least one account managed by an external advisor

<b>Dependent Variable</b>	<b>Annualized Returns</b>	<b>Stdev monthly returns</b>	<b>Sharpe Ratio</b>	<b>Stdev assets/# assets</b>
ln(Portfolio Value)	-0.004	-0.007*	0.041***	0.044***
External Advisor	0.008	0.007	0.113	0.030
Inv. Profile Aggressive	0.079**	0.040***	0.024	-0.040
Inv. Profile Moderate	0.031	0.013**	0.057	-0.008
Inv. Profile NA	0.016	0.006	-0.079	-0.119
Investor: Institutional	0.252*	-0.033*	0.304*	0.000
Investor: Qualified	0.062	0.022**	0.027	-0.009
Service: Private Banking	0.066***	0.019	0.164*	0.088
Service: High Net Worth	-0.376***	0.096***	-0.242**	0.018
Service: NA	0.042	0.038***	0.087	0.083
Client: Person	-0.054	-0.003	-0.109	0.085*
Client: NA	-0.037	0.003	0.100	0.397***
SSPW	-0.066	-0.052***	0.616***	0.154***
Motivated Asset / Pflio Value	-0.190***	0.027**	-0.347***	0.079***
R2	0.095	0.104	0.053	0.135
N	17036	17036	17036	17036

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

Table 8: The likelihood that an investor employs an External Advisor

	<b>Advisor</b>
ln(Portfolio Value)	0.190**
Inv. Profile Aggressive	0.417
Inv. Profile Moderate	-2.271
Inv. Profile NA	0.842
Investor: Institutional	N/A
Investor: Qualified	1.35***
Service: Private Banking	-6.33***
Service: High Net Worth	-6.23***
Service: NA	-3.76**
Client: Person	2.53
Client: NA	N/A
R <sup>2</sup>	0.528
N	17036

Notes: the results of a logit regression of the probability that an investor employs an external advisor. The dependent variable is a dummy that equals 1 if the investor employs an External Advisor and 0 otherwise. The sample is restricted to the subsample of institutions with at least one portfolio managed by an External Advisor.

\*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

**Table 9: Summary Statistics using institutions that have sold motivated assets to their clients**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Potfolio Characteristics</b>				
Portfolio Value	\$5,263,220	\$31,700,000	\$9,867	\$930,000,000
# Assets per portfolio	3.21	4.19	1	166
Standard deviation in assets within a portfolio	0.96	3.41	0.00	301
<i>Annualized Returns</i>	<i>-0.09%</i>	<i>37.78%</i>	<i>-87.29%</i>	<i>181.90%</i>
Average Monthly Returns	0.14%	3.36%	-14.07%	18.73%
Standard deviation of Average Monthly Returns	9.02%	8.77%	0.00%	54.55%
Sharpe Ratio	0.32	0.92	-1.41	3.73
Sum of Squared Portfolio weights (SSPW)	0.74	0.27	0.03	1
Portfolios with Motivated Assets	2.08%			
Motivated Assets to Total Value (MA2V)	1.18%	8.58%	0.00%	100%
Observations per portfolio (months)	11	0.00	11	11
<b>Investor Characteristics</b>				
External Advisor	2.53%			
Inv. Profile Aggressive	17%			
Inv. Profile Moderate	14%			
Inv. Profile Conservative	21%			
Inv. Profile NA	47%			
Investor: Institutional	1%			
Investor: Qualified	12%			
Investor: Not institutional or qualified	87%			
Service: Private Banking	14%			
Service: High Net Worth	8%			
Service: Office	13%			
Service: NA	64%			
Client: Person	52%			
Client: Company	4%			
Client: NA	44%			
<b>Market Characteristics</b>				
Number of Contracts	22746			
Number of Firms	19			
Number of Contracts Per Firm	1197	2439	84	11102



Table 10: Benchmark Regressions using institutions who sold motivated assets to their clients

<b>Dependent Variable</b>	<b>Annualized Returns</b>	<b>Stdev monthly returns</b>	<b>Sharpe Ratio</b>	<b>Stdev assets/# assets</b>
ln(Portfolio Value)	0.000	-0.006*	0.019	0.037***
External Advisor	-0.017	0.000	0.007	0.058
Inv. Profile Aggressive	0.082***	0.039***	-0.057	0.015
Inv. Profile Moderate	0.0179	0.023***	-0.035	0.033
Inv. Profile NA	0.033	0.01	0.149	-0.03
Investor: Institutional	0.087***	-0.009	-0.024	-0.068
Investor: Qualified	0.014	0.013***	0.260***	-0.094
Service: Private Banking	0.015	0.012	0.029	0.103
Service: High Net Worth	-0.301**	0.060***	-0.262***	0.057
Service: NA	-0.003	0.022**	-0.018	0.107***
Client: Person	-0.012	-0.001	-0.215*	0.078***
Client: NA	-0.015	0.005	-0.234	0.353***
SSPW	-0.042	-0.053***	0.555***	0.105
Motivated Asset / Pflio Value	-0.185***	0.007	-0.335***	0.031
R2	0.058	0.081	0.059	0.196
N	22746	22746	22746	22746

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

**Table 11:** The share of motivated assets in an investor's portfolio

	<b>Motivated Asset / Pflio Value</b>
ln(Portfolio Value)	0.003**
External Advisor	0.009*
Inv. Profile Aggressive	-0.01
Inv. Profile Moderate	-0.007
Inv. Profile NA	-0.008
Investor: Institutional	-0.012
Investor: Qualified	0.001
Service: Private Banking	0.022***
Service: High Net Worth	0.007
Service: NA	0.001
Client: Person	0.010**
Client: NA	0.011*
SSPW	-0.01
R2	0.017
N	22746

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level.

**Table 12:** average proportion of motivated assets held in portfolios by Service Type and Client Type using Private Banking Person Clients' average as numeraire

	Person	Company
Service Office	22%	1%
High Net Worth Client	56%	0%
Private Banking	100%	45%

Table 13: The likelihood that an investor holds motivated assets

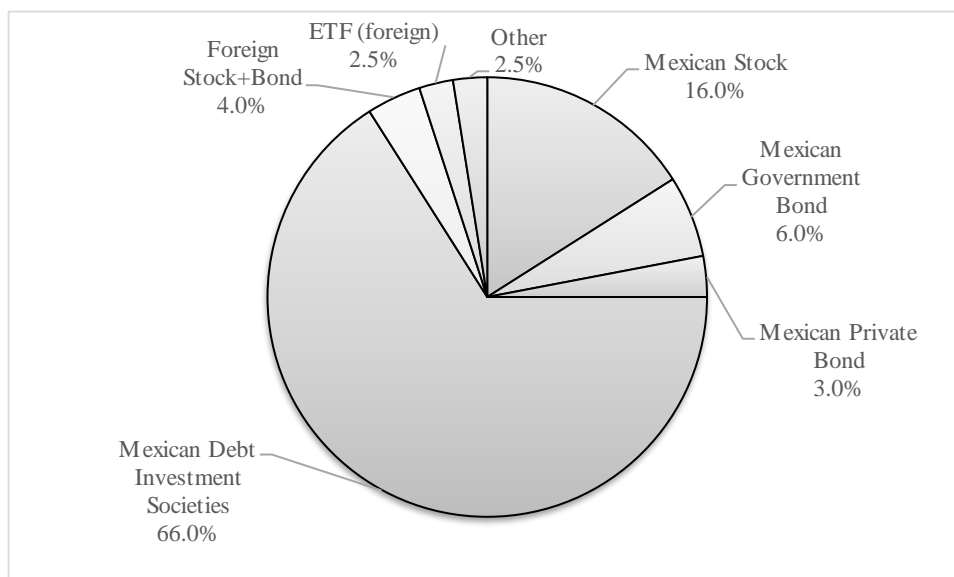
	<b>Motivated Asset</b>
In(Portfolio Value)	0.454***
External Advisor	1.29***
Inv. Profile Aggressive	-0.544
Inv. Profile Moderate	-0.350
Inv. Profile NA	-0.478
Investor: Institutional	0.524
Investor: Qualified	0.764
Service: Private Banking	1.67***
Service: High Net Worth	1.49***
Service: NA	0.480
Client: Person	1.33***
Client: NA	1.60**
R2	0.154
N	22746

Notes: the results of a logit regression of the probability that an investor holds motivated assets in her portfolio. The dependent variable is a dummy that equals 1 if the investor holds a positive amount of at least one motivated assets in her portfolio and 0 otherwise. The sample is restricted to the subsample of institutions with at least one investor holding motivated assets in her portfolio.

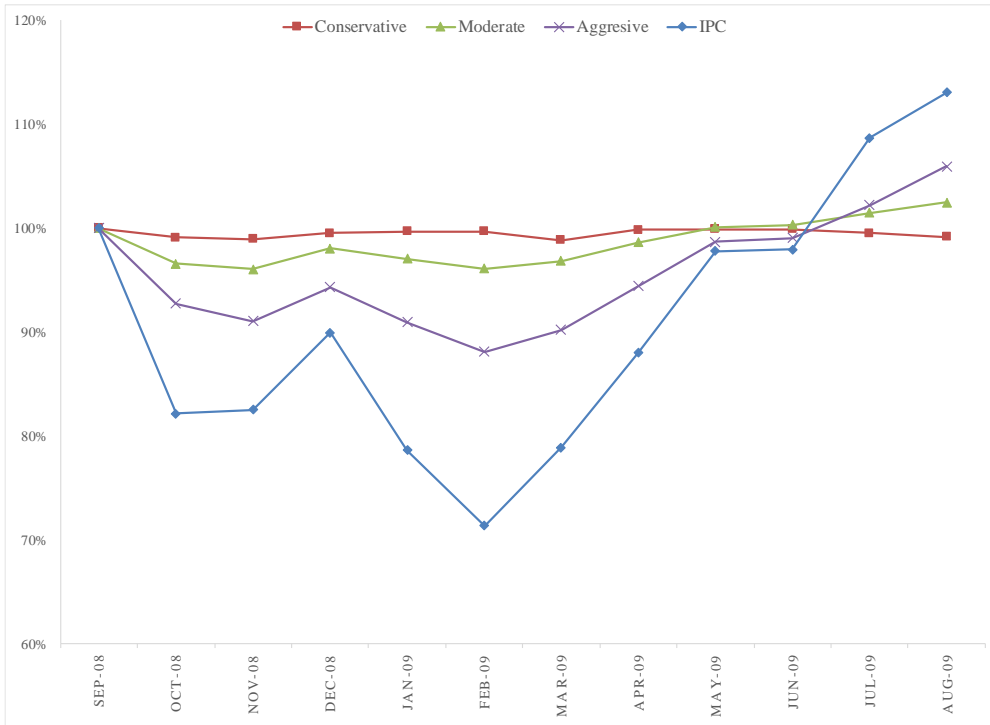
\*\* significant at 5%, \*\*\* significant at 1%

Significance levels have been calculated using clustered errors at the stockbroker level

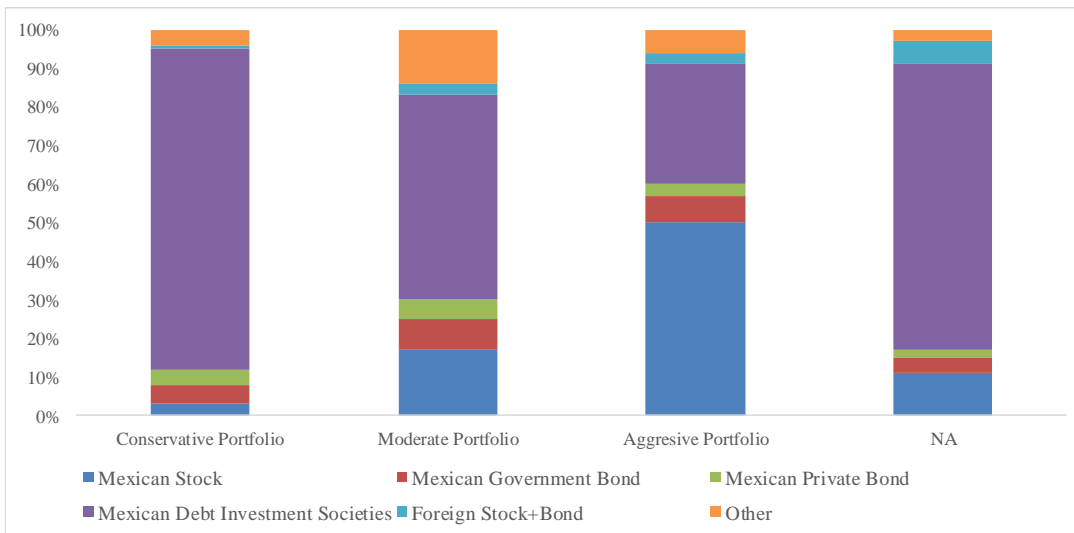
Figure 1: Overall Distribution of Assets



**Figure 2: IPC vs Aggressive, Moderate and Conservative Portfolios**



**Figure 3: Asset's Distribution by Risk-Profile**



**Figure 4: Sharpe Ratio by Portfolio Characteristics**

