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The Impact of Financial Systems on Bank-Affiliated Mutual Fund Fees and Flows

Mariana Teixeira Cunha

Master in Finance

Supervisor:
Professor António Manuel Corte Real de Freitas Miguel, Assistant Professor of Finance, ISCTE Business School

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BUSINESS
SCHOOL

Department of Finance

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O Impacto dos Sistemas Financeiros nas Comissões e Fluxos dos Fundos de Investimento Afiliados com Bancos

Resumo

Neste estudo utilizamos uma amostra de fundos de investimento de diferentes países, durante o período de 1999-2015, de modo a estudar as diferenças na relação fluxo-comissão e no nível de comissões cobradas por fundos afiliados com bancos em países com sistemas financeiros bases nos mercados ou nos bancos.

Verificámos que existem diferenças acentuadas na relação fluxo-comissão entre países com sistemas financeiros assentes nos mercados e sistemas financeiros assentes nos bancos. Nos países com sistemas financeiros bases nos mercados, os investidores são mais sensíveis às comissões cobradas por fundos afiliados com bancos e, portanto, estes fundos cobram menos comissões. Contrariamente, nos países com sistemas financeiros assentes nos bancos, os investidores reagem menos às comissões cobradas por fundos afiliados com bancos e, consequentemente, os fundos afiliados com bancos cobram mais comissões do que fundos que não são afiliados com bancos nestes países.

Palavras-Chave: Fundos de Investimento; Relação Fluxo-Comissão; Fundos Afiliados com Bancos; Sistemas Financeiros Bases nos Mercados; Sistemas Financeiros bases nos Bancos.

JEL Classification: G11, G15

The Impact of Financial Systems on Bank-Affiliated Mutual Fund Fees and Flows

Abstract

In this study, we use a worldwide sample of open-end actively managed mutual funds in the 1999-2015 period to study differences in the flow-fee sensitivity and in the level of fees charged by bank-affiliated funds in countries with market-based and bank-based financial systems.

We find marked differences in investor's flow-fee sensitivity to bank-affiliated funds between countries with market-based and bank-based financial systems. In countries with market-based financial systems, investors are more sensitive to the fees charged by bank-affiliated funds, and therefore, these funds charge less fees. Contrarily, in countries with bank-based financial systems, investors react less to the fees charged by bank-affiliated funds, and, as a consequence, bank-affiliated funds charge more fees than non-bank affiliated funds in these countries.

Keywords: Mutual funds; Flow-fee sensitivity; Bank-affiliated funds; Market-Based Systems; Bank-Based Systems.

JEL Classification: G11, G15

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Main abbreviations used

ETF	- Exchange Traded Funds
GDPC	- Gross Domestic Product per Capita
HML	- High Book-To-Market Equity Minus Low Book-To-Market Equity
IPOs	- Initial Public Offerings
MOM	- Momentum
NON-U.S.	- All countries except United States
SMB	- Small Market Equity Minus Big Market Equity
TER	- Total Expense Ratio
TNA	- Total Net Assets
TSC	- Total Shareholder Costs
U.S.	- United States
UK	- United Kingdom
WLS	- Weighted Least Squares

1. Introduction

Over the last decades, mutual funds became one of the most important investment vehicles, and its importance has been significantly increasing in the last years. Part of this growth is due to the fact that they are managed by professionals who allocate the assets in different securities. According to Investment Company Institute (2020), the worldwide number of TNA (Total Net Assets) regulated open-end funds was 29.1 trillion U.S. dollars in 2010, growing to 54.9 trillion U.S. dollars in 2019, an increase of around 47%. The number of funds changed from 86 301 to 122 528 funds, respectively, from 2010 to 2019. Of those 54.9 trillion U.S. dollars of TNA, 47% belong to the U.S., making them the biggest regulated fund market, Europe holds 34%, Asia 13% and the remaining 6% belong to the rest of the world.

The literature on mutual funds has also increased significantly over the last years. Carhart (1997), Ferreira et al. (2013), among others, explain the growth in mutual fund investment by studying its performance. Another important topic in the mutual fund literature is the flow-performance sensitivity. Ippolito (1992), Chevalier and Ellison (1997), Sirri and Tufano (1998) and Huang, Wei and Yan (2007) show that the flow-performance relationship is convex, i.e., investors tend to buy disproportionally more better performing funds than sell those funds at the bottom of the performance scale. Ferreira et al. (2012) explain that this effect is more pronounced in less developed countries because they have less sophisticated investors and higher participation costs.

Gruber (1996) studies fees in U.S. mutual funds and shows that funds that charge less fees perform worse. Contrarily, Gil-Bazo and Ruiz-Verdú (2009) find that the U.S. funds' performance is influenced by fees, funds with higher fees perform poorly compared with funds with smaller fees. Using a worldwide sample, Ferreira et al. (2013) find an inverse and not statistically significant relation between expenses and performance for the U.S. funds and an inverse and statistically significant relation for non-U.S. countries. Using a sample of the most influential European countries, Otten and Bams (2002) find a negative relation between expenses and performance.

However, the literature in mutual funds flow-fee sensitivity is scarce. Chevalier and Ellison (1997) and Sirri and Tufano (1998) show that, in the U.S. mutual fund industry, funds that charge higher fees tend to get lower flows, but there are no cross-country studies.

Ferreira, Matos and Pires (2018b) study the performance of bank-affiliated funds and show that bank-affiliated funds perform worst in relation to non-affiliated funds. This is because there are conflicts of interest in bank-affiliated funds, as fund manager's decisions tend to beneficiate the commercial banks' interests, instead of fund investor interests. Ferreira et al. (2018b) use the classification of bank-based and market-based financial systems developed by Demirgüc-Kunt and Levine (2001) and find that bank-affiliated funds perform worse in bank-based financial systems, as these funds face higher conflicts of interest.

In this study, we use a worldwide database that includes open-end actively managed mutual funds and ETF's (Exchange Traded Funds) from Lipper Hindsight in the 1999-2015 period.

Our results show marked differences in investor's flow-fee sensitivity to bank-affiliated funds between countries with market-based and bank-based financial systems. We find that, in countries with market-based financial systems, investors are more sensitive to the fees charged by bank-affiliated funds, and therefore, these funds charge less fees. Contrarily, in countries with bank-based financial systems, our results show that investors react less to the fees charged by bank-affiliated funds and, as a consequence, bank-affiliated charge more fees than non-bank affiliated funds in these countries.

We contribute to enhance the scarce literature on the flow-fee sensitivity of mutual funds. Additionally, to our knowledge, we are the first to study fees and the flow-fee sensitivity of bank-affiliated funds in market-based and bank-based financial systems. This is important for both investors and regulators as our findings indicate that funds affiliation have a direct impact on the level of fees investors pay and, therefore, on investors returns.

The remainder of this study is structured as follows. The next section presents the literature review of mutual fund fees, flows, bank-affiliated funds and unaffiliated funds, finishing with flow-fee sensitivity. In section 3, we present the description of the data and the variables construction. Section 4 displays the methodology. Section 5 presents the empirical results. Section 6 presents the robustness tests and section 7 the conclusion.

2. Literature Review

To analyze the flow-fee sensitivity of bank-affiliated funds in bank-based and market-based countries, we begin by reviewing the most meaningful literature and its conclusions. This section is divided into four subsections. Firstly, we approach the literature about mutual funds fees, followed by flows, then we step into the literature about bank-affiliated and unaffiliated funds, concluding with the literature on the flow-fee sensitivity.

2.1 Mutual fund fees

Regarding mutual fund fees, the literature emphasizes three important aspects: differences in fees among countries; the impact of funds characteristics on fees and the relation between performance and fees.

The seminal study by Khorana, Servaes and Tufano (2009) uses a sample of 18 countries to find that fees vary substantially across countries and that these differences are explained by fund size, as larger funds tend to have lower fees, by the amount of the initial investment - funds with higher minimum investment charge lower fees -, and by the funds managing method, as index funds (passively managed) have lower fees compared to actively managed funds. They also study how country characteristics influence management fees, concluding that countries that enhance investor protection have lower management fees. Those countries generally have better instruments to control conflicts of interest, higher GDPC (Gross Domestic Product per Capita) and, also, more educated population.

More recently, using a worldwide sample, Keswani, Miguel and Ramos (2017) state that fees also vary within countries, meaning that there is not a clear pattern regarding the amount of fees charged; there are countries where small funds charge more fees than large funds, countries where large funds charge more fees than small funds and even countries where there is no difference between the amount of fees charged and the size of the fund. As referred by Keswani et al. (2017), this unclear pattern is explained by the differences between the mutual fund industry competition level, this competition level varies from country to country and it is related with the investors' sensitivity to fees. Countries with less competition have less sensitive investors; thus large funds will charge more fees, because investors react less to fees (Keswani et al., 2017).

Regarding decoupled funds, i.e., funds in which the investor and stock holdings location do not coincide, Ferreira Massa and Matos (2018a) document that total expense ratio and loads are higher in that type of funds, given that they are smaller and affiliated with smaller fund families.

Gruber (1996) seminal paper on fees and performance uses a sample of U.S. funds; he finds that, on average, the worst net performance accrues from the costliest funds. However, according to Ferreira et al. (2013), who study the determinants of mutual funds' performance using a worldwide sample of 27 countries, there is an inverse and not statistically significant relation between expenses and performance for the U.S. funds and an inverse and statistically significant relation for non-U.S. countries. Cremers, Ferreira, Matos and Starks (2016) show that as index funds increase market competition, actively managed funds tend to chase different strategies, thus, charging lower fees and performing better. Meaning that markets with a high number of index funds, have higher competition, so actively managed funds charge lower fees (Cremers et al., 2016). Notwithstanding, Chen, Hong, Huang and Kubik (2004) find no relation between fees and net-performance.

Gil-Bazo and Ruiz-Verdú (2009) find that the performance of U.S. funds is influenced by fees, as higher fees lead to worse performance. These authors also state that investors' sensitivity to fees, explain why funds that have an inferior before-fee performance demand higher fees, so bad before-fee performing funds tend to charge more fees. Additionally, Evans and Fahlenbrach (2012) also argument that those investors that are more sensitive to performance, tend to be more sensitive to fees.

Outside the U.S., Otten and Bams (2002) using a sample of most influential European funds, and Bechmann and Rangvid (2007) using a sample of Danish funds, find a negative relation between expenses and performance.

There is also some literature that analyzes loads, Carhart (1997) and Pollet and Wilson (2008) find an inverse relation between performance and loads. They show that funds that do not charge loads overperform those who charge. Besides that, Chordia (1996) claims that the inverse relation happens because investors have to pay either to sell or buy the funds, which dissuades redemptions; thus, funds will hold more cash and, consequently, improve performance. Nevertheless, Chen et al. (2004), for the U.S., and Ferreira et al. (2013), using a worldwide sample, do not find a statistically significant relation between loads and performance.

2.2 Mutual fund flows

The literature on mutual fund flows tries to explain the reason why flows and performance are positively related. Accordingly, Gruber (1996) explains that as future performance is predicted using past performance, it means that investors will conduct their money to funds that performed better in the past. In addition, investors tend to direct their money to skilled managers, called the smart money effect. However, he also denotes that there is a selection ability and the existence of different types of investors, sophisticated and unsophisticated, explains why some investors invest in low performing funds. As it is possible to forecast future performance using past performance, Zheng (1999) states that funds with higher inflows have a better performance against those that lose money.

Contrarily, Sapp and Tiwari (2004) use Carhart (1997) model to argue that momentum explains the smart money effect, referring that investors seek high recent returns and that the "smart money" effect does not reflect the investors' ability to select funds.

More recently, Ferreira et al. (2013) acknowledge the evidence of Sapp & Tiwari (2004) by not founding evidence of smart money effect for U.S. funds. On the other hand, outside U.S. they find that funds with more inflows perform better, which indicates a smart money effect. [1]

The flow-performance sensitivity is also an extremely important topic in the literature of mutual funds flows. According to Ippolito (1992), Chevalier and Ellison (1997), Sirri and Tufano (1998) and Huang et al. (2007), who analyze how flows depend on the past performance, conclude that investors buy funds with high performance, but sell disproportionally less low performing funds, leading to a convex flow-performance relationship.

Khorana et al. (2009) argue that, for U.S. funds, there is not a consistent behavior between flows and performance, as whenever there is low performance dispersion and high average performance, the flows of good performing funds decrease, leading to a less convex relationship.

Ferreira, Keswani, Miguel and Ramos (2012) study the flow-performance relationship using a worldwide sample and conclude that non-U.S. funds behave differently, meaning that the convex flow-performance relationship only prevails for less developed countries. This is explained because in more developed countries, there are more sophisticated investors and participation costs are

[1] To enhance the knowledge about Carhart model see, for example, Ferreira, Keswani, Miguel and Ramos (2012).

lower, and therefore investors are more proactive in selling low performing funds, which reduces the convexity of the flow-performance relationship (Kim, 2019).

2.3 Bank-affiliated funds and unaffiliated funds

The literature on bank-affiliated funds focuses on conflicts of interest. Ferreira et al. (2018b) compare the performance of mutual funds affiliated with commercial banks to those unaffiliated and conclude that mutual funds affiliated by a commercial banking group perform worst, due to conflicts of interest. This is because fund managers tend to beneficiate the parent bank, which is a commercial bank, putting aside the interests of the fund investor, leading to a double agency problem.

Khorana et al. (2009) show that, in the U.S., investors are more protected; in addition, Ferreira et al. (2018b) argue that in common-law countries there is higher investor protection, and thus there is a higher separation between the lending division and the asset management division. The underperformance of bank-affiliated funds is less pronounced when comparing with non-common-law countries (Ferreira et al., 2018b). [2]

Massa and Rehman (2008) show that there is an information advantage within lending clientele and asset management in the U.S.. The performance of funds affiliated to stocks of borrowing firms is better in relation to funds' positions in other nonborrowing stocks.

Golez and Marin (2015) use Spanish mutual funds to show that funds affiliated to Spanish banks tend to follow the stock prices of the affiliated bank.

There is also literature regarding funds affiliated to investment funds, e.g., Ritter and Zhang (2007) and Johnson and Marietta-Westberg (2009), that study the use of IPOs by investment banks in their affiliated funds. Hao and Yan (2012) and Berzins, Liu and Trzcinka (2013) analyze the performance of investment banks affiliated funds and unaffiliated funds in the U.S. They find conflicts of interest as funds affiliated to investment banks underperform unaffiliated funds.

Regarding market-based and bank-based financial systems, Ferreira et al. (2018b) argue that the conflicts of interest between asset management and lending divisions should be more patent in bank-based countries. To prove that, these authors use the classification of market-based and bank-based financial systems developed by Demirgüc-Kunt and Levine (2001) and conclude "that the underperformance of affiliated funds is more pronounced in bank-based countries than in market-

[2] See La Porta et al. (1998) for further details on common-law countries.

based countries (31 basis points versus 20 basis points per quarter, respectively)" (Ferreira et al., 2018b, p. 2200).

2.4 Flow-fee sensitivity

Contrarily to the flow-performance literature, the literature on the flow-fee sensitivity is less abundant.

Chevalier and Ellison (1997) and Sirri and Tufano (1998) show that investors react differently to the increase or decrease of fees. These studies also conclude that in the U.S. flows are fee sensitive, i.e., funds that charge higher fees get lower flows.

According to Christoffersen and Musto (2002), who study the relationship between fees and demand curves, state that the elasticity of demand for funds shares sets the amount of fees charged, meaning that the higher the elasticity of demand, the lower the fees. When funds perform poorly, the elasticity of demand decreases; hence these investors are less flow-performance sensitive, because sensitive investors will not invest in funds that perform worse, the fees charged by low-performing funds will be higher.

Barber, Odean and Zheng (2005) claim that investors react differently to different types of fees and are more sensitive to loads and commissions. They conclude that flows and front-end loads have a negative relation, whereas they do not find any relation between operating expenses and flows. In addition, investors tend to be more sensitive to front-end loads and commissions, preferring to invest in funds with higher marketing expenses or lower fees. Barber et al. (2005) also find that experienced investors prefer to invest in funds with high operating expenses, instead of investing in funds with front-end loads.

Concerning new investors' participation costs effects on the flow-performance relationship, Huang et al. (2007) argue that in the U.S there is a higher flow sensitivity when in presence of lower participation costs and medium performance, as they attract more investors, than for high costs funds. In contrast, when the performance is better high cost funds have more flow-sensitivity than the low-costed funds.

Evans and Fahlenbrach (2012) analyze the behavior of retail versus institutional investors using a sample of U.S. equity mutual funds. They conclude that institutional investors are more sophisticated, more sensitive to performance, thus more flow-fee sensitive. In contrast, retail investors have more significant reactions to past performance.

3. Data and Variables Construction

This section presents the description of the mutual funds' database and the variables used in our study, including fund-level and country-level variables.

3.1 Sample description

Our data is provided by Lipper Hindsight and consists on a sample of open-end actively managed mutual funds and ETF's in the period of 1999 to 2015. The data is free from survivorship-bias. [3] To perform our analysis, we excluded from our sample off-shore funds.

We use an annual sample composed by 33 countries with a total of 30,038 unique funds representing, at the end of 2015, 14,516.1 million US dollars of TNA, as shown in Table 3.1. Table 3.1 also shows the number of funds per country and TNA for funds affiliated to a commercial bank and unaffiliated funds.

[3]This data base is also used by Ferreira et al. (2013), Cremers et al. (2016) and Ferreira, Matos and Pires (2018a).

Table 3.1- Number of unique funds per country and TNA

This table describes the number of funds per country and TNA (sum of all share classes in million US dollars at the end of 2015) for all funds and then splitting into bank-affiliated funds and unaffiliated funds. The last two columns represent the percentage of funds that are bank-affiliated and the correspondent percentage of TNA.

	All Funds		Bank-affiliated funds		Unaffiliated funds		% bank-affiliated	
Country	Number of Funds	TNA ($ million)	Number of Funds	TNA ($ million)	Number of Funds	TNA ($ million)	Number of Funds	TNA ($ million)
Argentina	79	24.5	46	10.3	33	14.2	58.23%	41.85%
Australia	1,813	285.1	704	54.4	1,109	230.8	38.83%	19.06%
Austria	418	108.9	251	70.0	167	38.9	60.05%	64.27%
Belgium	1,129	191.0	1,001	52.4	128	138.6	88.66%	27.43%
Brazil	1,933	51.9	1,090	27.2	843	24.7	56.39%	52.45%
Canada	1,977	578.5	537	354.1	1,440	224.4	27.16%	61.20%
China	236	290.3	41	109.0	195	181.3	17.37%	37.54%
Denmark	353	343.9	205	173.9	148	170.0	58.07%	50.57%
Finland	325	367.5	170	288.9	155	78.5	52.31%	78.63%
France	2,637	351.2	1,560	190.1	1,077	161.1	59.16%	54.12%
Germany	759	826.3	392	502.9	367	323.4	51.65%	60.86%
Greece	59	41.8	29	19.4	30	22.4	49.15%	46.41%
Hong Kong	203	848.5	105	296.2	98	552.2	51.72%	34.91%
India	430	295.7	155	166.7	275	129.1	36.05%	56.36%
Indonesia	140	110.7	36	55.8	104	54.9	25.71%	50.41%
Italy	417	413.3	289	241.6	128	171.7	69.30%	58.46%
Japan	2,646	377.6	1,218	190.0	1,428	187.6	46.03%	50.32%
Malaysia	352	101.5	248	81.7	104	19.8	70.45%	80.50%
Netherlands	228	549.0	116	374.1	112	175.0	50.88%	68.13%
New Zealand	82	142.1	11	70.8	71	71.3	13.41%	49.82%
Norway	265	620.8	147	335.2	118	285.6	55.47%	54.00%
Poland	162	129.3	104	50.9	58	78.4	64.20%	39.35%
Portugal	84	41.5	82	35.0	2	6.5	97.62%	84.32%
Singapore	240	189.7	116	60.3	124	129.4	48.33%	31.80%
South Africa	260	264.4	75	167.3	185	97.1	28.85%	63.29%
South Korea	1,541	76.2	394	17.8	1,147	58.3	25.57%	23.39%
Spain	593	207.6	426	123.0	167	84.6	71.84%	59.23%
Sweden	462	960.8	296	616.2	166	344.6	64.07%	64.13%
Switzerland	580	752.4	367	470.6	213	281.8	63.28%	62.55%
Taiwan	479	98.2	199	37.8	280	60.5	41.54%	38.44%
Thailand	330	93.8	186	73.2	144	20.5	56.36%	78.13%
UK	1,802	1,269.7	505	646.4	1,297	623.3	28.02%	50.91%
US	7,024	3,512.3	1,661	1,200.1	5,363	2,312.1	23.65%	34.17%
All countries	30,038	14,516.1	12,762	7,163.4	17,276	7,352.7	42.49%	49.35%

Table 3.1 shows that the countries with a higher amount of funds are the U.S., Japan, France and Canada, while Greece, Argentina, New Zealand and Portugal represent the countries with fewer funds. In terms of bank-affiliated funds, U.S., France, Japan and Brazil have the higher number of funds, whereas New Zealand, Greece, Indonesia and China are the countries with the smaller number of bank-affiliated funds.

When we look at the relative number of bank-affiliated funds in the total of funds Portugal, Belgium, Spain and Malaysia have the highest percentage, while New Zealand, China, U.S. and South Korea are the countries with a smaller percentage of bank-affiliated funds. Although U.S. is the country with more funds, it is also one of the countries with less bank-affiliated funds.

Regarding TNA, as mentioned above, our sample has a total of 14,516.1 million US dollars. Bank-affiliated funds represent 7,163.4 million US dollars and unaffiliated funds have a total of 7,352.7 million US dollar, which means that bank-affiliated funds represent around 49% in the total TNA of our worldwide sample. U.S, UK, Sweden and Hong Kong have the highest TNA, Argentina, Portugal, Greece and Brazil are the countries with lower TNA. The countries with highest TNA in bank-affiliated funds are Portugal, Malaysia, Thailand and Finland. Australia, South Korea, Belgium and Singapore are the countries with the lowest TNA in bank-affiliated funds.

3.2 Variables Construction

In this subsection, we describe all the variables used to perform our regressions. It is divided into (1) fund flow, (2) fund fees: front-end loads and TSC (Total Shareholder Cost), (3) performance measurement, (4) bank-based and market-based countries, (5) bank-affiliated funds and unaffiliated funds, (6) fund-level variables and (7) country-level variables. Table 3.2 reports, in Panel A, summary statistics for all the variables across funds. In Panel B and C, we split funds into bank-affiliated funds and unaffiliated funds, respectively.

Table 3.2 - Summary statistics

This table presents the summary statistics. Panel A, B and C reports the mean, median, standard deviation, 10th and 90th percentile and number of observations of fund and country-level variables, for all funds, bank-affiliated funds and unaffiliated funds, respectively. Panel D reports the average of TSC and front-end loads per country. Panel E shows the countries that are bank-based and market-based. Finally, Panel F reports the average of all country-level variables per country. See Appendix 1 for variables description.

Panel A - All funds

Variable	Mean	Median	Standard deviation	Percentile 10	Percentile 90	Observations
Raw return (%)	8.24	7.27	30.37	-28.44	44.19	196,464
Benchmark-adjusted return (%)	-0.18	-0.57	10.00	-10.66	10.63	196,464
Total shareholder cost (%)	1.86	1.83	0.95	0.65	3.02	196,464
Front-end loads (%)	1.73	0.97	1.93	0.00	5.00	196,464
Flows (%)	7.27	-6.58	77.36	-38.72	49.92	196,464
Bank-affiliated dummy	0.41	0.00	0.49	0.00	1.00	196,464
Investment bank affiliated dummy	0.32	0.00	0.47	0.00	1.00	196,464
Insurance-affiliated dummy	0.12	0.00	0.32	0.00	1.00	196,464
TNA ($ million)	582.51	62.32	3,864.55	4.36	926.40	196,464
TNA family ($ million)	28,412.63	4,058.30	104,796.00	150.15	42,984.40	196,464
Age (years)	10.77	8.33	8.84	3.17	20.42	196,464
Team managed dummy	0.67	1.00	0.47	0.00	1.00	196,464
Fund of fund dummy	0.08	0.00	0.27	0.00	0.00	196,464
Index tracking dummy	0.12	0.00	0.33	0.00	1.00	196,464
ETF dummy	0.05	0.00	0.22	0.00	0.00	196,464
International dummy	0.48	0.00	0.50	0.00	1.00	196,464
Approval	1.75	2.00	0.43	1.00	2.00	196,464
GDPC	40,808.76	42,554.12	15,452.13	15,907.67	54,598.55	196,464
Judicial	44.82	47.01	5.40	33.55	47.88	196,464
Fund industry Herfindahl	0.09	0.06	0.07	0.05	0.17	196,464
Fund industry size ($ million)	1,732,200.00	264,052.70	2,593,656.00	24,518.06	5,621,731.00	196,464
Bank concentration	65.80	73.08	21.71	36.71	93.65	196,464

Panel B - Bank-affiliated funds

Variable	Mean	Median	Standard deviation	Percentile 10	Percentile 90	Observations
Raw return (%)	7.41	6.52	30.50	-29.57	43.68	80,967
Benchmark-adjusted return (%)	-0.24	-0.58	9.69	-10.45	10.16	80,967
Total shareholder cost (%)	1.90	1.88	0.92	0.75	3.00	80,967
Front-end loads (%)	1.77	1.01	1.90	0.00	5.00	80,967
Flows (%)	3.87	-8.34	72.99	-39.13	41.86	80,967
Bank-affiliated dummy	1.00	1.00	0.00	1.00	1.00	80,967
Investment bank affiliated dummy	0.55	1.00	0.50	0.00	1.00	80,967
Insurance-affiliated dummy	0.02	0.00	0.14	0.00	0.00	80,967
TNA ($ million)	270.81	51.53	1,052.58	4.32	572.40	80,967
TNA family ($ million)	11,384.91	4,000.28	16,316.54	277.44	33,478.50	80,967
Age (years)	10.62	8.50	8.19	3.25	20.00	80,967
Team managed dummy	0.64	1.00	0.48	0.00	1.00	80,967
Fund of fund dummy	0.09	0.00	0.29	0.00	0.00	80,967
Index tracking dummy	0.11	0.00	0.31	0.00	1.00	80,967
ETF dummy	0.03	0.00	0.16	0.00	0.00	80,967
International dummy	0.54	1.00	0.50	0.00	1.00	80,967
Approval	1.74	2.00	0.44	1.00	2.00	80,967
GDPC	39,932.65	41,631.13	16,859.43	12,216.90	56,469.01	80,967
Judicial	44.36	46.86	5.61	32.31	48.98	80,967
Fund industry Herfindahl	0.11	0.09	0.08	0.05	0.20	80,967
Fund industry size ($ million)	929,696.60	184,076.50	1,904,087.00	17,414.40	3,610,523.00	80,967
Bank concentration	71.64	76.16	20.64	40.00	95.36	80,967

Panel C - Unaffiliated funds

Variable	Mean	Median	Standard deviation	Percentile 10	Percentile 90	Observations
Raw return (%)	8.82	7.79	30.26	-27.66	44.56	115,497
Benchmark-adjusted return (%)	-0.13	-0.56	10.21	-10.81	10.95	115,497
Total shareholder cost (%)	1.83	1.79	0.97	0.60	3.05	115,497
Front-end loads (%)	1.70	0.68	1.96	0.00	5.00	115,497
Flows (%)	9.65	-5.20	80.20	-38.41	55.41	115,497
Bank-affiliated dummy	0.00	0.00	0.00	0.00	0.00	115,497
Investment bank affiliated dummy	0.16	0.00	0.36	0.00	1.00	115,497
Insurance-affiliated dummy	0.18	0.00	0.39	0.00	1.00	115,497
TNA ($ million)	801.02	72.73	4,950.96	4.39	1,269.30	115,497
TNA family ($ million)	40,349.60	4,142.17	134,717.20	100.92	57,810.00	115,497
Age (years)	10.87	8.25	9.27	3.17	20.75	115,497
Team managed dummy	0.69	1.00	0.46	0.00	1.00	115,497
Fund of fund dummy	0.07	0.00	0.26	0.00	0.00	115,497
Index tracking dummy	0.13	0.00	0.34	0.00	1.00	115,497
ETF dummy	0.06	0.00	0.24	0.00	0.00	115,497
International dummy	0.43	0.00	0.50	0.00	1.00	115,497
Approval	1.75	2.00	0.43	1.00	2.00	115,497
GDPC	41,422.93	43,335.16	14,351.93	21,306.00	54,598.55	115,497
Judicial	45.14	47.61	5.22	33.55	47.88	115,497
Fund industry Herfindahl	0.08	0.06	0.06	0.04	0.14	115,497
Fund industry size ($ million)	2,294,781.00	376,428.80	2,851,907.00	32,745.29	6,151,340.00	115,497
Bank concentration	61.71	58.64	21.50	31.04	91.98	115,497

3.2.1 Fund flow

To compute fund flow, we follow Chevalier and Ellison (1997), Sirri and Tufano (1998) and Ferreira et al. (2012). Fund flow *i* in country *c* at quarter *t* is as:

$$Flow_{i,c,t} = \frac{TNA_{i,c,t} - TNA_{i,c,t-1}(1 + R_{i,c,t})}{TNA_{i,c,t-1}} \quad (1)$$

where $TNA_{i,c,t}$ is the total net asset value in local currency of fund i in country c at the end of quarter t, and $R_{i,c,t}$ is fund i's raw return from country c at the end of quarter t.

Thus, fund flow is "the new money growth rate as the net growth in total net assets (TNAs), not due to dividends and capital gains on the assets under management but to new external money" (Ferreira et al., 2012, p. 1761).

By analyzing Panel A, B and C of Table 3.2, the mean of all funds flows is around 7%. However, the mean of bank-affiliated funds flows is close to 4% and for unaffiliated funds around 10%. Regarding standard deviation, for all funds is around 77% and for bank-affiliated and unaffiliated funds is 73% and 80%, respectively.

3.2.2 Fund fees: Front-end loads and TSC

In our study, we measure fees using front-end loads and Total Shareholder Costs (TSC). Loads refers to fees that are only charged once, usually to the sales intermediary, there are two types of loads: front-end and back-end loads. Front-end loads are charged at the purchase time and back-end loads at redeeming time.

We follow Khorana et al. (2009) and measure TSC by adding TER to front-end loads and back-end loads divided by the investor's average holding period:

$$TSC_t = TER + \frac{front - end\ load_t + back - end\ load_t}{investor's\ average\ holding\ period} \quad (2)$$

where TER (referred as fund's expense in the U.S.) correspond to the annual expenses including management fees and other operating costs (Khorana et al., 2009). We use a 5-year holding period as in Khorana et al. (2009).

Panel D of Table 3.2 shows the average TSC per country, as well as front-end loads. We can see that fees vary substantially across countries. Poland represents the country with the highest average TSC, around 4%, followed by Greece and Taiwan with 3.3%. Netherlands is the country

with the lowest average TSC, as well as, U.S. and China. Concerning front-end loads, Austria and Singapore are the countries with the highest average (4.6%). Finland and Australia are the countries with the lowest front-end loads (1%).

Panel D – Average total shareholder costs and front-end loads by country

Country	Total shareholder cost (%)	Front-end load (%)
Argentina	2.96	2.40
Australia	1.64	1.03
Austria	2.75	4.59
Belgium	1.85	2.87
Brazil	1.67	1.10
Canada	2.66	2.43
China	1.46	1.57
Denmark	1.74	1.32
Finland	1.86	1.02
France	2.20	2.89
Germany	2.18	3.82
Greece	3.33	3.51
Hong Kong	2.05	3.46
India	2.16	2.84
Indonesia	3.24	1.77
Italy	2.55	2.26
Japan	1.79	2.16
Malaysia	2.77	2.62
Netherlands	1.28	1.31
New Zealand	1.53	1.61
Norway	1.58	1.20
Poland	3.91	3.65
Portugal	1.85	2.40
Singapore	2.80	4.57
South Africa	1.86	1.75
South Korea	1.70	1.38
Spain	1.98	1.40
Sweden	1.38	1.18
Switzerland	1.53	2.35
Taiwan	3.30	2.22
Thailand	1.73	2.10
UK	2.09	2.34
US	1.44	1.10
All countries	1.86	1.73

By looking at Panel A, B and C of Table 3.2, we can see that the mean of TSC and front-end loads is higher for bank-affiliated funds than for unaffiliated funds. Regarding TSC, the mean is around 1.9% and 1.8% for bank-affiliated funds and unaffiliated funds, respectively. In addition, front-end loads for bank-affiliated funds and unaffiliated funds is similar, representing 1.8% and 1.7%, respectively.

3.2.3 Performance measurement

We measure fund performance using benchmark-adjusted returns and risk-adjusted returns. Risk-adjusted returns are measured using the Carhart (1997) four-factor alpha model, according to the following regression:

$$R_{i,t} = \alpha_i + \beta_1 MKT_{i,t} + \beta_2 SMB_{i,t} + \beta_3 HML_{i,t} + \beta_4 MOM_{i,t} + \varepsilon_{i,t} \qquad (3)$$

where $R_{i,t}$ is the return net of fees in US dollars of fund i in month t in excess of the one-month US treasury bill. $MKT_{i,t}$ (*market*) excess return in the fund's investment region in month t, $SMB_{i,t}$ (*small minus big*) is the average return on the small-capitalization stock portfolio minus the average return on the large-capitalization stock portfolio in the fund's investment region, $HML_{i,t}$ (*high minus low*) is the average return on high book-to-market stock portfolio minus the average return on low book-to-market stock portfolio in the fund's investment region and $MOM_{i,t}$ (*momentum*) is the average return on past 12-month winners portfolio minus the average return on past 12-month losers. $\varepsilon_{i,t}$ is the error term.

To estimate the time-series regression of monthly excess returns, we used the previous 36 months of net returns based on the fund's factor portfolios. Subsequently, we estimate the fund's abnormal return (or alpha) in each month, comparing the difference between the expected return and realized return of the fund.

From Table 3.2, we find that the average raw return is higher for unaffiliated funds than for affiliated funds, 8.8% versus 7.4%, respectively. The average benchmark-adjusted return is -0.24% for bank-affiliated funds and -0.13% for unaffiliated funds.

3.2.4 Bank-based and market-based countries

We follow the classification developed by Demirgüc-Kunt and Levine (2001), represented in Panel E of Table 3.2, to classify countries into bank-based and market-based. Bank-based is a dummy variable that takes 1 when the country is bank-based and 0 when the country is market-based.

Panel E - Bank-based and market-based countries

Country	Bank-based
Argentina	1
Australia	0
Austria	1
Belgium	1
Brazil	0
Canada	0
China	1
Denmark	0
Finland	1
France	1
Germany	1
Greece	1
Hong Kong	0
India	1
Indonesia	1
Italy	1
Japan	1
Malaysia	0
Netherlands	0
New Zealand	1
Norway	1
Poland	1
Portugal	1
Singapore	0
South Africa	0
South Korea	0
Spain	1
Sweden	0
Switzerland	0
Taiwan	1
Thailand	0
UK	0
US	0

In bank-based countries, banks play the leading role in investing and saving decisions by investors (Demirgüc-Kunt & Levine, 2001), serving as financial intermediators and diminishing the risk (Bats & Houben, 2020), whereas in market-based countries, securities markets play the leading role in investors' decisions (Demirgüc-Kunt & Levine, 2001), as borrowers and savers resources are conducted directly. Market-based countries also have a higher investor protection and usually have a common-law tradition (Demirgüc-Kunt & Levine, 2001).

3.2.5 Bank-affiliated funds and unaffiliated funds

Following Ferreira et al. (2018b), we classify funds as bank-affiliated funds when they are affiliated to a commercial bank, and unaffiliated funds when they are affiliated to an investment bank, insurance company, or none.

A fund is classified as bank-affiliated if either its ultimate owner is a commercial bank with assets over $10 billion or the group owner is a commercial bank with assets over $10 billion (Ferreira et al., 2018b). Considering this, if the funds' ultimate owner is an investment bank or an insurance company, the fund is classified as investment bank-affiliated or insurance company affiliated, respectively. A fund can simultaneously have more than one classification. If it is affiliated to a commercial and investments bank, it will be classified as commercial and investments bank-affiliated fund.

3.2.6 Fund-level variables

Ferreira et al. (2013) show that other factors affect mutual funds behavior, so we control for other fund level characteristics, including TNA, the family TNA, fund age and management structure (See Appendix 1 for variables definitions). [4] We also control whether the fund is a fund of funds, an index tracking or ETF and whether the geographic focus is different from the domicile country (international dummy).

When comparing the summary statistics in Panel A, B and C of Table 3.2, we see that the average TNA, TNA family, age is higher for unaffiliated funds. Also, there are more unaffiliated funds that are team managed and more index tracking and ETF funds that are unaffiliated. Bank-affiliated funds present more international funds and fund of funds. We also note that the standard

[4] For a more in dept knowledge of fund level variables that affect mutual funds behavior see (Chevalier & Ellison, 1997; Ferreira et al., 2012; Sirri & Tufano, 1998).

deviation of TNA family has a remarkable difference, being for unaffiliated funds 118 400.66 $ million higher than for bank-affiliated funds.

3.2.7 Country-level variables

Our sample comprehends 33 countries, we therefore also control for differences across countries by adding country-level variables to our tests. Panel F of Table 3.2 reports average for the country-level variables used in our tests per country. Appendix 1 notes the variables definitions.

For this purpose, we use proxies for economic development, mutual fund industry development and concentration and regulatory environment.

We use GDPC to proxy for the level of economic development in the country, it is measured in US dollars and we use the measure from the World Development Indicators (WDI) database. Norway and Switzerland represent the countries with the highest average GDPC. Whereas Indonesia and India have the lowest average GDPC.

We use three proxies for the mutual funds' industry development and concentration. The first proxy is the fund industry Herfindahl, which is a measure of market concentration; higher values means that the industry has a higher concentration. Malaysia, New Zealand and Greece have a higher industry concentration, while UK, Australia and France have a small industry concentration. The second measure is fund industry size, which is a measure of industry development. U.S., UK and Canada represent the countries with a higher industry size and Argentina, Greece and Portugal. Following Khorana et al. (2009), the third proxy is bank concentration, which is measured as the top-five bank asset concentration. The measure is taken from de WDI and Bankscope, Bureau van Dijk. The countries with the highest average bank concentration are South Africa, Finland and Sweden. Taiwan, U.S. and India have the smallest average bank concentration.

Following Khorana et al. (2009), for the regulatory environment, we use two proxies. The first one is approval. Approval is the sum of two dummy variables that take the value of one if (1) the fund startup requires regulatory approval and (2) the prospectus requires regulatory approval (La Porta, Lopez-de-Silanes & Shleifer, 1998). As the average of all country's approval variable is 1.75, we can say that most of the funds' startup and the prospectus require regulatory approval. The second proxy is the quality of the legal system, which is measured as the sum of five variables: the efficiency of the judicial system, rule of law, corruption, risk of expropriation and risk of contract repudiation (La Porta et al., 1998). Switzerland, Norway and Netherlands represent the countries

which have a legal system with better quality, whereas Indonesia, Argentina and Thailand have the legal system with lowest quality.

Panel F – Average country-level variables per country

Country	Approval	GDPC	Judicial	Fund industry Herfindahl	Fund industry size ($ million)	Bank concentration
Argentina	1.00	11,407.70	28.19	0.11	438.03	59.27
Australia	2.00	56,129.01	46.50	0.04	200,444.70	90.75
Austria	2.00	47,192.16	47.36	0.13	18,273.99	80.46
Belgium	2.00	44,341.00	47.43	0.30	36,841.30	92.78
Brazil	2.00	11,104.00	32.31	0.09	78,052.85	77.25
Canada	1.00	46,213.32	47.88	0.06	322,749.70	86.28
China	1.00	7,046.22	31.00	0.07	92,009.00	56.56
Denmark	1.00	56,476.60	48.98	0.11	33,259.09	90.62
Finland	1.00	46,556.28	48.82	0.18	29,438.56	97.91
France	2.00	40,716.37	44.87	0.05	285,002.00	74.69
Germany	1.00	42,526.65	46.83	0.16	159,297.60	85.36
Greece	2.00	23,436.84	34.19	0.22	2,054.22	90.53
Hong Kong	2.00	35,625.10	43.85	0.12	52,155.83	77.09
India	2.00	1,319.34	30.61	0.10	37,692.96	41.69
Indonesia	2.00	3,178.31	21.88	0.19	6,576.80	56.77
Italy	2.00	35,440.37	39.73	0.12	51,598.90	60.70
Japan	2.00	39,915.76	46.86	0.11	253,324.20	56.67
Malaysia	2.00	9,409.41	38.54	0.39	14,972.71	77.48
Netherlands	2.00	49,583.62	49.33	0.15	43,736.41	92.18
New Zealand	1.00	37,907.31	48.98	0.38	3,925.07	92.34
Norway	1.00	83,495.87	49.59	0.18	38,012.72	97.09
Poland	1.00	12,633.65	31.00	0.13	10,483.92	52.94
Portugal	1.00	20,995.67	39.03	0.18	2,936.30	92.63
Singapore	1.00	44,620.16	44.95	0.12	11,852.72	96.75
South Africa	1.00	6,672.59	33.49	0.09	28,145.71	99.03
South Korea	2.00	23,723.85	33.55	0.11	59,387.28	76.97
Spain	2.00	30,361.96	39.35	0.10	25,852.60	80.13
Sweden	2.00	50,335.52	48.98	0.17	110,184.90	97.41
Switzerland	1.00	77,130.28	49.96	0.19	128,186.90	91.64
Taiwan	1.00	19,984.70	40.40	0.09	22,638.30	38.41
Thailand	2.00	5,187.49	29.67	0.12	10,350.19	66.49
UK	1.00	43,310.73	47.01	0.03	603,675.80	74.04
US	2.00	45,702.23	47.61	0.05	5,179,712.00	40.32
All countries	1.75	40,808.76	44.82	0.09	1,732,200.00	65.80

Table 3.3 reports the pairwise correlation matrix of all the variables explained below. As expected, TSC has a strong positive correlation with front-end loads (around 0.59). The dummy bank-affiliated is also highly correlated with the dummy investment bank affiliated (0.41). Otherwise, multicollinearity among these variables does not appear to be a serious concern as most correlation coefficients are low, suggesting that these variables may be included together in our regressions.

Table 3 - Pairwise correlation matrix

Table 3 presents the pairwise correlation matrix between the variables used to perform this analysis.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Raw return	1	1																					
Benchmark-adjusted return	2	-0.0368	1																				
Total shareholder cost	3	-0.0091	-0.0553	1																			
Front-end loads	4	-0.0069	-0.041	0.5921	1																		
Flows	5	-0.017	0.0663	-0.0459	-0.0422	1																	
Bank-affiliated dummy	6	-0.0229	-0.0084	0.0336	0.0181	-0.0412	1																
Investment bank affiliated dummy	7	-0.0194	0.0078	-0.0157	-0.0077	-0.0142	0.4101	1															
Insurance-affiliated dummy	8	0.0047	-0.0093	0.0431	0.1281	0.0011	-0.2503	-0.2025	1														
TNA	9	-0.0327	0.0403	-0.2379	-0.0134	0.0224	-0.0813	-0.0557	0.0771	1													
TNA family	10	-0.0495	0.039	-0.2505	-0.004	0.0092	0.0221	0.0862	0.032	0.4881	1												
Age	11	-0.0184	-0.0275	0.0458	0.0894	-0.2297	0.0035	-0.0489	0.0563	0.3717	0.1419	1											
Team managed dummy	12	-0.0196	0.0052	-0.1315	-0.1018	0.0315	-0.0501	0.071	-0.007	-0.0388	0.0228	-0.0835	1										
Fund of fund dummy	13	-0.032	-0.055	0.17	0.2121	-0.0098	0.1081	-0.0039	-0.0098	-0.0864	0.0283	-0.0577	-0.0755	1									
Index tracking dummy	14	-0.0284	-0.031	0.0759	0.0843	0.0028	0.0366	0.0367	-0.0144	-0.1292	-0.0703	-0.1014	0.0251	0.1712	1								
ETF dummy	15	0.0011	-0.0007	-0.39	-0.1773	0.0561	-0.0308	0.0347	-0.0401	0.0609	0.1687	-0.0973	0.0898	-0.044	-0.0698	1							
International dummy	16	-0.0059	0.0033	-0.294	-0.1289	0.065	-0.0856	-0.0007	-0.0618	0.0578	0.1868	-0.1385	0.101	-0.001	-0.0576	0.5961	1						
Approval	17	-0.0015	0.034	-0.2494	-0.2545	0.0128	-0.0128	0.0744	-0.0292	-0.0224	0.0699	-0.0872	0.1864	-0.1963	-0.0015	0.0467	0.0461	1					
GDPC	18	-0.0354	-0.034	-0.1311	0.1065	0.0162	-0.0496	-0.0194	0.0492	0.2324	0.2685	0.1642	0.0786	0.2158	-0.0114	0.048	0.0537	-0.0918	1				
Judicial	19	0.039	-0.0389	-0.1283	0.1577	0.0279	-0.0707	-0.0671	0.0711	0.3071	0.2964	0.1732	0.005	0.1566	-0.0692	0.0496	0.0415	-0.1233	0.85	1			
Fund industry Herfindahl	20	-0.0027	-0.0029	0.0774	0.1332	-0.0551	0.2225	0.0066	-0.0578	-0.1847	-0.1351	-0.0879	-0.1331	0.1575	0.0117	-0.0382	-0.0534	-0.0623	-0.1712	-0.1397	1		
Fund industry size	21	0.0517	-0.0072	-0.2919	-0.1225	0.0667	-0.2839	-0.0658	0.0839	0.4012	0.372	0.1271	0.1318	-0.2305	-0.1122	0.104	0.1357	0.2788	0.4397	0.5322	-0.566	1	
Bank concentration	22	-0.0538	-0.0026	0.1523	0.1544	-0.0542	0.2141	0.0143	-0.0553	-0.2506	-0.1425	0.0061	-0.0679	0.3569	0.129	-0.0528	-0.0549	-0.3788	0.0625	-0.1199	0.3595	-0.6379	1

4. Methodology

Our first goal is to determine whether investors react differently to the level of fees charged by bank-affiliated funds and non-bank affiliated funds. More particularly, we test for these differences in bank-based and market-based countries. Because banks play a leading role in investor's decisions in bank-based countries, we would expect investors to become less sensitive to the level of fees charged by these funds. Contrarily, in market-based countries, mutual funds investors have alternative investment channels and tend to conduct their investments directly through financial markets and are therefore are expected to react more to the level of fees charged by bank-affiliated funds.

To do so, we first split our sample into market-based and bank-based countries, following the classification of Demirgüc-Kunt and Levine (2001). For these countries, we perform separate panel data regressions, where we regress annual flows on last year fund fees, bank-affiliated funds, which is a dummy variable that takes the value of one if either its ultimate owner is a commercial bank with assets over $10 billion or the group owner is a commercial bank with assets over $10 billion and zero if its ultimate owner is an investment bank or an insurance company (Ferreira et al., 2018b) and on the interaction between fees and bank-affiliated funds dummy variable. To control for differences within funds, we include fund-level variables. Therefore, the first regression is as follows:

$$\begin{aligned} \text{Flows}_{i,c,t} = \; & a + \beta' \text{Fees}_{i,c,t-1} \times Bank - affilited\ dummy_{i,c,t-1} + \delta\, Fees_{i,c,t-1} \\ & + \lambda' Bank - affiliated\ dummy_{i,c,t-1} \\ & + \theta' Fund - level\ variables_{i,c,t-1} + \varepsilon_t. \end{aligned} \tag{4}$$

Where $Flows_{i,c,t}$ represents fund flows i in country c in year t. Following Khorana et al. (2009), we proxy for fees using both TSC and front-end loads and fund-level variables include fund size, family size, age, team managed dummy, fund of fund dummy, index tracking dummy, ETF dummy and international dummy concentration. [5]

We also include time, country, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year.

[5] Appendix 1 provides variable definitions.

To control for differences across countries, we include additional specifications where we control for differences in the level of competition in the different mutual fund industries:

$$\begin{aligned}\text{Flows}_{i,c,t} = \; & a + \beta' \text{Fees}_{i,c,t-1} \times Bank - affilited\ dummy_{i,c,t-1} + \delta\, Fees_{i,c,t-1} \\ & + \lambda' Bank - affiliated\ dummy_{i,c,t-1} \\ & + \theta' Fund - level\ variable_{i,c,t-1} \\ & + \vartheta' Country - level\ variables_{i,c,t-1} + \varepsilon_t.\end{aligned} \tag{5}$$

Country-level variables include approval, GDPC, judicial system, fund industry Herfindahl index, fund industry size and bank concentration (see, e.g., Ferreira et al. (2013), and Khorana et al. (2005)).

Because differences in the flow-fee sensitivity are expected to determine differences on the level of fees charged by mutual fund management companies, we next test whether there are differences in the level of fees charged by bank-affiliated funds when compared to non-bank-affiliated funds. More particularly, we want to see whether these differences exist in bank-based and market-based countries.

We then run a regression of fees on bank-affiliated funds dummy, bank-affiliated funds dummy interacted with the bank-based dummy and the bank-based dummy just by itself. The regression is presented in Equation (6):

$$\begin{aligned}\text{Fees}_{i,c,t} = \; & a + \beta' Bank - Affiliated\ dummy_{i,c,t-1} \\ & + \delta\, Bank - based\ dummy_{i,c,t-1} \\ & + \lambda' Bank - Affiliated\ dummy_{i,c,t-1} \\ & \times Bank - based\ dummy_{i,t-1} + \theta' Fund - level\ variable_{i,c,t-1} \\ & + \varepsilon_t.\end{aligned} \tag{6}$$

Regressions include identical fund-level control variables to those in Equation (4) and also include time, country, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year.

Subsequently, repeat the Equation (6), but controlling for country-level variables:

$$\begin{aligned}\text{Fees}_{i,c,t} = \; & a + \beta' Bank - Affiliated\ dummy_{i,c,t-1} \\ & + \delta' Bank - based\ dummy_{i,c,t-1} \\ & + \lambda' Bank - Affiliated\ dummy_{i,c,t-1} \\ & \times Bank - based\ dummy_{i,t-1} + \theta' Fund - level\ variable_{i,c,t-1} \\ & + \vartheta' Country - level\ variables_{i,c,t-1} + \varepsilon_t.\end{aligned} \tag{7}$$

Country-level variables are those in Equation (5). Regressions include time, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year.

5. Empirical Results

This section presents the results of the regressions mentioned on the previous section and its analysis.

5.1 Flow-fee sensitivity

First, we present the results of the regressions in Equations (4) and (5) that aim to test for differences in the flow-fee sensitivity between bank-affiliated funds and non-bank-affiliated funds in market-based (Columns (1), (3), (5) and (7)) and bank-based countries (Columns (2), (4), (6) and (8)) in Table 5.1. In Columns (1)-(4), we measure fees using TSC, while in Columns (5)-(8) fees are measured using front-end loads.

Table 5.1 - Flow-fee sensitivity

This table presents the results of panel regressions presented in equations (4) and (5). We, regressing flows on fees (TSC and front-end loads) and bank-affiliated funds, which is a dummy variable that takes the value of if either its ultimate owner is a commercial bank with assets over $10 billion or the group owner is a commercial bank with assets over $10 billion and fees interacted with bank-affiliated funds. In Columns (1)-(4) we measure fees using TSC, while in Columns (5)-(8) fees are measured using front-end. We run separate regressions for market-based countries and bank-based countries, in Columns (1), (3), (5), and (7), and Columns (2), (4)., (6), and (8), respectively. In Columns (1), (2), (5) and (6) we control for fund-level variables, while in Columns (3), (4), (7), and (8) we control for both include country-level variables. See Appendix 1 for variable definitions. Regressions also include time, country, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Total shareholder cost				Front-end loads			
	Market-based	Bank-based	Market-based	Bank-based	Market-based	Bank-based	Market-based	Bank-based
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TSC	-0.0387***	-0.0513***	-0.0408***	-0.0534***	-0.0179***	-0.0188***	-0.0165***	-0.0176***
	(-3.92)	(-3.66)	(-4.27)	(-3.81)	(-4.65)	(-4.20)	(-4.41)	(-3.80)
TSC x Bank affiliated	-0.0117**	0.0217**	-0.0124**	0.0228**	-0.0109**	0.0092**	-0.0102**	0.0087**
	(-2.11)	(2.15)	(-2.25)	(2.21)	(-2.31)	(2.09)	(-2.23)	(1.99)
Bank affiliated	-0.0097	0.0107	-0.0226	0.0023	-0.0310*	0.0277*	-0.0277	0.0060
	(-0.33)	(0.67)	(-0.81)	(0.16)	(-1.75)	(1.78)	(-1.49)	(0.26)
Investment bank-affiliated	0.0170	-0.0234	0.0115	-0.0221	-0.0166	-0.0201	-0.0113	-0.0204
	(1.44)	(-1.36)	(1.09)	(-1.55)	(-1.38)	(-1.20)	(-1.06)	(-1.43)
Insurance-affiliated	-0.0049	-0.0116	-0.0074	-0.0089	-0.0083	-0.0014	-0.0093	0.0006
	(-0.40)	(-0.74)	(-0.60)	(-0.57)	(-0.70)	(-0.09)	(-0.78)	(0.04)
Benchmark-adjusted return	0.1267***	5.6097***	0.1269***	0.0562***	0.1273***	0.0568***	0.1278***	0.0571***
	(9.56)	(6.67)	(9.49)	(6.60)	(9.71)	(6.74)	(9.68)	(6.71)
TNA (log)	-0.0613***	-7.2466***	-0.0671***	-0.0748***	-0.0598***	-0.0710***	-0.0650***	-0.0733***
	(-10.73)	(-14.12)	(-13.97)	(-14.54)	(-10.30)	(-14.18)	(-13.22)	(-14.56)
TNA Family (log)	0.0197***	1.2470***	0.0198***	0.0176***	0.0194***	0.0150***	0.0197***	0.0182***
	(3.79)	(3.16)	(3.63)	(4.91)	(3.83)	(3.90)	(3.66)	(5.13)
Age (log)	-0.1492***	-8.0678***	-0.1543***	-0.0910***	-0.1522***	-0.0819***	-0.1572***	-0.0916***
	(-14.02)	(-5.92)	(-16.28)	(-6.99)	(-14.43)	(-5.92)	(-16.47)	(-6.90)
Team	-0.0021	-4.5010***	0.0064	-0.0455***	-0.0020	-0.0424***	0.0065	-0.0449***
	(-0.24)	(-3.00)	(0.89)	(-3.51)	(-0.23)	(-3.02)	(0.90)	(-3.57)
International	0.0105	5.6827*	0.0275	0.0060	0.0048	0.0639**	0.0236	0.0108
	(0.59)	(1.75)	(1.12)	(0.18)	(0.28)	(1.98)	(0.95)	(0.33)
Fund of fund	-0.0864***	2.6439	-0.0479***	0.0126	-0.0856***	0.0347	-0.0467***	0.0199
	(-5.49)	(1.23)	(-3.33)	(0.61)	(-5.53)	(1.60)	(-3.28)	(0.93)
Index tracking	0.0417	6.2698**	0.0363	0.0590**	0.0531**	0.0651**	0.0491**	0.0645**
	(1.60)	(2.17)	(1.45)	(2.17)	(2.06)	(2.30)	(2.02)	(2.40)
ETF	0.0530	12.0514**	0.0340	0.0934*	0.0553	0.1359**	0.0396	0.1097**
	(1.31)	(2.29)	(0.86)	(1.81)	(1.36)	(2.56)	(1.01)	(2.10)
Approval			-0.0306	-0.0482**			-0.0206	-0.0454**
			(-1.54)	(-2.30)			(-1.01)	(-2.25)
Judicial			0.0344***	-0.0159***			0.0342***	-0.0127***
			(10.07)	(-4.02)			(10.23)	(-2.93)
Fund industry Herfindahl			-0.1366	-0.4262***			-0.1256	-0.4063***
			(-1.34)	(-3.12)			(-1.24)	(-3.08)
Fund industry size (log)			0.0205**	0.0113			0.0201**	0.0143*
			(2.35)	(1.58)			(2.23)	(1.96)
Bank concentration			-0.0177	0.2119***			-0.0137	0.2071***
			(-0.44)	(8.91)			(-0.34)	(8.88)
GDP per capita (log)			-0.1668***	0.0512**			-0.1627***	0.0442*
			(-6.12)	(2.07)			(-6.04)	(1.75)
Bank concentration			-0.0177	0.2119***			-0.0137	0.2071***
			(-0.44)	(8.91)			(-0.34)	(8.88)
Adjusted R-squared	0.072	0.051	0.078	0.055	0.072	0.053	0.077	0.056
Number of observations	128,610	65,748	128,610	65,748	128,610	65,748	128,610	65,748

The results in Table 5.1 show that, in market-based countries, investors react significantly more to the level of fees charged by bank-affiliated funds. However, in bank-based countries, the flow-

fee sensitivity to bank-affiliated funds is significantly lower than that of non-bank-affiliated funds. These results are consistent whether we proxy for funds using TSC or front-end loads and whether we control for fund-level variables only or both fund-level and country-level variables.

Our results are not only statistically significant but also economically important. If we take the results when fees are proxied by TSC, in Column (3), we can see that, in market-based countries, the flow-fee sensitivity of bank-affiliated funds exceeds that of non-bank-affiliated funds by 30% [((-0.0408 + -0.0124)/-0.0408)-1]. However, in bank-based countries, in Column (4), the flow-fee sensitivity of bank-affiliated funds represents only 60% of the flow-fee sensitivity of non-bank-affiliated funds.

5.2 Fees and bank-affiliated funds

Table 5.2 presents the results of the regression in Equations (6) and (7), where we test for differences in the level of fees charged by bank-affiliated and non-bank-affiliated funds in bank-based and market-based countries. In Columns (1) and (2), we proxy for fees using TSC, while Columns (3) and (4) present the results with fees proxied by using front-end loads.

Table 5.2 - Fees and bank-affiliated funds

This table presents the results of panel regressions presented in equations (6) and (7). We regress fees (TSC and front-end loads) on bank-affiliated funds dummy, which is a dummy variable that takes the value of if either its ultimate owner is a commercial bank with assets over $10 billion or the group owner is a commercial bank with assets over $10 billion, bank-affiliated funds dummy interacted with the bank-based dummy and the bank-based dummy just by itself. In Columns (1) and (2) we measure fees using TSC, while in Columns (3) and (4) fees are measured using front-end loads. In Columns (1) and (3) we control for fund-level variables, while in Columns (2) and (4) we control for both include country-level variables. See Appendix 1 for variable definitions. Regressions also include time, country, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Total shareholder cost		Front-end loads	
	(1)	(2)	(3)	(4)
Bank-affiliated	-0.1143**	-0.1224**	-0.2175**	-0.1979**
	(-2.25)	(-2.46)	(-2.23)	(-2.02)
Bank-affiliated x Bank-based	0.3068***	0.2932***	0.4122**	0.3977**
	(3.63)	(3.51)	(2.32)	(2.25)
Bank-based	0.1316**	0.1970***	0.4435***	0.5485***
	(2.12)	(3.63)	(3.05)	(3.52)
Investment bank-affiliated	0.0124	0.0002	0.0808	0.0672
	(0.33)	(0.01)	(0.78)	(0.67)
Insurance-affiliated	0.0987**	0.0964**	0.5940***	0.5846***
	(2.47)	(2.47)	(5.89)	(5.78)
Benchmark-adjusted return	-0.2583***	-0.2479***	-0.2551***	-0.1842***
	(-7.35)	(-7.29)	(-4.43)	(-3.11)
TNA (log)	-0.0828***	-0.0855***	-0.0229	-0.0401**
	(-10.32)	(-10.80)	(-1.32)	(-2.35)
TNA Family (log)	-0.0188*	-0.0166*	0.0542*	0.0359
	(-1.83)	(-1.70)	(1.87)	(1.04)
Age (log)	0.1308***	0.1290***	0.1915***	0.1858***
	(8.21)	(8.31)	(4.28)	(4.44)
Flows	0.0098*	0.0084	-0.0011	-0.0058
	(1.83)	(1.63)	(-0.09)	(-0.45)
Flow-performance sensitivity	-0.0279***	-0.0303***	-0.0076	-0.0131
	(-3.00)	(-3.30)	(-0.29)	(-0.49)
Team	-0.0367	-0.0226	0.0113	0.0431
	(-1.54)	(-0.94)	(0.17)	(0.70)
International	0.3334***	0.3329***	0.6909***	0.8018***
	(6.51)	(7.39)	(6.23)	(5.83)
Fund of fund	-0.0333	-0.0201	0.1608**	0.2772***
	(-0.95)	(-0.60)	(2.52)	(4.58)
Index tracking	-0.7880***	-0.7769***	-0.8446***	-0.8527***
	(-16.00)	(-15.78)	(-11.11)	(-10.83)
ETF	-0.3544***	-0.3643***	-0.1075	-0.1260
	(-5.32)	(-5.37)	(-0.47)	(-0.54)
Approval		-0.3519***		-0.6342***
		(-5.87)		(-3.70)
Judicial		-0.0006		0.0965***
		(-0.07)		(4.14)
Fund industry Herfindahl		-1.2082***		0.7476
		(-3.43)		(0.69)
Fund industry size (log)		-0.0088		0.1311*
		(-0.34)		(1.67)
Bank concentration		-0.3200***		-0.5429***
		(-5.25)		(-3.17)
GDP per capita (log)		-0.0923		-0.4700***
		(-1.60)		(-3.04)
Adjusted R-squared	0.388	0.406	0.292	0.318
Number of observations	194,362	194,362	194,362	194,362

The positive and statistically significant coefficient on the dummy bank-based funds, in the regression, shows that mutual funds investors, on average, react more to fees in bank-based countries than in market-based countries. The coefficient on the bank-affiliated dummy is negative and significant, indicating that bank-affiliated funds charge on average less fees in market-based countries. However, the interaction between bank-affiliated and bank-based countries is positive and significant, which indicates that the level of fees charged by bank-affiliated in bank-based countries is significantly higher than that charged in market-based countries.

The results are also economically sizable. The coefficients in Column (2) of Table 5.2, where we proxy for fees using TSC, show that in market-based countries bank-affiliated funds charge, on average, less 0.12% than non-bank-affiliated funds. However, in bank-based countries, bank-affiliated funds charge more 0.3% than non-bank-affiliated funds. These numbers are economically relevant as the average TSC charged by bank-affiliated and non-bank-affiliated funds in our sample is 1.90% and 1.83%, respectively (see Table 3.2, Panels B and C).

Together with the results obtained in Table 5.1, our study shows that because investors are less fee sensitive to the level of fees charged by bank-affiliated funds in bank-based countries, in these countries bank-affiliated funds charge higher fees. Contrarily, in market-based countries, mutual fund investors react more to the level of fees charged by bank-affiliated funds and this explains why bank affiliated funds charge less fees in these countries.

6. Robustness tests

In this section, we perform additional tests in order to check the robustness of our main findings. Because the U.S represents 23% of funds in our sample (see Table 3.1), it is possible that our main conclusions are determined by the large weight of the U.S. domiciled funds in our sample. Table 6.1, Columns (1), (2), (5) and (6) and Table 7, Columns (1) and (3) show that our main results hold when we exclude the U.S. from our tests.

Table 6.1 - Flow-fee sensitivity – Excluding U.S. and using WLS

This table presents the regressions in Table 4, except that we exclude the U.S. from our sample and use weighted least squares, , in Columns (1), (2), (5) and (6) and Columns (3), (4), (7) and (8), respectively. In the weighted least squares method, we weight our observations by the inverse of the number of funds in each country-year. We regress flows on fees (TSC and front-end loads) and bank-affiliated funds, which is a dummy variable that takes the value of if either its ultimate owner is a commercial bank with assets over $10 billion or the group owner is a commercial bank with assets over $10 billion and fees interacted with bank-affiliated funds. In Columns (1)-(4) we measure fees using TSC, while in Columns (5)-(8) fees are measured using front-end. We run separate regressions for market-based countries and bank-based countries, in Columns (1), (3), (5), and (7), and Columns (2), (4)., (6), and (8), respectively. In Columns (1), (2), (5) and (6) we control for fund-level variables, while in Columns (3), (4), (7), and (8) we control for both include country-level variables. See Appendix 1 for variable definitions. Regressions also include time, country, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Non-US		**WLS**		**Non-US**		**WLS**	
	Total shareholder cost				Front-end loads			
	Market-based	Bank-based	Market-based	Bank-based	Market-based	Bank-based	Market-based	Bank-based
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TSC	-0.0318***	-0.0534***	-0.0344***	-0.0530***	-0.0158***	-0.0176***	-0.0149***	-0.0179***
	(-3.40)	(-3.81)	(-3.36)	(-3.45)	(-3.60)	(-3.80)	(-3.36)	(-3.75)
TSC x Bank affiliated	-0.0106**	0.0228**	-0.0135**	0.0315**	-0.0156**	0.0087**	-0.0151**	0.0106**
	(-1.97)	(2.21)	(-2.22)	(2.52)	(-2.11)	(1.99)	(-2.22)	(2.26)
Bank affiliated	0.0171	0.0023	-0.0263	0.0184	-0.0271	0.0060	-0.0218	0.0284
	(0.53)	(0.16)	(-0.76)	(1.07)	(1.53)	(0.26)	(-1.33)	(1.07)
Adjusted R-squared	0.058	0.055	0.069	0.089	0.058	0.056	0.069	0.089
Number of observations	69,483	65,748	128,610	65,748	69,483	65,748	128,610	65,748

Table 6.2 - Fees and bank-affiliated funds – Excluding U.S. and using WLS

This table presents the regressions in Table 4, except that we exclude the U.S. from our sample and use weighted least squares, in Columns (1) and (3) and Columns (2) and (4), respectively. In the weighted least squares method, we weight our observations by the inverse of the number of funds in each country-year. We regress fees (TSC and front-end loads) on bank-affiliated funds dummy, which is a dummy variable that takes the value of if either its ultimate owner is a commercial bank with assets over $10 billion or the group owner is a commercial bank with assets over $10 billion, bank-affiliated funds dummy interacted with the bank-based dummy and the bank-based dummy just by itself. In Columns (1) and (2) we measure fees using TSC, while in Columns (3) and (4) fees are measured using front-end loads. In Columns (1) and (3) we control for fund-level variables, while in Columns (2) and (4) we control for both include country-level variables. See Appendix 1 for variable definitions. Regressions also include time, country, investment region, benchmark, and fund type fixed effects. Robust t-statistics clustered by country-year are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Non-US	**WLS**	**Non-US**	**WLS**
	Total shareholder cost		Front-end loads	
	(1)	(2)	(3)	(4)
Bank-affiliated	-0.1042**	-0.1581**	-0.2923	0.1071
	(-2.01)	(-2.45)	(-1.64)	(0.51)
Bank-affiliated x Bank-based	0.2841**	0.3378**	0.3662*	-0.1371
	(3.21)	(3.40)	(1.68)	(-0.50)
Bank-based	0.2030***	0.1835**	0.3911**	0.1991
	(2.98)	(2.73)	(2.16)	(0.92)
Adjusted R-squared	0.354	0.478	0.337	0.375
Number of observations	135,235	194,362	135,235	194,362

The results are presented in Table 6 and Table 7, show that our main results do not change when using the weighted least squared method in our regressions.

7. Conclusion

In this study, we use a sample of 33 countries in the period of 1999-2015 to analyze fees and the flow-fee sensitivity of bank-affiliated mutual funds in countries with market-based and bank-based financial systems.

Our results indicate that in bank-based financial systems, funds charge higher fees than unaffiliated funds. This is because in these markets, investors' flows are less sensitive to the level of fees charged by bank-affiliated funds. In the case of market-based financial systems, we find that bank-affiliated funds charge lower fees than unaffiliated funds.

Our results are consistent with the findings in Ferreira et al. (2018b), that show that bank-affiliated funds in bank-based countries underperform those in market-based countries. Our results are also consistent with that of Gruber (1996), who shows that funds that perform worse charge more fees. Our results are robust whether we measure fees using TSC and front-end loads.

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Appendixes

Appendix 1- Variables Definitions

Variable	Definition
Panel A: Fund-level variables	
Raw return	Fund net return in local currency (percentage per year) (Lipper).
Benchmark-adjusted return	Difference between the fund net return and its benchmark return (percentage per quarter).
Total shareholder cost	Sum of fund's expense ratio and fund's annualized front-end and back-end loads: Total shareholder costs = (Expense ratio + Loads) / 5.
Front-end loads	Loads charged at the purchase time.
Flows	Percentage growth in TNA (in local currency) in a quarter, net of internal growth (assuming reinvestment of dividends and distributions).
Bank-affiliated dummy	Dummy variable that takes a value of 1 if the ultimate owner of the fund's management company is a commercial banking group, and 0 otherwise (Lipper and FactSet)
Investment bank affiliated dummy	Dummy variable that takes a value of 1 if the ultimate owner of the fund's management company is among the top 20 investment banks in a given region and quarter, and 0 otherwise (Lipper and FactSet).
Insurance-affiliated dummy	Dummy variable that takes a value of 1 if the ultimate owner of the fund's management company is an insurance banking group, and 0 otherwise (Lipper and FactSet).
TNA	Total net assets in millions of U.S. dollars (Lipper)
TNA family	Family total net assets in millions of U.S. dollars of other equity funds in the same management company excluding the own fund TNA (Lipper)
Age (years)	Number of years since the fund launch date (Lipper)
Team managed dummy	Dummy that takes the value of one if fund managed by more than one person or team.
Fund of fund dummy	Dummy that takes the value of one if fund of fund.
Index tracking dummy	Dummy that takes the value of one if index fund or ETF and 0 otherwise.
ETF dummy	Dummy that takes the value of one if ETF and 0 otherwise.
International dummy	Dummy that takes the value of one if a fund's geographic focus is different from the fund's country of domicile.

Panel B: Country-level variables

Approval	Sum of two dummy variables that take value of one if (1) the fund startup requires regulatory approval and (2) the prospectus requires regulatory approval (La Porta, Lopez-de-Silanes & Shleifer, 1998).
GDPC	Gross domestic product per capita in U.S. dollars in the fund's country (World Development Indicators).
Judicial	Judicial system quality defined as the sum of five variables (all variables are scaled between 0 and 10)): the efficiency of the judicial system, rule of law, corruption, risk of expropriation and risk of contract repudiation (La Porta et al., 1998).
Fund industry Herfindahl	Sum of squared market shares of fund management companies for open-end equity mutual funds in the fund's country.
Fund industry size	Sum of total net assets (in millions of U.S. dollars) for open-end equity mutual funds in the fund's country.
Bank concentration	Top–five bank asset concentration (World Development Indicators/Bankscope, Bureau van Dijk).