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THE SCOPE OF INTERNATIONAL MUTUAL FUND OUTSOURCING: FEES, PERFORMANCE AND RISKS

DOUGLAS CUMMING
ARMIN SCHWIENBACHER
FENG ZHAN

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Douglas Cumming
York University - Schulich School of Business
4700 Keele Street
Toronto, Ontario M3J 1P3
Canada
douglas.cumming@gmail.com
http://ssrn.com/author=75390

Armin Schwienbacher
Université de Lille – SKEMA Business School
Université de Lille 2
Faculté de Finance, Banque, Comptabilité
Rue de Mulhouse 2 - BP 381
F - 59020 Lille Cédex (France)
armin.schwienbacher@skema.edu
http://ssrn.com/author=301672

Feng Zhan
Boler School of Business
John Carroll University
University Heights, OH 44118-4581
United States
fzhan@jcu.edu
http://ssrn.com/author=1570631

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Abstract

This paper examines the causes and consequences of mutual fund outsourcing to different types of service providers: advisors, custodians, administrators, and transfer agents. The data indicates outsourcing is less common among bank-managed funds, funds of leading groups, but more common among funds that are distributed through third parties. Moreover, initial subscription fees are lower among funds that outsource non-advisory services, while annual management fees are not different among funds that outsource. The effect of service outsourcing on subscription fees occurs only for funds targeting institutional investors; retail investors enjoy no fee gains. The outsourcing of advisor services is associated with greater fund risk, but also with higher risk-adjusted performance (Sharpe ratio). However, the positive link with performance disappears when controlling for endogeneity, suggesting that fund managers optimally outsource advisory services in response to expected performance gains. Consistent with our predictions, outsourcing of other services does not impact portfolio decisions. Their impact is through lower subscription fees.

Keywords: Mutual Funds, Outsourcing, Advisors, Administrators, Transfer Agents, Custodians

JEL Codes: G23, G30

> "Investors simply don't believe that advisory firms can do it anymore, especially your $150 million [AUM] firms and smaller. They just don't believe that you have the resources, the research, the ability to do globally diversified portfolios.
>
> Every advisor should ask themselves, can I do it best? … And if not, how do you fire yourself? … Outsourcing does not lead to fee changes."
>
> Northern Trust Asset Management, Webinar Summary, October 3, 2014

1. Introduction

Mutual fund management involves a variety of functions, and some of these functions may be outsourced to external service providers. For example, strategy formation, portfolio management and stock picking may be outsourced to advisory service providers. Administrators are another service provider that issue and redeem interests and shares, and calculate the net asset value of the fund; these tasks can be done internally or outsourced to an external service provider. Similarly, some funds act as their own transfer agents which involves maintaining their own records, account balances and transactions, and handle the issuance of certificates and process of investor mailings; other funds chose a third party service provider to carry out these tasks on behalf of the fund. Custodians provide safe keeping of a fund's assets, and some funds elect to have this task carried out internally. Trustees and auditors, by contrast, are generally required to be external to a fund for legal reasons to guarantee the neutrality of such functions.

There is a small but growing literature on mutual fund outsourcing, mainly with samples of U.S. mutual funds. This literature to date has focused mainly on the outsourcing of advisory

services, which relates to the front office. To the best of our knowledge, no prior paper has examined the full scope of services that are outsourced: administrator, transfer agent, custodian, advisory, trustee, and auditor. Our paper adds to the literature by examining the full scope of outsourcing, and by examining international evidence. Further, unlike prior work, in this paper we examine for the first time the effect of outsourcing on fund fees.

We believe it is important to study the causes and consequences of mutual fund outsourcing, as evidenced by the frequency of outsourcing. Based on the LIPPER database from over 13,000 mutual funds domiciled in Europe, we show outsourcing is very common: 12% of funds use external advisors, 41% use external administrators, 45% use external transfer agents, 58% use external custodians, and all funds outsource to external trustees and auditors. [1]

An important question for practitioners and academics alike is whether outsourcing affects portfolio selection and thus ultimately operating risk and performance of funds. While operating risk cannot be measured directly, an indirect way is to examine the impact on the risk-return profile of funds; i.e., do funds with more outsourced services have a different risk-return profile and efficiency level from funds with internal services? Principal-agent theory may predict that the effect may go either way: (1) external services may oversee investment decisions more thoroughly as there are no conflicts of interests with management, leading to more oversight and thus a less risky (or better performing) portfolio; (2) external services may oversee fund management less effectively as access to "soft" information (i.e., not directly quantifiable) is more difficult than for internal services, leading to less efficient monitoring and ultimately more

[1] In rare circumstances (4% of our sample), trustees are used internally when there is a Chinese wall in the organization. In view of this very small proportion of internal trustees, we do not examine this component of outsourcing in our analysis.

risk-taking behavior of investment fund managers. The UK Financial Conduct Authority (FCA, 2013) has expressed such a concern with "oversight risk" in the fund management industry. Eventually this may impact the level of fees as more players get involved along the chain of operations, as well as potentially generating performance inefficiencies. Whether customers of funds are better served when some of the services are outsourced is an open issue worth investigating.

Our examination of the LIPPER database indicates the following main findings. Outsourcing is less common among funds managed through banks, UCITS funds, and institutional funds. Outsourcing is more common among funds that use third party distributors, retail client funds, and equity funds. Next, we find that funds relying on outsourcing have different fee structures. Initial subscription fees are lower among funds that outsource a greater number of types of services, while annual management fees are not different.

Further, the data indicate performance implications with outsourcing. While outsourcing of administrator, transfer agent, and custodian services is unrelated to risk in terms of the standard deviation of fund returns, outsourcing advisor services is associated with greater fund risk. Moreover, outsourcing advisor services is associated with higher risk-adjusted performance (gross of fees), measured by Sharpe ratios. The association between outsourcing of advisory services and performance is more pronounced for funds belonging to bank-managed groups than funds of asset management firms. However, we find the performance results are sensitive to controlling for endogeneity. In other words, if funds that outsourced did not in fact do so then they would underperform. We further examine the impact of outsourcing when we would not have expected a fund to do so (based on our statistical model), and find a positive performance

impact from the outsourcing decision. The finding is consistent with the view that fund managers have private information that leads them to make better decisions about whether or not to outsource.

Our paper is related to a small number of recent papers on outsourcing in the mutual fund literature that falls into at least four streams. One stream of literature shows outsourcing advisory services is negatively associated with performance. Duong (2010) and Chen et al. (2013) find that outsourced mutual funds underperform internally managed mutual funds. Chen et al. argue that the contractual externalities due to firm boundaries imply that it is more difficult for a fund to extract performance from an outsourced relationship, and as such outsourced funds are less likely to take excessive risk and are more likely to be closed in the event of poor performance. Chen et al.'s results are consistent regardless of whether or not they control for endogeneity of the outsourcing decision. More specifically on endogeneity, Cashman and Daniel (2009) find that outsourced mutual funds perform better when they are both predicted to be sub-advised and are in fact sub-advised relative to those that are predicted to be sub-advised but are not sub-advised.

A second stream of literature shows no performance implications associated with outsourcing after controlling for endogeneity. Debaere and Evans (2014), for example, find that there are no performance implications for outsourced funds after controlling for selection bias. They explain that funds that do not outsource would otherwise underperform because they are too small to do things internally.

The third stream of the mutual fund literature shows different findings on the consequences of external advisory services based on analysis of segmentation in the mutual fund

market. Using unique U.S. data from the Financial Research Corporation, Del Guerico et al. (2010) are able to analyze market segmentation by distribution channels (direct, captive, bank, insurance, wholesale, institutional, and other), as well as sub-advisory fees. Del Guerico et al. (2010) show that sub-advisor skill matters for more performance-sensitive clientele, and skilled sub-advisors in these performance-sensitive distribution channels are able to earn in excess of 1% higher risk-adjusted before-fee returns than those earned by comparable funds in other channels. Del Guerico et al. (2014) comment that the existence of advisory service providers would be hard to explain in the absence of market segmentation. That is, it would be puzzling for mutual fund families to enter into sub-advisory contracts with competitor fund families if the market was not at least partially segmented. Other studies are consistent with market segmentation in the mutual fund industry, such as Masa (2003) who shows some fund families compete for performance-sensitive investors while others compete for less sophisticated investors who place a greater value on advice. Telser (1960) shows that broker incentives themselves can create market segmentation as brokers will recommend those funds which better maximize their compensation.

A fourth stream of literature shows performance implications for in-house funds managed by families that have outsourcing relationships. Chuprinn et al. (2014) find that fund families have preferential treatment for their in-house funds with respect to IPO allocations, trading opportunities and cross trades. These advantages are particularly important at times when in-house funds face steep outflows and require liquidity. These connections through outsourcing relationships enable performance improvements that would not otherwise be available in the absence of outsourcing.

These differential findings in the prior mutual fund literature highlight the importance of further evidence on this topic from other countries. We study an international sample, a wider range of different types of mutual funds and the full scope of types of outsourced relationships.

This paper is organized as follows. Section 2 discusses the costs and benefits of outsourcing in the mutual fund industry. Section 3 introduces the data and provides summary statistics. Section 4 presents multivariate analyses. Further robustness checks are discussed in section 5. The last section concludes.

2. The Costs and Benefits of Outsourcing in the Mutual Fund Industry

Mutual funds always outsource auditor and trustee services for legal and regulatory reasons. But mutual funds may or may not outsource a variety of other services, including custodian, advisory, administrator, and transfer agent services. Custodians are safe-keepers of fund assets that arrange settlement, collect information on fund assets, administer tax documents, maintain information on securities such as annual meetings and related proxies, and perform foreign exchange transactions. Advisors provide investment and portfolio management advice. Administrators calculate NAV, maintain the fund's books, pay fund expenses, settle daily purchases and sales, calculate payment of transfers, prepare and file prospectus and other regulatory body filings and reports, calculate returns, and supervise liquidations. Transfer agents maintain records of investors and account balances and transactions, cancel and issue certificates, and process mailings.

There are a number of human capital benefits of outsourcing which are regularly reported in industry.[2] It is obviously not feasible that 100% of the funds have 100% of the very best people that can do specific tasks pertinent to mutual fund management. Outsourcing enables funds to pick the very best people in the industry to do the very best job. In turn, this potentially translates into "operational alpha" insofar as there is improved business performance as a result of outsourcing, as well as "investment alpha" insofar as fund funds may gain access to superior investment strategies. Of course, when investment strategies can be replicated and shared across different competing funds that share the same outsourcing advice, investment alpha is less likely to be realized.

There are two potential operational benefits associated with outsourcing. First, outsourcing enables protection of assets. Second, outsourcing enables funds to achieve economies of scale in terms of minimizing costs and obtaining a global reach. Outsourcing enables funds to launch products in different regions with a quicker time to market. An outsourced fund has the ability to execute a business strategy faster when it does not have the resources in place to do it internally.[3]

Next, there are certification benefits associated with outsourcing. Outsourcing provides certification insofar as assuring there is accuracy in the fund's data, such as valuations. This certification is particularly important for institutional clients that demand timely and accurate accountings.

[2] For example, see the Northern Trust Asset Management, Webinar Summary, October 3, 2014.
[3] In conversations with fund managers, we understand that time to market can be reduced from 5 months to 1 month in certain contexts with the use of outsourced services.

Outsourcing can also enable a fund to save on regulatory compliance costs. Regulatory changes over time and in different countries give rise to high costs of regulatory compliance. Outsourcing enables third-party service providers to specialize and achieve economies of scale with dealing with regulatory upgrades, as well as system upgrades. For example, core accounting systems can cost $30 million or more if they need changing. Outsourcing enables fund managers to focus their efforts on things that they are good at, while ensuring that they are compliant with the latest regulations.

There are potentially fee structure implications associated with outsourcing. Outsourcing enables costs to be spread over time, while doing everything internally has higher upfront costs for a mutual fund (Financial Conduct Authority, 2013). Therefore, we expect outsourced funds to have higher management fees which reflect ongoing fund expenses, but lower subscription fees which reflect the costs of hiring fund managers and various administrative and infrastructure costs. The effect on total costs is however ambiguous and likely to be difficult to predict.

More generally, there are other costs of outsourcing for mutual funds. First, there is a loss of control of data, which poses risks on a fund in terms of its proprietary information. Second, there is a loss of control of staff, which at times poses potential cultural problems. Third, outsourcing poses potential conflicts within a fund. For example, a CEO or CFO may want to outsource, while operational staff at a fund may not want to.

Overall, there are a variety of potential costs and benefits associated with outsourcing. In the next sections, we introduce a dataset and examine whether or not the data reveal any systematic effects of outsourcing on fee structure, fund performance and risk.

3. Data Sample

To perform our analysis, we extract all funds available on LIPPER in July 2014. We restrict our sample to funds with vintage years 2000 to 2014. This leads to an original sample of 29,491 funds domiciled in different European countries. While all the funds in our sample are domiciled in Europe, they may be affiliated and thus managed by non-European management groups (such as BlackRock or Fidelity) that domicile some of their funds in a member state of the European Union (and thus comply to the same EU regulation) in order to reach European clients more easily. Filtering for the availability of the relevant fund-level information reduces the sample to 13,886 funds managed by over 850 different institutions such as banks and asset management firms. Using ISIN codes, we then match each fund in Datastream to obtain daily pricing data in order to calculate returns and other risk and performance measures. We were able to obtain pricing data for 11,724 funds. We calculate our risk (annualized standard deviation of daily raw returns) and performance (annualized Sharpe ratio) measures over the last three years (from July 1st 2011 to July 1st 2014, leading to 780 trading days).

Table 1 on page 24, indicates that the most common services to be outsourced are (in rank order): custodian, transfer agent, administrator, and adviser.[4] Forty-eight percent of the funds in the sample outsource at least two services (recall that Outsourcing Dummy = 1 if Outsourcing Index

≥ 1.5). The average (median) number of services outsourced is 1.56 (1.00) out of a maximum of the four services considered. In terms of the number of services outsourced, 35% of the funds in

[4] Note that we exclude trustee and auditor services in analysis because these services are always outsourced, with the exception of a very few cases for trustees. See also Footnote 1 for related comment.

the sample do not outsource, 18% outsource exactly 1 service, 10% outsource 2 services, 33% outsource 3 services, and 4% outsource 4 services.

Table 2 on page 25, summarizes the within group variation of outsourcing services. Table 2 enables us to address the question of whether the observed variation on outsourcing is driven by differences between groups only or whether there is also variation within groups. For instance, if fund families systematically either outsource everything or nothing for all their funds, any observed variation in outsourcing would be due to variation between groups only. Table 2 shows that there is significant variation within a fund family. Groups on average outsource 2.215 services (looking at the average within the group, and then across the groups). Most insightful are the statistics on the difference between maximum and minimum values of outsourcing (last column in the lower panel). It shows that among the 888 groups in our sample, 571 of them have no within group variation (they may outsource but they outsource exactly the same number of services for each of their funds so that the difference Max - Min is zero). All other groups exhibit within group variation, with 31 groups having very large variation (Max - Min = 4). Moreover, of the 888 groups in the sample, only 204 groups have a minimum number of outsourced services of 0, while only 154 groups have a maximum number of outsourced services of 4.

Table 3 on page 26, provides summary statistics for the distribution of the most frequent combinations of services that are outsourced. A total of 4,921 funds of the full sample of 13,866 funds did not outsource any service. The rest of the sample of funds outsourced at least one service. The data indicate that if three services are outsourced then most likely funds will outsource custodian, administrator, and transfer agent services, but not adviser services.

This specific combination is also the most common one among funds that use outsourcing, as a total of 4,373 funds outsourced together exactly these three services. A total of 667 funds outsourced all four services.

Table 4 on page 27, provides league tables that show the identity of outsourcing service providers for our sample of Europe-domiciled mutual funds. These league tables indicate that while there are clearly market leaders, they often tend to be specific to a certain type of service and that market leaders do not seem to enjoy monopolistic positions. Rather, markets for the provision of fund services appear, at first sight, to be competitive.

The summary statistics in Table 5 on page 30, (last column) show comparison tests for funds that outsource versus those that do not. The data indicate that outsourcing is significantly more common among asset management firms, insurance companies, Luxembourg and Ireland based funds, equity funds, funds that use third-party distributions, and institutional funds. Table 5 further indicates that management fees, subscription fees, and standard deviations of monthly fund returns are higher with outsourcing, while Sharpe ratios are not significantly different for outsourced funds. In the next section below, we consider regression evidence to further study the relation between outsourcing, fee structure, performance and risk, while controlling for other things being equal.

4. Regression Results

Our regression analyses proceed in three steps. First, we examine the determinants of outsourcing. Second, we examine whether or not outsourcing is systematically related to management and subscription fees. Third, we relate outsourcing to fund Sharpe ratios, as well as fund risk. The variables used in each of the regressions are defined in the Appendix Table A1 on page 39.

Table 6 on page 31, presents probit regressions for the determinants of outsourcing (the dummy variable Outsourcing) in Panel A, and Poisson regressions for the extent of outsourcing (the variable Outsourcing Index) in Panel B. We include a variety of fund characteristics as explanatory variables, we well as including fund vintage year dummy variables, fund country dummy variables, and group country dummy variables. These dummy variables are included to control, among other things, for possible regulatory, legal and fiscal differences between funds and groups that are located in other countries. We control for these differences at the fund and group level, since they are often not the same. For instance, a German bank may domicile some of its funds in Luxembourg, or a US asset management group will have funds domiciled in a given European country and thereby be required to comply to that country's regulatory rules. We present nine different regression models to assess robustness to the use of different control variables.

Table 6 on page 31, Panel A indicates that outsourcing is affected by a variety of fund characteristics. First, a fund that is part of a leading group (with more than 100 active funds) is associated with a reduced probability of outsourcing by 16-27% depending on the model specification, and this effect is significant at the 1% level of significance in all of the specifications. Second, bank groups decrease the probability of outsourcing by 27-30%, and this effect is likewise significant at the 1% level in each of the models. Third, the data indicate that funds that rely on third-party distributions have a higher probability of outsourcing by 10-21%, which is significant at the 1% level in models 5, 7 and 9, and at the 5% level in Model 8. Finally, UCITS funds are less likely to be outsourced by 7%, but this result is not significant in Models 5 and 7, and significant at the 1% level in Models 8 and 9.

The evidence in Table 6 is very similar in respect of the probability of outsourcing (Panel A) and the number of outsourced services (Panel B), with one exception. In Panel A Model 9, there is no evidence that larger funds are less likely to outsource, while in Panel B there is significant evidence at the 5% level that larger funds outsource a fewer number of services. However, the economic significance effect is small: an increase in fund size from €100 million to €600 million reduces the predicted number of outsourced serves by 0.03, while an increase in fund size from €600 million to €1,100 million reduces the predicted number of outsourced services by 0.01.

Table 7 on page 33, presents regression evidence for the determinants of fund fees. Panel A shows results using the dummy variable Outsourcing. Panel B shows results based on outsourcing of individual services. In Panel A, Model 3 indicates that management fees are 0.091% higher with outsourcing, and this effect is significant at the 10% level of significance. The average management fee in the sample is 1.15%, and hence this effect is economically large (a 7.9% higher fee relative to the average management fee, or an increase from a fee of 1.15% to a fee of 1.24%). However, this effect is not significant in Models 1, 2 and 4. Therefore, overall there is at best weak evidence that outsourcing affects management fee.

Table 7 Panel A Models 7 and 8 indicate that subscription fees are approximately 0.3%-0.4% lower with outsourcing, and this effect is significant at the 1% level of significance. The average subscription fee in the data is 2.83%, which implies outsourcing is associated with a 11-14% reduction in subscription fees relative to the average fee in the data. The interaction term between outsourcing and retail funds is positive significant in Models 7 and 8 at the 1% level, and roughly the same magnitude of a 0.3-0.4% increase. We examined the possibility that these results are due to collinearity between these variables, but the variance inflation factor was not significant. Hence, the data indicate that outsourcing enables lower subscription fees amongst most mutual funds, but not for retail funds.

Table 7 Panel B examines the impact of outsourcing on management and subscription fees that is associated with different types of outsourcing arrangements. The data indicate that there are no significant effects on management fee from outsourcing. By contrast, different types

of outsourcing are significantly negatively related to subscription fees. Model 7 shows custodian outsourcing is associated with a 0.355% reduction in subscription fees, while Model 8 shows that administrative outsourcing is associated with a 0.343% reduction, and Model 9 shows that transfer agent outsourcing is associated with a 0.391% reduction in subscription fees. Model 9 also shows, however, that transfer agent outsourcing is associated with higher fees by 0.284% for retail funds, which largely cancels the effect of outsourcing on subscription fees for retail funds. The interaction term with retail funds, however, is not significant with any other models in Table 7 Panel B. Also, when we include all of the different outsourcing variables in the same regression, the variables are insignificant (Model 10).

Table 8 on page 35, Panel A presents regressions for the determinants of Sharpe ratios, our measure of risk-adjusted fund performance (gross of fees). Panel A presents regressions that do not control for endogeneity. The data indicate in Models 3 and 4 that Sharpe ratios are 0.36 higher for funds that outsource adviser services, and these results are significant at the 5% level. The average Sharpe ratio in the data is 0.1427, and the median is 0.9920, which implies that these effects are very large economically. The other forms of outsourcing, by contrast, are not significantly related to Sharpe ratios.

In other regressions, not reported but available on request, we carried out a variety of additional tests. First, we considered controls for endogeneity with two step regressions such as treatment regressions. In those specifications, we found that the significance of adviser outsourcing shown in Table 8 Panel A disappears. Second, we considered regressions with

unexplained outsourcing as an explanatory variable, where unexplained outsourcing is the difference between actual outsourcing and predicted outsourcing based on our models in Table 6. Those regressions indicated that unexplained outsourcing is 0.37 higher for funds that outsource when we did not expect them to, and this effect is significant at the 1% level. This finding indicates that funds rationally outsource based on their own private information. Third, we considered the subsample of January 2013 to June 2014 vintage year funds, and found the results as reported in Table 8 Panel A to be extremely similar, and hence we do not believe the findings are affected by survivorship bias. Also, the extent of outsourcing does not vary much across fund vintage years (Appendix, Table A2), suggesting that the decision to outsource is not limited to the time when a fund is set up.

Table 8 Panel B presents regressions for the standard deviation of monthly fund raw returns. The data indicate that adviser outsourcing is associated with a higher standard deviation of returns, and this effect is significant at the 5% level in Model 3 and the 10% level in Model 4. The economic significance, however, is very small. Standard deviations are approximately 0.0002 higher for funds that outsource advisory services, while the average standard deviation in the sample is 0.0045, which implies that outsourcing is associated with an increase in standard deviations by only 0.44% relative to the average fund in the sample. Further, when we control for endogeneity as discussed in Table 8 Panel A above, this effect is no longer statistically significant. Likewise, the other forms of outsourcing are not significantly related to standard deviations of returns in any of the regression models.

Table 9 on page 37, presents regressions for the relation between outsourcing and performance based on subsamples of the data. Panel A shows the difference in the results for Sharpe ratios based on the group of asset management firms (Models 1-5) versus the group of banks (Models 6-9). For asset management firms, there is a positive and statistically significant effect of outsourcing adviser services in Models 1 and 2, and this effect is significant at the 10% level in Model 1 and the 5% level in Model 2. The economic significance is large (0.21 in Model 1 and 0.24 in Model 2). As well, administrator services and transfer agent services are significantly related to Sharpe ratios in Models 4 and 5, respectively, but these effects are not robust to inclusion of different types of outsourcing services included together in Model 1.

Table 9 Panel A Models 6-9 shows similar results for bank group funds. The data indicate that adviser services are positively and significantly related to adviser services in Models 6 and 7, and this effect is significant at the 1% level. The effect of adviser services on Sharpe ratios for banks is economically large as well (0.59 in Model 6 and 0.56 in Model 7). Custodian services are negatively related to Sharpe ratios in Model 8, but this effect is not statistically significant in Model 6 when all types of outsourcing services are accounted for in the same regression. In other unreported regressions, we observed that these findings in Table 9 Panel A on outsourced advising activities are not robust to controlling for endogeneity.

Table 9 Panel B presents similar regressions for the standard deviation of returns for asset management group funds (Models 1-5) and bank group funds (Models 6-9). For funds managed by asset management firms, there is some evidence of higher fund risk for advisers and administrators in Models 2 and 4, respectively, but these results are insignificant in Model 1 when all types of outsourcing are included in the same regression. There is evidence of higher

standard deviations of returns when transfer agents are outsourced in Models 1 and 5, and this effect is significant at the 5% level in both models. However, as discussed in the context of Table 8 Panel B above, the size of this effect here is likewise economically small (the same magnitude as that in Table 8 Panel B). For Models 6-9, we do not observe any significant relation between outsourcing and standard deviations for bank group funds.

5. Further Tests and Robustness Checks

We carried out a number of additional tests and robustness checks. First, we examined differences in advisor outsourcing and fund risk or Sharpe ratios based on different proxies for the advisor reputation, and we did not find any significant effect. Consistent with research on underwriter reputation in IPOs[5], we proxied advisor reputation by various measures related to the number of funds serviced externally as well as globally. Second, we re-calculated the performance and risk measure for a shorter time period of two years to examine robustness of our results on both dimensions. We find that our conclusions hold; while the results in Table 8 become somewhat weaker (but still statistically significant), the difference in performance between asset management firms and banks becomes more significant (Table 9). Third, we considered differences in fund alphas as an alternative performance measure instead of Sharpe ratios in relation to different types of outsourcing and/or proxies for the reputation of the service provider, and likewise did not find significant effects. Thus, the extent of service outsourcing does not relate to abnormal returns generated by mutual funds. Forth, we considered various specifications of the selection equations for two-step estimates of the effects of outsourcing on

[5] Our approach is similar to Megginson and Weiss (1991) with the exception that we do not weight by market value, since this information is only available for a limited amount of observations in our sample.

fees, performance and risk, and did not find material differences relative to what we had presented above. These and other specifications are available on request.

6. Conclusion

This paper examined for the first time the full range of outsourcing (administrator, transfer agent, custodian, advisory, trustee, and auditor) in the mutual fund industry. We investigated the characteristics of the funds that make use of different types of outsourcing services. Likewise, we examined the relationship between external fund services and fund fees, fund risk, and risk-adjusted fund performance.

The main findings in the data are briefly summarized as follows. First, we find evidence that subscription fees are lower with outsourcing, while management fees not significantly different with outsourcing. Second, we find some evidence of a relation between outsourcing and Sharpe ratios. Not controlling for endogeneity, we observed some evidence that advisory outsourcing is associated with higher risk but also higher Sharpe ratios. Controlling for endogeneity, there are fewer discernible performance differences associated with outsourcing. In other words, if funds that outsourced did not in fact do so then they would underperform. When funds outsource when we would not have expected them to do so (based on our regression model), there is a positive performance impact from the outsourcing decision; that is, fund managers with private information make better decisions about whether or not to outsource.

Further research could more closely examine the full scope of different outsourcing services among mutual funds and among other financial intermediaries. It is possible that there

are complementarities to the use of different outsourcing services and advantages that are not observed in the large dataset examined here. This type of work will help inform academics, practitioners and policy-makers about the costs and benefits of outsourcing each of the different types of services.

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TABLE 1: Summary Statistics on Outsourcing of Services (Full Sample)

This table shows for the full sample of 13,886 funds summary statistics for the individual services outsourced as well as for Outsourcing Dummy and Outsourcing Index, the two aggregate measures used in this study. Definitions of variable are provided in Appendix Table 1.

Variable	Nbr. Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
Individual Services:						
Adviser	13,886	0.1182	0	0.3228	0	1
Custodian	13,886	0.5823	1	0.4932	0	1
Auditor	13,165	1.0000	1	0.0000	1	1
Administrator	13,886	0.4105	0	0.4919	0	1
Trustee	472	0.9619	1	0.1917	0	1
Transfer Agent	13,886	0.4497	0	0.4975	0	1
Outsourcing Variables:						
Outsourcing Index	13,886	1.5606	1	1.3846	0	4
Outsourcing Dummy	13,886	0.4831	0	0.4997	0	1

TABLE 2: Summary Statistics on Outsourcing of Services (Within-Firm Variation; Based on Outsourcing Index)

This table shows summary statistics of within-management group variation of the usage of individual services outsourced for the 888 unique groups included in our full sample. Statistics reported are based on the variable Outsourcing Index, as defined in Appendix Table 1.

Measure	Nbr. Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
Average	888	2.215	2.963	1.144	0	4
Mode	888	2.151	3	1.259	0	4
Minimum	888	1.890	2	1.315	0	4
Maximum	888	2.637	3	1.113	0	4
Max - Min (diff.)	888	0.749	0	1.176	0	4

Distribution of Values	Mode	Minimum	Maximum	Max - Min
0	146	204	60	571
1	151	166	112	121
2	71	85	73	78
3	463	390	490	87
4	57	43	153	31
TOTAL	888	888	888	888

TABLE 3: Outsourcing Practices - Distribution of Most Frequent Combinations of Services Outsourced, besides Audit & Trustee

This table shows the distribution of different combinations of services outsourced for the full sample of 13,886 funds.

Nbr. Obs.	Type of Service Outsourced				
	Adviser	Custodian	Administrator	Transfer Agent	Outsourcing Index
4,921	-	-	-	-	0
432	YES	-	-	-	1
1,559	-	YES	-	-	1
136	-	-	YES	-	1
123	-	-	-	YES	1
212	YES	YES	-	-	2
24	YES	-	YES	-	2
15	YES	-	-	YES	2
318	-	YES	YES	-	2
693	-	YES	-	YES	2
122	-	-	YES	YES	2
42	YES	YES	YES	-	3
222	YES	YES	-	YES	3
27	YES	-	YES	YES	3
4,373	-	YES	YES	YES	3
667	YES	YES	YES	YES	4

TABLE 4: League Table of Top-5 Service Providers, in Number of Funds Serviced

Panels A-F show league tables of the top-5 service providers. The first column shows frequency based on the full sample of funds (i.e., including funds serviced internally). The second column shows frequency based on the funds that are serviced externally for the specific type of service considered by the league table.

PANEL A - Advisers		
Name of Service Provider	All Funds Serviced (Total: 13,886)	Funds Serviced Externally (Total: 1,650)
UBS	366	- -
State Street Global Advisors	334	- -
BlackRock	282	- -
Allianz	221	- -
Amundi	210	- -
State Street Global Advisors	- -	241
Assenagon Asset Management	- -	36
UBS	- -	28
Top Ten AG	- -	20
FERI Wealth Management	- -	17
PANEL B - Custodian		
Name of Service Provider	All Funds Serviced (Total: 13,886)	Funds Serviced Externally (Total: 8,087)
State Street	1388	- -
RBC Investor Services	863	- -
BNP Paribas	830	- -
J.P. Morgan	777	- -
CACEIS	740	- -
State Street	- -	1284
RBC Investor Services	- -	782
CACEIS	- -	683
J.P. Morgan	- -	630
BNP Paribas	- -	497

PANEL C - Auditors		
Name of Service Provider	All Funds Serviced (Total: 13,165)	Funds Serviced Externally (Total: 13,165)
PricewaterhouseCoopers	4,703	4,703
KPMG	2,943	2,943
Ernst & Young	2,300	2,300
Deloitte	1,992	1,992
PANEL D - Administrator		
Name of Service Provider	All Funds Serviced (Total: 13,886)	Funds Serviced Externally (Total: 5,695)
State Street	1033	- -
RBC Investor Services	731	- -
CACEIS	671	- -
BNP Paribas	633	- -
Société Générale	568	- -
State Street	- -	924
CACEIS	- -	649
RBC Investor Services	- -	616
Société Générale	- -	363
BNP Paribas	- -	357
PANEL E - Trustee		
Name of Service Provider	All Funds Serviced (Total: 472)	Funds Serviced Externally (Total: 454)
Royal Bank of Scotland	87	- -
J.P. Morgan	73	- -
State Street Trustees	61	- -
Bank of Ireland Securities Services	46	- -
HSBC	39	- -
Royal Bank of Scotland	- -	87
J.P. Morgan	- -	71
State Street Trustees	- -	57

Bank of Ireland Securities Services	- -	46
HSBC	- -	36
PANEL F - Transfer Agents		
Name of Service Provider	All Funds Serviced (Total: 13,886)	Funds Serviced Externally (Total: 6,244)
RBC Investor Services	1037	- -
State Street	931	- -
CACEIS	638	- -
BNP Paribas	611	- -
UBS	403	- -
RBC Investor Services	- -	933
State Street	- -	829
CACEIS	- -	564
BNP Paribas	- -	433
J.P. Morgan	- -	304

TABLE 5: Summary Statistics of Our Main Variables

This table shows for the full sample of 13,886 funds summary statistics for the main dependent and independent variables used in this study. Definitions of variable are provided in Appendix Table 1. The last column shows p-values of difference-in-means tests between the subsample of funds that did not make use of outsourcing (i.e., Outsourcing Dummy = 0) and those that made use of outsourcing (i.e., Outsourcing Dummy = 1).

	Full Sample						Sample w/o Outsourcing Dummy = 0	Sample w/ Outsourcing Dummy = 1	Test Diff. Mean
	Nbr. Obs.	Mean	Median	Std. Dev.	Min.	Max.	Mean	Mean	p-value
Outsourcing Variables:									
Outsourcing Dummy	13,886	0.4831	0	0.4997	0	1	0.0000	1.0000	- -
Outsourcing Index	13,886	1.5606	1	1.3846	0	4	0.3136	2.8930	0.000
Group Characteristics:									
Leading Group	13,886	0.5820	1	0.4933	0	1	0.6622	0.4964	0.000
Group Type: Bank	13,886	0.5971	1	0.4905	0	1	0.7549	0.4290	0.000
Group Type: Asset Management	13,886	0.2917	0	0.4546	0	1	0.1693	0.4223	0.000
Group Type: Other	13,886	0.1111	0	0.3143	0	1	0.0758	0.1488	0.000
Fund Characteristics:									
Fund Type: Equity	13,886	0.3735	0	0.4838	0	1	0.3263	0.4239	0.000
Fund Type: Bond	13,886	0.2063	0	0.4046	0	1	0.2018	0.2110	0.182
Fund Type: Other	13,886	0.4202	0	0.4936	0	1	0.4719	0.3651	0.000
3rd-Party Distribution	13,886	0.4468	0	0.4972	0	1	0.3140	0.5883	0.000
UCITS Fund	13,886	0.5042	1	0.5000	0	1	0.5535	0.4516	0.000
Fund Client: Retail	13,886	0.7150	1	0.4514	0	1	0.7558	0.6716	0.000
Fund Client: Institutional	13,886	0.2259	0	0.4182	0	1	0.1873	0.2671	0.000
Fund Client: HNWI	13,886	0.0591	0	0.2357	0	1	0.0569	0.0613	0.277
Fund Fee: Management Fee (%)	12,835	1.1466	1	0.7286	0	9	1.1631	1.1288	0.006
Fund Fee: Subscription Fee (%)	13,025	2.8343	3	2.1310	0	12	2.7881	2.8857	0.007
Fund Sharpe Ratio (annualized)	11,488	0.1427	0.9920	4.6583	-36.4434	4.0846	0.0955	0.1964	0.203
Fund Return Std. Dev. (annualized)	12,118	0.0045	0.0039	0.0033	0.00003	0.0158	0.0042	0.0048	0.000

TABLE 6: Determinants of Service Outsourcing

This table shows drivers of service outsourcing. The dependent variable is Outsourcing Dummy in Panel A and Outsourcing Index in Panel B. Panel A provides results of Probit regressions, while Panel B results of Poisson regressions. All the specifications include fund vintage year, fund country and group country dummies. Coefficients are all marginal effects. Definitions of variables are provided in Appendix Table 1. Standard errors are clustered by fund vintage years. Significance levels: * < 10%, ** < 5%, *** < 1%.

PANEL A - Dep. Var. = Outsourcing Dummy (Probit Regressions)

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Leading Group	-0.265***		-0.159***					-0.166***	-0.192***
Group: Bank		-0.303***	-0.269***					-0.273***	-0.327***
Group: Asset Management		0.047***	0.018					-0.022	-0.212***
Fund Type: Equity				0.0288			0.013	0.017	0.003
Fund Type: Bond				-0.001			0.003	0.011	-0.014
3rd-Party Distribution					0.212***		0.210***	0.095**	0.189***
UCITS Fund					-0.023		-0.022	-0.068***	-0.082**
Fund Client: Retail						0.01	0.005	0.046	0.076**
Fund Client: Institutional						-0.036	-0.0381	-0.016	0.036
ln(Fund Size)									0.002
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	13880	13880	13880	13880	13880	13880	13880	13880	4838
Pseudo-R2	0.279	0.299	0.307	0.252	0.270	0.252	0.271	0.314	0.330

PANEL B - Dep. Var. = Outsourcing Index (Poisson Regressions)

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Leading Group	-0.514***		-0.293***					-0.300***	-0.398***
Group: Bank		-0.462***	-0.401***					-0.398***	-0.480***
Group: Asset Management		0.216***	0.128***					0.056*	-0.182***
Fund Type: Equity				0.080*			0.056*	0.057	0.020
Fund Type: Bond				-0.014			-0.002	0.015	-0.050
3rd-Party Distribution					0.443***		0.436***	0.189***	0.498***
UCITS Fund					-0.018		-0.010	-0.099***	-0.089
Fund Client: Retail						0.016	0.011	0.057	0.107
Fund Client: Institutional						-0.069	-0.069	-0.039	0.063
ln(Fund Size)									-0.016**
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	13880	13880	13880	13880	13880	13880	13880	13880	4838
Pseudo-R2	0.147	0.154	0.158	0.135	0.143	0.135	0.144	0.161	0.109

TABLE 7: Impact of Service Outsourcing on Fee Structure

This table shows drivers of fee structure. In Panel A, the first four regressions use Management Fee as dependent variable and the last four regressions Subscription Fee. In Panel B, the first five regressions use Management Fee as dependent variable and the last five regressions Subscription Fee. All the panels provide results of OLS regressions. All the specifications include fund vintage year, fund country and group country dummies. Definitions of variables are provided in Appendix Table 1. In Panel B, the term *"Outsourcing Type" * Retail* corresponds to the interaction term between the corresponding outsourcing dummy used and the variable "Fund Client: Retail". Standard errors are clustered by fund country location. Significance levels: * < 10%, ** < 5%, *** < 1%.

Panel A - Dep. Var. = Management Fee in Models (1)-(4), and Subscription Fee in Models (5)-(8) (OLS Regressions)

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Dep. Var. = Management Fee				Dep. Var. = Subscription Fee			
Outsourcing Dummy	0.055	-0.009	0.091*	0.022	-0.072	-0.127	-0.317***	-0.369***
Outsourcing * Retail			-0.075	-0.045			0.305***	0.348***
Leading Group		-0.070**		-0.068**		-0.008		-0.017
Group: Bank		-0.195***		-0.195***		0.148		0.149
Group: Asset Management		-0.042		-0.041		0.160*		0.155
Fund Type: Equity		0.113***		0.113***		-0.075		-0.079
Fund Type: Bond		-0.307***		-0.306***		-0.499***		-0.505***
3rd-Party Distribution		-0.072		-0.073		0.172*		0.179**
UCITS Fund		0.191***		0.191***		0.069		0.075
Fund Client: Retail		0.388***	0.435***	0.410***		0.532**	0.408	0.361
Fund Client: Institutional		-0.008	-0.010	-0.010		-0.201	-0.207	-0.182
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	12829	12829	12829	12829	13019	13019	13019	13019
Adjusted R-squared	0.114	0.235	0.168	0.235	0.154	0.184	0.175	0.185

Panel B - Dep. Var. = Management Fee in Models (1)-(5), and Subscription Fee in Models (6)-(10) (OLS Regressions)

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Dep. Var. = Management Fee					Dep. Var. = Subscription Fee				
Outsourcing: Adviser	-0.007				0.020	0.106				0.185
Outsourcing: Custodian		0.034			-0.021		-0.355***			-0.173
Outsourcing: Administrator			-0.042		-0.114			-0.343***		-0.120
Outsourcing: Transfer Agent				0.027	0.078				-0.391***	-0.028
"Outsourcing Type" * Retail	0.029	-0.084	-0.039	-0.051		0.059	0.164	0.191	0.284**	
Leading Group	-0.069**	-0.068**	-0.078**	-0.068**	-0.078**	0.012	-0.010	-0.030	-0.024	-0.017
Group: Bank	-0.193***	-0.201***	-0.203***	-0.195***	-0.206***	0.167	0.119	0.142	0.153	0.105
Group: Asset Management	-0.042	-0.041	-0.040	-0.041	-0.045	0.156*	0.167	0.161	0.171*	0.164
Fund Type: Equity	0.112***	0.113***	0.115***	0.113***	0.114***	-0.081	-0.078	-0.074	-0.074	-0.077
Fund Type: Bond	-0.307***	-0.305***	-0.305***	-0.306***	-0.306***	-0.497***	-0.502***	-0.500***	-0.501***	-0.493***
3rd-Party Distribution	-0.073	-0.071	-0.072	-0.073	-0.072	0.161*	0.192**	0.175*	0.178**	0.186**
UCITS Fund	0.191***	0.188***	0.189***	0.191***	0.190***	0.072	0.065	0.073	0.073	0.057
Fund Client: Retail	0.384***	0.439***	0.407***	0.411***	0.390***	0.522**	0.439	0.457	0.407	0.544**
Fund Client: Institutional	-0.008	-0.011	-0.011	-0.011	-0.009	-0.197	-0.196	-0.193	-0.185	-0.201
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	12829	12829	12829	12829	12829	13019	13019	13019	13019	13019
Adjusted R-squared	0.235	0.236	0.236	0.235	0.237	0.183	0.185	0.185	0.185	0.186

TABLE 8: Impact of Service Outsourcing on Performance

This table shows the impact of outsourcing on fund performance. The dependent variable is Fund Sharpe Ratio in Panel A and Fund Return Std. Dev. in Panel B. All the panels provide results of OLS regressions. All the specifications include fund vintage year, fund country and group country dummies. Definitions of variables are provided in Appendix Table 1. Standard errors are clustered by fund vintage years. Significance levels: * < 10%, ** < 5%, *** < 1%.

PANEL A - Dep. Var. = Fund Sharpe Ratio (OLS Regressions)

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Outsourcing Dummy	-0.0657						
Outsourcing Index		0.0151					
Outsourcing: Adviser			0.3694**	0.3630**			
Outsourcing: Custodian			-0.1501		-0.1150		
Outsourcing: Administrator			0.3695*			0.1191	
Outsourcing: Transfer Agent			-0.2813				-0.1025
Leading Group	-0.0865	-0.0745	-0.0521	-0.0689	-0.0858	-0.0621	-0.0903
Group: Bank	-0.0542	-0.0349	-0.0727	-0.0551	-0.0691	-0.0250	-0.0544
Group: Asset Management	0.2729	0.2683	0.2740	0.2585	0.2764	0.2670	0.2793
Fund Type: Equity	2.0337***	2.0313***	2.0185***	2.0218***	2.0324***	2.0289***	2.0360***
Fund Type: Bond	1.1534***	1.1516***	1.1600***	1.1582***	1.1532***	1.1497***	1.1553***
3rd-Party Distribution	0.3821***	0.3750***	0.3979***	0.3749***	0.3909***	0.3754***	0.3831***
UCITS Fund	0.2060	0.2116	0.1931	0.2036	0.2025	0.2137	0.2046
Fund Client: Retail	1.0609***	1.0568***	1.0591***	1.0570***	1.0639***	1.0539***	1.0625***
Fund Client: Institutional	0.5307	0.5319	0.5352	0.5319	0.5315	0.5335	0.5302
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	11486	11486	11486	11486	11486	11486	11486
Adjusted R-squared	0.0519	0.0519	0.0530	0.0526	0.0520	0.0520	0.0520

PANEL B - Dep. Var. = Fund Return Std. Dev. (OLS Regressions)

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Outsourcing Dummy	-0.0000						
Outsourcing Index		0.0000					
Outsourcing: Adviser			0.0002**	0.0002*			
Outsourcing: Custodian			-0.0001		-0.0000		
Outsourcing: Administrator			-0.0000			0.0000	
Outsourcing: Transfer Agent			0.0000				0.0000
Leading Group	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Group: Bank	0.0001*	0.0002*	0.0001	0.0001	0.0001*	0.0001*	0.0001*
Group: Asset Management	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
Fund Type: Equity	0.0042***	0.0042***	0.0042***	0.0042***	0.0042***	0.0042***	0.0042***
Fund Type: Bond	-0.0011***	-0.0011***	-0.0011***	-0.0011***	-0.0011***	-0.0011***	-0.0011***
3rd-Party Distribution	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***
UCITS Fund	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***
Fund Client: Retail	0.0003*	0.0003*	0.0003*	0.0003**	0.0003*	0.0003*	0.0003*
Fund Client: Institutional	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	12116	12116	12116	12116	12116	12116	12116
Adjusted R-squared	0.5408	0.5408	0.5410	0.5411	0.5408	0.5408	0.5408

TABLE 9: Impact of Service Outsourcing on Performance, Based on Subsamples

This table shows the impact of outsourcing on fund performance for different subsamples. The dependent variable is Fund Sharpe Ratio in Panel A and Fund Return Std. Dev. in Panels B. Regressions (1) to (5) are for the subsample of asset management groups only (Group: Asset Management = 1) and regressions (6) to (10) for the subsample of banks only (Group: Bank = 1). All the panels provide results of OLS regressions. All the specifications include fund vintage year, fund country and group country dummies. Definitions of variables are provided in Appendix Table 1. Standard errors are clustered by fund vintage years. Significance levels: * < 10%, ** < 5%, *** < 1%.

PANEL A - Dep. Var. = Fund Sharpe Ratio (OLS Regressions) - Asset Management Firms Versus Banks

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Group: Asset Management = 1					Group: Bank = 1				
Outsourcing: Adviser	0.2051*	0.2372**				0.5946***	0.5577***			
Outsourcing: Custodian	-0.0353		0.2438			-0.1359		-0.2656*		
Outsourcing: Administrator	0.1003			0.3815**		0.6608			0.0411	
Outsourcing: Transfer Agent	0.3668				0.4318***	-0.8408*				-0.4410**
Leading Group	-0.0490	-0.1563	-0.1476	-0.0678	-0.0558	0.1475	0.1407	0.0920	0.1285	0.0725
Group: Bank	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Group: Asset Management	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Fund Type: Equity	1.3540***	1.3802***	1.3817***	1.3732***	1.3553***	2.2186***	2.2409***	2.2557***	2.2609***	2.2634***
Fund Type: Bond	0.8512***	0.8714***	0.8639***	0.8588***	0.8468***	1.1289***	1.1256***	1.1099***	1.1122***	1.1140***
3rd-Party Distribution	-0.2718	-0.2770	-0.3172	-0.2789	-0.2719	0.5945***	0.5085**	0.5182***	0.4832**	0.5521**
UCITS Fund	-0.1462	-0.1379	-0.1348	-0.1277	-0.1448	0.3723	0.4134*	0.3880	0.4088*	0.3805
Fund Client: Retail	0.3928	0.4132	0.4215	0.3795	0.4008	1.7198**	1.6730**	1.6888**	1.6656**	1.6846**
Fund Client: Institutional	0.0831	0.1008	0.1107	0.0704	0.0949	0.9957	0.9548	0.9549	0.9470	0.9388
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	3242	3242	3242	3242	3242	6965	6965	6965	6965	6965
Adjusted R-squared	0.0325	0.0305	0.0308	0.0322	0.0333	0.0579	0.0557	0.0551	0.0546	0.0557

PANEL B - Dep. Var. = Fund Return Std. Dev. (OLS Regressions) - Asset Management Firms Versus Banks

Explanatory Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Group: Asset Management = 1					Group: Bank = 1				
Outsourcing: Adviser	0.0002	0.0002*				0.0002	0.0002			
Outsourcing: Custodian	-0.0001		0.0001			-0.0000		-0.0001		
Outsourcing: Administrator	0.0000			0.0002**		0.0001			-0.0000	
Outsourcing: Transfer Agent	0.0002**				0.0002**	-0.0002				-0.0001
Leading Group	0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0000
Group: Bank	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Group: Asset Management	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Fund Type: Equity	0.0034***	0.0034***	0.0034***	0.0034***	0.0034***	0.0045***	0.0045***	0.0045***	0.0045***	0.0045***
Fund Type: Bond	-0.0015***	-0.0015***	-0.0015***	-0.0015***	-0.0015***	-0.0009***	-0.0009***	-0.0009***	-0.0009***	-0.0009***
3rd-Party Distribution	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004***	0.0003***	0.0003***	0.0003***	0.0003***
UCITS Fund	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0004***	-0.0004***	-0.0004***	-0.0004***	-0.0004***
Fund Client: Retail	-0.0001	-0.0000	-0.0000	-0.0001	-0.0000	0.0005**	0.0004**	0.0004**	0.0004**	0.0004**
Fund Client: Institutional	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0003	0.0003	0.0003	0.0003	0.0003
Vintage Year Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Fund Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Group Country Dummies Included?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nbr. Observations	3450	3450	3450	3450	3450	7314	7314	7314	7314	7314
Adjusted R-squared	0.5062	0.5057	0.5051	0.5056	0.5060	0.5500	0.5499	0.5497	0.5496	0.5498

APPENDIX TABLE A1: Definition of Variables

Variable Name	Definition
Outsourcing Index	Number of services outsourced, based on the following services: Adviser, Custodian, Administrator, and Transfer Agent. The other services, Trustee and Audit, are considered due to lack of data and/or because it is always outsourced. This variable ranges between 0 and 4.
Outsourcing Dummy	Dummy variable equal to one if "Outsourcing Index" ≥ 1.5, and zero otherwise.
Outsourcing: Adviser	Dummy variable equal to one if Adviser service is outsourced, and zero otherwise.
Outsourcing: Custodian	Dummy variable equal to one if Custodian service is outsourced, and zero otherwise.
Outsourcing: Administrator	Dummy variable equal to one if Administrator service is outsourced, and zero otherwise.
Outsourcing: Transfer Agent	Dummy variable equal to one if Transfer Agent service is outsourced, and zero otherwise.
Leading Group	Dummy variable equal to one if the fund management group has more than 100 funds under management as of July 2014, and zero otherwise.
Group Type: Bank	Dummy variable equal to one if management group is a Bank, and zero otherwise.
Group Type: Asset Management	Dummy variable equal to one if management group is an Asset Management firm, and zero otherwise.
Group Type: Other	Dummy variable equal to one if management group is of other type (e.g., insurance company), and zero otherwise.
Fund Type: Equity	Dummy variable equal to one if fund type is Equity, and zero otherwise.
Fund Type: Bond	Dummy variable equal to one if fund type is Bond, and zero otherwise.
Fund Type: Other	Dummy variable equal to one if fund type is other than Equity or Bond, and zero otherwise.
3rd-Party Distribution	Dummy variable equal to one if the fund is distributed by a third party, and zero otherwise.
UCITS Fund	Dummy variable equal to one if the fund is a UCITS, and zero otherwise.
Fund Client: Retail	Dummy variable equal to one if the fund is intended for Retail clients, and zero otherwise.
Fund Client: Institutional	Dummy variable equal to one if the fund is intended for Institutional clients, and zero otherwise.
Fund Client: HNWI	Dummy variable equal to one if the fund is intended for High Net Worth Individual (HNWI) clients, and zero otherwise.
Fund Fee: Management Fee (%)	Maximum management fees, in percent, charged to clients
Fund Fee: Subscription Fee (%)	Maximum subscription fees, in percent, charged to clients
Fund Sharpe Ratio (annualized)	Fund's Sharpe ratio on annual basis, using daily raw returns of past 3 years.
Fund Return Std. Dev. (annualized)	Fund's standard deviation of raw returns on annual basis, using daily raw returns of past 3 years.
Vintage Year Dummies	Set of dummy variables for the vintage year (year of start) of the fund.

Fund Country Dummies	Set of dummy variables for the different countries in which funds are domiciled. This can be the same as the group, but does not have to.
Group Country Dummies	Set of dummy variables for the different countries in which fund management groups are domiciled.

APPENDIX TABLE A2: Current Outsourcing Practices, by Fund Vintage Year

Vintage Year	Outsourcing Dummy	Outsourcing Index	Outsourcing of Individual Services			
			Adviser	Custodian	Administrator	Transfer Agent
2000	0.2737	1.0000	0.0740	0.4423	0.2352	0.2485
2001	0.3642	1.2316	0.0927	0.5000	0.2955	0.3435
2002	0.4257	1.3755	0.1283	0.5223	0.3532	0.3717
2003	0.4032	1.3423	0.1201	0.5376	0.3136	0.3710
2004	0.4092	1.3449	0.0825	0.5363	0.3432	0.3828
2005	0.3762	1.2718	0.0983	0.5182	0.3095	0.3459
2006	0.3948	1.2832	0.1203	0.5034	0.3026	0.3569
2007	0.4109	1.3791	0.1766	0.4905	0.3351	0.3768
2008	0.4616	1.4971	0.1440	0.5195	0.3929	0.4407
2009	0.5375	1.7359	0.1603	0.6209	0.4606	0.4940
2010	0.5866	1.8307	0.1460	0.6641	0.4832	0.5375
2011	0.5944	1.8802	0.0933	0.6576	0.5511	0.5783
2012	0.6043	1.8989	0.0861	0.7180	0.5333	0.5616
2013	0.5955	1.8448	0.1078	0.6818	0.5036	0.5517
2014	0.5469	1.7187	0.0859	0.6641	0.4766	0.4922