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Abstract

Firms' competitive advantages are unsustainable when competitors poach their employees away to learn about their organization processes. We document inter-firm knowledge spillovers through such personnel moves in the mutual fund industry. Almost two thirds of the competitive advantage of the originating fund family spills over to the recipient family. This effect intensifies when the switching manager has amassed more organizational knowledge at the originating family. Performance deterioration at the originating family suggests erosion of its competitive advantage, which intensifies when more money chases the newly-transferred knowledge at the recipient family. This implies wealth transfers across investors in respective families.

Keywords: organization capital, knowledge spillovers, mutual funds, learning-by-hiring

JEL-Classification: D86, G23 K12, K31, M5

Competition in the mutual fund industry is high (e.g., Wahal and Wang 2011, Khorana and Servaes 2012, and Cremers, Ferreira, Matos, and Starks 2016), and fund families spend much time and effort to maintain existing competitive advantages or develop new ones. They hire highly skilled managers and invest continuously in their organizational processes (e.g., research, investment, and distribution processes) and the resources needed (e.g., information systems) in order for their fund managers to achieve the best performance possible. However, this investment is at risk when competitors hire away their fund managers. The reason is that a fund manager who has worked for a given fund family for a certain period of time is likely to have accumulated knowledge regarding organizational processes and resources used at that family and can transfer this knowledge to her new employer after changing jobs.

Such knowledge transfers are potentially important for two reasons. First, if knowledge spillovers happen across fund families and fund families are thus unable to protect their competitive advantage from being copied by competitors, fund families might have less of an incentive to invest in their organization processes and resources, which in turn might make the securities markets less efficient. Second, if knowledge spillovers exist and they affect the performance of the recipient and the originating family in opposite ways, this would suggest that spillovers of this type cause wealth transfers across investors who invest in the respective families. Despite their potentially high importance in the asset management industry, such knowledge spillovers due to labor mobility have not been studied yet.[1] The objective of our study is to fill this research gap.

From a theoretical point of view, it is not clear whether such spillovers materialize. On the one hand, fund families with more limited resources or weaker organization processes might

[1] The notion of knowledge spillovers via labor mobility was first acknowledged by Arrow (1962) in the economics literature. Subsequent papers have documented that labor mobility is an important channel through which knowledge spillovers occur across firms (e.g., Moen 2005; Stoyanov and Zubanov 2012; and Heggedal, Moen, and Preugschat 2017). A number of related papers also document knowledge spillovers through the labor channel from multinational corporations to local firms (e.g., Görg and Strobl 2005; Balsvik 2011; Pesola 2011; and Poole 2013).

try to emulate families with competitive advantages by hiring away their fund managers in order understand the know-how behind their advantages and consequently utilize this information to produce better investment outcomes. This would lead to knowledge transfers and ultimately to performance improvements for recipient families. On the other hand, there are reasons why transmission of knowledge through a learning-by-hiring strategy might not work and performance not increase. First, constrains and frictions at the recipient firm might undermine knowledge spillovers as argued by Eeckhout and Jovanovic (2002) and Song, Almeida, and Wu (2003).[2] Second, fund families might seek to limit the knowledge that a manager can transfer when she moves. For example, many fund families use non-compete or garden-leave clauses in employment contracts, which delay the actual time when the departing manager can start working at the new family, as a way of preventing these managers from transmitting up-to-date information to their new employers.[3] Therefore, whether knowledge spillovers happen across fund families or not is an empirical question.

We rely on 290 cases of portfolio managers switching families during our 1992-2017 sample period in a difference-in-differences setting. Key to our analysis is what we refer to as the "performance gap", which is a proxy for the competitive advantage of the originating family relative to the recipient family. We compute performance gap as the difference in performance between the originating and the recipient family before the manager's switch. Our methodology relates the performance gap with the change in performance of the recipient family after the switch in a regression framework. The resulting coefficient on the performance gap, hereafter referred to as the knowledge spillover coefficient, reflects the knowledge spillover, i.e., what fraction of the comparative advantage of the originating family spills over to the recipient

[2] Imperfect copying from leading companies is at the core of the dynamic model with knowledge spillovers of Eeckhout and Jovanovic (2002), whereas Song, Almeida, and Wu (2003) test and find support for the hypothesis that firms that are path-dependent exhibit lower acceptance of knowledge generated outside of the organization.

[3] A non-compete clause prohibits an employee from working for a competing firm during a limited period of time and in a certain geographical area. A garden leave clause extends employment by a period of time during which an employee is still officially employed and paid by the firm but has no significant responsibilities. Garden leave periods are typically six months or less, while non-complete clauses cover periods of up to three years.

family. If the switching manager facilitates knowledge spillovers, we expect the knowledge spillover coefficient to be positive and significant. In other words, we expect the knowledge spillover and the associated performance improvement for the recipient family to be greater when the performance gap between the originating and recipient family is greater, i.e., when the originating family enjoys a greater competitive advantage relative to the recipient family.

To assess performance effects and compute the performance gap, we measure characteristic-adjusted performance at the level of the aggregate equity portfolio of the family and also measure the aggregated performance of the family in each of the 12 Fama-French industries (hereafter referred to as sectors). While the first approach provides us with insights about how knowledge spillovers affect the family in general, the latter approach is more powerful because it allows us to use within-recipient family variation, effectively controlling for unobserved family heterogeneity.

Our results show a positive relation between the performance change of the recipient family and the performance gap. This supports our main hypothesis that as a portfolio manager moves, she transfers knowledge from the originating to the recipient family. This result is both statistically and economically significant. To illustrate economic significance, our knowledge spillover coefficient estimates suggest that more than half of the competitive advantage of the originating family spills over to the recipient family during the three-year period after the manager switches families.

While the finding of a positive relation between the performance gap and the performance change of the recipient family supports the inference that the switching portfolio manager facilitates knowledge transfers from the originating to the recipient family, it is possible that the documented performance effect is due to the switching portfolio manager having superior general human capital, which improves the performance of the recipient fund family (e.g., Ma, 2013). To rule this out, we re-compute the aggregate performance of the recipient family portfolio and the performance gap measure after stripping of all the holdings

contributed by the funds managed by the switching manager. The positive relation between the recomputed performance gap and the change in the recomputed performance of the recipient family persists. Further, we control explicitly for the performance of the switching manager prior to the switch in our regressions, and our results are again unaffected. In sum, we are able to rule out that human capital of the switching portfolio manager is responsible for the overall performance improvement of the recipient family. This supports our view that knowledge about organization processes and resources (organization capital, hereafter) spills over to the recipient family and leads to performance improvements.

The competitive advantage of the original family relative to the recipient family reflects differences in the quality of human capital and organization capital between the two families. However, because only knowledge of organization capital is portable when a manager switches, we expect that knowledge spillover will intensify when the originating family has a greater wealth of organization capital. That is indeed what we find. The sensitivity of the performance change at the recipient family to the performance gap increases when the originating family has a greater wealth of organization capital. The sensitivity also increases when the switching manager had better access to this organization capital while working at the originating family. This is consistent with the notion that the amount of transferred knowledge is greater when there is more knowledge amassed at the originating family that can be potentially transferred and when the switching manager has better access to that knowledge, providing further support for our main hypothesis.

To provide further support for the existence of the spillover effect we document, we conduct an additional test. We argue that if there are no knowledge spillovers taking place that are being exploited by the recipient family, we would expect knowledge spillovers to have no effect on the originating family. On the other hand, knowledge spillovers, if present, could lead the recipient family to follow similar trading strategies as the originating family, eroding the returns earned by the originating family as more capital is chasing the same trading strategies.

Our evidence rejects the first possibility and supports the hypothesis that knowledge spillovers come at the detriment of the performance of the originating family. Specifically, we find a negative relation between the performance change of the originating family and the performance gap. In addition, we find that when the recipient family is larger, the relation described above intensifies. This suggests that the usefulness of the organization capital to the originating family diminishes when the transferred knowledge is subjected to a larger capital base at the recipient family. Overall, this is consistent with the competitive advantage of the originating family being eroded away due to knowledge spillovers to competitors. This evidence provides further support for our hypothesis that inter-family knowledge spillovers happen through the mobility of portfolio managers.

Our paper makes a contribution to the literature that studies competition in the mutual fund industry (e.g., Elton, Gruber, and Busse 2004; Hortacsu and Syverson 2004; Choi, Laibson, and Madrian 2010; Wahal and Wang 2011; Khorana and Servaes 2012; and Cremers, Ferreira, Matos, and Starks 2016). The most recent evidence from this literature suggests that competition in the mutual fund industry is high, with price competition as well as product differentiation featuring prominently in the strategies of mutual fund families. Our analysis furthers our understanding of the nature of competition in the mutual industry by suggesting a another way in which mutual fund families compete, namely by obtaining knowledge of each other's organization capital through mobility of their work force.

Our paper also contributes to a growing literature that studies strategies employed by mutual fund families that affect the performance their member funds. Examples of such strategies include cross-fund performance subsidization (e.g., Guedj and Papastaikoudi 2005 and Gaspar, Massa, and Matos 2006), centralization of decision making (e.g., Kacperczyk and Seru 2015), outsourcing of portfolio management (e.g., Chen, Hong, Jiang, and Kubik2013; Kostovetsky and Warner 2015; Moreno, Rodriguez, and Zambrana 2018; and Debaere and Evans 2015). Our contribution to this literature is that by documenting knowledge spillovers

that happen though labor mobility, we are in effect documenting an additional strategic decision, namely learning-by-hiring, that can potentially affect the quality of a family's organization capital and consequently its performance.

The rest of our paper is organized as follows. In Section 1 we describe our data and provide descriptive statistics. Section 2 documents that knowledge spillovers exist in the fund industry and, thus, presents the main results of the paper. In Section 3 we show that the extent of knowledge spillover depends on the amount of organization capital the originating family has and on the extent to which the switching manager had access to. In Section 4, we finally show that knowledge spillover hurt the performance of the originating family and that this effect is stronger when more capital is chasing the strategies of the originating family. Section 5 concludes.

1. Data

1.1 Data sources

We obtain information on family names and fund characteristics, such as monthly net returns, total net assets under management, investment objectives, and others, from the CRSP Survivor-Bias-Free U.S. Mutual Fund Database (CRSP MF). Our sample consists of actively managed diversified U.S. domestic equity and sector funds, excluding international, balanced, bond, index, and money market funds. Information provided at the share-class level is aggregated at the fund level by value-weighting all share classes of a fund.

To obtain data on fund portfolio holdings, we merge the CRSP MF database with the Thomson Reuters Mutual Fund Holdings Database (MF Holdings) using the MFLINK tables. In addition, funds' common stock portfolio holdings are supplemented with stock-specific information from the CRSP Monthly Stock Database (CRSP MS), which we link with MF holdings using stock CUSIPS. We categorize stocks into twelve sectors using the 12 industry

definitions provided in Kenneth French's data library.[4]

Finally, we obtain the names of fund managers from the Morningstar Direct Mutual Fund Database (MS Direct). We merge MS Direct with CRSP MF using fund CUSIPs. The combination of these two datasets helps us construct an employer-employee data set that maps portfolio managers to the funds that they manage at each point in time and the families they work for. Instances when a manager starts to manage funds for another family under a subadvising arrangement while still being an employee of the same family are manually checked and are not treated as family switches. The employer-employee data set allows us to track the exact date when a manager was lastly reported as a portfolio manager at the originating family and also shows the first date the switching manager assumed responsibilities at the recipient family. Manager switches due to mergers between fund families are manually checked and eliminated from our sample because the associated business restructuring, which might in turn give rise to restructuring of investment processes for the combined entities, makes it hard to isolate one-directional knowledge spillovers and their impact on performance. We restrict our sample of manager switches to observations, in which the time span between the originating and recipient family is less than 36 months.[5] In cases of a longer time span, the likelihood that the managers engaged in interim activities such as working at or consulting for non-mutual fund companies is greater. This makes it hard to attribute the transferred knowledge to the originating family because part of that knowledge could have originated at other non-mutual fund firms where the manager worked in the interim.

The first manager switch in our sample happens in February 1992 and the last one in December 2014. Because our analysis (see below) requires 36 months of family and fund data

[4] Data on industry definitions is obtained from "Details" of 12 Industry Portfolios as published on http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[5] This time span between the end date at the originating family and start date at the recipient family is likely due to non-compete clauses in employment contracts used by mutual fund families to restrict portfolio manager mobility (e.g., Cici, Hendriock, and Kempf 2018). We chose to restrict it to less than 36 months because non-compete clauses restrict their employees to not work for a competitor typically for up to three years.

before and after each switch, our sample period is from February 1989 till December 2017. We analyze 290 manager switches from 113 distinct originating families to 122 unique recipient families.

1.2 Descriptive Statistics

Table I provides descriptive statistics for the recipient and the originating families as well as all other (not treated) families. There are 122 distinct recipient and 113 distinct originating families compared to 661 not-treated families. There are no significant differences between recipient and originating families in our sample suggesting that recipient families hire, on average, managers from competitors with similar family characteristics. This might be due to the concern that big differences between the families could make the absorption of transferred knowledge more difficult for the recipient family.

All family groups show about the same average family size as measured by assets under management and number of funds. However, recipient and originating families employ more managers, on average, than the other families, with the difference being statistically significant at the 1%-level. This reflects the fact that families with more fund managers are more likely to be in the position of needing to hire a new manager or losing a manager to a competitor.

Insert Table I about here

All family groups employ the team-management approach to the same degree, but treated families seem to have a broader investment approach. More specifically, both recipient and originating families offer a larger number of investment styles and the recipient families have

a lower sector concentration than the non-treated families.[6] Finally, there are no significant performance differences among the three family groups. They all deliver comparable DGTW-adjusted returns, which have been aggregated over all their equity holdings and measured over the last 36 months before the managers' switch.

1.3 Methodology and Definition of Key Variables

The main independent variable in our study is the performance gap (*PG*), which is a proxy for the competitive advantage of the originating family relative to the recipient family. It captures the excess performance of the originating family relative to the recipient family, being measured as the difference in DGTW characteristic-adjusted return between the originating and the recipient family during the 3-year period before time *T* when the switching manager takes over her first fund at the recipient family.[7]

$$PG(T) = DGTW_O(T-3,T) - DGTW_R(T-3,T) \quad (1)$$

We compute the DGTW return of a fund family as the value-weighted sum of the DGTW-adjusted returns of all stocks in the aggregate family portfolio (aggregated over all the family funds in our sample). We calculate a stock's characteristic adjusted return in a given month by subtracting from its return the return of the benchmark portfolio, to which that particular stock belongs. Each stock's benchmark portfolio is a value-weighted portfolio that includes all stocks that are part of the same size, book-to-market, and one-year past return quintile.

The main independent variable in our analysis is the change in performance of the recipient family between the three-year period before and the three-year period after the starting date *T*

[6] We calculate sector concentration as proposed by Kacperczyk, Sialm, and Zheng (2005) using the Fama-French 12 Sectors and the CRSP MS universe as the benchmark portfolio. More specifically, the industry concentration index, ICI_t, is calculated as the sum of the squared differences between the family weight in the sector and the weight of this sector in the market portfolio. This index is smaller if the family portfolio resembles the market portfolio in terms of holdings across sectors.

[7] We follow following Daniel, Grinblatt, Titman, and Wermers (1997) and Wermers (2004) to calculate DGTW characteristic-adjusted returns.

of the newly hired manager, $\Delta DGTW_R(T)$. Thus, our baseline regression reads as:

$$\Delta DGTW_R(T) = \alpha + \beta PG(T) + \varepsilon_R(T) \quad (2)$$

The β coefficient on the performance gap, which we refer to as the knowledge spillover coefficient, measures the knowledge spillover, i.e., what fraction of the comparative advantage of the originating family spills over to the recipient family. If the switching manager facilitates knowledge spillovers, we expect the knowledge spillover coefficient to be positive and significant.

To control for family characteristics that could affect both the dependent and independent variable, we extend this basic specification to a diff-in-diff model by subtracting the performance of matching families from the performance of the recipient and originating family, respectively.

Insert Table II about here

We determine matching families for the recipient family based on a probit analysis that determines the likelihood of hiring a new fund manager at time T. The independent variables in the probit analysis are family size, family focus as defined by Siggelkow (2003), distinct number of fund styles as offered by the recipient family in the three-year period before *T*, past performance (DGTW returns for the year $T-4$ to $T-3$)[8], and team approach, i.e., the ratio of funds managed in teams to all family funds. The results in Panel A of Table II show that only family size, family focus, and number of fund styles have a significant impact on the likelihood of hiring a new manager. Therefore, we use only these variable to calculate propensity scores.

[8] We measured past performance over this particular interval to avoid overlaps in the measurement period with our dependent variable and the performance gap.

Our control group consists of the three fund families with the closest match.[9] We substract the average DGTW return of this control group, $\Delta DGTW_R^C$, from the DTGW return of the recipient family. For the originating family, we use the same approach but now based on the likelihood that a manager of the family is hired away. The results are presented in Panel B of Table II. Ultimately, our diff-in-diff model reads as

$$\Delta DGTW_R(T) - \Delta DGTW_R^C(T) = \alpha + \beta\left[PG(T) - PG^C(T) \right] + \varepsilon_R(T) \tag{3}$$

where $\Delta DGTW_R^C$ is the change in DGTW return of the control group matched to the recipient family and PG^C is the performance gap between the control groups matched to the originating and recipient family.

To control for unobserved family heterogeneity even more effectively, we analyze the effects of knowledge spillover not only at the level of the aggregate equity portfolio of the family, but also at the level of the performance of the family in the various sectors.[10] To do so, we calculate a sector-level performance measure of each fund family in our sample as the value-weighted sum of the DGTW returns of all stocks that the fund family held in each sector. Based on these DTGW returns of family sector portfolios, we calculate sector-specific performance gaps, sector-specific performance changes of the recipient family, and the respective performance measures for the control groups like before. Thus, we ultimately run model (3) for the aggregated family portfolio as well as for the sector portfolios of a family.

[9] We restrict control families so that they are neither a recipient nor an originating family during a 6-year period around the manager's switch.

[10] The sector classification is based on the 12 Fama-French industry classifications. We exclude the *Others* sector due to its heterogeneity. We also exclude the *Finance* sector in order to avoid cases when the originating family and its affiliated entities are publicly traded. In such cases, the switching manager might transfer information regarding the business operations of these entities that could affect the recipient family's investments in their stocks. We are not after this type of information transfers. For example, the parent company of PIMCO is the Allianz Group, an insurance and asset management company that is publicly traded. A manager that leaves PIMCO for another family might bring with him information about Allianz that the recipient family can exploit to invest in Allianz's stock.

2. Knowledge Spillovers and the Performance of the Recipient Family

2.1 Baseline Result

To examine whether knowledge spillovers facilitated by switching managers materialize, we estimate regression (3). Results are presented in Table III, where we measure performance at the family level in column (1) and at the family-sector level in columns (2) – (4). Thus, the unit of observation in column (1) is the aggregate portfolio of each of the 290 families, which hired a new manager from another family, and the unit of observation in the remaining columns is the portfolio of each of the 290 families in each sector. In columns (2) – (4) we cluster standard errors by recipient families. In these specifications, we also employ various combinations of sector fixed effects to control for cross-sector differences in knowledge production intensity (e.g., Utilities vs. Healthcare) and recipient family by year fixed effects to control for unobserved heterogeneity across families.

Insert Table III about here

All specifications in Table III show a positive relation between the performance change of the recipient family and the performance gap, both of which have been adjusted for the performance of control families. The knowledge spillover coefficient is statistically significant at the 1%- level and highly relevant in economic terms. For example, at the aggregated family level, the value of the knowledge spillover coefficient suggests that a one-percent performance gap is associated with a future performance improvement of 0.64 percentage points per year for the recipient family. This is consistent with more than half of the competitive advantage of the originating family relative to the recipient family spilling over to the recipient family within three years after the manager switched families. At the family-sector level, we find similar results. In sum, the evidence from Table III provides strong support for our main hypothesis that knowledge spillovers facilitated by portfolio managers as they move from a family that is

at a competitive advantage relative to the recipient family benefit the performance of recipient families.

2.2. Controlling for the Human Capital of the Switching Manager

Previous research documents that various aspects of portfolio managers' human capital such as education (e.g., Chevalier and Ellison 1999; Gottesman and Morey 2006; Fang, Kempf, and Trapp 2014), investment experience (e.g., Golec 1996; Chevalier and Ellison 1999; Greenwood and Nagel 2009; Kempf, Manconi, and Spalt 2017), and prior industry experience (e.g., Cici, Gehde-Trapp, Göricke, and Kempf 2018) have a positive effect on the investment performance of these managers. In light of this evidence, an alternative explanation of the performance effect we document above is that recipient families might hire managers with superior human capital (e.g., Ma 2013). In other words, the performance effect might result from the high quality of the switching fund manager and not from the knowledge spillover from the originating family.

We conduct two tests to control for any performance effects that are possibly related to the superior human capital of the switching portfolio manager. In the first test, we re-compute the performance of the recipient family and the associated performance gap measure after removing all the holdings contributed by the funds managed by the switching manager. We then re-estimate the results of Table III using the re-computed variables that have been stripped of any direct influences coming from the human capital of the switching portfolio manager.

Insert Table IV about here

Results are presented in Panel A of Table IV. We observe that the positive relation between the re-computed performance gap and the change in the re-computed performance of the recipient family is highly significant. This provides a first indication that the performance

improvement of the recipient family does not result from hiring a portfolio manager with superior human capital.

To further support this conclusion, in the second test, we extend the analysis of Panel A by adding explicit control variables for the performance of the switching manager prior to the switch. We view prior performance of the switching manager as a comprehensive measure of the quality of the switching manager's human capital. The idea is that the superior human capital of the switching manager could affect the performance of the recipient family in ways other than through performance of the investments managed directly by the switching manager. For example, a skilled newly-hired fund manager might mentor, advise, and even help train other managers at the recipient family. Additionally, given her superior human capital, she might also increase the internal benchmark and thus the competitive pressure within the fund family. All these might cause the other fund managers from the recipient family to improve their performance.

In Panel B of Table IV we control for the quality of the human capital of the switching managers in two ways. First, we control for the performance of all the holdings of the switching manager in the originating family during the three-year period prior to his departure. This captures the overall skills of the switching manager. Second, we control for the performance of the holdings of the switching manager during the same period in the respective sector, i.e., the sector-specific skills. The positive relation between the re-computed performance gap and the change in the re-computed performance of the recipient family continues to be highly significant even after we control for the quality of the switching manager's human capital. In sum, the results from both tests rule out that the human capital of the switching portfolio manager is responsible for the overall performance improvement of the recipient family.

3. Factors that Strengthen the Effect of Knowledge Spillovers

In this section, we examine additional hypotheses related to factors that are expected to

intensify the knowledge spillover we document above. Specifically, we hypothesize that the knowledge spillover due to manager mobility intensifies when the switching manager amasses more knowledge of the organization capital at the originating family since that kind of knowledge is portable to the recipient family. This amassment should depend (1) on the wealth of organization capital at the originating family and (2) on the degree of access that the switching manager had to this capital. We test these hypotheses in Section 3.1 and 3.2, respectively.

We conduct the analysis at the family-sector level for two reasons: First, doing so allows us to distinguish between general and sector-specific organization capital. Second, like before, it allows us to better control for unobserved differences among fund families.[11] We again cluster standard errors by recipient families and employ sector as well as family by year fixed effects to control for cross-sector differences in knowledge production intensity and for unobserved heterogeneity among the fund families.

3.1. Wealth of Organization Capital at the Originating Family

The competitive advantage of the originating family relative to the recipient family reflects differences in the quality of human capital and organization capital between the two families. However, because only knowledge of organization capital is portable when a manager switches, we expect that knowledge spillover will intensify when the originating family has more organization capital.

To measure organization capital at the originating family, we use the level of resources available at that family, which we categorize based on its assets under management. The idea is that larger families arguably have more resources at their disposal and more well-defined processes in place. To conduct our test, we use an indicator variable that equals one if the assets

[11] Results are similar but statistically weaker when we conduct the analysis at the family level.

under management of the originating family are above the median assets of all originating families. We then interact this dummy variable with the performance gap variable and hypothesize the coefficient of the interaction term to be positive. The results are presented in the first column of Table V.

In a second step, we distinguish between general and sector-specific organization capital at the originating family. We expect the originating family to have more general organization capital when it manages a broader portfolio, i.e. a portfolio with a lower sector concentration, a larger number of funds, and a larger number of investment styles. We employ separate indicator variables that respectively capture each of the characteristics above, i.e., the originating family has a sector concentration that is below the median sector concentration of all originating families, manages a number of funds above the median number of funds of all originating families, and offers a number a styles above the median number of styles of all originating families. These dummy variables are then interacted with the performance gap, and we expect the coefficient of the interaction term to be positive. Results are presented in columns (2) – (4) of Table V.

We expect the originating fund family to have more sector-specific organization capital in a particular sector when it overweights that sector relative to its benchmark. The idea is that families exploit information advantages associated with their specialized research and investment expertise in certain sectors by having most of their funds exploit those advantages, which can lead the family as a whole to overweight those sectors. As before, we employ a dummy variable to capture sector-specific organization capital at the originating family, which equals one if the family's aggregate portfolio weight in a sector is above the median weight of

all originating families in that particular sector. Results are presented in column (5) of Table V.

Insert Table V about here

Table V strongly supports our hypothesis. Each dummy when interacted with the performance gap has the hypothesized sign and is statistically significant. Interestingly, our general measure of organization capital, family resources, delivers the strongest interaction effect in statistical and economical terms. The coefficient is statistically significant at the 1% percent level and highly significant in economic terms. The knowledge spillover coefficient is about 70% stronger when the portfolio manager is coming from originating families with more resources relative to originating families with fewer resources.

Turning to the distinction between general versus sector-specific organization capital, we find that general organization capital is more easily transferred than sector-specific organization capital. The coefficients on the interaction terms in columns (2) – (4) where different proxies for general organization capital are used are larger both in statistical and economic terms than the interaction term in column (5), which captures the impact of sector-specific organization capital on knowledge spillovers. Each general organization capital dummy when interacted with the performance gap is statistically significant at 5% significance level, at least, whereas the sector-specific organization capital dummy is significant at the 10% level only. Comparing economic significance presents a similar picture: the main effect measured by the knowledge spillover coefficient is stronger when originating families have more general organization capital relative to the other originating families by roughly 40% to 70%. For originating families with sector-specific organization capital, the respective number is only 20%. This suggests that sector-specific organization capital is less portable than general organization capital either because it is harder to fathom by the switching managers or because

it is harder to be absorbed by the recipient family given its highly specialized nature.

3.2. Switching Manager's Access to Organization Capital

Our analysis so far suggests that the knowledge spillover to the recipient family intensifies when the originating family possesses more organization capital, in which case the switching manager can potentially carry over a greater amount of useful information to the recipient family. While the wealth of organization capital at the originating family is important, we hypothesize that better access to such knowledge by the switching manager prior to the switch is also important. Thus, we expect that better access to the organization capital at the originating family leads to stronger knowledge spillovers from the originating to the recipient family.

We follow two approaches to identify switching managers that had better access to organization capital at the originating family. First, we argue that size of the assets managed by the switching manager while working at the originating family determines her access to organization capital. The rationale is that managers with a large asset base enjoy an economically more important position in the family relative to managers with smaller asset base. Such a position should provide the managers with better access to the family resources and consequently better access to the organization capital of the originating family. To test this hypothesis, we use a dummy variable, which equals one if the assets under management (AUM) for which the switching manager was responsible for before the switch was above the median of all fund managers in that family.

Insert Table VI about here

The first column of Table VI presents results where we interact the AUM dummy with the performance gap. Results show that the coefficient on the interaction term is significant at

the 1% significance level. The magnitude of the coefficient suggests that the interactive effect is also economically significant. Specifically, it suggests that the performance effect due to do knowledge spillovers is almost 50 percent stronger for switching managers with above median AUM relative to switching managers with below median AUM.

The second approach we follow to identify managers with better access to the organization capital of the originating family employs the position that the switching manager held in the originating family. The idea is that managers who held a more senior position at the originating family, by the nature of their job, had better access to the organization capital of the originating family. For example, a manager who is also a Director of Research and thus manages and coordinates many of family's research and investment processes is likely to have better access to the organization capital than someone who had no other responsibilities apart from portfolio management. To identify switching portfolio managers that held senior positions at the originating family, we look for keywords in the titles of those managers such as Director of Research, Chief Investment Office, etc.[13] We then introduce a dummy variable that equals one if the switching manager held a senior position in the originating family and interact that variable with the performance gap.

The second column of Table VI presents the results. The interaction term is not only statistically significant (at the 5%-level), but also economically highly relevant. The knowledge spillover effect is almost 60 percent stronger for switching managers that had senior positions relative to switching managers that did not.

Extending the notion of better access to organization capital further, we argue that having had better access for a longer time provides even better knowledge of the organization capital of the originating family. The idea is that having access for a longer period affords the

[13] More specifically, we search for the keywords Chief Executive Officer, Chief Investment Officer, Co-Chief Investment Officer, Director of Equity Research, Director of Research, Executive Vice President, Head of Investments, Managing Director, Partner, President, Principal, Senior Vice President, and Senior Managing Director.

manager a more comprehensive understanding of the organization capital of the originating family. Thus, in the third and fourth columns of Table VI, we replace the dummies employed in the first and second columns, with two dummies that reflect whether the manager was responsible for a larger fund or held her senior position for a longer period of time than the median switching manager. Consistent with a longer period granting the switching manager even better access to the organization capital of the originating family, we find that the coefficients on the interactions of performance gap with the long period dummy are even bigger than the coefficients on the interaction terms employed in the first (0.2869 versus 0.1811) and second column (0.3920 versus 0.2751).

In sum, the results of Section 3 provide a clear picture of factors that facilitate knowledge spillovers from the originating to the recipient family. The more organization capital the originating family has and the better the access the switching manager had to this capital, the stronger are the knowledge spillovers from the originating to the recipient family. This implies that a fund family hiring a new manager should take into account not only the relative competitive advantage of the family where the manager is coming from but also how much of that advantage results from the organization capital of the originating family and how much access to this capital the switching manager had.

4. Knowledge Spillovers and the Performance of the Originating Family

So far, we have looked at performance changes that the recipient family enjoys through knowledge spillovers from the originating family. We now turn our attention to how the performance of the originating family is affected by such spillovers. We hypothesize that knowledge spillovers lead the recipient family to use similar research processes and resources and, consequently, follow similar trading strategies as the originating family, which erodes the returns earned by the originating family as more capital is chasing the same trading strategies. Thus, when looking at originating families, we expect to see a performance effect that is

opposite to the one we observed for recipient families. To test this hypotheses, we re-run the main analyses of Section 2 (Table III and Panel B of Table IV) but now use the performance change of the originating family as our dependent variable. The results are presented in Table VII.

Insert Table VII about here

Both, Panels A and B of Table VII, document a negative and highly significant relation between the performance change of the originating family and the performance gap. This is consistent with the view that knowledge spillovers hurt the originating family by diminishing its competitive advantage since additional capital deployed by the recipient family is chasing the same trading strategies and, thus, eroding the returns earned by the originating family.

If this is indeed true, we expect to see an even stronger performance deterioration when the amount of capital contributed by the recipient family in pursuit of the same trading strategies is even larger. This is likely to happen when the recipient family is larger and can thus potentially deploy more capital to the trading strategies newly introduced due to knowledge spillovers. We test this hypothesis by interacting the performance gap variable with a variable that captures the size of the recipient family. More specifically, when we run the analysis at the family level, we use a dummy variable that takes the value of one if the assets under management of the recipient family is above the median value of all recipient families. When

we run the analysis at the sector-family level, we define the dummy in a similar fashion but based on the assets under management that the recipient family invests in the specific sector.

Insert Table VIII about here

The results provided in Table VIII strongly support our hypothesis. They show that when the transferred knowledge is subjected to a larger asset base at the recipient family, the detrimental performance effect on the originating family becomes even larger. The coefficient of the interaction term is negative and significant in all specifications.

Overall, the evidence of Section 4 provides further support for our hypothesis that inter-family knowledge spillovers happen through the mobility of portfolio managers. Combined with Section 2, the results indicate that labor mobility affects the performance of the recipient and the originating family in opposite ways suggesting wealth transfers across investors who invest in the respective families.

5. Conclusion

Although competition in the mutual fund industry has been subject to long-standing academic scrutiny, little to nothing is known of knowledge spillovers that may occur among mutual fund families. In a highly competitive industry such as the mutual fund industry, fund families with competitive advantages would try to protect and sustain their advantages, while families with no such advantages would aspire to gain access to the knowledge behind the advantages of their more successful counterparts. Our study is the first to investigate knowledge spillover across mutual fund families, focusing on a particular channel through which such spillovers may occur, namely labor mobility. The idea is that families with few or no competitive advantages might try to make up for their disadvantages by hiring mutual fund

managers away from their more successful competitors as a way to access knowledge pertaining to the organization capital of their competitors.

We document economically significant inter-family knowledge spillovers caused by the mobility of mutual fund managers, whereby recipient families are the beneficiaries of significant performance improvement that results from such knowledge spillovers. Specifically, we find that the related performance improvement is greater when knowledge is transferred via incoming managers from a family that is at a greater competitive advantage, with more than half of that advantage spilling over to the recipient family. In addition, the knowledge spillovers intensify when the switching manager comes from a family with more organization capital, knowledge of which is more portable, and when the manager had better access to that organization capital. In the same vein, knowledge spillovers intensify when organization capital at the originating family was general as opposed to sector-specific, which again might be easier to transfer to or absorb by the recipient family. Besides documenting the impact that these knowledge spillovers have on the recipient families, we also study their impact on the originating family. Our evidence from this investigation is consistent with the competitive advantages of the originating family being eroded away as a competing family learns about its organization capital and has more capital available to exploit the newly discovered ideas.

Our analysis and findings are important for a number of reasons. First, since we find evidence that knowledge spillovers have a negative effect on the originating families, fund families would benefit from limiting such spillovers. If fund families are unable to do so and protect their organization capital from being copied by competitors, they might have less of an incentive to invest in their organization capital, which in turn might make the securities markets less efficient. Second, our findings have implications for the hiring decisions of fund families with limited or no competitive advantages. In particular, these families might benefit from a learning-by-hiring strategy, which targets hires from families with more organization capital and targets managers who had better access to such capital. Finally, the fact that the knowledge

spillovers documented in this study benefit the performance of the recipient families while hurting the performance of the originating family suggests that these spillovers cause wealth transfers from investors who invest with the originating family to those that invest with the recipient family.

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Table I: Family characteristics

This table reports descriptive statistics at the fund family level. Means are provided for three groups of fund families: recipient (Rec), originating (Orig), and non-treated (NT) families. The last three columns provide differences between the means of the various family groups. Size measures total net assets under management aggregated over the fund family. Number of funds is the total number of funds run by the family. Number of managers is the number of managers employed by the fund family. Team management is the percentage of funds in the family that are managed by more than one portfolio manager. Number of styles is the distinct number of styles offered by the family. Following Kacperczyk, Sialm, and Zheng (2005), Sector concentration is calculated as the sum of the squared deviations of the value weights for each of the ten different Fama-French Sectors held by the fund family relative to the sector weights of the total stock market as approximated by the CRSP-universe. DGTW-adjusted returns are estimated as in Daniel, Grinblatt, Titman, and Wermers (1997), where a stock's characteristic-adjusted return in a given month is computed by subtracting from its return from the return of the benchmark portfolio to which that particular stock belongs. These adjusted returns are then value-weighted at the fund family portfolio level. Size is reported in $ millions and Sector concentration as well as DGTW-adjusted return in percent. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Characteristics	Recipient families	Originating families	Non-Treated families	Difference Rec - Orig	Difference Rec - NT	Difference Orig - NT
Number of families	122	113	661			
Size ($ million)	15,096	13,648	17,001	1,448	-1,904	-3,353
				(0.28)	(-0.22)	(-0.38)
Number of funds	4.37	4.23	4.25	0.1464	0.1220	-0.0244
				(0.75)	(0.32)	(-0.06)
Number of managers	10.36	10.02	6.23	0.3468	4.1308***	3.7840***
				(0.34)	(3.12)	(2.62)
Team management	0.49	0.47	0.44	0.0216	0.0526	0.0310
				(0.69)	(1.43)	(0.76)
Number of styles	3.44	3.38	2.39	0.0656	1.0565***	0.9909***
				(0.39)	(4.90)	(4.17)
Sector concentration (%)	2.02	2.26	2.79	-0.24	-0.77**	-0.52
				(-0.60)	(-2.05)	(-0.79)
DGTW (% per year)	0.43	0.41	0.57	0.01	-0.15	-0.16
				(0.06)	(-0.44)	(-0.46)

Table II: Probit regression

This table presents results from probit regressions that relate a family's likelihood of experiencing a manager change at time T (when the manager takes over the first fund at the recipient family) and various family characteristics. Size, Number of styles, Sector concentration, and Team management are measured as in Table I. Past performance is calculated as the DGTW-adjusted return for the period T-4 to T-3. The DGTW-adjusted return is calculated as in Table I. Panel A reports the results for the likelihood of hiring a manager, i.e., being a recipient family and Panel B shows the results for the likelihood of experiencing a manager departure, i.e., being an originating family. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Panel A: Recipient families

Variables	(1)	(2)	(3)
Constant	-3.2535***	-3.3063***	-3.3020***
	(-25.50)	(-26.92)	(-26.93)
Log(Size)	0.0834***	0.0815***	0.0812***
	(6.95)	(6.85)	(6.82)
Number of styles	0.0627***	0.0658***	0.0655***
	(3.18)	(3.37)	(3.36)
Sector concentration	-0.2246**	-0.2133*	-0.2180*
	(-1.99)	(-1.90)	(-1.94)
Past performance	-2.5318	-2.5554	
	(-1.06)	(-1.07)	
Team management	-0.0829		
	(-1.46)		

Panel B: Originating families

Variables	(1)	(2)	(3)
Constant	-3.5458***	-3.5552***	-3.5490***
	(-26.92)	(-28.24)	(-28.23)
Log(Size)	0.0967***	0.0964***	0.0959***
	(7.99)	(7.97)	(7.93)
Number of styles	0.0962***	0.0966***	0.0964***
	(4.96)	(5.01)	(4.99)
Sector concentration	-0.3280***	-0.3265***	-0.3319***
	(-2.82)	(-2.81)	(-2.87)
Past performance	-3.4647	-3.4721	
	(-0.24)	(-1.39)	
Team management	-0.0143		
	(-0.24)		

Table III: Baseline results

This table presents results from OLS regressions that relate the performance change of the recipient family with the performance gap between the originating and recipient family. Performance gap is measured over a three-year-interval before time T (when the manager takes over her first fund at the recipient family). Performance change of the recipient family is measured over the three-year period before and the three-year period after time T. Performance is measured using DGTW-returns in all specifications. In Model (1), performance and performance gap are measured at the family level, i.e., we calculate the value-weighted sum of the DGTW-adjusted returns of all stocks in the aggregate family portfolio. In Model (2) – (4), performance and performance gap are measured at the family-sector level, i.e., we calculate the value-weighted sum of the DGTW returns of all stocks that the fund family held in each sector. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Variables	Family Level	Family-Sector Level		
	(1)	(2)	(3)	(4)
Constant	0.0003*	0.0003*	0.0005	0.0036***
	(1.72)	(1.76)	(1.14)	(7.10)
Performance gap	0.6404***	0.5165***	0.5167***	0.5074***
	(14.16)	(13.77)	(13.76)	(11.55)
Sector FE	No	No	Yes	Yes
Recipient x Year FE	No	No	No	Yes
Cluster	None	Recipient	Recipient	Recipient
Observations	290	2,812	2,812	2,812
Adjusted R-squared	0.408	0.200	0.199	0.246

Table IV: Baseline Result Controlled for Switching Manager's Human Capital

This table replicates Table III using two modifications. In Panel A, we exclude funds managed by the switching manager when calculating the performance of the recipient and originating family. In Panel B, we extend the analysis of Panel A by controlling for the prior performance of the switching manager. We measure the switching manager's prior performance as the average DGTW-adjusted return of the funds she has managed in the originating family during the three-year period prior to her departure. Manager DGTW (all holdings) is calculated using all her stock holdings, Manager DGTW (sector holdings) is calculated using only her stock holdings in a specific sector. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Panel A: Excluding the Holdings of the Switching Manager

	Family Level	Sector Level		
Variables	(1)	(2)	(3)	(4)
Constant	0.0002	0.0003	0.0006	0.0017***
	(0.93)	(1.65)	(1.40)	(3.67)
Performance gap	0.6638***	0.4800***	0.4802***	0.4647***
	(14.31)	(14.41)	(14.50)	(12.55)
Sector FE	No	No	Yes	Yes
Recipient x Year FE	No	No	No	Yes
Cluster	None	Recipient	Recipient	Recipient
Observations	290	2,812	2,812	2,812
Adjusted R-squared	0.414	0.247	0.246	0.282

Panel B: Controlling for Prior Performance of the Switching Manager

	Family Level	Sector Level		
Variables	(1)	(2)	(3)	(4)
Constant	0.0001	0.0014***	0.0015***	0.0015***
	(0.51)	(2.73)	(2.91)	(2.67)
Performance gap	0.7081***	0.4678***	0.4766***	0.4767***
	(14.52)	(12.43)	(12.30)	(12.30)
Manager DGTW (all holdings)	-0.0387	0.0105		0.0241
	(-1.38)	(0.13)		(0.34)
Manager DGTW (sector holdings)			0.0074	0.0073
			(0.74)	(0.73)
Sector FE	No	Yes	Yes	Yes
Recipient x Year FE	No	Yes	Yes	Yes
Cluster	None	Recipient	Recipient	Recipient
Observations	260	2,504	2,333	2,333
Adjusted R-squared	0.447	0.279	0.292	0.291

Table V: Impact of Wealth of Organization Capital

This table presents an extended version of Model (4) in Panel B of Table IV. More specifically, we interact the performance gap with a dummy variable that captures a certain aspect of the organization capital of the originating family. For this, we use various characteristics, all of which are averaged over the three-year period before time T (when the manager takes over her first fund at the recipient family). In Model (1), the dummy equals one if the size of the originating family is above the median of all originating families. In Model (2), the dummy equals one if the sector concentration of the originating family is below median. In Model (3) and (4), the dummy equals one if the number of funds and the number of distinct styles of the originating family are above median, respectively. In Model (5), the dummy equals one if the difference between the weight of the originating family in a specific sector and the sector weight in the CRSP-universe is above median. T-statistics, based on standard errors clustered by recipient families, are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Org. Dummy Name:	Family Resources	Sector Diversification	# Funds	# Styles	Sector Overweighting
Variables	(1)	(2)	(3)	(4)	(5)
Constant	0.0013**	0.0012**	0.0013**	0.0013**	0.0010
	(2.46)	(2.21)	(2.32)	(2.32)	(1.55)
Performance gap	0.3785***	0.4074***	0.3770***	0.3854***	0.4406***
	(8.40)	(8.63)	(8.70)	(8.31)	(10.41)
Org. Dummy	-0.0007	0.0002	-0.0003	0.0002	-0.0005
	(-1.09)	(0.43)	(-0.49)	(0.45)	(-1.35)
Performance gap * Org. Dummy	0.2643***	0.1633**	0.2617***	0.2356***	0.0857*
	(4.27)	(2.24)	(3.98)	(3.59)	(1.79)
Manager DGTW (all holdings)	0.0323	0.0184	0.0343	0.0464	0.0238
	(0.52)	(0.27)	(0.50)	(0.63)	(0.36)
Manager DGTW (sector holdings)	0.0065	0.0067	0.0069	0.0067	0.0067

	(0.70)	(0.68)	(0.74)	(0.71)	(0.67)
Sector FE	Yes	Yes	Yes	Yes	Yes
Recipient x Year FE	Yes	Yes	Yes	Yes	Yes
Cluster	Recipient	Recipient	Recipient	Recipient	Recipient
Observations	2,333	2,333	2,333	2,333	2,333
Adjusted R-squared	0.307	0.297	0.307	0.304	0.293

Table VI: Impact of Switching Manager's Access to Organization Capital

This table presents an extended version of Model (4) in Panel B of Table IV. More specifically, we interact the performance gap with a dummy variable that captures the degree of access that the switching manager had to the organization capital of the originating family. In Model (1), High access denotes an indicator variable that equals one if the assets under management for which the switching manager was responsible at the originating family was above the median of all fund managers in that family. In Model (2), the High access dummy equals one if the switching manager held a senior position (defined as Chief Executive Officer, Chief Investment Officer, Co-Chief Investment Officer, Director of Equity Research, Director of Research, Executive Vice President, Head of Investments, Managing Director, Partner, President, Principal, Senior Vice President, and Senior Managing Director) at the originating family. In Model (3) and (4), we split the dummies used in Model (1) and (2) further. Short (long) access is a dummy that equals one if the manager had high access to the organization capital of the originating family for a period of time that is below (above) the median period of all switching managers with high access. T-statistics, based on standard errors clustered by recipient families, are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Variables	Managers' AUM (1)	Senior Position (2)	Managers' AUM (3)	Senior Position (4)
Constant	0.0013**	0.0015***	0.0011*	0.0015***
	(2.29)	(2.66)	(1.67)	(2.63)
Performance gap	0.3926***	0.4677***	0.3844***	0.4676***
	(7.77)	(11.92)	(6.50)	(11.92)
High access	0.0005	0.0000		
	(1.05)	(0.06)		
Performance gap * High Access	0.1811***	0.2751**		
	(2.63)	(2.40)		
Manager DGTW (all holdings)	0.0249	0.0232	0.0144	0.0279
	(0.40)	(0.33)	(0.21)	(0.41)
Manager DGTW (sector holdings)	0.0061	0.0073	0.0065	0.0071
	(0.62)	(0.73)	(0.65)	(0.71)
Short access			0.0004	0.0004
			(0.83)	(0.54)
Long access			0.0000	-0.0015***
			(0.03)	(-4.75)
Performance gap * Short access			0.0543	-0.0060
			(0.59)	(-0.02)
Performance gap * Long access			0.2869***	0.3920***
			(3.39)	(3.11)
Sector FE	Yes	Yes	Yes	Yes
Recipient x Year FE	Yes	Yes	Yes	Yes
Cluster	Recipient	Recipient	Recipient	Recipient
Observations	2,333	2,333	2,333	2,333
Adjusted R-squared	0.299	0.293	0.303	0.293

Table VII: Performance Effect on Originating Family

Panel A of this table replicates Table III but uses the performance change of the originating family as dependent variable. Panel B replicates Panel B of Table IV but use the performance of the originating family as the dependent variable. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Panel A: Baseline results

	Family Level	Sector Level		
Variables	(1)	(2)	(3)	(4)
Constant	-0.0001	-0.0000	0.0002	-0.0037***
	(-0.36)	(-0.31)	(0.55)	(-8.01)
Performance gap	-0.4398***	-0.3994***	-0.3996***	-0.3864***
	(-9.90)	(-10.11)	(-10.11)	(-9.27)
Sector FE	No	No	Yes	Yes
Recipient x Year FE	No	No	No	Yes
Cluster	None	Originating	Originating	Originating
Observations	265	2,404	2,404	2,404
Adjusted R-squared	0.268	0.140	0.139	0.184

Panel B: Controlling for Prior Performance of the Switching Manager

	Family Level	Sector Level		
Variables	(1)	(2)	(3)	(4)
Constant	-0.0001	-0.0029***	-0.0039***	-0.0039***
	(-0.57)	(-5.81)	(-7.76)	(-7.80)
Performance gap	-0.3665***	-0.3927***	-0.4005***	-0.4009***
	(-7.73)	(-11.36)	(-10.88)	(-10.93)
Manager DGTW (all holdings)	-0.0090	-0.0325***		-0.0402***
	(-0.34)	(-3.07)		(-3.21)
Manager DGTW (sector holdings)			0.0035	0.0044
			(0.33)	(0.42)
Sector FE	No	No	Yes	Yes
Recipient x Year FE	No	No	No	Yes
Cluster	None	Originating	Originating	Originating
Observations	239	2,189	2,035	2,035
Adjusted R-squared	0.195	0.235	0.245	0.245

Table VIII: Size of Recipient Family and Performance Effect on Originating Family

This table augments the models of Table VII by interacting the performance gap with a size dummy that equals one if the assets under management of the recipient family is above the median of all recipient families. Assets under management are measured over the three-year period before T (when the manager takes over her first fund at the recipient family). In Model (1), the assets under management are measured using the entire family portfolio. In Model (2) – (4), the assets under management are measured using the portfolio the family has in a specific sector. T-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% significance level, respectively.

Panel A: Baseline results

	Family Level	Sector Level		
Variables	(1)	(2)	(3)	(4)
Constant	-0.0004	-0.0002	0.0001	-0.0037***
	(-1.39)	(-0.66)	(0.26)	(-8.04)
Performance gap	-0.3333***	-0.2902***	-0.2899***	-0.2854***
	(-6.04)	(-7.08)	(-7.08)	(-6.08)
Size Dummy	0.0006	0.0003	0.0003	0.0001
	(1.48)	(0.80)	(0.86)	(0.16)
Performance gap * Size Dummy	-0.2790***	-0.2885***	-0.2901***	-0.2633***
	(-3.08)	(-4.26)	(-4.32)	(-3.62)
Sector FE	No	No	Yes	Yes
Recipient x Year FE	No	No	No	Yes
Cluster	None	Originating	Originating	Originating
Observations	265	2,404	2,404	2,404
Adjusted R-squared	0.294	0.157	0.156	0.198

Panel B: Controlling for Prior Performance of the Switching Manager

	Family Level	Sector Level		
Variables	(1)	(2)	(3)	(4)
Constant	-0.0006**	-0.0031***	-0.0041***	-0.0042***
	(-2.00)	(-6.20)	(-8.31)	(-8.37)
Performance gap	-0.274***	-0.3138***	-0.3258***	-0.3265***
	(-4.64)	(-8.18)	(-8.05)	(-8.09)
Size Dummy	0.0008**	-0.0000	-0.0000	-0.0001
	(2.05)	(-0.065)	(-0.10)	(-0.24)
Performance gap * Size Dummy	-0.2280**	-0.2188***	-0.2041***	-0.2033***
	(-2.32)	(-4.41)	(-3.80)	(-3.78)
Manager DGTW (all holdings)	-0.0191	-0.0267**		-0.0350**
	(-0.72)	(-2.31)		(-2.42)
Manager DGTW (sector holdings)			0.0028	0.0036
			(0.27)	(0.35)
Sector FE	No	No	Yes	Yes
Recipient x Year FE	No	No	No	Yes
Cluster	None	Originating	Originating	Originating
Observations	239	2,189	2,035	2,035
Adjusted R-squared	0.219	0.249	0.257	0.257

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