Attracting Flows by Attracting Big Clients

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ABSTRACT

We explore a new channel for attracting inflows using a unique data set of corporate 401(k) retirement plans and their mutual fund family trustees. Families secure substantial inflows by being named trustee. We find that family trustees significantly overweight, and are reluctant to sell, their 401(k) client firm's stock. Trustee overweighting is more pronounced when the relationship is more valuable to the trustee family, and is concentrated in those funds receiving the greatest benefit from the inflows. We quantify this flow benefit and find that inclusion in the 401(k) plan has an economically and statistically large, positive effect on inflows.

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Retirement assets make up a large and growing percentage of the mutual fund universe. In 2004, nearly 40% of *all* mutual fund assets were held by Defined Contribution Plans and Individual Retirement Accounts. This percentage is steadily increasing largely because these retirement accounts represent the majority of new flows into non-money market mutual funds (60% in 2004).[1] With such a large and growing percentage of their assets coming from retirement accounts, mutual funds are likely to be interested in securing these big clients. Previous literature on the agency problems associated with increasing funds under management has concentrated on the flow-performance relationship (Brown, Harlow, and Starks (1996), Goetzmann and Peles (1997), and Sirri and Tufano (1998)). In this paper we examine a new channel through which mutual fund families can attract assets: by becoming the trustee of a 401(k) plan.

The trustee of a 401(k) plan plays a fundamental role in our analysis. Under the United States Code, 401(k) plan sponsors must appoint a trustee who holds fiduciary responsibility over the plan's assets. Among the trustee's duties are the obligations to act in a "prudent" manner with respect to employee contributions and to ensure that the plan offers a diversified and suitable set of investment options to plan participants.[2] Thus, the *trustee*, along with the other fiduciaries (usually company affiliates), decides which investment options will be available to employees.

Many plans employ large mutual fund families (often with pension management divisions) as their trustees. Perhaps not surprisingly, in most plans the majority, and in some cases all, of the fund options are those of the trustee (Huberman and Jiang (2006), Elton, Gruber, and Blake (2006)). For example, in 1997, T. Rowe Price was the trustee of CB Richard Ellis Services Inc.'s 401(k) plan. This plan offered 15 investment options: one was CB Richard Elllis company stock. The remaining 14 were T. Rowe Price mutual funds.

From the family's perspective, becoming the trustee of a large 401(k) plan is attractive for several reasons. First, by becoming the trustee, the family guarantees a large inflow of money

in the form of plan assets invested in family funds. In our sample, the average 401(k) plan has more than $550 million in assets, or about 9% of the assets held by the average family. Second, the employees become captive investors in the plan options. A typical 401(k) plan in our sample has 13 options, one of which is company stock and another is a money market fund. Most, if not all, of the remaining options are mutual funds chosen (at least in part) by the trustee. Employees are able to invest and move their 401(k) retirement assets only between these plan options. Thus, in addition receiving an initial large inflow, the trustee fund family receives additional flows in retirement contributions as the employees save each year. Third, 401(k) plans rarely change trustees. In our sample, the unconditional probability that a company will change trustees in a given year is about 3.4%. Search costs, administrative costs, the cost to employees of rebalancing, and similar factors likely explain this low transfer rate. Thus, the expected future benefits of the relationship are relatively long-lived.

Given the size and importance of sponsor firms' 401(k) assets to mutual funds, and the complex set of agency relationships within mutual fund conglomerates, it's important to understand: (i) how portfolio allocations are affected by the trustee relationship, and (ii) what the sources (if any) of these distortions are. In this paper we concentrate on the first point and provide strong evidence that the trustee relationship affects portfolio allocations. In addition, we provide evidence on the nature and timing of these distortions that may be useful in assessing how the relationship affects trustees' portfolio choices.

We find that families acting as trustees systematically overweight their sponsor firms. One measure we use is the proportion of the firm's shares outstanding held by the family. Controlling for other firm, family, and plan characteristics, trustee families hold significantly more in sponsor firms (nearly 47% more on average). This translates into holding on average about $62 million

more in each of the sponsor firms, which implies a total distortion over the industry of more than $24 billion.

In order to gain a better sense of what could be driving this overweighting, we look into other portfolio choices taken by the trustee and find a number of additional effects. We find that the trustee overweighting is largest when it appears to be most valuable for the mutual fund family. Specifically, overweighting is more severe for (i) relatively larger 401(k) plans, (ii) relatively smaller fund families, and (iii) those mutual funds included as options in the 401(k) plan. Intuitively, larger 401(k) plans imply larger benefits for the family (in the form of inflows and fees), these benefits are relatively more valuable to smaller families (as a percentage of total assets), and the benefits are likely to accrue especially to those mutual funds included in the plan. The magnitudes of each effect are empirically large. Controlling for firm and family characteristics, a one-standard deviation increase in 401(k) plan size results in 15% more overweighting ($19 million) in the sponsor firm's stock. In addition, smaller trustee mutual fund families overweight significantly more than larger families, all else being equal: a one-standard deviation decrease in fund family size results in about 10% ($12 million) more overweighting. We also find that although funds outside the plan overweight the sponsor stocks by 15% on average, trustee funds inside the plan overweight by 98% on average, or more than six times as much.

We next examine the dynamics of the trustee overweighting. We find that the trustee behaves differently from other families when it comes to trading its sponsor firm's stock. Specifically, when mutual funds are on aggregate selling a sponsor firm's shares, trustees take the opposite position and significantly increase their holdings of the sponsor firm's stock. We look for events in which mutual funds collectively sell more than 1% of the total shares outstanding of the sponsor firm (the top decile of share-selling). We find that whereas non-trustees significantly decrease their holdings by 2.6% on average, the trustee significantly *increases* its position in the stock by 11.45%. Similar

conclusions follow from looking at negative Cumulative Abnormal Returns (*CAR*) surrounding earnings news. Both results suggest that trustees behave differently, seemingly at times when it may be of value to the sponsor firm.

We look at how changes in trustees affect their holdings of the sponsor firm's stock. We provide evidence that fund families increase the amount invested in the sponsor firm's stock during their first years as trustee and decrease the amount invested in the sponsor firm's stock in the years after they end the trustee relationship.

Finally, we quantify the flow benefit to trustee mutual funds of being included in the sponsor firm's 401(k) plan, and find that these benefits are economically and statistically large. If we take a fund the same size as the average trustee fund in the plan, with the same past returns and same flow to its style, we find that trustee funds in 401(k) plans have on average more than 35% higher flows and are over 40% less likely to experience outflows. Further, consistent with existing evidence that 401(k) participants rarely change allocations or deferral choices in plans (Mitchell et al. (2009)), we also find that the annual flow increase is performance-insensitive (it accrues to trustee funds equally across all levels of past performance).

The paper is organized as follows. Section I provides a brief background and literature review. Section II describes the data. Section III presents our main findings on overweighting. Section IV provides evidence on portfolio changes around trustee changes, and quantifies the flow benefit to trustee mutual funds included in the 401(k) plan. Section V concludes.

I. Background

Because the focus of this paper is on the trustee relationship, we provide a brief description of the trustee choice process.[3] Each plan is required to appoint a trustee who assumes fiduciary responsibility over the plan and is obliged not only to act in a "prudent" way with respect to employee contributions but also to ensure that the plan offers a diversified, acceptable set of investment op-

tions. Discussions with 150 (50) randomly selected sponsor firms (mutual fund families acting as trustees) indicate that the trustee is typically chosen by the plan's administrative (or investment) committee. This committee consists primarily of affiliated firm members, including directors and employees (usually management). Most firms state that investment options are chosen jointly by the investment committee and trustee firm. On the trustee side, most funds also indicate that the plan's investment options are decided jointly with the plan committees. The majority of trustee fund families state that they have specific brokers assigned to individual 401(k) plans, and that these brokers work with the plan committee and the trustee fund family in assessing each plan's needs.[4]

A large body of literature establishes a link between a fund's returns and subsequent flows. This literature finds a generally positive relation: better-performing funds attract more flows, and, while investors pour money into strong-performing funds, they fail to pull money from poor-performing funds at the same intensity (Chevalier and Ellison (1997), Sirri and Tufano (1998), Goetzmann and Peles (1997)). A number of researchers explore the incentive effects of these findings and the resulting implications for portfolio choice. Chevalier and Ellison (1999) find that younger managers are penalized more severely for choices away from the fund-objective class mean, and thus are more likely to herd and to hold portfolios with less idiosyncratic risk. Brown, Harlow, and Starks (1996) find that mid-year losing managers tend to increase volatility of fund returns in the second half of the year more than mid-year winners do. Gaspar, Massa, and Matos (2006) examine the "allocation" of performance across funds within a mutual fund family and find evidence of strategic allocation of performance to funds that could potentially generate more revenue (e.g., higher fees) for the fund complex.[5]

Coupled with the evidence on mutual funds, more evidence is pointing to new issues in the defined benefit plan structure. Cocco and Volpin (2007) find that when a defined benefit plan assigns

members of the board of directors to have fiduciary responsibility over the plan, the plan tilts more toward equities and has a higher dividend payout ratio. Bergstresser, Desai and Rauh (2005) find additional evidence that defined benefit plans make investment decisions in response to suspect incentives, while Goyal and Wahal (2008) find that defined benefit plans choose investments in a suboptimal way over time. The paper most relevant to ours is Davis and Kim (2006), who study the effect of business ties between mutual funds and 401(k) plans on the voting behavior of mutual fund families. The authors find that although particular pension ties to a firm do not make the family more likely to vote in that firm management's favor, the volume of pension business has strong predictive power for how management-friendly a mutual fund is in general. They also examine overweighting for the one-year cross-section from mid-2003 to mid-2004 and do not find evidence of significant overweighting. In Section III we discuss why our results differ on this dimension.

II. Data

A. 401(k) Data

The majority of data we use come from a hand-collected data set of retirement plans sponsored by publicly traded firms matched to the stock holdings of mutual fund families. We gather information on 401(k) plans from Form 11-K documents filed by firms with the SEC and Form 5500 Filings filed with the Department of Labor (DOL).[6] The 11-K data (SEC) are available for the fiscal years 1993 to 2003. Over this sample period, we hand collect all documents. Our initial sample thus represents the universe of firms filing 11-Ks with the SEC. In the 11-K document, we collect the total assets invested in the 401(k) plan, the proportion invested in company stock, the identity of the trustee, and the amount invested in every mutual fund option in the 401(k) plan. So, for each plan-year filing, we can tell not only what funds are in the plan, but how much is invested in each fund. Our Form 5500 sample is from 1995 to 2004. The Form 5500 also has information on plan assets and trustees, although it is not nearly as complete as 11-K data for our sample of

firms. One data item we do collect from the Form 5500 is the fee paid to the trustee for trustee services.

The initial data set contains more than 2,500 companies. For inclusion in our sample, however, the company must meet the following requirements. First, we need to be able to identify the company in the CRSP database. Companies in our 401(k) data set are identified by their IRS Employer Identification Number (EIN). We use the CRSP/Compustat Merged Database to map the EINs into PERMNOs, CRSP's primary stock identifier. We then check each match by looking at the company's name. Once we have identified the companies, we exclude financial corporations (SIC codes between 6000 and 6999), as they are usually the trustee of their own plan and hence there are likely other incentives and restrictions for holding their own stock. This gives 1,537 companies. The final requirement is that we identify the trustee of the company as a mutual fund family. Not all companies report their trustee and not all trustees are mutual fund families. Keeping only those plans that report one of the mutual fund families in our sample as their trustee leaves us with 899 companies. Of the 638 excluded trustees, 453 (nearly 70%) are missing, and the remaining are usually foreign banks or individuals within the company.

Companies often have more than one 401(k) plan. In the vast majority of cases, all plans from a given company belong to the same trustee. Whenever this happens, we sum the plan assets of the plans. In the few cases in which the company has two different trustees, we keep only the largest plan. This ensures that, at any given time, there is only one trustee for each company in our sample.

[Insert Table I Here]

Panel A of Table I reports summary statistics for the 401(k) plans. Note that we measure a plan's size as the *residual* of plan assets after subtracting out the amount of plan assets invested in company stock. Restrictions are often placed on participants' ability to transfer portions of their

assets out of company stock (the company-matched portion), and the portion that is not restricted is empirically highly sticky within the company stock account (Huberman and Jiang (2006)). It is thus more reasonable to think of the amount of potentially transferrable assets into the funds of the trustee family as the residual plan assets after subtracting off this company stock piece. For brevity, we refer to this measure of residual plan assets as "plan assets." The average size of a retirement plan in terms of this measure for our 1993 to 2003 sample is roughly $553 million.[7] In general, plan size increased over the sample, and the aggregate size of our sample peaked in 2003 at $449 billion. In 2003, the largest plan in our sample had plan assets of nearly $18 billion. The second and third largest plans that year had plan assets of roughly $17 billion and $14 billion, respectively. Our sample size averages 392 firms per year, and the sum of all plans' assets averages about $178 billion per year.

Panel B summarizes the sample at the fund level. For each 401(k) plan, we match every equity mutual fund to the CDA/Spectrum mutual fund holding database. This matching was done by hand because each plan uses different conventions for reporting fund names and fund-level holdings. The average percentage of the funds that belong to the trustee fund family is 43%, while the average amount of plan assets in trustee mutual funds is roughly 45%. Further, for nearly 20% of our sample (approximately one in every five plans), the trustee fund family comprises 100% of the equity funds that we are able to match from the plan.

B. Matching Retirement and Mutual Fund Data

Our data on mutual fund holdings come from the CDA/Spectrum Institutional holding database and the CDA/Spectrum Mutual Fund holding database. These contain the quarterly holdings of virtually all U.S. investment companies.[8]

We first describe the data collection for the institutional data. We focus on the largest 100 mutual fund families because they better represent potential trustees for 401(k) plans.[9] Our final

sample consists of 251 mutual fund families. Over 95% of the trustees identified as a mutual fund family are among the families in our final sample. In addition, these families represent over 80% of the total mutual fund industry, as measured by the market value of equity holdings.

We are mainly interested in comparing the holdings of the trustee family in the sponsor firm with those of a similar family. We therefore consider only families' holdings of companies in our 401(k) data set. However, as we explain below, all equity holdings are included in the computation of aggregate measures, such as total assets under management.[10] We present summary statistics of the mutual fund families in our sample in Panel C of Table I. The average fund family in our sample has approximately $12 billion in Total Net Assets (TNA).[11] Comparing the TNA of trustee and non-trustee fund families, we see that 401(k) plan trustees are on average larger families.

We next collect quarterly mutual fund-level data for this same sample from the CDA/Spectrum Mutual Fund holdings database. We include all equity mutual funds, presenting the fund-level summary statistics in Panel D. The average TNA of a mutual fund in our sample is a little over $1 billion. Comparing the size of mutual funds of trustees relative to non-trustees we see that the average trustee fund is roughly 50% larger than the average non-trustee fund.

The final step is to match our 401(k) data set back to institution- and fund-level data on mutual funds. To do this, we first identify the trustees in the mutual fund data set. We use the family name to match each company's trustee to its corresponding family in the CDA database. At the fund level, we take each mutual fund name provided in every 401(k) plan, and hand match this back to the corresponding fund name for that year in CDA. In sum, our final sample spans the years 1993 to 2003 and contains the number of shares that each of the 251 families (1,929 funds) in our sample owns of each of the 899 publicly traded companies whose 401(k) plan's trustee we matched as a mutual fund family.[12]

C. *Variable Construction*

We focus on two measures of holdings, (i) how much of the family's assets are invested in a given stock (*% TNA*) and (ii) what fraction of the company's stock the family's holdings represent (*% Shares*). Our first measure, *% TNA*, for a given firm-family pair is measured as the market value of shares of the firm held by the specific family, divided by the family's total TNA. So if family f owns \$10 billion worth of firm s and has TNA of \$100 billion, *% TNA* for this observation will be 0.10. As such, it is a holdings measure from the family's viewpoint. From the company's point of view, the more relevant variable is our second measure, *% Shares*, which measures the percentage of the company's shares held by a given family. For the same family f and firm s pair as above, if the total market value of firm s is \$40 billion, then *% Shares* for the same observation will be 0.25. For some tests we also use a measure of time-series changes in holdings, *Change*, which is the number of shares held this period divided by the number of shares held last period, adjusted for splits.

We use a number of variables as controls for company and family characteristics. Size (*ME*) is the company's market value on the last day of the most recent quarter. Book-to-market (*BM*) is the ratio of the book equity at the end of the firm's fiscal year during the calendar year preceding the formation date to the market value at the end of the preceding December (book equity is calculated as in Fama and French (1992)). A firm's *Past Returns* are computed as the cumulative past returns of the firm over the previous 11 months (not including the last month of the quarter), and *Future Returns* are computed as the cumulative future returns of the firm over the next 11 months. The *Market Weight* is measured as the weight of the stock in the CRSP value-weighted market index. Finally, the *TNA* of a family is measured as the sum of the value of all equity holdings of that family in a given quarter.

We next compute two variables to measure the investment focus of the family, percentage invested in style (*% in Style*) and percentage invested in industry (*% in Ind*). To construct *% in Style*, we follow Daniel et al. (1997) and create 27 style portfolios based on a triple sort on size, book-to-market, and momentum.[13] Once these portfolios are constructed and each stock is assigned a style, *% in Style* is computed as the proportion of the family's TNA in a given style. We construct *% in Ind* in a similar manner, but across industries. So, for each industry, defined by two-digit SIC code, we calculate the proportion of the family invested in this industry. For example, if at a given time firms s and h are in the same style category and industry and they are both held by the same family f, then they will have identical values of *% in Style* and *% in Ind*.

In our time-series tests, we make use of changes over time in these explanatory variables. In addition, we use two independent variables: *CAR* and percentage of company sold (*% Comp Sold*). The variable *CAR* is measured as the cumulative return from two days before to two days after the earnings announcement date from CRSP, minus the CRSP value-weighted index return. The variable *% Comp Sold* is measured as minus the change in the percentage of shares held by all families in the CDA database from time $t-1$ to time t. So if fund families held an aggregate of 10% of the shares of firm s last quarter, and hold 11% this quarter, *% Comp Sold* for firm s would be -1.

III. Trustee Overweighting

In this section we report empirical evidence on the portfolio choices of trustees in their 401(k) sponsor firm's stock. Specifically, we show that controlling for other firm, fund, and plan characteristics, the trustee of a 401(k) plan significantly overweights that 401(k)'s sponsor stock in its portfolio.

Davis and Kim (2006) also examine how pension fund business ties affect mutual fund companies, focusing mainly on effects on the funds' proxy voting, although they do look at overweighting

for their six largest pension tie funds and find no significant effect. The differences between our results and theirs are due to two factors. First, we focus solely on the trustee relationship, whereas they examine *any* relation of the pension fund to the mutual fund, including administrative services and custodial services (the day-to-day servicing of the plan). Second, we use an 11-year panel of the universe of mutual fund trustees, whereas Davis and Kim (2006) examine a one-year cross-section of their six largest pension tie families. [14] When we restrict our sample to the six families they consider, focusing *only* on the trustee relationship and using our 11-year panel, we find, consistent with our results on other trustees, a significant overweighting by these trustees of their sponsor firms' stocks.

We focus on the trustee relationship in this paper because the trustee is involved in choosing investment options. We expect this to be the strongest tie, because the potential gains from attracting funds far outweigh those from the direct trustee fees. Indeed, a Department of Labor (DOL) study conducted in 1998 (DOL (2000)) finds that 90% of fees paid by a 401(k) plan are investment management fees. In our sample, we calculate trustee fees from the Form 5500 filings, and use the average mutual fund management expense ratio in 401(k) plans of 0.76% from Investment Company Institute (2006a; ICI hereafter), which estimates this expense ratio using a large sample of 401(k) plans. The average annual expense revenue from attracting a 401(k) plan is then: \$552.90 million (from Table I) times 0.76%, or almost \$4.2 million. This is more than 27 times the average trustee fee revenue in our sample of \$150,000, indicating that investment management expenses far outweigh the relatively small trustee fees received by the families.[15]

A. Trustee Overweighting Regression Results

The specific action we test for in this section is the overweighting of the 401(k) sponsor firm's stock in the trustees' fund portfolios. We show here and in Section IV that firms overweight the sponsor firm's stock and increase this overweighting around times of negative shocks. In the

regressions of Table II, we separate out the effect of other characteristics that determine mutual fund portfolio choice. Each dependent variable observation can be thought of as a triple (f, s, t), where f is the family, s represents the stock, and t is the quarter. So, for example, the holdings of family f in firm s in the first quarter of 1995 would be one observation. The dependent variable in all regressions is *Log(% Shares)*, which measures the percentage of a firm's shares outstanding that the family holds.[16] Our main variable of interest is *Trustee*, which is a categorical variable that identifies when a fund family is the trustee for a given sponsor firm. Thus, *Trustee*(f, s, t) is one if, at time t, family f is the trustee of company s, and it is zero otherwise. The control variables, and their construction, are described in Section II. We include the firm characteristics *Log(ME)*, *Log(BM)*, and prior-year returns (*Past Returns*) to control for firm-specific reasons that a fund may be weighting in a security. For fund family controls, we include *Log(TNA)* to control for the size of the family,[17] and two variables discussed above, *% in Style* and *% in Ind*, to proxy for the investment focus of the family. We include these variables because a fund family might overweight the sponsor while decreasing the weight in a similar stock (same style or industry) to keep the fund's style or industry exposure the same. We also include *Market Weight*, which is the weight the stock would receive if the fund simply invested in line with the CRSP value-weighted market portfolio. We run the regressions using pooled regressions with quarter fixed effects, clustering our standard errors at the firm level.[18]

[Insert Table II Here]

Column 1 of Table II shows the main regression specification. To mitigate concerns that auto-correlation is driving the significance levels, in column 2 we run the same specification but only on a single cross-section (which is why we cannot include the quarter fixed effect in column 2). We choose the middle of our sample, June 1998. Note that the coefficient estimates and significance levels are quite similar across both estimation types (columns 1 and 2), especially on the variable

of interest, *Trustee*. Specifically, from column 1 (full sample), the coefficient on *Trustee* indicates that, controlling for other firm and family characteristics, a trustee invests $e^{0.385} - 1 = 46.9\%$ ($t = 6.89$) more in the sponsor firm's stock than do other families. This translates into an overweighting of about \$61,574,000 more in each of the sponsor firms, or a total distortion over the industry of more than \$24 billion.[19] Other coefficients that affect the holdings decision are size (the larger the firm, the smaller the percentage of shares outstanding the average family holds) and TNA (larger fund families hold larger amounts of stock as a percentage of shares outstanding). Both coefficients are highly significant. In addition, families seem to prefer stocks with higher past returns. Finally, to determine whether this effect is concentrated in a specific group of fund families, in column 3, we run a separate test only on the subsample of fund families that are trustees at some point during the sample period. This gets at the idea that perhaps the right comparison sample for trustee family holdings should be only other trustee families (and not all other large fund families). From column 3 we see that the coefficient on *Trustee* is large and significant, with the point estimate even slightly larger than for the identical full-sample specification in column 1. Note that we run specifications including direct trustee fees paid, even though they are an order of magnitude smaller than fees from fund expense ratios, to ensure that there is no substitution effect between the two. The coefficient on fees is not significant, nor does it affect the magnitude or significance of *Trustee*.

It could be the case that the investment patterns we see are driven by superior information. On securing a trusteeship, the fund family may have access to information about the company that other funds lack. If the trustee were getting superior information, we would expect it to get both positive and negative signals, and thus it is not clear that this would induce a positive overweighting in holdings.[20] Nevertheless, to test this explanation, we check whether the trustee is better at predicting the future returns of the sponsor firm, relative to both other stocks and other

mutual fund families holding the sponsor firm's stock. This test is in column 4 of Table II. From the loadings on *Future Returns*, mutual fund families in our sample don't seem to be able to consistently predict which firms will have higher future returns.[21] We also include the interaction term *Trustee* $\times$ *Future Returns*, which captures the extent to which the trustee has superior ability to predict future returns of the sponsor firm, relative to other firms and other fund families. If the trustee trades on superior information on securing the trusteeship, this coefficient should be positive and significant. From column 4, we see that it is close to zero and insignificant, suggesting that superior information cannot explain the overweighting of the sponsor firm's stock that we document.

B. Additional Evidence: Small Funds and Large 401(k) Plans

In this section we examine whether overweighting is related to how greatly fund families are expected to benefit from the trustee relationship. Specifically, we look at the effect of the size of the mutual fund family and the size of the 401(k) plan on the tendency of trustees to overweight the sponsor firm's stock. Larger 401(k) plans represent more potential asset inflows to the fund families, whereas 401(k)s of a given size represent a larger relative increase in assets for smaller fund families. We create two interaction terms to measure these two implications. The first is *Trustee* $\times$ *Log(TNA)*, which we predict to be significantly negative: the smaller the mutual fund trustee, all else being equal, the more attractive a given 401(k) plan will be since the plan will represent a larger percentage increase in TNA. The second interaction term is *Trustee* $\times$ *Log(401(k) Size)*, which we expect to be significantly positive: the larger the plan, the larger the benefit a given mutual fund will receive for attracting it.

The tests for both interaction terms are in column 5 of Table II. Consistent with the trustees' overweighting being greater when it is of most value to them, we find evidence for a more severe overweighting in both mechanisms. First, controlling for other firm, fund, and plan characteris-

tics (including the size of the 401(k) plan), a decrease in the size of the fund family significantly increases the extent of overweighting (*Trustee* $\times$ *Log(TNA)*). The coefficient in column 6 implies that a one-standard deviation decrease in fund size implies a 10% increased overweighting ($12,121,000). The second interaction term, that on plan size, implies that, controlling for other characteristics (including fund size), a given fund family will overweight significantly more to retain larger 401(k) plans. The coefficient on this interaction term implies that a one-standard deviation increase in the size of the 401(k) plan increases overweighting by the family by $19,561,000, or 15%.

C. Fund-level Evidence

In this section, we examine mutual fund-level holdings to gain further insight into the forces that drive the trustee family overweighting. This allows us to test varied implications of trustee overweighting *within* the trustee fund family, and addresses a possible confounding accounting issue in the family-level reporting of the sponsor firm's stock. Some families may report the company stock held by employees in their 401(k) plans as assets under management, which would be included in the 13-f filing, in which case the results we document in the previous subsections may be mechanically caused by this accounting method. Although the subset of trustees we contacted indicated that they do not account for company stock in 401(k) plans as an asset in their holdings, this does not preclude the possibility that other trustees in our sample engage in this practice. Using mutual fund-level data, we can include equity mutual funds *only* in our analysis and thus alleviate this mechanical accounting concern. We first replicate the regression as in Table II, but now using mutual fund-level holdings data. Thus, we are measuring the weights that managers place at the fund level. As such, we now define *Trustee* as equal to one if a mutual fund manager whose fund belongs to the trustee family is holding the sponsor firm's stock. The results are in Table III. From column 1, we see that the fund-level overweighting is nearly identical to that at

the family level. Specifically, the coefficient on *Trustee* indicates that controlling for other firm- and fund-level characteristics, a trustee mutual fund invests 43.3% ($t = 8.37$) more in the sponsor firm's stock than do other funds.

[Insert Table III Here]

Using data at the fund level also allows us to test where, within the trustee fund family, the overweighting is being concentrated. Specifically, the mutual funds included in the sponsor firm's 401(k) plan are those that capture most of the benefits of the increased flows into their mutual funds. Thus, in line with the results on smaller families and larger 401(k) plans, it may be reasonable to expect that these funds have the greatest overweighting. To test this conjecture, we match the CDA/Spectrum mutual fund holdings data to the data on mutual funds contained in the sponsor firm's 401(k) plans, hand-collected directly from the 11-K filings. We then split trustee family mutual funds into two categories. The first group of funds comprises those mutual funds included in the sponsor firm's 401(k) plans. The variable *Plan Trustee Fund* measures this group's sponsor firm stock overweighting, and is equal to one for a trustee mutual fund that is holding a sponsor firm's stock in whose 401(k) plan its mutual fund is also included, and zero otherwise. The second group of funds consist of those trustee mutual funds not included in sponsor firm 401(k) plans. The variable *Non-Plan Trustee Fund* measures this group's sponsor firm stock overweighting and is defined similar to *Plan Trustee Fund*. We can see that *Plan Trustee Fund*+*Non-Plan Trustee Fund*=*Trustee* (the original trustee variable).

The results of these tests are in columns 2-4 of Table III. Examining the overweighting of the trustee mutual funds outside the sponsor firm's 401(k) plans, the coefficient on *Non-Plan Trustee Fund* in column 4 is 0.137 ($t = 3.04$), implying an overweighting of 15% by these funds. For the mutual funds included in the 401(k) plan, the coefficient on *Plan Trustee Fund* in column 3 is 0.681 ($t = 7.32$), implying an overweighting of 98% in the sponsor firm's stock. These results

indicate that the trustee funds included in the plan overweight by more than six times as much as those not included in the plan, which is again consistent with our finding that the overweighting is more severe when the benefits are higher.

Taken together, we find that (i) trustees significantly overweight their 401(k) sponsor firm's stock relative to their holdings of all other stocks and to other families' holdings of the same stock, (ii) this overweighting is larger for smaller fund families and for larger 401(k) plans, and (iii) within the trustee fund family, the overweighting is concentrated in those funds that are included as investment options in the sponsor firm's 401(k) plan (and receive the benefits of the fund inflows).

IV. Trustee Behavior Following Shocks

A. Changes in Trustee

The changing of a 401(k) plan's trustee gives a more precise way of measuring the effect of trusteeship on portfolio choice. It also provides a more direct test of the result in Section III that trustee families tend to overweight the sponsor firm's stock. The idea is to test whether the family, on initiating (terminating) the trustee relationship, increases (decreases) its position in the sponsor firm's stock.

Just 3.4% of firms switch trustees each year. The number of trustee changes we can match with CDA holdings the year before and after the change is only 58. The rarity of the event thus reduces the power of the tests. It is important to note, however, that the rarity of the event – in other words, the propensity of sponsor firms to maintain long-standing ties with the trustee – may be part of what makes the trustee relationship so valuable to the fund family.

[Insert Figure 1 Here]

Figure 1 plots the change in the family's holdings of the sponsor firm before and after the trustee change. For each company that changed its trustee in our sample, we follow the change

in holdings of both the old and the new trustee from one year before the change to two years after the change.[22] If we set the date of change as zero, this corresponds to looking at the interval $[-4, 7]$. Because we don't know in which quarter the change occurred (we know only the year of the change), we compute a moving average of four quarters. The pattern that emerges is that the old trustee strongly decreases its position in the stock after it stops being the trustee, whereas the new trustee progressively increases its position in the stock after becoming trustee.

B. Trustee Behavior around Negative Shocks

We now turn to trustee behavior at times that appear more valuable to the sponsor firm, in particular, times of negative shocks to the company. Specifically, we look at downward price pressure events caused by widespread selling of the sponsor firm's stock. Because such events can be a time in which the trustee-sponsor firm relation is stressed, the trustee may behave in ways that differ from other fund families without this relationship with the sponsor firm. We test the trustee response in two ways. First, we examine a measure of widespread selling of the sponsor stock by mutual funds. A benefit of this analysis is that it is independent of a model of flows. We define periods of large selling as those when more than 1% of the shares outstanding of a firm are being sold in aggregate by all funds (including the trustee) in a quarter, an event that happens about 10% of the time. This allows us to examine differences in the behavior of trustees and other families at times when the sponsor is likely experiencing downward pressure on its price. The second measure we examine is the *CAR* around earnings announcements. The construction of this measure is similar to Baker et al. (2009). We use the [-2,2] day abnormal return around earnings announcements, controlling for the return on the CRSP value-weighted market index. A negative shock is an event where the $CAR < 0$ at the closest earnings announcement of the firm before quarterly holdings are reported.

The results are presented in Table IV. The dependent variable in the regressions is *Log(Change)*, defined in Section II as *Log(shares(t)/shares(t-1))*. Columns 1-3 contain the regressions for periods of large selling by fund families. The variable *% Comp Sold* measures the percentage of the company sold in aggregate by all fund families, while *% Comp Sold* > 1 is a categorical variable equal to one when *% Comp Sold* is greater than 1, and zero otherwise. The variable of interest is *Trustee* $\times$ *% Comp Sold* > 1, the interaction between our trustee indicator and *% Comp Sold* > 1, which measures how trustees behave relative to other fund families in situations where the average family is selling off the sponsor firm's stock. If the trustee is behaving differently around times of aggregate fund selling, we expect this interaction term to be positive and significant.

[Insert Table IV Here]

From column 1, the coefficient on the categorical variable *% Comp Sold* > 1 is negative and significant, indicating that when a large percentage of a given firm is sold in aggregate by *all* fund families, the average family that is not the trustee is selling that firm's shares. From the interaction term *Trustee* $\times$ *% Comp Sold* > 1, however, we find that the trustee does the exact opposite of the other firms: the trustee significantly buys the sponsor firm's shares. The positive and significant coefficient on *Trustee* $\times$ *% Comp Sold* > 1 in column 1 of 0.141 ($t = 3.97$) implies that the trustee increases its already overweighted stake in the sponsor firm by 11.45% $(0.141 - 0.025)$ around negative shocks. We also run separate regressions for trustees and non-trustees (columns 2-3). As in column 1, whereas fund families on the whole are selling large quantities of the sponsor firm's stock, trustees are significantly increasing their holdings of the sponsor firm's stock (coefficient on *% Comp Sold* > 1 in column 2 relative to column 3).

Column 4 of Table IV contains the regressions for the *CAR* measure of a negative shock to the firm. The categorical variable *CAR* < 0 is equal to one when *CAR* is negative and zero otherwise. The interaction term *Trustee* $\times$ *CAR* < 0 then tests how trustees behave differently toward sponsor

firms following a sponsor firm's negative *CAR*. From column 4, the coefficient on *CAR* is positive although not significant, indicating that fund families do increase (decrease) their holdings in firms following positive (negative) abnormal returns around earnings announcements, but not reliably so. As in other regressions, this controls for the prior-year returns of the firm. The coefficient on $CAR < 0$ is negative but also not significant, implying that funds do slightly decrease their holdings following negative earnings surprises as measured by *CAR*, but not significantly. The positive and marginally significant coefficient on the interaction term $Trustee \times CAR < 0$ suggests that the trustee invests more in the sponsor firm following negative earnings surprises, with *CAR* itself seeming to be a weaker identification of a shock to a firm.

Another way to examine the effect of being a 401(k) trustee on portfolio choice at times of negative shocks is to look at the probability of selling a firm's stock. In columns 5 and 6 of Table IV we compare the probability of other fund families selling the sponsor stock to that of the trustee. We use probit regressions in which the dependent variable *Sell* is equal to one if the mutual fund sold the firm's stock, and zero otherwise. We estimate the coefficients using an approach similar to Fama and MacBeth (1973): after running probit regressions for each quarter in our sample, we use the time series of estimates to calculate the coefficients in Table IV, correcting the standard errors for autocorrelation. The coefficient estimates reported in the table are the implied marginal effects on the probability of selling. Again, the main variables of interest are the interaction terms $Trustee \times \%\ Comp\ Sold > 1$ and $Trustee \times CAR < 0$. The negative and significant coefficient estimate of -0.198 ($t = -3.42$) on $Trustee \times \%\ Comp\ Sold > 1$ implies the trustee actually has a 19.8% smaller probability of selling the sponsor's firm stock when fund families are on average doing so. As before, the interaction $Trustee \times CAR < 0$ does not have a significant effect.

In sum, the evidence in Table IV further supports the idea that the trustee-sponsor relationship affects the trustee's portfolio choice. During times of aggregate selling of the sponsor firm, when

there is negative price pressure, the trustee acts in a manner opposite of other fund families and significantly increases its position.

C. Quantifying the Flow Benefit

One large benefit of the trusteeship to the family, and more directly to the trustee funds included in the 401(k) plans, is the flow of 401(k) funds. In this section we quantify this benefit. By being included as an investment option in the plan, managers gain access to both new capital and a constant *inflow* of new contributions by employees. These new inflows are based on participant flow deferrals, which again are rarely altered. Mitchell et al. (2009), for instance, find that 80% of plan participants in their sample make no changes in fund choices over their two-year sample. Accordingly, these 401(k) flows should translate into: (i) significantly higher flows than otherwise identical funds not included in a 401(k) plan, and (ii) less performance-sensitive flows, since participants rarely rebalance accounts or deferrals.

We test this empirically in Table V. The variable to be explained is annual fund flows, defined as the increase in total assets net of fund returns (Sirri and Tufano (1998)). The main independent variable is *Plan Trustee Fund*, a categorical variable equal to one for trustee mutual funds that are included in one of the trustee's 401(k) plans. We also include: *Any Trustee Fund*, a categorical variable equal to one for any trustee mutual fund (both inside and outside the 401(k) plan); *Past-Ret Quintile 1-5*, categorical variables that measure a mutual fund's performance rank in the universe of funds for the prior year, ranging from worst performing (Quintile 1) to best performing (Quintile 5); *Trustee* $\times$ *Past-Ret Quintile*, the interaction of *Plan Trustee Fund* and *Past-Ret Quintile*; *Lag TNA*, the logarithm of the TNA of the mutual fund in the prior year; *Flow To Style*, the aggregate flow to all mutual funds that share the style of the given mutual fund (defined by holdings characteristics using Daniel et al. (1997)); and *Lag Return*, the return of the mutual fund in the prior year. We

additionally include year fixed effects, and all of our standard errors are clustered at the mutual fund level.

[Insert Table V Here]

Columns 1 and 2 of Table V present the annual flow results. From column 1, mutual funds included in the 401(k) plan of the sponsors have significantly higher flows. The *Plan Trustee Fund* coefficient is 22.50 (t=7.53), which implies that trustee funds in the 401(k) plan have over 35% higher flows (22.50/64.12) than comparable funds. Note that *Any Trustee Plan*, measuring the benefit to any trustee mutual fund (both inside and outside the plan), is also included, but is small and insignificant in each of the regressions, indicating that the trustee funds *not* included in the 401(k) plan gain no increase in flows.[23] The fact that the increased flow benefit accrues entirely to those trustee funds included in the 401(k) plan is in line with our finding from Table III that the overweighting is concentrated in the funds that get the greatest flow benefits.[24]

Column 2 explores the effect on flows more deeply by splitting funds by past performance, and by examining the effect of trustee plan funds' increased flows across these past return quintiles. From column 2, we first see the well-established convex performance-flow relationship, in that being in the top return quintile corresponds to a disproportionate jump in flows (the omitted category is the lowest performers, *Past-Ret Quintile 1*). The interaction terms give the additional increase in flows in each past return quintile for being a trustee mutual fund in a 401(k) plan. What we see is a remarkably stable effect across past return categories: the trustee flow increase is large, significant, and similar in magnitude across all categories (all five coefficients are statistically the same). This is exactly what we would expect to see given the 401(k) literature's finding that participants exhibit extreme inertia in their fund contributions – a stream of new flows into the funds unaffected by past returns.

Columns 3 and 4 test more specifically whether being in the plan prevents those states of the world that may be most disruptive to fund managers: net outflows from the fund. The dependent variable in column 3 is a categorical variable equal to one when the fund has outflows (i.e., negative net flows), and zero otherwise. The dependent variable in column 4 is a categorical variable equal to one if the fund is experiencing outflows in the lowest quintile of the distribution (in our sample, this is flows< -15.26).

From both specifications, being a trustee fund included in the plan has a large and significant effect on preventing these bad (outflow) states. The coefficient in column 3 implies that this reduces the likelihood of outflow states by over 36% (0.161/0.453), while the coefficient in column 4 implies that the likelihood of extreme outflows (lowest quintile) is significantly decreased, by over 42% (0.108/0.257), for these funds.

Across all these tests, we see that being included in the plan not only has an economically and statistically large positive effect on inflows, but also significantly reduces the probability of experiencing outflows.[25]

V. Conclusion

Mutual fund families attract assets under management in several ways. We document a new, economically large, and growing channel, namely the 401(k) market, and find evidence that mutual fund families exhibit systematically different behavior with respect to these 401(k) clients' stocks. Specifically, we find that mutual fund families who become trustees significantly overweight their 401(k) sponsor firm's stock. This overweighting is significantly more pronounced for larger 401(k) plans and for smaller fund families, and is concentrated in those mutual funds actually included in the 401(k) plans (those accruing the largest benefit of increased flows). Moreover, we find that the trustee family behaves in contrast to other fund families by buying its sponsor firm's stocks around times of substantial selling of the sponsor firm's stocks by all other funds. This overweighting

cannot be explained by information, as trustees do no better on their sponsor firm holdings than other fund families. We quantify a substantial flow benefit to trustee mutual funds included in the 401(k) plan. The increased flows accrue to these funds regardless of past performance.

Agency problems might be one possible explanation for our findings. Specifically, it could be the case that conflicts of interest within mutual funds are driving the patterns we document. Although their fiduciary duty is to maximize risk-adjusted returns, fund complexes also have incentives to maximize their own value as a going concern. From the point of view of individual fund managers, increasing the underlying value of the fund also has many benefits because their compensation often increases with the size of the fund. Attracting a 401(k) plan results in a large and captive flow of capital. This inflow increases not only the current but also the future size of the fund as employees continue to save. Since sponsor companies understand how valuable a 401(k) plan can be to fund families, they could attempt to use their bargaining power to influence fund actions that may go against the fund's fiduciary duty (e.g., buying shares at times of negative shocks to the company). Future research should explore both other agency implications that accompany the increasing role and importance of 401(k) plans for mutual fund families, and potential policy implications that could address resultant agency costs.

As the percentage of mutual fund assets held by defined contribution retirement plans steadily increases, we expect these 401(k) plans to become more important sources of growth for fund families. Indeed, following the passage of the Pension Protection Act of 2006, projections estimate that 401(k) participation rates will increase by nearly 50% in coming years (Investment Company Institute (2006a)), vastly increasing the size of 401(k) plans. We therefore predict the importance of the trustee relationship on mutual fund portfolio choice that we document here to increase in coming years.

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Notes

[1]These numbers reflect 2004 and are taken from the Investment Company Institute (2005a), Federal Reserve Flow of Funds (2005), and Department of Labor. These non-money market funds are termed "long-term" mutual funds by the Investment Company Institute. Individual Retirement Accounts (IRA) and Defined Contribution Plans (DC) together held $3.1 trillion in mutual funds (DC held $1.6 trillion, IRA held $1.5 trillion) out of a total $8.1 trillion in the entire universe.

[2]These requirements are outlined in the Employee Retirement Income Security Act of 1974 (ERISA) and Title 29 Ch.18 of the United States Code (Title 29, Ch. 18, SUBCHAPTER I, Subtitle B, part 4, Section 1104). Throughout the paper we use the term "sponsor firm" to refer to the firm that sponsors the 401(k) plan to which the trustee has been hired.

[3]We thank the Investment Company Institute for helpful conversations on this subject. In addition, as discussed below, we contacted 150 of our firms and 50 trustees, and their responses also helped shape this description.

[4]Some specific responses from the trustees were: "The trustee decides which funds go into the platform, and the plan sponsor and the FA [fund administrator] then picks from that list which funds will go into the plans," and from another trustee, "The plan sponsor and the fund administrator pick funds from the trustee's menus." From the firms, we received responses such as: "[The trustee] was chosen a long time ago and is evaluated based on performance" and from another firm, "Options are determined by the benefits committee, which meets once a quarter with representatives from [the trustee] to see how options are doing."

[5]Other recent literature has explored agency relationships owning to mutual funds' affiliations with other institutions. Massa and Rehman (2009) explore these with respect to financial conglomerates, while Kuhnen (2009) examines connections between fund directors and advisory firms. Reuter (2006) studies IPO allocations to mutual funds and finds a strong positive relation between underwriting and the IPO shares held by funds, while Zitzewitz (2006) documents the widespread nature of late trading in the mutual fund industry from the late 1990s until 2003. Sensoy (2009) finds that a large percentage of mutual fund managers report benchmarks that are mis-matched with their holdings, and that flows accrue relative to these mis-matched benchmark-relative returns. Huberman (2009) examines mutual fund fees, profit margins, and the long-term valuation estimates of money management firms.

[6]Plans that need to file 11-K documents are those 401(k) plans that have company stock as an option, and issue new shares for the plan. This encompasses almost all of the largest 401(k) plans and makes up 60% of the universe of 401(k) assets. Regarding Form 5500, any firm that sponsors an employee benefit plan that qualifies under ERISA must file a Form 5500 with the Department of Labor.

[7]The plans in our sample hold roughly $90 million in company stock on average. All tests in the paper are also run using aggregate plan assets; the results are very similar in magnitude and significance.

[8]The primary source of holdings data at the institution level is the 13-f form that investment companies with more than $100 million under management are required to file with the SEC each quarter (Securities Exchange Act Section 3(a)(9) and Section 13(f)(5)(A)). Smaller companies are also permitted to file, and many actually do. Thus, data on smaller families may be inconsistent and have a selection bias. However, as we explain below, we focus only on large mutual fund families.

At the mutual fund level, the primary source of data are N-30D forms filed at the individual fund level to the SEC.

[9]Specifically, in each quarter, families are sorted by the market value of their holdings of CRSP stocks and the largest 100 families identified. Our sample includes all families that, at some point in time, are among those top 100 (i.e., if a family happens to be among the largest 100 families in the second quarter of 1999, it is included in our sample in *every* quarter from 1993 to 2003).

[10]Another reason why only holdings of companies in our 401(k) data set are included is for homogeneity of sample across tests. Some of our tests (e.g., changes in trustees) necessarily include only such companies.

[11]We refer to TNA throughout as being the sum of the market value of the *equity* holdings of a family. The averages in Table I are taken over all families and all quarters

[12]We have also run all tests in the paper on the subsample of fund families that are trustees at some point in time. We do this to rule out results that might be driven by something specific to this sample of families. The results in the subsample are actually a bit stronger, but we decide to use the top 100 fund families because we think it provides a better comparison group for holdings.

[13]The construction of these portfolios and the criteria used for the inclusion of the stocks are very similar to those in Daniel et al. (1997). Each July, stocks are first sorted into three groups based on each firm's market equity on the last day of June. The firms within each size group are then further sorted into three groups based on their book-to-market ratio. Last, the firms in each of the nine size-BM portfolios are sorted into three groups based on their preceding 12-month return. The main difference is thus that Daniel et al. (1997) constructed 125 style portfolios, as opposed

to our 27. We briefly describe the construction of these portfolios here and refer the reader to their paper for details.

[14]The Internet Appendix (http://www.afajof.org/supplements.asp) contains many robustness checks and further results related to the patterns we document in this section.

[15]As explained above, not all investment options necessarily belong to the trustee. However, even if only a fraction of the plan assets is invested in the trustee family, the benefits from management fees far exceed those from the trustee fees.

[16]We focus on *Log(% Shares)* throughout the paper instead of *Log(% TNA)*, because this is the more relevant measure from the sponsor firm's perspective. Our conclusions hold regardless of the measure used. In fact, our point estimate for the effect of *Trustee* overweighting is almost identical, which is not surprising since one can simply rewrite both measures as the difference of logs and see that the regression models will be nearly identical.

[17]To control for other possible nonlinear effects of *TNA* on holdings, we also ran the regressions including a categorical variable for different cutoffs of *TNA* (e.g. top 10%). This does not affect the magnitude or significance of the results.

[18]We have used a number of alternative specifications including family fixed effects, firm fixed effects, and clustering the standard errors at the fund family and the quarter levels. Magnitudes and significance are very similar, and all our conclusions remain the same. We also use a Fama and MacBeth (1973) type approach, which we report in the Internet Appendix, and get nearly identical results.

[19]These numbers are calculated using the estimated increases in holdings attributed to the trustee relationship. For each observation, we first compute the fitted value implied by our regression, $\widehat{Log(\%\ Shares)}$. From these estimates, we calculate the fitted dollar value of each holding as $\widehat{Holding} = \exp(\widehat{Log(\%\ Shares)}) \times ME$, where ME stands for the market value of the given company. We then average the estimated holdings for trustees and non-trustees separately to get \$77.4 billion and \$15.8 billion, respectively. The estimated increase due to the trustee relationship (i.e., implied by the *Trustee* coefficient) is the difference of these averages. The total distortion is then found by multiplying this difference by the average number of sponsor firms per year in our sample (392 from Table I).

[20]Even if the company reveals only good information to the trustee, it is not clear why the trustee wouldn't anticipate this behavior.

[21]This is consistent with the view that managers don't have stock-picking ability. See Carhart (1997), Pastor and Stambaugh (2002), Jones and Shanken (2005), and references therein for a discussion.

[22]Our measure of holdings here is the percentage of the family's TNA the stock accounts for. The same pattern emerges if we use changes in the percentage of the company instead. We chose the percentage of the TNA because we abstract from size of fund family issues when sponsors change trustees.

[23]Including this trustee effect (even though insignificant) increases the flow benefit estimate to over 36%. As below, we simply include the effect of being a trustee mutual fund in the plan in our estimates of magnitudes (not the combined effect), to strip out any effect of simply being part of the trustee family.

[24]This same flow benefit should accrue to all of the mutual funds in the 401(k) plan. However, because we focus on trustee benefits throughout the paper and because trustee mutual funds make up nearly half of all mutual funds in 401(k) plans, we focus on these funds in our tests.

[25]There may be other benefits of the trustee overweighting to funds and to sponsor firms, in addition to potential costs to the investors in trustee mutual funds. Recent evidence in Elton, Gruber, and Blake (2007) and Brown and Harlow (2009) suggest, though, that funds within 401(k) plans outperform their peers. Any investor cost must thus be weighed against this seeming benefit of outperformance. We choose to focus here on a benefit that is easily observable and measurable: that of significant increases in fund flows.

Table I

Summary Statistics

Panel A: This panel is a summary of the 401(k) plan data used, collected from SEC Form 11-K filings. All numbers are in millions of dollars. When a firm has more than one 401(k) plan, if all the plans have the same trustee (the vast majority of cases) we aggregate them by company, otherwise we choose the largest plan. Number of Plans is the total number of plans in our sample. All numbers in both panels measure 401(k) size as the residual assets in the plan after subtracting the amount of plan assets invested in company stock. Panel B: This panel contains data on the number of equity funds available as options in 401(k) plans. Included in the sample are all equity funds available as an option in one of the 401(k) plans in our sample that could be identified in the merged CDA-CRSP Mutual Fund database. *Funds in Plan* contains the number of distinct funds and the average TNA (in millions). *Trustee Funds in Plan* represents those funds in the plan that are identified as being part of the plan trustee family. Panel C: This panel is a summary of the mutual fund family data we use in the paper (top 100 families), and comes from the CDA/Spectrum Institutional database. All numbers are in millions of dollars. We then separate by trustee families and non-trustee families. Panel D: This panel replicates Panel C for mutual funds. The sample consists of all equity mutual funds in the merged CDA-CRSP Mutual Fund database that could be identified as belonging to one of the mutual fund families in our sample.

Panel A: Average 401(k) Plan Size

Period	Number of unique plans	Mean (Millions)	STD	Max	Min
Full Sample	899	552.90	1,847.19	22,530.27	0.0003
1993-1998	560	460.07	1,595.58	21,845.84	0.0003
1999-2003	741	629.22	2,027.75	22,530.27	0.0005

Panel B: Funds in 401(k) Plans

Period	Funds in Plan		Trustee Funds in Plan		
	Number of Funds	Avg TNA (Millions)	Number of Funds	Avg TNA (Millions)	% Plan Assets in Trustee Funds
Full Sample	846	3,406	362	3,503	44.5
1993-1998	427	2,938	188	2,791	43.0
1999-2003	746	3,658	309	3,930	45.2

Panel C: Mutual Fund Family Summary Statistics

Period	Number of Families			Avg TNA (millions)			Std of TNA (millions)		
	Full Sample	Non-Trustee	Trustee	Full Sample	Non-Trustee	Trustee	Full Sample	Non-Trustee	Trustee
Full Sample	251	197	54	12,199	8,856	29,940	22,820	15,585	40,280
1993-1998	228	184	44	8,184	6,025	20,737	14,638	8,338	29,535
1999-2003	208	165	43	17,375	12,625	39,963	29,470	21,188	47,430

Panel D: Mutual Fund Summary Statistics

Period	Number of Funds			Avg TNA (millions)			Std of TNA (millions)		
	Full Sample	Non-Trustee	Trustee	Full Sample	Non-Trustee	Trustee	Full Sample	Non-Trustee	Trustee
Full Sample	1,929	1,495	942	1,040	886	1,338	3,343	2,671	4,345
1993-1998	1,609	1,204	624	760	632	1,070	2,389	1,806	3,394
1999-2003	1,691	1,204	848	1,270	1,124	1,507	3,943	3,264	4,841

Table II

Trustee Effect on Portfolio Choice

The dependent variable in each regression is the logarithm of the percentage of the shares outstanding of a firm owned by a given mutual fund family, *log(% Shares)*. All regressions are pooled, with standard errors clustered at the firm level (in parentheses). Quarter fixed effects are included where indicated. In Column 2, we estimate the parameters for one cross-section, corresponding to the middle of our sample (June 1998), and thus cannot include a quarter fixed effect. In Column 3, we include only trustee families. The independent variable of interest in the regressions is *Trustee*. All variables are defined in Table VI. Included in all regressions are the stock characteristic of *ME*, *BM*, *Market Weight*, *Past Returns*, and *Future Returns*, as well as the the mutual fund family characteristic of *TNA*, *% in Ind*, and *% in Style*. *Trustee* $\times$ *401(k) Size* , *Trustee* $\times$ *TNA*, and *Trustee* $\times$ *Future Returns* are the interactions of *Trustee* with *401(k) Size*, *TNA*, and *Future Returns*, respectively. The sample period is 1993 to 2003. All regressions include an intercept (not reported). *,**,*** denote significance at the 90%, 95%, and 99% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Trustee	0.385***	0.451***	0.450***	0.384***	1.026**
	(0.056)	(0.111)	(0.058)	(0.058)	(0.492)
ME	−0.202***	−0.256***	−0.036***	−0.205***	−0.179***
	(0.011)	(0.017)	(0.012)	(0.011)	(0.014)
BM	0.021	0.062*	−0.068**	0.021	0.047**
	(0.026)	(0.034)	(0.029)	(0.026)	(0.018)
TNA	0.817***	0.815***	0.969***	0.818***	0.832***
	(0.009)	(0.012)	(0.006)	(0.009)	(0.010)
Past Returns ($\times$100*)*	0.071***	0.107*	0.032**	0.069***	0.068***
	(0.012)	(0.056)	(0.013)	(0.012)	(0.018)
% in Style	0.022***	0.026***	0.009***	0.022***	0.022***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)
% in Ind	0.028***	0.034***	0.009***	0.029***	0.031***
	(0.003)	(0.005)	(0.003)	(0.003)	(0.003)
Market Weight	0.237***	0.496***	0.537***	0.246***	0.209***
	(0.067)	(0.129)	(0.085)	(0.068)	(0.064)
Future Returns ($\times$100*)*				−0.035***	
				(0.013)	
Trustee $\times$ *Future Returns (*$\times$100*)*				0.011	
				(0.060)	
401(k) Size ($\times$100*)*					0.470
					(0.850)
Trustee $\times$ *TNA*					−0.103**
					(0.043)
Trustee $\times$ *401(k) Size*					0.108***
					(0.029)
Quarter Fixed Effects	Yes	-	Yes	Yes	Yes
R^2	0.26	0.27	0.33	0.26	0.26
Observations	1,715,610	40,908	727,513	1,695,480	820,766

Table III

Trustee Effect at the Fund Level

The dependent variable in each regression is the logarithm of the percentage of the shares outstanding of a firm owned by a given mutual fund, *Log(% Shares)*. All regressions are pooled, with standard errors clustered at the firm level (in parentheses). All variables are defined in Table VI. In Column 1, the independent variable of interest in the regressions is *Trustee Fund*. In Column 2, this dummy variable is decomposed into *Plan Trustee Fund* and *Non-Plan Trustee Fund*. Columns 3 and 4 include only plan funds and non-plan funds, respectively. Plan funds are funds that, at some point in time, are included in some plan in our sample. Non-plan funds are those that are not included in any plan. Included in all regressions are the stock characteristic of *ME*, *BM*, *Market Weight*, and *Past Returns*, as well as the mutual fund characteristic of *TNA*, *% in Ind*, and *% in Style*. The mutual fund assets are measured as the logarithm of the percentilized total net assets. The sample period is 1993 to 2003. All regressions include an intercept (not reported). *,**,*** denote significance at the 90%, 95%, and 99% level, respectively.

	(1)	(2)	(3)	(4)
Trustee Fund	0.360***			
	(0.043)			
Plan Trustee Fund		1.082***	0.681***	
		(0.110)	(0.093)	
Non-Plan Trustee Fund		0.309***		0.137***
		(0.043)		(0.045)
ME	−0.593***	−0.593***	−0.511***	−0.638***
	(0.018)	(0.018)	(0.019)	(0.018)
BM	−0.176***	−0.177***	−0.192***	−0.171***
	(0.034)	(0.034)	(0.032)	(0.036)
TNA	2.168***	2.168***	3.221***	1.904***
	(0.009)	(0.009)	(0.014)	(0.007)
Past Returns (×100*)*	0.199***	0.199***	0.215***	0.196***
	(0.020)	(0.020)	(0.022)	(0.020)
% in Style	3.731***	3.732***	4.400***	3.511***
	(0.133)	(0.130)	(0.180)	(0.111)
% in Ind	1.307***	1.307***	1.376***	1.245***
	(0.089)	(0.089)	(0.112)	(0.082)
Market Weight	−0.095	−0.095	−0.131	−0.0429
	(0.101)	(0.103)	(0.100)	(0.108)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
R^2	0.66	0.66	0.62	0.69
Observations	1,084,491	1,084,491	346,263	738,228

Table IV

Trustee Behavior around Negative Shocks

The dependent variable in the pooled regressions in Columns 1 to 4 is the logarithm of the ratio *(shares(t)/shares(t-1))* held by the given firm. These regressions include quarter fixed effects and have standard errors clustered at the firm level (in parentheses). Column 1 and Column 4 use the full panel. Column 2 includes trustees only, while Column 3 is run for non-trustees only. All variables are defined in Table VI. For the full panel regressions, the independent variables of interest are *Trustee* $\times$ *% Comp Sold* > 1 and *Trustee* $\times$ *CAR* < 0, which are the interactions of *Trustee* with *% Comp Sold* > 1 and *CAR* < 0, respectively. These measure the differential behavior of the trustee around negative events for the firm. Columns 5 and 6 run Probit regressions with the specification listed every quarter, and calculate time series averages and standard errors of the regressions using a Fama-MacBeth approach. The dependent variable in these regressions, *Sell*, is equal to one if the given family sold the given firm over the last quarter, and zero otherwise. The coefficient estimates shown are the implied marginal effects on the probability of selling. For these regressions, standard errors (in parentheses) are estimated using the Newey-West procedure with a four period lag. The sample period is 1993 to 2003. All regressions include an intercept and the controls *ME*, *BM*, *Past Returns*, *TNA*, *% in Ind*, *% in Style*, and *Change Market Weight*, all described in Table VI (not reported). *,**,*** denote significance at the 90%, 95%, and 99% level, respectively.

	Pooled Regressions				Probit	
	(1) (Full)	(2) (Trustees)	(3) (Non-Trustees)	(4) (Full)	(5) (Full)	(6) (Full)
Trustee	-0.025***			-0.035*	0.014	-0.020
	(0.008)			(0.018)	(0.034)	(0.053)
% Comp Sold > 1	-0.026***	0.079**	-0.026***		0.079***	
	(0.005)	(0.038)	(0.005)		(0.011)	
% Comp Sold ($\times 100$)	-0.770***	-0.023	-0.784***		0.783***	
	(0.072)	(0.487)	(0.059)		(0.077)	
Trustee $\times$ *% Comp Sold* > 1	0.141***				-0.198***	
	(0.035)				(0.058)	
CAR < 0				-0.002		0.015***
				(0.005)		(0.006)
CAR				0.001		0.001
				(0.001)		(0.001)
Trustee $\times$ *CAR* < 0				0.052*		0.017
				(0.027)		(0.056)
Quarter Fixed Effects	Yes	Yes	Yes	Yes		
R^2	0.01	0.01	0.01	0.01		
Observations	591,510	8179	583,331	266,520		

Table V

Flows to Trustee Mutual Funds Included in the 401(k) Plans

The dependent variable in each regression is: *Flow* (the percentage increase in TNA, after taking out returns) (Columns 1 and 2), and two categorical variables (0,1) that measure *Outflow* (equal to one if negative flows) and *Bot 20%* (equal to one for bottom quintile flows). All variables are defined in Table VI. *Trustee* × *Past-Ret Quintile* is the interaction of *Plan Trustee Fund* and *Past-Ret Quintile*. The sample period is 1993 to 2003. All regressions include an intercept (not reported). Year fixed effects are included where indicated, and standard errors adjusted for clustering at the mutual fund level are included in parentheses below the coefficient estimates. *,**,*** denote significance at the 90%, 95%, and 99% level, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable	Flow	Flow	Outflow	Bot 20%
Plan Trustee Fund	22.50***		−0.161***	−0.108***
	(2.99)		(0.023)	(0.015)
Past-Ret Quintile 2		8.07***		
		(2.08)		
Past-Ret Quintile 3		16.84***		
		(2.37)		
Past-Ret Quintile 4		28.10***		
		(2.43)		
Past-Ret Quintile 5		55.09***		
		(3.22)		
Trustee× Past-Ret Quintile 1		23.25***		
		(4.06)		
Trustee× Past-Ret Quintile 2		23.95***		
		(3.55)		
Trustee× Past-Ret Quintile 3		23.59***		
		(3.46)		
Trustee× Past-Ret Quintile 4		15.09***		
		(3.44)		
Trustee× Past-Ret Quintile 5		25.56***		
		(7.38)		
Lag TNA	−10.93***	−10.91***	0.026***	−0.003
	(0.71)	(0.71)	(0.003)	(0.002)
Flow To Style (×100)	3.34***	2.09*	−0.018***	−0.003
	(1.19)	(1.21)	(0.006)	(0.005)
Lag Return	83.11***		−0.642***	−0.410***
	(5.78)		(0.026)	(0.021)
Any Trustee Fund	0.75	−0.02	0.034**	0.038***
	(2.04)	(2.04)	(0.014)	(0.011)
Constant	64.12***	48.83***	0.453***	0.257***
	(3.99)	(3.94)	(0.014)	(0.010)
Year Fixed Effects	Yes	Yes	Yes	Yes
R^2	0.04	0.07	0.08	0.04
Observations	19,715	19,715	19,715	19,715

Table VI

Variable Definitions

401(k) Size	Logarithm of the size of the 401(k) plan of the firm being considered.
Any Trustee Fund	Categorical variable equal to one for any trustee mutual fund (both inside and outside the 401(k) plan), and zero otherwise.
BM	Logarithm of book-to-market.
CAR	Cumulative abnormal return in the [-2,2] day window around earnings announcement, controlling for the return on the CRSP value-weighted market index.
$CAR < 0$	Categorical variable equal to one if the *CAR* is negative, and zero otherwise.
Flow To Style	The aggregate flow to all mutual funds that share the style of the given mutual fund (defined by the characteristics of holdings, using Daniel et. al (1997)).
Future Returns	Accumulated next 11-month return for the firm being considered.
Lag Return	The return of the mutual fund in the prior year.
Lag TNA	Natural logarithm of the TNA of the mutual fund in the prior year.
Market Weight	Firm's weight in the CRSP value-weighted market portfolio.
ME	Logarithm of the firm market equity.
Non-Plan Trustee Fund	Categorical variable equal to one for a mutual fund whose family is the plan's trustee, while the fund itself is not in plan at that point in time, and zero otherwise.
Past-Ret Quintile 1-5	Categorical variables that measure a mutual fund's performance rank in the universe of funds for the prior year, from worst performing (Quintile 1) to best performing (Quintile 5).
Past Returns	Accumulated prior 11-month return for the firm (excluding last month).
% Comp Sold	Percentage of the firm that is sold by the aggregate mutual fund industry *including* the trustee in a given quarter.
% Comp Sold > 1	Categorical variable equal to one if the percentage sold of the company is greater than 1% of shares outstanding, and 0 otherwise.
% in Ind	Percentage of the *TNA* invested in the industry of the stock being considered.
% in Style	Percentage of the *TNA* invested in the style of the stock being considered (computed following Daniel et al. (1997)),
Plan Trustee Fund	Categorical variable equal to one for a mutual fund whose family is the plan's trustee, and who also is an investment option in the plan at that point in time, and zero otherwise.
TNA	Logarithm of total net assets.
Trustee	Categorical variable equal to one if the given mutual fund family is the trustee for the given firm's 401(k) plan, and zero otherwise.
Trustee Fund	Categorical variable equal to one if the given mutual fund belongs to the family who is trustee for the given firm's 401(k) plan, and zero otherwise (same as *Any Trustee Fund*).

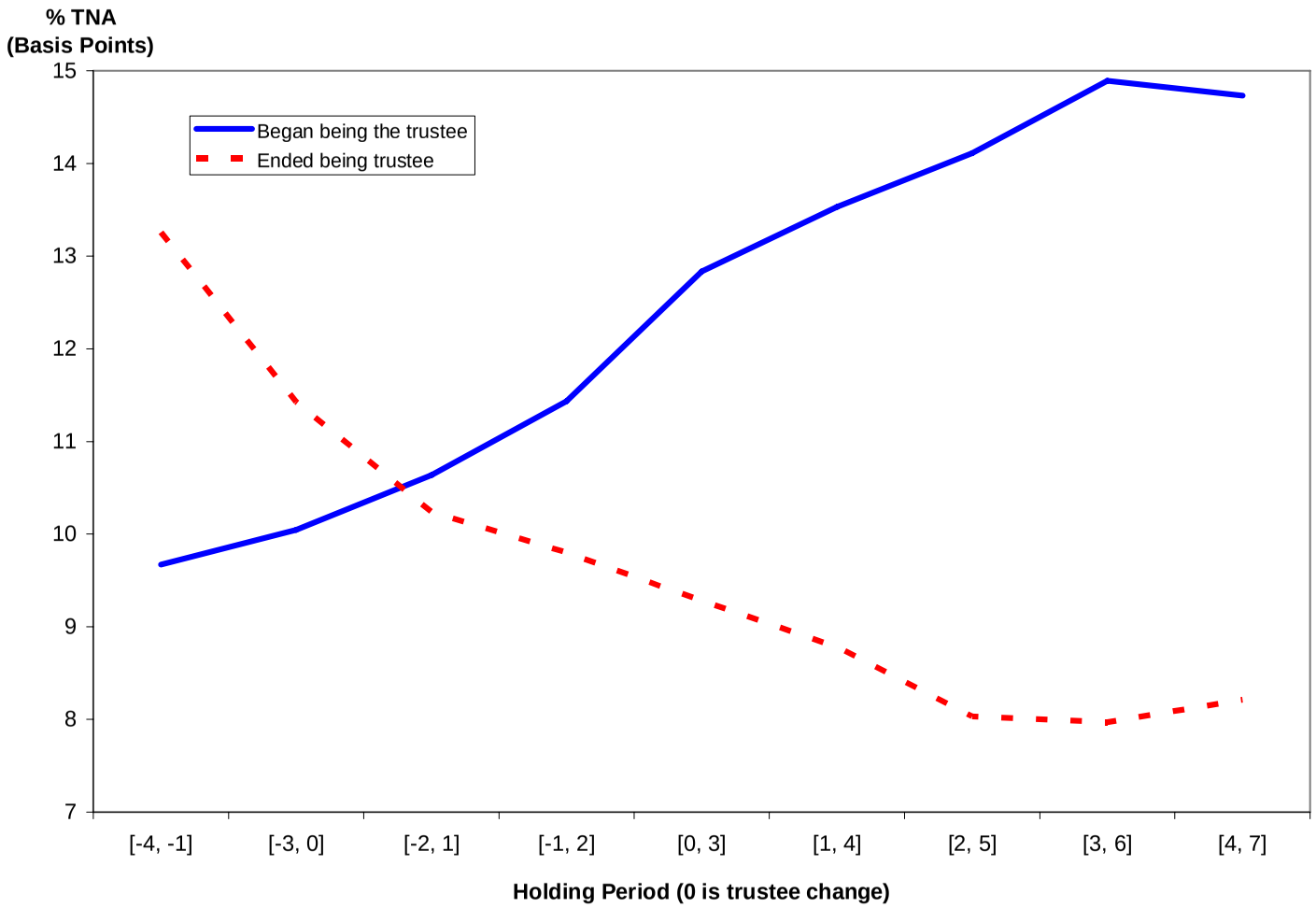

Figure 1 Changes in trustee. This figure plots the holdings of mutual fund family trustees around a change in trustee. It compares the holdings of firms that begin being trustee (solid line) with those that end being trustee (dotted line). The holdings in the sponsor firm are calculated as the percentage of the trustee family's TNA (*% TNA*). The y-axis in the figure is in percentages (from 0.09% to 0.16%). The x-axis measures time, with time 0 being the time of the trustee change. Holdings are measured as the average past four quarters of holdings. So, [-4,-1] refers to the average holdings in the sponsor firm in the one-year period from the quarter directly before the trustee change to four quarters before the trustee change. The figure represents the average over the 58 cases of trustee changes we observe and can match to CDA holdings data.