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Attracting Flows by Attracting Big Clients: Conflicts of Interest and Mutual Fund Portfolio Choice[1]

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Abstract

We explore a new channel for attracting inflows using a unique dataset of corporate 401(k) retirement plans and their mutual fund family trustees. Families secure substantial inflows by being named trustee of a 401(k) plan. This affords the plan sponsor potential influence on the family's portfolio decisions. Consistent with this, we find that family trustees significantly overweight their 401(k) client firm's stock. Trustee overweighting is more pronounced when the conflict of interest of the trustee family is more severe and when other mutual funds are selling the client firm's stock. This overweighting is not explained by superior information. We quantify a potentially large benefit to the 401(k) sponsor firm of having its price propped up by its trustee fund's more severe overweighting. We also estimate the resulting loss to mutual fund investors, which can be large in some cases.

JEL classification: G11, G23, J26

Keywords: Conflicts of Interest, Portfolio Choice, Mutual Funds, Overweight

Introduction

Retirement assets make up a large and growing percentage of the mutual fund universe. In 2004, nearly 40 percent 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 et al. (1996), Chevalier and Ellison (1997), 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 a 401(k) plan's trustee. We provide evidence consistent with the trustee relationship affecting families' portfolio choice decisions. These portfolio decisions, however, are likely to be in conflict with the fiduciary responsibility mutual funds have for their investors, and can impose potentially large costs.

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

Many plans employ large mutual fund families (often with pension management divisions) as their trustee. 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 et al. (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, with the remaining 14 all being T. Rowe Price mutual funds.

From the family's perspective, 401(k) plans are attractive clients for several reasons. First, by becoming

[1]These numbers reflect 2004 and are taken from the Investment Company Institute (2005), Federal Reserve Flow of Funds (2005), and the 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 dollars in mutual funds (DC held 1.6, IRA held 1.5) out of a total 8.1 trillion dollars in the entire universe.

[2]These requirement 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.)

the trustee of a large 401(k) plan, 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 over $ 550,000,000 in assets, which corresponds to about 9% of the total assets held by the average family. Second, the employees become captive investors in the plan options. A typical 401(k) plan in our sample will have approximately 13 options, one of which is company stock and another a money market fund. The majority, if not all, of the remaining options are mutual funds chosen (at least in part) by the trustee. Employees are only able to invest and move their 401(k) retirement assets between these plan options. Thus, in addition to the initial large inflow, the trustee fund family will receive additional flows in retirement contributions as the employees save each year. Third, 401(k) plans do not change trustees often. In our sample, the unconditional probability that a company will change trustees in a given year is around 3.4%. This could be because of search costs, administrative costs, the cost to employees of rebalancing, etc. Thus, the expected future benefits of the relationship are relatively long lived.

For these reasons, mutual fund families may find it valuable to secure trusteeships of 401(k) plans, even if at the expense of other investors. As there are gains to be made by a mutual fund increasing assets under management (Brown et al. (1996), Chevalier and Ellison (1997, 1999)), families may engage in actions to attract the large, stagnant, and captive assets of 401(k) plans. In this paper, we focus specifically on observable distortions in families' equity holdings This presents a conflict of interest within the fund families: by distorting its portfolio, the family violates its fiduciary duty to provide the best investment opportunities to its entire set of investors.

There are a number of reasons firms might consider this portfolio distortion a valuable payment. First, having shares in friendly hands can help tilt investor voting toward managers. Along these lines, Davis and Kim (2006) find evidence that mutual fund families with large pension volume vote significantly more in favor of management friendly provisions. We discuss this further in Section IV. Second, the firm's stock price response to negative shocks may be reduced as the trustee has a block of shares it does not sell. Third, there may be short term upward price pressure as the trustee builds up the overweighted position.

Our main hypothesis, that fund families distort their portfolio allocations to secure a trustee relationship, leads to several testable implications: First, trustee families will hold disproportionately more of the 401(k) sponsor firm's stock, which we term "overweighting"[3]. Second, securing the trustee relationship will be

[3]"Sponsor" firm refers to the firm that sponsors the 401(k) plan to which the trustee has been hired. We will use this

more valuable for (i) relatively smaller fund families, (ii) relatively larger 401(k) plans, and (iii) those mutual funds included as options in the 401(k) plan. Larger 401(k) plans imply larger benefits for the family (in the form of inflow and fees), these benefits are relatively more important to smaller families, while we expect the benefits to accrue especially to those mutual funds that are included in the plan. Third, families should increase their position in the stock once they become trustee and decrease it when this relationship ends. Fourth, trustee families will try to mitigate price variation in the company's stock, for instance, by buying or holding the sponsor stock when all other families are selling large quantities. In this paper, we find supporting evidence for all of these predictions.

We find that families acting as trustees do systematically overweight the 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 $ 62,000,000 more in each one of the sponsor firms, which implies a total distortion over the entire industry of more than 24 billion dollars. It could be that, upon becoming trustee, the mutual fund family is privileged to superior information about the firm. We test this superior information explanation, and find that trustees are no better at predicting the future return of the sponsor firm than other mutual fund families.

Our hypothesis predicts that overweighting will be more severe for larger 401(k) plans and smaller families, *ceteris paribus*. Consistent with this, we find that sponsor firms with larger 401(k) plans are overweighted significantly more, controlling for firm and family characteristics. A one standard deviation increase in 401(k) plan size results in 15% more overweighting ($ 19,000,000) in the sponsor firm. In addition, smaller trustee mutual fund families overweight significantly more than larger families, all else equal. A one standard deviation decrease in fund family size results in about a 10% ($ 12,000,000) more severe overweighting. In a similar line, the individual trustee funds that are included in the plan get more direct benefits in terms of flows, and so are expected to be the ones most likely to overweight. Consistent with the conflict of interest driving the overweighting, we find that while funds outside the plan overweight the sponsor stocks by 15% on average, trustee funds inside the plan overweight by 98% on average, or over 6 times as much.

As a more precise test of this conflict of interest effect on overweighting, we then look at distortions in

terminology throughout the paper.

allocations when the trustee of a given firm's 401(k) plan changes. We find that fund families significantly increase the amount invested in the sponsor firm stock during their first two years as a trustee (6.5% increase in purchases), and then decrease the amount invested in sponsor firm stock in the year after they stop being trustee (6.0% decrease in purchases on average). This results in the fund holding significantly less in the sponsor firm in the years before and after the trustee-sponsor firm relationship. In addition, we construct a sample of similar funds to those of the trustee and find that the trustee funds behave significantly differently than these control funds around trustee changes.

We then look at a specific benefit that the trustee can give to the sponsor firm: holding or even buying shares of the sponsor firm when other funds are selling large amounts. These are the times when the company is most concerned about downward price pressure, and when the trustee can be most useful by buying or holding the sponsor's stock. To test this hypothesis, we identify these events in a number of ways. The first is by looking at the aggregate amount of selling by all mutual funds. We find that when mutual funds are (on aggregate) selling more than 1% of the total shares outstanding of the sponsor firm, the trustee takes the opposite position by significantly increasing its holdings. While non-trustees significantly decrease their holdings by 2.6% on average, the trustee significantly *increases* its position on the stock by 11.45%. Similar conclusions follow from defining bad times using negative Cumulative Abnormal Returns (CAR) around earnings news.

We quantify the benefit of increased trustee overweighting around bad times by looking at the price impact that the significant share purchases of the trustee can have on the sponsor firm's stock price. Using estimates of demand elasticity from previous literature, we find that the trustee props up the 401(k) sponsor firm's price by 151 basis points by buying large amounts of shares when other funds are selling. This implies a roughly 10% propping up of price, a potentially large benefit to the 401(k) sponsor firm. Lastly, we examine and quantify the welfare effects of this conflict of interest on investors in the mutual fund families. We use loss in risk adjusted returns, and find that, the mutual fund loss from the trustee overweighting is roughly 60 basis points per year, translating into a loss over the life of the trustee-sponsor firm relationship of over 21%. In addition, 401(k) plan participants in particular forego roughly $42,000 in retirement income, or about 6%, because of the trustee overweighting.

The paper is organized as follows. Section I provides a brief background and literature review. Section II describes the research design and testable implications. Section III provides a description of the data.

Section IV presents our initial empirical results on the conflict of interest and trustee allocation. Section V provides additional evidence and specific benefits to the firm of the trustee relationship. Section VI provides estimates of the costs to fund family investors and also the price impact of their purchasing when other funds are selling large amounts. Section VII concludes.

I Background

Since the focus of this paper is on the trustee relation, we provide a brief description of the trustee choice process[4]. Each plan is required to appoint a trustee who holds fiduciary responsibility over the plan. This entails the obligations to act in a "prudent" way with employee contributions and making sure the plan offers a diversified, acceptable set of investment options.[5] We randomly selected and contacted 150 of our sponsor firms and 50 of the mutual fund families acting as trustees. We asked them specifics on how the trustee is chosen and evaluated, and what roles the trustee plays. By far, the most common response from firms is that the trustee is chosen by the plan administrative (or investment) committee. This committee consists mostly of affiliated firm members, including both directors and employees (usually management). This choice is evaluated periodically by the committee. The trustee services are sometimes also tied together with record keeping, day-to-day servicing of the plan. In these instances, firms tend to have longer gaps between formal evaluation. Most firms said investment options are chosen jointly by the investment committee and trustee firm. On the trustee side, most funds also indicated that investment options in the plans were decided jointly with plan committee. The majority of trustee fund families said 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 the given plan's needs[6].

There is a large body of literature establishing the link between a fund's returns and subsequent flows. This literature has found 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

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

[5]Footnote 1 outlines the codes from which this obligation derives.

[6]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 pick 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."

the same intensity (Chevalier and Ellison (1997), Sirri and Tufano (1998), Goetzmann and Peles (1997)). A number of papers have then explored the incentive effects these findings and the resulting portfolio choice implications. Chevalier and Ellison (1999) find that younger managers are more severely penalized for choices away from the fund-objective class mean, and thus are more likely to herd in general and to hold portfolios with less idiosyncratic risk. Brown et al. (1996) find that mid-year losing managers tend to increase volatility of fund returns in the second half of the year more than middle year winners do. Gaspar et al. (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.

There has been recent literature exploring potential conflicts of interest due to relationships of mutual funds with other institutions. Massa and Rehman (2005) show how mutual funds benefit from information spillovers of their affiliated banks within financial conglomerates. Kuhnen (2006) finds that some business connections between fund directors and advisory firms cause directors and advisory firms to make decisions in the interest of their joint welfare. Reuter (2006) examines the relationship of IPO allocations to mutual funds in the context of the effect of brokerage relations on IPO allocations. The paper finds a strong positive relation between underwriting an IPO and shares of the IPO held by funds, with the correlation driven by IPOs that appear the most desirable to funds. Zitzewitz (2006) documents the widespread nature of late trading in the mutual fund industry from the late 1990s until 2003. Sensoy (2007) 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 (2007) examines mutual fund fees, profit margins, and the long term valuation estimates of money management firms.

Coupled with evidence on mutual funds, more evidence is pointing to potential problems in the defined benefit plan structure. Cocco and Volpin (2005) 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 et al. (2005) find additional evidence that defined benefit plans make investment decisions in response to suspect incentives, while Goyal and Wahal (2005) find that defined benefit plans choose investments in a sub-optimal way over time. The paper most relevant to ours is Davis and Kim (2006). This paper studies the effect of business ties between mutual funds and 401(k) plans on the voting behavior of mutual fund families. The paper finds that while particular pension ties to a

firm do not make the family more likely to vote in that particular firm management's favor, the volume of pension business has strong predictive power for how management friendly a mutual fund is in general. The paper also examines overweighting for the one year cross-section from mid-2003 to mid-2004, and does not find evidence of significant overweighting. We discuss in Section IV in more detail why our results differ on this dimension.

II Research Design

In this paper we exploit the basic agency problem in which mutual fund investors would like funds to maximize risk adjusted returns, while the fund complexes will take actions to maximize their own value as a going concern. As management fees are often tied to the underlying value of the fund, it is in managers' best interest to take actions to increase the size of their funds. Attracting a 401(k) plan results in a large, stagnant, and captive flow of capital which increases not only the current, but also the future size of the fund (as employees continue to save).

We examine actions mutual funds can take through their portfolio choices to attract and retain 401(k) plans. Our first testable implication is that fund families overweight the 401(k) plan-sponsor's stock. This secures more of the firm's stock in friendly hands, and allows the fund family to better influence the price of the sponsor firm's stock. If this overweighting is being driven by the agency problem generated by the 401(k) assets, we should observe more overweighting in cases where the conflict of interest is more severe. To proxy for the severity of the conflict of interest we use the size of the fund family and the size of the 401(k) plan assets. The idea is that, given a certain size of 401(k) plan assets, a smaller fund family will benefit more than an equivalent large fund family in terms of percentage addition to concern value. We should then see these smaller funds being willing to overweight more to attract a given 401(k) plan's assets. In a similar way, given a certain size of fund family, we would expect the fund to be willing to overweight a sponsor firm's stock more the larger the 401(k) plan's size. Another proxy for this severity comes from exploiting within trustee fund family variation to identify those specific mutual funds that receive the largest benefits from attracting the sponsor 401(k) plan. We do this by singling out those trustee mutual funds that are actually included in the sponsor 401(k) plans, and compare these to trustee mutual funds not included in the plan, as well as to other non-trustee mutual funds.

Another implication of this overweighting being driven by the conflict of interest is that we should see the trustee overweighting the most at times when it is most valuable to the sponsor firm. We identify times of negative shocks to the sponsor firm as times when fund families are selling a large aggregate quantity of the sponsor firm. This is when we would expect the sponsor to exert the most pressure on the trustee fund family to overweight. An additional implication is that, when a sponsor firm switches fund family trustee, we should observe a resulting shift in overweighting: a fund family should increase overweighting upon becoming a trustee, and decrease it upon termination of the relationship. An important note on this last testable implication involves the timing of the trustee overweighting. We do not have a clear prediction whether the overweighting should begin directly preceding or following the official initiation of the trustee relationship. This will depend on the agreement between trustee and sponsor firm, and so it is not clear that the ordering gives insight into the nature of the relationship. This being said, in Section IV we examine the dynamics of this trustee overweighting relative to a group of "competitor" fund families for the trustee business, to get some insight into the timing of the relative overweighting.

III Data

The majority of data we use comes from a hand-collected dataset of retirement plans sponsored by publicly traded firms matched to the stock holdings of mutual fund families. In this section we describe how we collected information on 401(k) plans, the mutual fund family holdings data we use, and how we matched these two datasets.

III.A 401(k) data

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)[7]. The 11-K data (SEC) is available from 1994-2004 (which corresponds to fiscal years 1993-2003). Over this sample period, we hand collect all documents. Thus, our initial sample represents the entire universe of firms filing 11-K's with the SEC. In the 11-K

[7]The specific 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 total 401(k) assets. Regarding Form 5500, any firm that sponsors an employee benefit plan that qualifies under the Employee Retirement Income Security Act of 1974 must file a Form 5500 with the Department of Labor.

document, we collect a number of the data items. Total plan assets invested in the 401(k) plan, plan assets invested in company stock, and the identity of the trustee of the plan are generally available. In addition, we collect the amount of plan assets that are 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 1995-2004. 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 dataset contains over 2500 companies. To be included in our sample, however, the company has to meet the following requirements. First, we need to be able to identify the company in the CRSP database. Companies in our 401(k) dataset are identified by their IRS Employer Identification Number (EIN). We use the CRSP/Compustat Merged Database to map the EIN's into PERMNO's, CRSP's primary stock identifier. We then check each match by looking at the company's name. The CRSP/Compustat database doesn't have historical EIN's and so we couldn't always find a PERMNO match for each company in our initial dataset. Once the company is identified, we exclude financial companies (SIC codes between 6000-6999). We do this as they are usually the trustee of their own plan, and there are likely other incentives and restrictions for holding their own stock. This gives us 1537 companies. The final requirement is that we can 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 reported one of the mutual fund families in our sample as their trustee leaves us with a total of 899 companies[8].

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 where the company had two different trustees, we keep only the largest plan. This ensures that, at a given point in time, there is only one trustee for each one of the companies in our sample.

Table I Panel A lists summary statistics for the 401(k) plans. We measure the plan size throughout the paper as the *residual* of plan assets after subtracting out the amount of plan assets invested in company stock. We do this as there are often restrictions placed on participants transferring portions of their assets out of company stock (the company matched portion), and the portion that is not restricted is empirically

[8]Of the 638 missing trustees, 453 (nearly 70%) are missing, and the remaining are usually foreign banks or individuals within the company.

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[9]. For brevity, we will term this residual plan assets measure simply as "plan assets" throughout the paper. The average size of a retirement plan in terms of this measure for our 1993-2003 sample is then roughly 553 million dollars[10]. Plan sizes are in general increasing over the sample, and the aggregate size of our sample peaked in 2003 at 449 billion dollars. In 2003, the largest plan in our sample had plan assets of nearly 18 billion dollars. The second and third largest plans that same year had plan assets of roughly 17 billion and 14 billion dollars, respectively. Our sample size averages 392 firms per year, and the total sum of all plans' assets averages about 178 billion dollars per year.

Panel B gives summary statistics for the sample at the fund level. For each 401(k) plan, we match every equity mutual fund to the CDA/Spectrum mutual fund database. This matching had to be done by hand, as each plan uses different conventions for reporting fund names and fund level holdings. From Panel B, 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, about 1 in every 5 plans, the trustee fund family comprises 100% of the equity funds we are able to match from the plan.

III.B Mutual fund holdings

Our data on mutual fund holdings comes from the CDA/Spectrum Institutional holding database and the CDA/Spectrum Mutual Fund holding database. These contain the quarterly holdings of virtually all US investment companies[11].

We first describe the data collection for the institutional data. We focus on large mutual fund families since they better represent potential trustees for 401(k) plans. Specifically, in each quarter, families are sorted by the market value of their holdings of CRSP stocks and the largest 100 families identified. Our

[9]We thank Wei Jiang for suggesting this measure.

[10]The plans in our sample hold roughly 90 million dollars in company stock on average. All tests in the paper were also run using aggregate plan assets, with the results very similar in magnitude and significance.

[11]The primary source of holdings data at the institution level is the 13f form that investment companies with more than 100 million dollars under management are required to file with the SEC on a quarterly basis (Securities Exchange Act Section 3(a)(9) and Section 13(f)(5)(A)). Smaller companies are permitted to file as well, and many actually do. Thus, data on smaller families may be inconsistent and have a selection bias. However, as explained below, we will only focus 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.

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 will be included in our sample in *every* quarter from 1993 to 2003). 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) dataset. However, as explained below, all equity holdings are included in the computation of aggregate measures, such as the total assets under management[12]. We present summary statistics of the mutual fund families in our sample in Table I, Panel C. The average fund family in our sample has approximately 12 billion dollars in Total Net Assets (TNA)[13]. Comparing the TNA of trustee and non-trustee fund families, we see that 401(k) plan trustees are on average larger families.

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

III.C Matching Retirement Data To Mutual Funds

The final step is to match our 401(k) dataset back to institution and fund level data on mutual funds. To do this, we first identify the trustees in the mutual fund dataset. 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 from 1993 to 2003 and contains the number of shares each one of the 251 families (1,929 funds) in our sample owns of each of the 899 publicly traded companies whose

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

[13]Throughout the paper, we refer to TNA 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

401(k) plan's trustee we matched as a mutual fund family[14].

III.D Variable Construction

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

Throughout the paper, 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)). *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). Future Returns are computed as the cumulative future returns of the firm over the next 11 months. *Market Weight* is measured as the weight of the stock in CRSP's value weighted market index. Finally, the total net assets (TNA) of a family are measured as the sum of the value of all equity holdings of that family in a given quarter.

We then compute two variables to measure the investment focus of the family, percentage invested in style ($PctInvStyle$) and percentage invested in industry ($PctInvInd$). To construct $PctInvStyle$,

[14]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 the results being 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, as we think it provides a better comparison group for holdings. These results are available upon request. We thank Jon Reuter for suggesting these tests.

following Daniel et al. (1997), we create 27 style portfolios based on a triple sort on size, book-to-market and momentum[15]. On each July, stocks are first sorted into 3 groups based on each firm's market equity on the last day of June. Then, the firms within each size group are further sorted into 3 groups based on their book-to-market ratio. Finally, the firms in each of the 9 size-BM portfolios are sorted into 3 groups based on their preceding twelve-month return. Once these portfolios are constructed and each stock is assigned a particular style, $PctInvStyle$ is computed as the proportion of the family's TNA in a given style. We construct $PctInvInd$ in a similar manner, but across industries. So, for each industry, defined by 2-digit SIC code, we calculate the proportion of the family invested in this industry. To give an example, if at a given point in time firms s and h are in the same style category and industry, and are both held by the same family f, then they will have identical values of $PctInvStyle$ and $PctInvInd$.

In our time series tests, we make use of changes over time in these explanatory variables. In addition, we will be using the following two independent variables: cumulative abnormal return (CAR) and percentage of company sold ($PctCompSold$). CAR is measured as the cumulative return from 2 days prior to 2 days after the earnings announcement date from CRSP, minus the CRSP value weighted index return. $PctCompSold$ 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, $PctCompSold$ for firm s would be -1.

IV Conflicts of Interest

In this section we document the initial empirical evidence regarding the conflict of interest in the market for 401(k) plans. 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 firms and find no significant effect. The differences between our results and those of Davis and Kim (2006) are driven by (i) our focus solely on the trustee relationship whereas the ties they examine are *any*

[15]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). The main difference is that Daniel et al. (1997) constructed 125 style portfolios, as opposed to our 27. We only give a brief description of the construction of these portfolios and the reader is referred to their paper for further details.

relationship of the pension fund to the mutual fund, including administrative services and custodial services (the day to day servicing of the plan), and (ii) our use of an eleven year panel while Davis and Kim (2006) examine a one year cross section.

We focus on the trustee relationship as the trustee is involved with the choosing of investment options. We expect this to be the strongest tie, as the potential gains from syphoning funds far outweigh those from the direct trustee fees. In fact, a study done by the Department of Labor in 1998 (DOL (2000)), found that 90% of total fees paid by a 401(k) plan are investment management fees. In our sample, we estimate this using trustee fees and an estimate of investment management expenses paid by 401(k) plan investors. We calculate trustee fees from the Form 5500 filings, and use the average mutual fund management expense ratio of ICI (2006), which estimate these expenses for a large sample of 401(k) plans. We estimate the average annual expense revenue from attracting a 401(k) plan to be close to 4.2 million dollars: the average size of plan assets invested in mutual funds in our sample of 552 million, times the average expense ratio 0.76%, from ICI (2006). This is over 27 times the average trustee fee revenue in our sample of 150 thousand dollars, indicating that investment management expenses far outweigh the relatively small trustee fees received by the families[16]. Given this, we expect fund families to be more interested in becoming (and remaining) trustees in order to benefit from the investment management revenues it brings, rather than from explicit trustee fees.

On the issue of the difference in samples between Davis and Kim (2006) and our paper, 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 of these trustees in their sponsor firms' stocks[17].

IV.A Conflicts of Interest: Univariate 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. According to our hypothesis, a firm may value overweighting of its shares by a fund because (i) it places a block of its shares in friendly hands, (ii) it decreases the response to negative shocks, as the firm has a block of shares which are not sold by the trustee, and (iii) it pushes up the price of

[16] 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.

[17] These results are available upon request.

the firm's shares as the fund purchases these shares. We show in this section and Section V that firms both overweight the sponsor firm stock and increase this overweighting around times of negative shocks.

We first show the fund overweighting in a univariate setting, and then use a regression framework to separate out other factors driving mutual fund portfolio choices. As overweighting can be measured using different metrics (each with shortcomings), we test for a variety of holdings measures of the sponsor firm in Table II. The first is the market value of the sponsor firm in the fund family's portfolio. In Panel A of Table II, for each sponsor firm, we compare the average holdings of its trustee family relative to all other mutual fund families. The trustee holds on average 188 million dollars worth of the sponsor firm's stock in its portfolio, while all other fund families hold only an average of 24 million dollars of the same firm ($t = 11.25$ for the difference). As a percentage of shares outstanding of the trustee firm ($PctSharesOut$), the trustee holds on average 2.19% while all other fund families hold on average only 0.78% ($t = 20.72$ for the difference)[18]. This is about 3 times larger a holding by trustees. The difference, though, may be driven by the fact that trustees are larger fund families on average (from Table I) and hold more in absolute terms of every stock than non-trustee fund families. To control for this difference in family size, we look at the average holding of the sponsor firm stock as a percentage of the total net assets of the fund family. Again, we see the trustee significantly overweighting the sponsor firm relative to all other fund families in terms of $PctTNA$.

The last two univariate overweighting measures we examine attempt to match the 401(k) sponsor firm to similar firms, and then test whether the trustee is simply overweighting a specific type of firm (e.g. auto firms), or there is something special about the trustee relation. The two measures of similarity we use are industry and characteristic style, based on size-book to market-momentum categories (Daniel et al. (1997)). For each sponsor firm, we compute the difference between the trustee's investment in that firm and the trustee's average investment in the matched group of similar firms. We aggregate across trustees to get a time series of differences. Panel B of Table II reports the average of these differences, both in terms of $PctSharesOut$ and $PctTNA$. In both cases (industry and style), trustee families significantly overweight the sponsor firm relative to even this group of similar firms. The magnitude and significance in terms of $PctTNA$ of the family is almost identical to Panel A. In terms of $PctSharesOut$, the overweighting is highly significant relative to both similar groups ($t = 15.11$ and $t = 16.66$), with the magnitude about

[18]The t-statistics in this section are calculated using a Newey-West adjusted standard error with four lags.

half of that in Panel A, still implying an overweighting of roughly $ 41,000,000 relative to the sponsor's industry, and $ 38,000,000 relative to the sponsor firm's characteristic style.

IV.B Conflict of Interest: Regression Results

In the regressions of Table III, we separate out the effect of other characteristics determining 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 $\log(PctSharesOut)$, and measures the percentage of a firm's shares outstanding that the family holds. We focus on $\log(PctSharesOut)$ throughout the paper instead of $\log(PctTNA)$, as from the sponsor firm's perspective of the benefits of trustee overweighting, this is the more relevant measure. All our conclusions hold irrespective of the measure used[19]. 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 1 if, at time t, family f is the trustee of company s, and it is 0 otherwise. The control variables, and their construction, were described in Section III. We include firm characteristics of $\log(ME)$, $\log(BM)$, and past year returns (*Past Returns*), to control for firm specific reasons a fund may be weighting in a security. For fund family controls, we include $\log(TNA)$ to control for the size of the family, and two variables discussed above, $PctInvStyle$ and $PctInvInd$, to proxy for the investment focus of the family. We include these as it might be that a fund family overweights the sponsor, but decreases the weight in a similar stock (same style or industry) to keep total style or industry exposure the same. *Market Weight* is also included, and is the weight the stock would receive if the fund simply invested in line with the (CRSP) value weighted market portfolio. We also include quarter fixed effects in our pooled specifications as they control for time specific variability[20]

We run the regressions using both (i) a Fama and MacBeth (1973) type approach and (ii) pooled regressions with fixed effects, clustering our standard errors. Columns 1 and 2 of Table III show pooled regressions. In both specifications, standard errors are clustered at firm level, but only Column 2 includes

[19] In fact, our point estimate for the effect of *Trustee* overweighting is almost identical, which is not surprising as one can simply rewrite both measures as the difference of logs, and see that the regression models will be nearly identical.

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

quarter fixed effects. We use quarter fixed effects and cluster standard errors by firm in all future pooled regressions[21]. In Column 3, estimates were obtained using the Fama-MacBeth approach, with standard errors corrected for autocorrelation. To quell further concerns that autocorrelation is driving the significance levels, in Column 5 we run the same specification but only on a single cross-section. We choose the middle of our sample, June 1998. Note that the coefficient estimates and significance levels are quite similar across all 3 estimation types (Columns 2-4), especially on the variable of interest, *Trustee*. Specifically, from Column 2, the coefficient on the variable of interest, *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 than do other families. This translates into an overweighting of about $ 61,574,000 more in each one of the sponsor firms, or a total distortion over the entire industry of more than 24 billion dollars[22]. Other coefficients affecting the holdings decision are size, (the larger the firm, the smaller percentage of entire 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. We also include the log of the size of 401(k) assets in Column 5. It is insignificant, and has almost no effect on the coefficient of *Trustee*. Lastly, to get an idea of whether this effect is concentrated in a specific group of the firms, we perform 2 additional tests. First, in Columns 8 and 9, we run separate tests on the two sub-groups of trustees: those with the highest market share (top 5 in terms of market share) in Column 8, and all other trustees in Column 9. This tests whether the trustee overweighting is present only in our top market share trustees, or is pervasive throughout the trustee-sponsor firm sample. From Columns 8 and 9 of Table III, we see that the coefficient on *Trustee* is nearly identical across the 2 sub-samples, implying that the effect is not concentrated in the top market share trustees. Next, in Column 10, we run a separate test only on the sub-sample 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

[21] 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 level. Magnitudes and significance are very similar, and all our conclusions remain the same. These results are available upon request.

[22] 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, $\log(\widehat{PctSharesOut})$. From these estimates, we calculate the fitted dollar value of each holding as $\widehat{Holding} = \exp(\log(\widehat{PctSharesOut})) \times ME$, 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 dollars, respectively. The estimated increase due to the trustee relation (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).

only be other trustee families (and not all other large fund families). From Column 10, the coefficient on *Trustee* is large and significant, with the point estimate even slightly larger than for the identical full sample specification in Column 2. We have, in addition to these tests, included direct trustee fees paid, even though they are an order of magnitude smaller than fees from fund expense ratios, to make sure there is not a substitution effect between the two. The coefficient on trustee fees is neither significant nor does it affect the magnitude or significance of *Trustee*.

It could be that the investment patterns we see are driven by superior information. Upon securing a trusteeship, the fund family may have access to information about the company that other funds do not have. 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[23]. To test this explanation, we simply check whether or not the trustee is better at predicting the future returns of the sponsor firm than other stocks, and than other mutual fund families holding the sponsor stock.

This test is in Column 7 of Table III. 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[24]. We then also include the interaction term *Trustee*Future Returns*. This should measure 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 does trade on superior information upon securing the trusteeship, this coefficient should be positive and significant. From Column 7, it is close to zero and insignificant, suggesting that superior information cannot explain the overweighting of sponsor firm's stock that we observe.

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

In this section we test another implication of the conflict of interest driven overweighting. 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. According to our hypothesis in Section II, the overweighting documented in the previous section should be more severe when the bargaining power of the company is higher. That is, in those cases when the company's 401(k) plan is relatively larger and the family is

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

[24]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.

relatively smaller. We create two interaction terms to measure these two implications. The first is $Trustee * log(TNA)$. Our hypothesis predicts that this interaction term should be significantly negative. The smaller the mutual fund trustee, the more attractive a given 401(k) plan, as the plan will represent a larger percentage increase in TNA. The second interaction term is $Trustee * \log(401(k)Size)$. We expect this interaction term to have a significantly positive coefficient. The larger the plan, the larger the benefit a given mutual fund will receive for attracting it, so the higher the bargaining power of the company.

The tests for both of these interaction terms are in Column 6 of Table III. Consistent with the fund family conflict of interest driving the overweighting in sponsor firm stock, we find evidence for a more severe conflict of interest leading to more severe overweighting in both mechanisms mentioned above. First, controlling for other firm, fund, and plan characteristics (including size of the 401(k) plan), a decrease in the size of the fund family significantly increases the extent of overweighting ($Trustee * log(TNA)$). 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%. We have also used size of the 401(k) plan as a percentage of TNA, and find similar magnitudes and significance. Both of these results provide further evidence of the trustee overweighting we document being driven by the family's conflict of interest.

IV.D Fund Level Evidence

In this section, we examine mutual fund level holdings to gain further insight into the forces driving the trustee family overweighting[25]. We do this for two main reasons: First, it allows us to test varied implications of trustee overweighting across mutual funds *within* the trustee fund family. Second, it addresses one possible confounding accounting issue in the family level reporting of sponsor firm stock. It may be the case that for some trustee fund families, the families report the company stock account of the 401(k) plan as assets under their own management, which would be included in the 13-f filing. Although the subset of trustees we contacted indicated they do not account for company stock in 401(k) plans as an asset they

[25] We are grateful to the referee for suggesting these tests.

hold, this certainly does not preclude this from being practiced by other trustees in our sample. If this were indeed true, then the results we document in the previous subsections may be mechanically caused by this accounting method. Using mutual fund level data, we are able to include solely equity mutual funds in our analysis, and thus alleviate this mechanical accounting concern. We first replicate the regression as in Table III, but now using mutual fund level holdings data. Thus, we are measuring the weights managers place at the fund level. As such, we now define *Trustee* to be equal to 1 if a mutual fund manager whose fund belongs to to the trustee family is holding the sponsor firm stock. The results are in Table IV. 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 than do other funds.

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. It may be reasonable, then, that they might also be those fund managers most willing to overweight in order to keep these benefits. In order to test this, we match the CDA/Spectrum mutual fund holdings level data to the data on mutual funds contained in the sponsor 401(k) plans, collected directly from the 11-k filings. We then split trustee family mutual funds into 2 categories. The first is those mutual funds included in sponsor firm 401(k) plans. The variable *Plan Trustee Fund* measures this group's sponsor firm stock overweighting. It is equal to 1 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 0 otherwise. The second group of funds are 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 congruent to *Plan Trustee Fund*. We can then 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 IV. First, examining the overweighting of those trustee mutual funds outside of the sponsor 401(k) plans, the coefficient on *Non-Plan Trustee Fund* in Column 4 of 0.137 ($t = 3.04$) implies an overweighting of 15% by these funds. For those mutual funds included in the 401(k) plan, the coefficient on *Plan Trustee Fund* in Column 3 of 0.681 ($t = 7.32$) implies an overweighting of 98% in the sponsor firm stock. These results indicate that the trustee funds included in the plan overweight by over 6 times as much as those not included in the plan, which is again consistent with the overweighting being more severe when

the benefits are higher. This provides fund level evidence consistent with the overweighting being tied to the trustee conflict of interest.

V Trustee Behavior Following Shocks

V.A Changes In Trustee

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

Only 3.4% of firms switch trustees each year. Thus, the total 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. However, it is important to note that the rarity of the event, in other words, the propensity of sponsor firms to only infrequently sever ties with the trustee, may be part of what makes this trustee relationship so valuable to the fund family.

Figure I plots the change in the family's holdings of the sponsor firm before and after the trustee change. For each company that changed 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[26]. If we set the date of change to be 0, this corresponds to looking at the interval $[-4, 7]$. Because we don't know in which quarter the change took place (we only know the year of the change), we compute a moving average of 4 quarters. The pattern that emerges is that the old trustee strongly decreases its position in the stock after it stops being the trustee, while the new one progressively increases its position on the stock when it becomes the trustee. We are not controlling for stock and family characteristics in the figure, and so we move next to a regression framework where we can do so.

In the first two columns of Table V, Panel A, we break up the overweighting effect to separately estimate responses to beginning and ending trusteeship. The dependent variable here is $\log(Change)$ = $\log(shares(f, s, t)/shares(f, s, t-1))$ and measures the percentage change in family f's holdings of

[26]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. The reason we chose the percentage of the TNA is that we abstract from size of fund family issues when sponsors change trustees.

stock s from quarter $t-1$ to t. In addition to the usual controls for firm and family characteristics, we present two additional explanatory variables: $Beginning1Year(f,s,t)$ is a categorical variable that is 1 if family f began being the trustee of company s in the year to which quarter t belongs, and is 0 otherwise. Similarly, $Ending1Year(f,s,t)$ is 1 for the quarters in the year when the trustee relationship between f and s ended, and is 0 otherwise. The variables $Beginning2Years$ and $Ending2Years$ are constructed in a similar manner except that they are 1 for the year the trustee changed and the year after.

From Columns 1 and 2, the effects go in the directions predicted by our hypothesis. In Column 1, where the dummies represent the year of the change, the signs go in the right direction but the estimates are not significant. In Column 2, we allow the period dummy to be the year of trustee change and the following year. *Beginning* implies that the new trustee significantly increases percentage of shares held in the sponsor firm by roughly 6.5% ($t = 2.52$), and *Ending* suggests that the opposite occurs. Funds ending the trustee relationship decrease the amount invested in the sponsor firm by 3.4% in the two years following the trustee change. This *Ending* coefficient is not, however, significant. These results combined suggest that families steadily increase their position in the sponsor stock in the year of and year after they become the trustee, but revert this position more rapidly (within the year) when they end being the trustee. Columns 3 and 4 of Panel A then test the level implication of these results. The regressions are pooled and only include those observations which have changed (or will at some point during the sample change) trustees. The variable *Ex/Fut Trustee* is a categorical variable equal to 1 in the two years before and after a trustee relationship, and 0 during the relationship. The coefficient then measures how much more (or less) the trustee weights in the sponsor firm when it does not have a trustee relationship. The negative and significant coefficients ($t = -2.18$ and -2.05) suggest that the trustees hold less of the same sponsor firm when the two are not in a trustee relationship, relative to when they are.

In order to get more insight into the evolution of the trustee relation, we attempt to identify the timing of the trustee overweighting. As we only see changes in trustee at the yearly frequency, it makes it difficult to use time series variation at a finer level than (year before-year after) changes. So, here we take a different approach and instead exploit cross sectional changes in weighting between the eventually named trustee and other potential "competitor" trustees. The advantage of fund level data is then that we can compare funds that become trustee funds to similar funds that do not become trustee funds. In order to identify potential competitor funds, we first use only other fund families that are in the trustee sample. We then

create 125 style categories based on a triple sort (size-BM-momentum) as in Daniel et al. (1997), and assign each fund to a style category based on the value-weighted average of its holdings. We compare the holdings of the funds that eventually do become trustees (*Trustees*) to all other funds in its style category (*Comparable*) in three periods: the year before, during, and after the trustee change is undertaken. The results of this comparison are in Panel B of Table V. We find strong results when a firm end being trustee. In the year before ending being trustee, there is a significant difference between trustee and comparable funds in holdings of the sponsor firm stock of .065 percent of shares outstanding (t=2.51) (at the fund level). This difference decreases, but is still significant, during the year of the trustee change, at .046 (t=2.03). However, by the year following the ending of the trustee relationship, there is almost no difference in holdings between the now ex-trustee and comparable mutual funds (.018 difference (t=1.34)). So, we see the largest drop in trustee holding of the sponsor firm only after the sponsor firm ends the relationship with the trustee, resulting in the trustee holdings of the sponsor firm being statistically indistinguishable from comparable funds.

For the initiation of the trustee relationship, the results are a little more difficult to interpret. We do see the trustee overweight relative to comparable firms by roughly the same magnitude (.049 and .046) and significance in the year before and after the trustee initiation. The interesting variation seems to be happening in the year of the trustee initiation. In the year of the initiation, we see the eventual trustee funds increasing their weighting in the sponsor stock, while the comparable funds decrease their weights. This results in a large and highly significant difference in weighting in the initiation year of .082 (t=3.62). However, in the year following the naming of the new trustee, we see the trustee funds unwinding the ”extra” overweighting, to end up with the same overweighting relative to comparable funds as the year before. Although we cannot pinpoint exactly what this says about a negotiation between sponsor firm and trustee, this is consistent with the trustee fund having to especially overweight in the year in which the trusteeship is initiated (and potentially the year the decision is actually made), and then being able to reduce the large overweighting somewhat, but not entirely, as we see the trustee still significantly overweighting the sponsor firm i.) in the year following the trustee initiation, and ii.) even still in the year before the end of the trustee relation.

V.B Trustee Behavior Around Negative Shocks

The sponsor firm may find its relationship with the trustee more valuable at certain times; specifically, times of downward price pressure due to widespread selling of the sponsor firm's stock. This is when there may be more stress on the trustee to overweight in the sponsor, and thus when the consequences of the conflict of interest are more apparent. Our hypothesis predicts that we should observe the biggest deviations at precisely these times. We test this response of the trustee using two measures. The first and most direct measure is when there is widespread selling of the sponsor stock by mutual funds. A benefit of this measure is that it is independent of a model of flows. We define periods of large selling as those when more than 1 percent 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 the trustee's behavior (i) relative to when all funds are on average selling and (ii) when the sponsor firm is likely in greatest need of price propping up. The second measure we use is the cumulative abnormal return (CAR) around earnings announcements. The construction of this measure is similar to Baker et al. (2005). We use the [-2,2] day abnormal return around an earnings announcement, controlling for the return on the CRSP value weighted market index. A negative shock will be an event where the $CAR < 0$ at the closest earnings announcement of the firm before quarterly holdings are reported.

Table VI contains the regressions. The dependent variable in the regressions is $\log(Change)$, defined in Section III as $\log(shares(t)/(shares(t-1))$. Columns 1-3, contain the regressions for periods of large selling by fund families. $PctCompSold$ measures the percentage of the company sold in aggregate by all fund families, while $PctCompSold > 1$ is a categorical variable equal to 1 when $PctCompSold$ is greater than one, and zero otherwise. We then interact this categorical variable with the *Trustee* categorical variable. ($Trustee * PctCompSold > 1$) measures how trustees behave relative to other fund families in situations where there is selling off of the sponsor firm by the average family, and is the variable of interest. If the trustee is propping up the firm especially in times of aggregate fund selling, we expect this interaction term to be positive and significant.

From Column 1, the coefficient on the categorical variable $PctCompSold > 1$ 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 ($Trustee * PctCompSold > 1$) 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 ($Trustee * PctCompSold > 1$) 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% ($0.141 - 0.025$) at exactly those times when the sponsor firm may find it most valuable. This is consistent with the sponsor firm having some ability to exert pressure on the trustee. We also run separate regressions for trustees and non-trustees (Columns 2-3). As in Column 1, while fund families on whole are selling large quantities of the sponsor firm, trustees are significantly increasing their holdings of the sponsor firm (coefficient on $PctCompSold > 1$ in Column 2 relative to Column 3).

Column 4 of Table VI contain the regressions for the CAR measure of a negative shock to the firm. The categorical variable $CAR < 0$ is equal to 1 when CAR is negative and 0 otherwise. The interaction term ($Trustee * CAR < 0$) 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 is controlling for past year returns of the firm. The coefficient on $CAR < 0$ is negative but also not significant. 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 ($Trustee * CAR < 0$) suggests that the trustee invests more in the sponsor firm following negative earnings surprises, with CAR itself seeming to be a weaker identification for a shock to a firm.

Another way to examine the effect of the conflict of interest 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 VI we compare the probability of other fund families selling the sponsor stock to that of the trustee. We use probit regressions where the dependent variable *Sell* is equal to 1 if the mutual fund sold the firm's stock, and 0 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 VI, 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 ($Trustee * PctCompSold > 1$) and ($Trustee * CAR < 0$). The negative and significant coefficient estimate of -0.198 ($t = -3.42$) on ($Trustee * PctCompSold > 1$) 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. The interaction $Trustee * CAR < 0$, as before, does not have a significant effect. The evidence in Table VI further supports the idea that the conflict of interest is affecting trustee portfolio choice. During times of aggregate selling of the sponsor firm, causing negative price pressure, the trustee is acting in an opposite manner to other fund families, and helping to prop up the firm's price.

V.C Returns to Liquidity

Coval and Stafford (2006) examines the price implications of mutual fund fire sales of securities. The paper finds that when constrained funds are forced to liquidate shares, this depresses the prices of the firms that they sell. On the opposite side, those that provide liquidity to constrained funds during these times earn significantly positive returns[27]. We want to rule out the possibility that the results in Table VI are driven by this effect, namely that trustees provide liquidity to the sponsor firms' stocks in order to capture future positive returns.

Specifically, we test whether the trustee is able to obtain positive future returns by exhibiting the buying behavior we document in Table VI. In Table VII, we replicate the experiment in Coval and Stafford (2006) using our measure of liquidity instead. We use the quarter in which $PctCompSold > 1$ as our event quarter and set the last month of this quarter as our event date, $t = 0$. We then look at returns in the 12 months preceding and 12 months subsequent to the event (from $t = -12$ to $t = 12$). We use two measures of returns, average abnormal return (AAR) and cumulative average abnormal returns (CAAR). Abnormal returns in both measures are defined as the firm's return minus the return on the CRSP value weighted market index. From Table VII, the trustee earns significantly negative returns on its overweighted position leading up to and including the event date. For example, the CAAR for the quarter in which the mutual fund industry is selling the sponsor firm (months -2, -1, and 0), is -5.14% ($t = -5.95$). Further, although the estimated abnormal returns are positive following the mass selling, they are not statistically different from zero, and the magnitudes are smaller than the negative returns surrounding the event. It therefore does not appear that the trustee is compensated for the liquidity it provides by buying significant amounts of shares

[27] See Panel A of Table 4 in Coval and Stafford (2006). Note, however, that mutual funds are only able to earn high abnormal returns from providing liquidity in the case of fire sales by *constrained* funds. As these sells are not driven by new information, liquidity providers earn positive returns once prices revert to their "fundamental" values. When mass sales include those driven by information updates, future returns from providing liquidity are smaller (Panel B of Table 4 in their paper).

in the sponsor firm.

VI Costs To Investors and Price Impact

VI.A Costs to Investors

In Sections IV and V, we present evidence of overweighting by fund families of their 401(k) client firms, consistent with the desire of fund families to attract and retain 401(k) clients. We now turn to a cost of this overweighting for the current fund's investors. Investors within a mutual fund family want the mutual fund to maximize a risk adjusted expected return[28]. The fund family, on the other hand, has the incentive to maximize assets under management, maximizing fee revenues (Brown et al. (1996), Chevalier and Ellison (1997, 1999)). As one way to do this is to attract the large inflows from 401(k) plans, this creates a conflict of interest if the method used to attract funds is not maximizing risk adjusted returns.

We have shown evidence that fund families do overweight 401(k) client firms, and buy their shares when other funds are selling, consistent with this conflict of interest affecting the fund's portfolio decisions. There are a number of possible ways to quantify the effects on fund investors of this overweighting. One is to look at the loss in risk adjusted returns[29]. As we found in Table IV that the overweighting is concentrated in those trustee funds that appear in their sponsor 401(k) plans, we focus on these funds. An important point to note is that these funds are not funds specific to 401(k) plans, but are also available in the fund families' menus to all outside investors. Using the estimates from Table IV, we calculate the loss in risk adjusted returns using Sharpe ratios. We do this for both the trustee mutual fund level and at the level of a 401(k) plan investor.

Panel A of Table VII shows the loss in Sharpe ratio for the trustee mutual funds because of the trustee overweighting, a loss incurred by all fund investors. We estimate both Sharpe ratios for both an *Optimal Weighting*, defined as free of the trustee overweighting piece, and *Overweighting*, including the estimated trustee overweighting. From Panel A, this results in a loss in risk adjusted returns of around 60 basis points per year for the overweighted fund, or roughly a risk adjusted loss in returns of 21% over the life of the

[28]There are certainly other goals, such as tax considerations and current income, that some investors have. The conflict of interest would still develop in that overweighting in the 401(k) client is likely in conflict with these goals, as well.

[29]This ignores their loss in returns because of the increased overweighting around negative shocks. We therefore expect losses to be greater when taking this behavior into account.

trustee-sponsor firm relationship. In Panel B, we do a similar analysis, but for an individual investing in a 401(k) plan. We assume that our investor is 30 years old, will retire at 65, and saves the average annual deferred savings in our sample, which is $3,320 per year. Further, as the average percentage of plan assets invested in company stock in our sample is 14%, we assume this is her allocation to company stock. Finally, from Panel B, the percentage of mutual fund assets in our average sample 401(k) plan invested in trustee mutual funds is 45%. We thus assume that the 401(k) investor has 45% of her assets in trustee mutual funds, and the other 55% in non-trustee funds. Using this, we estimate the amassed retirement income of this investor with and without the trustee overweighting. From Panel B, the trustee overweighting imposes a cost of $42,313 on the investor, which translates into a roughly 6% loss in retirement income. In net, these panels give estimates of the costs imposed by the trustee overweighting on both the outside investors in the family's mutual funds and those 401(k) participants inside the plans. Considering both the retirement income cost and the potentially sizeable return loss over the average trustee-401(k) sponsor relationship (21%), this combines to a potentially large cost imposed by the trustee overweighting.

VI.B Quantifying a Benefit: Price Impact

From Section III, trustee funds buy sponsor firm shares precisely when all other fund families are selling a significant amount. From the sponsor firm's perspective, this may help to dampen adverse price movements of its stock. In this section, we quantify this benefit by estimating to what extent the trustee's increased overweighting specifically in these bad times can have a tangible price impact on the sponsor firm. To do this, we first need an estimate of the demand elasticity of the sponsor firms. We rely on the previous literature, which has estimated demand elasticities of firm stock in the range of roughly 1 to 11 (Shleifer (1986), Loderer et al. (1991), Petajisto (2006)). We will use the average of this range, 6, for our tests. From Column 1 of Table VI, trustees actually increase their purchases in the sponsor firm by 11.45 percent (0.1406-0.0261), when other funds are on average selling a significant portion of the firm. This translates into the trustees buying roughly .25% more of the shares outstanding of the sponsor firm[30]. To give a further idea of what this means to the sponsor firm, the median amount of its shares sold by all firms, including the trustee, when $PctCompSold > 1$, is 2.28%. Thus, using the elasticity estimate of 6, the estimated price

[30]This figure comes from multiplying the 11.45 percent increase by the average holdings of the trustee in the sponsor firm of 2.19% of shares outstanding (Table III).

response of the firm is a -13.70 percent return. However, because the trustee buys shares at exactly these times, the returns are 151 basis points higher than they otherwise would be. Therefore, the trustee provides a 9.92% (1.51/(13.70+1.51)) propping up of the sponsor firm's stock price. We note that one potential caveat of this measure is that we do not know how long the upward price effect will persist. Thus, the propping up of price we estimate suggests a tangible benefit (although perhaps of shorter horizon) to the 401(k) sponsor firm of having the trustee conflict of interest.

VII Conclusion

There are several ways mutual fund families attract assets under management. We document a new, economically large, and growing channel, through the 401(k) market, and find evidence that mutual fund families systematically distort their portfolios to attract these 401(k) clients. This presents a conflict of interest, as the fund's fiduciary responsibility to outside investors is to maximize return subject to a given risk or benchmark. Specifically, we find that mutual fund families who become trustees significantly overweight 401(k) sponsor firm's stock in their fund families. This overweighting is significantly more pronounced for smaller fund families, for larger 401(k) plans, 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 performs a valuable service to the sponsor company by buying or holding its stocks around times of substantial selling of the sponsor firm by all other funds. We quantify this benefit of increased buying of sponsor firm shares by its trustee around bad times, and find that it can have substantial price impact by propping up the sponsor firm's price. Further, this overweighting cannot be explained by information, as trustees do no better on their sponsor firm holdings than other fund families. We find that this overweighting can in some cases result in a large cost to the mutual fund investors.

With the percentage of mutual fund assets held by defined contribution retirement plans steadily increasing, we expect fund families to exert more effort in attracting these 401(k) plans in the future. This is coupled with the recent passage of the Pension Protection Act of 2006, following which, projections estimate that 401(k) participation rates will increase by nearly 50% in the coming years (Investment Company Institute (2006b)), vastly increasing the size (and so attractiveness) of 401(k) plans to fund families. We therefore predict the magnitude of the distortion in portfolio allocations we find in the paper will increase,

rather than decrease, in the future. We believe the need to address this trustee portfolio distortion is thus also increasing. Future research should explore potential policy implications that could lessen the conflict of interest. One possible remedy is to require the trustee to be independent of the mutual fund providers in the plan. This could greatly reduce the overweighting behavior currently seen by ostensibly ridding the relationship of its embedded, and unneeded, conflict of interest.

References

Baker, M., L. Litov, J. Wachter, and J. Wurgler (2005). Can mutual fund managers pick stocks? evidence from the trades prior to earnings announcements. New York University Working Paper.

Bergstresser, D., M. Desai, and J. Rauh (2005). Earnings manipulation and managerial investment decisions: Evidence from sponsored pension plans. *Quarterly Journal of Economics 121*(1), 157–195.

Brown, J. R., N. Liang, and S. Weisbenner (2007). Individual account investment options and portfolio choice: Behavioral lessons from 401(k) plans. NBER Working Paper number 13169.

Brown, K. C., W. V. Harlow, and L. T. Starks (1996). Of tournaments and temptations: An analysis of managerial incentives in the mutual fund industry. *Journal of Finance 51*(1), 85–110.

Carhart, M. M. (1997). On persistence in mutual fund performance. *Journal of Finance 52*(1), 57–82.

Chevalier, J. and G. Ellison (1997). Risk taking by mutual funds as a response to incentives. *Journal of Political Economy 105*(6), 1167–1200.

Chevalier, J. and G. Ellison (1999). Career concerns of mutual fund managers. *Quarterly Journal of Economics 114*(2), 389–432.

Cocco, J. and P. Volpin (2005). The corporate governance of defined benefit pension plans: evidence from the united kingdom. London Business School working paper.

Coval, J. and E. Stafford (2006). Asset fire sales (and purchases) in equity markets. *Journal of Financial Economics Forthcoming*.

Daniel, K., M. Grinblatt, S. Titman, and R. Wermers (1997). Measuring mutual fund performance with characteristic-based benchmarks. *Journal of Finance 52*(3), 1035–58.

Davis, G. and H. Kim (2006). How do business ties influence proxy voting by mutual funds? *Journal of Financial Economics Forthcoming*.

Department of Labor (2000). *Private Pension Plan Bulletins Abstract of Form 5500 Annual Reports*. Department of Labor.

Elton, E. J., M. J. Gruber, and C. R. Blake (2006). The adequacy of investment choices offered by 401(k) plans. *Journal of Public Economics 90*(6-7), 1299–1314.

Fama, E. F. and K. R. French (1992). The cross-section of expected stock returns. *Journal of Finance 47*(2), 427–65.

Fama, E. F. and J. D. MacBeth (1973). Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy 81*(3), 607–36.

Federal Reserve (2005). *Flow of Funds Accounts of the United States*. Federal Reserve.

Gaspar, J.-M., M. Massa, and P. Matos (2006). Favoritism in mutual fund families? evidence on strategic cross-fund subsidization. *Journal of Finance 61*(1), 73 – 104.

Goetzmann, W. N. and N. Peles (1997). Cognitive dissonance and mutual fund investors. *Journal of Financial Research 20*(2), 145–58.

Goyal, A. and S. Wahal (2005). The selection and termination of investment managers by plan sponsors. Emory University working paper.

Huberman, G. (2007). Is the price of money managers too low? Columbia University Working Paper.

Huberman, G. and W. Jiang (2006). Offering vs. chice by 401(k) plan participants: Equity exposure and number of funds. *Journal of Finance 61*(2), 763–801.

Investment Company Institute (2005a). *Appendix: Additional Data on Mutual Funds and the U.S. Retirement Market in 2004*. Investment Company Institute.

Investment Company Institute (2005b). *Mutual Funds and the U.S. Retirement Market in 2004*. Investment Company Institute.

Investment Company Institute (2006a). *The Economics of Providing 401(k) Plans: Services, Fees, and Expenses*. Investment Company Institute. Prepared by Michael Hadley and Sarah Holden.

Investment Company Institute (2006b). *Key Savings Provisions in the Pension Protection Act of 2006*. Investment Company Institute. Released Research Paper.

Jones, C. and J. Shanken (2005). Mutual fund performance with learning across funds. *Journal of Financial Economics 78*, 507–552.

Kuhnen, C. (2006). Social networks, corporate governance and contracting in the mutual fund industry. Northwestern University Working Paper.

Loderer, C., J. W. Cooney, and L. D. van Drunen (1991). The price elasticity of demand for common stock. *Journal of Finance 46*(2), 621–51.

Massa, M. and Z. Rehman (2005). Information flows within financial conglomerates: Evidence from the banks-mutual funds relationship. INSEAD Working paper.

Pastor, L. and R. F. Stambaugh (2002). Investing in equity mutual funds. *Journal of Financial Economics 63*(3), 351–80.

Petajisto, A. (2006). Why do demand curves for stocks slope down? Yale University Working Paper.

Reuter, J. (2006). Are ipo allocations for sale? evidence from mutual funds. *Journal of Finance 61*(5), 2289–2324.

Sensoy, B. A. (2007). Performance evaluation and self-designated benchmark indexes in the mutual fund industry. University of Southern California Working Paper.

Shleifer, A. (1986). Do demand curves for stocks slope down? *Journal of Finance 41*(3), 579–90.

Sirri, E. R. and P. Tufano (1998). Costly search and mutual fund flows. *Journal of Finance 53*(5), 1589–1622.

Zitzewitz, E. (2006). How widespread was late trading in mutual funds? *American Economic Review 96*(2), 284–289.

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, as long as the plans have the same trustee (which happens the vast majority of times), 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 are measuring 401(k) size as the residual assets in the plan after subtracting out 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 is taken 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

	Number of Families			Avg TNA (millions)			Std of TNA (millions)		
Period	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

	Number of Funds			Avg TNA (millions)			Std of TNA (millions)		
Period	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: Univariate Measures

Panel A: This panel presents the univariate statistics for various measures of holdings. *MV Hold* is the market value of the family's holdings of the stock at each quarter. *% TNA* is the market value of the holdings divided by the Total Net Assets of the family (equity positions only). *% Company* is the number of shares held as a percentage of the number of shares outstanding. In each case, for each quarter and each stock we average the measure across families separately for trustees and non-trustees. Then, we average across stocks. The panel then presents the statistics of the time series of averages. The *T-stat* is the t-statistic for the difference between trustees and non-trustees. *Newey-West T-stat* is the t-statistic for the difference using Newey-West standard errors with a 4-period lag. Panel B: This panel presents measures of the trustee holdings of sponsor firm stock relative to a matched group of similar firms. The two categories of similar firms are based on (i) industry, and (ii) characteristic style (computed following Daniel et al. (1997)). For each sponsor firm, we compute the difference between the trustee holdings in the sponsor firm and the trustee average holdings of the matched group of similar firms. We aggregate this across all sponsor firms for each quarter, and then take the time series average of this difference to compute the statistics below. *Sponsor - Industry* is the difference between the trustee's holdings of the sponsor firm and average holdings of all other firms in the same industry, while *Sponsor - Style* is the difference between the trustee's holdings of the sponsor firm and average holdings of all other firms in the same characteristic style. *Newey-West T-stat* is the t-statistic for the difference adjusted using the Newey-West procedure with a 4-period lag.

Panel A: Trustees vs. Non-trustees

Variable	Trustees	Non-Trustees	Difference	Newey-West T-stat
MV Hold ($ millions)	188	24	164	11.25
% TNA	0.168	0.092	0.076	3.57
% Company	2.19	0.78	1.41	20.72

Panel B: Sponsor Firm vs. Matched Group of Similar Firms

Variable	Sponsor - Industry	NW T-stat	Sponsor - Style	NW T-stat
% TNA	0.070	3.92	0.074	3.65
% Company	0.66	15.11	0.62	16.66

Table III: 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(PctSharesOut)*. With the exception of Columns 3 and 4, all regressions are pooled, with standard errors clustered at the firm level (in parentheses). Quarter fixed effects are included where indicated. Column 3 estimates were computed using an approach similar to Fama-MacBeth (1973). Standard errors in Column 3 were calculated using the Newey-West estimator with 4 lags. In Column 4, we estimate the parameters for one cross-section, corresponding to the middle of our sample (June of 1998). In Columns 8 and 9 we split our trustee sample into two groups according to plan assets under management. In Column 8, only families that are either never a trustee (control families) or families that are among our top 5 trustees (in terms of plan assets under management) are included. In Column 9, only control families and families that are not among our top 5 trustees are included. In Column 10 we only include trustee families. The independent variable of interest in the regressions is *Trustee*, a categorical variable equal to 1 if the given mutual fund is the trustee for the given firm, and 0 otherwise. Also included in the regressions are the logarithms of firm characteristics of market equity and book-to-market, *ME* and *B/M*, and the firm's weight in the CRSP value-weighted market portfolio, *Market Weight*. *Past Returns* are included, which are the previous 11 months of returns for the firm (excluding last month). The mutual fund family characteristic of the logarithm of total net assets, *TNA*, is included. Additional fund family characteristics of percentage invested in the industry of the stock being considered, *PctInvInd*, and percentage invested in the style of the stock being considered (computed following Daniel et al. (1997)), *PctInvStyle*, are included. *401(k) Size* is the logarithm of the size of the 401(k) plan of the firm being considered. *Trustee*401(k) Size* is the interaction of the Trustee categorical variable and *401(k) Size*. *Trustee*TNA* is the interaction of the Trustee categorical variable and *TNA*. *Future Returns* are measured as the next 11 months of returns for the firm being considered, with *Trustee*Future Returns* being the interaction of the *Trustee* categorical variable and *Future Returns*. The sample period is 1994-2003. All regressions include an intercept (not reported).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Trustee	0.466***	0.385***	0.430***	0.451***	0.381***	1.026**	0.384***	0.306***	0.369***	0.450***
	(0.056)	(0.056)	(0.060)	(0.111)	(0.055)	(0.492)	(0.058)	(0.088)	(0.073)	(0.058)
ME	−0.262***	−0.202***	−0.220***	−0.256***	−0.179***	−0.179***	−0.205***	−0.228***	−0.287***	−0.036***
	(0.012)	(0.011)	(0.029)	(0.017)	(0.014)	(0.014)	(0.011)	(0.012)	(0.012)	(0.012)
B/M	0.052**	0.021	0.035**	0.062*	0.047**	0.047**	0.021	0.020	0.062**	−0.068**
	(0.026)	(0.026)	(0.014)	(0.034)	(0.018)	(0.018)	(0.026)	(0.026)	(0.025)	(0.029)
TNA	0.709***	0.817***	0.816***	0.815***	0.832***	0.832***	0.818***	0.799***	0.790***	0.969***
	(0.008)	(0.009)	(0.011)	(0.012)	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.006)
Past Returns (×100)	0.055***	0.071***	0.100***	0.107*	0.068***	0.068***	0.069***	0.077***	0.075***	0.032**
	(0.014)	(0.012)	(0.030)	(0.056)	(0.018)	(0.018)	(0.012)	(0.013)	(0.013)	(0.013)
PctInvStyle	0.027***	0.022***	0.025***	0.026***	0.022***	0.022***	0.022***	0.022***	0.029***	0.009***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
PctInvInd	0.028***	0.028***	0.031***	0.034***	0.031***	0.031***	0.029***	0.030***	0.038***	0.009***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Market Weight	0.533***	0.237***	0.328***	0.496***	0.208***	0.209***	0.246***	0.304***	0.119*	0.537***
	(0.103)	(0.067)	(0.063)	(0.129)	(0.064)	(0.064)	(0.068)	(0.071)	(0.066)	(0.085)
401(k) Size					0.005	0.004				
					(0.008)	(0.008)				
*Trustee*TNA*						−0.103**				
						(0.043)				
*Trustee*401(k) Size*						0.108***				
						(0.029)				
Future Returns (×100)							−0.035***			
							(0.013)			
*Trustee*Future Returns (×100)*							0.011			
							(0.060)			
Quarter Fixed Effects	No	Yes	-	-	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.23	0.26	0.26	0.27	0.26	0.26	0.26	0.23	0.28	0.33
Observations	1715610	1715610	44	40908	820766	820766	1695480	1617800	1085907	727513

*,**,*** denote significance at the 90%, 95% and 99% level, respectively.

Table IV: Trustee Effect at 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(PctSharesOut)*. All regressions are pooled, with standard errors clustered at the firm level (in parentheses). In Column 1, the independent variable of interest in the regressions is *Trustee Fund*, a categorical variable equal to 1 if the given mutual fund is the trustee for the given firm, and 0 otherwise. In Column 2, this dummy variable is decomposed into *Plan Trustee Fund* and *Non-Plan Trustee Fund*. The former is 1 if the trustee fund also belongs to the sponsor firm's plan and 0 otherwise. The latter, *Non-Plan Trustee Fund*, is 1 if *Trustee Fund* equals 1 but the fund is not in the sponsor firm's plan at that point in time. 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. Also included in the regressions are the logarithms of firm characteristics of market equity and book-to-market, *ME* and *BM*, and the firm's weight in the CRSP value-weighted market portfolio, *Market Weight*. *Past Returns* are included, which are the previous 11 months of returns for the firm (excluding last month). The mutual fund assets are measured as the logarithm of the percentilized total net assets. Additional fund characteristics of percentage invested in the industry of the stock being considered, *Pct Inv Ind*, and percentage invested in the style of the stock being considered (computed following Daniel et al. (1997)), *Pct Inv Style*, are included. The sample period is 1994-2003. All regressions include an intercept (not reported).

	(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***
	(0.0088)	(0.0088)	(0.014)	(0.0073)
Past Returns (×100)	0.199***	0.199***	0.215***	0.196***
	(0.020)	(0.020)	(0.022)	(0.020)
Pct Inv Style	3.731***	3.732***	4.400***	3.511***
	(0.133)	(0.130)	(0.180)	(0.111)
Pct Inv Ind	1.307***	1.307***	1.376***	1.245***
	(0.089)	(0.089)	(0.112)	(0.082)
Market Weight	−0.0947	−0.0946	−0.131	−0.0429
	(0.101)	(0.103)	(0.100)	(0.108)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Observations	1084491	1084491	346263	738228
R-squared	0.66	0.66	0.62	0.69

*,**,*** denote significance at the 90%, 95% and 99% level, respectively.

Table V: Changes in Trustees

Panel A: All regressions are pooled with quarter fixed effects and standard errors clustered at the firm level (in parentheses). In Columns 1 and 2, the dependent variable is the logarithm of the fraction *(shares(t)/shares(t-1))* held by the given firm. In Column 3 and Column 4 the dependent variables are the logarithm of the percentage of shares outstanding and the logarithm of the family TNA, respectively. *Beginning (1 Year)* is a categorical variable equal to 1 if the mutual fund family began as a trustee of the given firm within the past year, and 0 otherwise. *Ending (1 Year)* is a categorical variable equal to 1 if the mutual fund family ended as a trustee of the given firm within the past year, and 0 otherwise. *Beginning (2 Year)* and *Ending (2 Year)* are similarly defined, but for periods of two years instead of one year. *Trustee* is a categorical variable equal to 1 if the given mutual fund is the trustee for the given firm, and 0 otherwise. *Ex/Fut Trustee*, is a categorical variable equal to 1 for the two years before and after the trustee-sponsor firm relationship, and 0 during the relationship. Only those sponsor firm observations where the given trustee changes at some point during the sample are considered in these regressions. The sample period is 1994-2003. All regressions include an intercept and the controls *ME*, *B/M*, *Past Returns*, *TNA*, *PctInvInd*, *PctInvStyle* and *Market Weight*, all described in Table III (not reported). Panel B: Overweighting around trustee changes at the fund level. This table compares the holdings of trustee funds to those of similar non-trustee funds around times of trustee changes. For each trustee change, we track the quarterly holdings of trustee funds from one year before the year of the change to one year after the year of the change. For each of these funds, we compare its quarterly holdings to that of a similar, non-trustee funds. Each trustee fund is matched to a comparable fund in the earliest available quarter of the year before the trustee change and this same match is is kept until the year after the change. The matching is as follows: first, we create 125 style categories based on a triple sort on size, book-to-market and momentum, similar to those in Daniel et al. (1997). Each fund is then assigned to one of these categories based on a value-weighted average of its holdings. For each fund belonging to the trustee, we selected all non-trustee funds that were in the same style category as the trustee and that were holding the sponsor company stock throughout the evaluation period. Among these, we find the one closest in size to the trustee fund and use it as a benchmark to which the trustee holdings of the sponsor stock will be compared to. We show the results for funds of families that either became or ended being a trustee. In each case, *Before* corresponds to the year before the trustee change, *Change* corresponds to the year of the change and *After* is the year after the trustee change. The average holdings (as a percentage of the total company stock) of the trustee funds in each period are shown in the *Trustee* row (in %). The *Comparable* row contains the average holdings of the comparable funds used as benchmarks. The average difference between the holdings of the trustee and the benchmark are displayed in the *Difference* row. *P Value* is the probability that the t-statistic of the difference is positive and significant.

Panel A: Family Level

	(1)	(2)	(3)	(4)
Ex/Fut Trustee			−0.299**	−0.285**
			(0.137)	(0.139)
Beginning (1 Year)	0.075			
	(0.052)			
Ending (1 Year)	−0.061			
	(0.041)			
Beginning (2 Years)		0.062**		
		(0.025)		
Ending (2 Years)		−0.035		
		(0.029)		
Trustee	−0.013*	−0.014**		
	(0.007)	(0.007)		
Quarter Fixed Effects	Yes	Yes	Yes	Yes
R-Squared	0.01	0.01	0.50	0.57
Observations	591877	591877	1520	1520

*,**,*** denote significance at the 90%, 95% and 99% level, respectively.

Panel B: Changes in % of Shares Outstanding at Fund level

	Begin Trustee Relationship			*End Trustee Relationship*		
	Before	Change	After	Before	Change	After
Trustee (%)	0.170	0.188	0.145	0.110	0.104	0.055
Comparable (%)	0.121	0.105	0.099	0.045	0.056	0.036
Difference (%)	0.049*	0.082***	0.046**	0.065**	0.048**	0.019
T Stat	1.70	3.62	1.97	2.51	2.03	1.34

Table VI: Trustee Behavior Around Negative Shocks

The dependent variable in the pooled regressions in Column 1 - Column 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 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. For the full panel regressions, the independent variables of interest are $Trustee * (PctCompSold > 1)$ and $Trustee * (CAR < 0)$. These measure the differential behavior of the trustee around negative events for the firm. Trustee is a categorical variable equal to 1 if the given family is the trustee for the given firm, and 0 otherwise. $PctCompSold$ is the percentage of the given firm that is sold by the aggregate mutual fund industry *including* the trustee in a given quarter. $PctCompSold > 1$ is a categorical variable equal to 1 if the percentage sold of the company is greater than 1% of shares outstanding, and 0 otherwise. $Trustee*(PctCompSold > 1)$ is the interaction of $Trustee$ and $PctCompSold > 1$. CAR measures the abnormal return in the [-2,2] day window around earnings announcement, controlling for the return on the CRSP value weighted market index. $CAR < 0$ is a categorical variable equal to 1 if the CAR is negative, and 0 otherwise. $Trustee * (CAR < 0)$ is then an interaction of $Trustee$ and $CAR < 0$. Column 5 and Column 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 1 if the given family sold the given firm over the last quarter, and 0 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 4 period lag. The sample period is 1994-2003. All regressions include an intercept and the controls *ME*, *B/M*, *Past Returns*, *TNA*, *PctInvInd*, *PctInvStyle* and *Change Market Weight*, all described in Table III (not reported).

	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)
$(PctCompSold > 1)$	-0.026***	0.079**	-0.026***		0.079***	
	(0.005)	(0.038)	(0.005)		(0.011)	
$PctCompSold$	-0.008***	-0.000	-0.008***		0.008***	
	(0.001)	(0.005)	(0.001)		(0.001)	
$Trustee * (PctCompSold > 1)$	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)
$Trustee * (CAR < 0)$				0.052*		0.017
				(0.027)		(0.056)
Quarter Fixed Effects	Yes	Yes	Yes	Yes		
R-Squared	0.01	0.01	0.01	0.01		
Observations	591510	8179	583331	266520		

*,**,*** denote significance at the 90%, 95% and 99% level, respectively.

Table VII: Returns for Providing Liquidity

For each stock, we first define the event date as the quarter in which families sold more than 1% of the shares outstanding of the stock. This corresponds to months $t = -2, -1, 0$. We then compute, for each event month from $t = -12$ to $t = 12$, the abnormal return on this stock. For each stock, the cumulative abnormal return is also calculated. This abnormal return is defined as the difference between the stock's return and the return on the value-weighted CRSP index. We then compute the average abnormal return (AAR) and the cumulative average abnormal return (CAAR) for each event month. The CAAR for different event periods is the average of the cumulative abnormal return (across stocks) over the period defined. The t-statistics are computed across stocks. The number of observations each month is denoted by N .

t	AAR (%)	t-stat	CAAR (%)	t-stat	N
-12	0.50	0.95	0.50	0.95	515
-11	0.20	0.38	0.67	0.95	540
-10	1.91	3.89	2.57	2.88	541
-9	0.50	0.97	3.07	2.85	543
-8	-0.57	-1.01	2.35	2.01	570
-7	0.83	1.66	3.18	2.47	570
-6	0.04	0.08	3.21	2.27	572
-5	-0.53	-0.97	2.47	1.71	610
-4	-0.09	-0.21	2.38	1.52	611
-3	0.01	0.02	2.38	1.42	612
-2	-1.57	-3.02	0.78	0.44	620
-1	-0.43	-0.83	0.36	0.18	621
0	-3.06	-6.15	-2.71	-1.36	623
1	0.75	1.28	-2.36	-1.15	605
2	0.85	1.80	-1.51	-0.72	605
3	0.42	0.78	-1.09	-0.49	605
4	0.38	0.71	-1.46	-0.63	582
5	0.59	1.17	-1.00	-0.41	580
6	0.28	0.51	-0.72	-0.29	580
7	-0.07	-0.11	-1.67	-0.67	561
8	1.10	2.15	-0.76	-0.30	560
9	-0.22	-0.36	-0.94	-0.35	559
10	1.11	1.62	-0.74	-0.27	541
11	0.53	0.88	-0.21	-0.07	541
12	-0.55	-1.09	0.24	0.09	537
	Event Period $[-2, 0]$		-5.14	-5.95	
	Event Period $[-2, +3]$		-3.17	-2.37	
	Event Period $[+4, +12]$		2.88	1.60	
	Event Period $[+7, +12]$		1.90	1.27	

Table VIII: Trustee-Overweighting Cost to Fund Investors

We present estimates of the cost to fund investors of the trustee overweighting. We use loss in risk adjusted returns using Sharpe ratios. The first panel presents summary statistics for the firm and sample. As we found in Table IV that the overweighting is concentrated in funds that appear in the 401(k) plans of trustees, in addition to appearing to investors outside of the plans, we focus on these plans. Mean Ret and Std Ret measure the quarterly mean and standard deviation respectively. Rf is the quarterly risk free rate measured as the average 90-day T-bill rate over the sample. W(sponsor) and W(trustee fund) are the weights the mutual fund family has invested in the sponsor firm's stock and in the remainder of its assets, respectively. Panel A presents the calculation for loss to the mutual fund, so loss to any investor wealth that an investor chooses to invest into it. Risk adjusted return loss over the life of the relationship is calculated using the average estimated length of trustee-sponsor firm relationship of roughly 29 years. Panel B measures the cost of the trustee overweighting, but now for solely for the subset of investors that are participating in 401(k) plans. We assume that the plan participant invests the sample averages of: 14.0% of her assets in company stock, and of the remaining amount in mutual funds. Of this mutual fund investment, she invests 45% into trustee mutual funds, with the remaining 55% into non-trustee funds. We then assume she invests $3320 per year into the plan (estimated from fund contributions and matching percentages), and that she is 30 years old, and will retire at age 65.

Panel A: Firm and Family Statistics

	Mean Ret	*Std Ret*
Sponsor Firm	0.038	0.216
Trustee Fund in Plan	0.034	0.048
Cov(Sponsor, Trustee Fund)	0.015	
Rf	0.010	
	Optimal Weighting	*Overweighting*
W(sponsor)	0.013	0.027
W(trustee fund)	0.987	0.974
Sharpe Ratios	0.465	0.439
SR Deviation	0.026	
Std of Portfolio	0.055	
Loss In Annual Returns	0.580%	
Loss Over Life of Relationship	21.02%	

Panel B: Investor in Retirement Plan

% of Plan Funds in Trustee	43%	
% of Plan Assets in Trustee	45%	
Annual Deferred Saving	$3,320	
	With Trustee Overweighting	*Without Trustee Overweighting*
Retirement Savings	$728,871	$771,184
Cost in Dollars	$42,313	
Cost in % of Retirement Savings	5.81%	

Figure I: Changes in Trustee

This figure plots the holdings of mutual fund family trustees around the event of 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 ($PctTNA$). The y-axis in the figure is in percentages (from 0.09 percent to 0.16 percent). The x-axis measures time, with Time 0 being the time of the trustee change. Holdings are measured as the average past 4 quarters of holdings. So, [-4,-1] refers to the average holdings in the sponsor firm in the 1 year period from the quarter directly prior to 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.