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

Lauren Cohen
Yale School of Management

Breno Schmidt
Marshall School of Business
University of Southern California

January 9, 2007

[1]We would like to thank Andrew Ang, Nick Barberis, Joe Chen, Judy Chevalier, James Choi, Marty Gruber, Wei Jiang, Chris Jones, Owen Lamont, Pedro Matos, Massimo Massa, John Matsusaka, Toby Moskowitz, Lubos Pastor, Nagpurnanand Prabhala, Josh Rauh, Jon Reuter, Matt Richardson, and Jeff Wurgler for their helpful discussions and suggestions. We are also grateful to seminar participants at Yale University, the University of Southern California, the NYU/NY Fed Conference on Financial Intermediation, the FRA Conference, and the EFA 2006 Meetings in Zurich for useful comments. *Correspondence to:* Lauren Cohen, Yale School of Management, 135 Prospect Street, New Haven, CT 06520. E-mail: lauren.cohen@yale.edu.

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. In some cases, this can be large.

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[2]. 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[3]. Included in the duties of fiduciary responsibility 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[4]. 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

[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]Brown et al. (1996), Chevalier and Ellison (1997), Goetzmann and Peles (1997), and Sirri and Tufano (1998) are a few of the papers that document a convexity in the flow-performance relationship, and how it can affect mutual fund incentives and portfolio decisions.

[3]This requirement is outlined in the Employee Retirement Income Security Act of 1974 (ERISA) and Title 29 Ch.18 of the United States Code.

[4]Title 29, Ch. 18, SUBCHAPTER I, Subtitle B, part 4, Section 1104.

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 Ellis company stock, with the remaining 14 all T. Rowe Price mutual funds[5].

From the family's perspective, 401(k) plans are attractive clients for several reasons. First, by becoming 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. Fourth, we empirically observe employees tilting their portfolios in 401(k) plans to higher fee funds. Of the nearly 1.1 trillion dollars invested by defined contribution plans in mutual funds, only about 250 billion is invested in money market and index funds (Investment Company Institute (2005b))[6]. The remaining 76% of these assets are in higher fee alternatives, which generate a higher fee revenue for families.

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,

[5]From telephone conversations with a number of our largest trustee fund families, the accounting for the 401(k) plan assets is essentially as follows: the company stock account in the plan is held by the firm itself, while the assets in the mutual funds are held by the respective mutual funds.

[6]401(k) plan assets make up the vast majority of all defined contribution assets in mutual funds, 73%.

we focus specifically on observable distortions in families' equity holdings[7]. 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 firm 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; we term this "overweighting"[8]. Second, securing the trustee relationship will be more valuable for (i) relatively smaller fund families and (ii) relatively larger 401(k) plans. Larger 401(k) plans imply larger benefits for the family (in the form of inflow and fees) and these benefits are relatively more important to smaller families. 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

[7]There are a number of ways a family could potentially "purchase" a trusteeship. If the fund family pays through trips to Europe or expensive automobiles, we will not observe this. However, one disadvantage of these payment methods is they are more easily identifiable as illegal, which may discourage their use.

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

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 are 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 the average trustee overweighting by over $ 19,000,000 more 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 $ 12,000,000 more severe overweighting.

As a more precise test of this conflict of interest effect on overweighting, we then look at distortions in 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 exists, relative to the years of the relationship.

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 times 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, although the average losses tend to be small over the length of the trustee-sponsor firm relationship (ranging from 1-7%), the losses for investors in smaller fund families with larger 401(k) plans can be substantial (reaching over 13%).

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 and Literature Review

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. At both the negative and positive extremes, additional empirical regularities have been found. Chevalier and Ellison (1997), for instance, estimate the shape of the performance-flow relationship for mutual funds from 1982-1992. They find convexity in flows, as top performing funds command disproportionately more flows. Sirri and Tufano (1998) also estimate this relation and find that while investors do chase past returns, they do so asymmetrically: they direct large flows to funds that have performed very well, but fail to pull money from poorly performing funds. Goetzmann and Peles (1997) also offer evidence of the asymmetry of flows between positive and negative mutual fund returns, and link it to cognitive dissonance of investors.

A number of papers have explored the incentive effects of the performance-flow findings and the

resulting portfolio choice implications. Chevalier and Ellison (1999) test whether career concerns of fund managers affect managers' portfolio choices. They find that the shape of the performance-termination curve for younger managers may give an incentive to avoid portfolios with high idiosyncratic risk, and that younger managers are more severely penalized for choices away from the fund-objective class mean. Consistent with career concerns, they find that younger managers are more likely to herd in general, and more likely to hold portfolios with less idiosyncratic risk. Brown et al. (1996) find that middle year losing managers tend to increase volatility of fund returns in the second half of the year more than middle year winners do. Also in line with these inter-year changes in portfolio risk, Chevalier and Ellison (1997) find that managers tilt their portfolios to more risky securities at year end. Gaspar et al. (2006) examine the "allocation" of performance across funds within a mutual fund family. They find evidence of strategic allocation of performance to funds that could potentially generate more revenue (e.g. higher fees) for the fund complex. They find collaborating evidence by also showing that the higher revenue generators get preferential allocation of IPOs within 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), for instance, show how mutual funds benefit from information spillovers within financial conglomerates. In their paper, mutual funds have private information about firms with which affiliated banks start a lending relationship. The mutual fund investors of the connected funds benefit, as the fund managers are able to earn abnormal returns based on this relationship information. 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, with the cost being borne by fund investors. The increased concentration of these fund board to advisory firm connections result in higher fees, which are actually accompanied by smaller fund alphas than firms without connections. 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 (e.g. nonnegative first day returns). Zitzewitz (2006) documents the widespread nature of late trading in the mutual fund industry from the late 1990s until 2003. The paper finds

that this practice, which benefits a small class of shareholders to the detriment of those not able (or willing) to late trade, was present in well over half of the fund families in the paper's sample.

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. So, mutual funds with more pension volume vote significantly more in favor of management backed propositions. As the authors can examine only a period in which voting was mandated to be publicly disclosed, they interpret this evidence as mutual funds with important pension clients adopting management friendly voting policies to not alienate clients, while attempting to do so in a less explicit way. 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 themselves 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 maximize the size of their fund. 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 really 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, both holding all else constant. 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 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. These are the precise times we would expect the sponsor to exert the most pressure on the trustee fund family to overweight. We should then see a more severe overweighting at times when it is most valuable to sponsor firms, following negative shocks. 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.

III Data

The majority of data we use comes from a hand-matched dataset of (i) retirement plans sponsored by publicly traded firms and (ii) 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)[9]. 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 document, 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. 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 checked 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

[9]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.

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[10].

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 kept 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 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 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[11]. 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[12]. 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 18.06 billion dollars. The second and third largest plans that same year had plan assets of roughly 17.71 billion and 14.53 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. To put this into perspective, this represents on average nearly two percent of annual GDP, and about two and half percent of the entire market capitalization (NYSE+NASDAQ+AMEX).

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

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

[12]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.

III.B Mutual fund holdings

Our data on mutual fund holdings comes from the CDA/Spectrum Institutional database. This database contains the quarterly holdings of virtually all US investment companies[13].

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 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[14]. We present summary statistics of the mutual fund families in our sample in Table II. In Panel A, the average fund family in our sample has approximately 12.2 billion dollars in Total Net Assets (TNA)[15]. Comparing the TNA of trustee and non-trustee fund families, we see that 401(k) plan trustees are on average larger families.

III.C Matching Retirement Data To Other Sources

The final step is to identify the trustees in the mutual fund dataset. We used the family name to match each company's trustee to its corresponding family in the CDA database. In sum, our final sample spans from 1993 to 2003 and contains the number of shares each one of the 251 families in our

[13]The primary source of holdings data is the 13f forms 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.

[14]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.

[15]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 II are taken over all families and all quarters

sample owns of each of the 899 publicly traded companies whose 401(k) plan's trustee we matched as a mutual fund family[16].

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[17].

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-value 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. *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

[16]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.

[17]The reason we do not use market value of stocks held by a family as a measure of holdings is that price movements generate changes in the market value of holdings even when the number of shares held by the company doesn't change.

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 $PctInvStyle$, following Daniel et al. (1997), we create 27 style portfolios based on a triple sort on size, book-to-market and momentum[18]. 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 char-

[18]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.

acteristics, 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* 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 expenses (loads, expense ratios, and 12b-1 fees) from CRSP as an estimate for investment management expenses. Both are in Panel B of Table II. We were concerned that perhaps 401(k) participants get some kind of discount on fees through their plans. However, in telephoning representatives from three of our largest trustee families, none of them give discounted fees on funds in the 401(k) plans. Thus, we believe the expenses in CRSP should be a reasonable estimate for the investment management expenses paid in the plans. We estimate the average annual expense revenue from attracting a 401(k) plan to be close to 9 million dollars (average size of the plan, 552 million, times 1.56%). This is over 57 times the trustee average fee revenue of 150 thousand dollars, indicating that investment management expenses far outweigh the relatively small trustee fees received by the families[19]. 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

[19]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.

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[20].

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 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 will 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 III. The first is the market value of the sponsor firm in the fund family's portfolio. In Panel A of Table III, 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)[21]. This is about 3 times larger a holding by trustees in the sponsor firm than by other fund families, and is a difference of roughly $ 87,000,000 difference. The difference, though, may be driven by the fact that trustees are larger fund families on average (from Table II), so 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,

[20]These results are available upon request.

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

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 III 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 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 IV, 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[22]. Our main variable of interest is *Trustee*, which is a categorical variable that identifies when a fund family is the trustee for a given

[22]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.

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. This helps control for index fund weightings' in the various stocks, as well as liquidity issues. We also include quarter fixed effects in our pooled specifications as they control for time specific variability[23]

We run the regressions using both (i) a Fama and MacBeth (1973) approach and (ii) a pooled regression with fixed effects approach. Columns 1 and 2 of Table IV show the regression run in a pooled regression framework. In both specifications, standard errors are clustered at firm level. The difference between Column 1 and Column 2 is that the latter includes quarter fixed effects. We use these fixed effects and the clustering of the standard errors by firm in all future OLS regressions[24]. Column 3 then contains the same regression model, but run in a Fama-MacBeth framework. 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 $e^{0.3849} - 1 = 46.9\%$ ($t = 6.89$) 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[25]. Other coefficients

[23]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.

[24]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.

[25]These numbers are calculated using the estimated increases in holdings attributed to the trustee relationship.

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*. We have, in addition, 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*.

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 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 IV. Consistent with the fund family conflict of interest driving the overweighting in sponsor firm stock, we find evidence for a more

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).

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 an increased overweighting of $ 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. 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 Alternative Explanation: Superior Information

It could be that the investment patterns we see are driven by superior information. Upon securing a trusteeship, the mutual fund family may have access to information about the company that other funds do not have. This may then cause the trustee to invest differently in the sponsor firm than other funds. 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[26]. 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 IV. 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[27]. 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

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

[27]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.

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.

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 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 test to identification from these 58 cases. 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[28]. 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 to a regression framework where we can do so.

In the first two columns of Table V, we break up the overweighting effect to separately esti-

[28]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.

mate 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 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. Thus, $Ending2Years(f,s,t) = 1$ if family f ended being the trustee of company s and t is a quarter belonging to the year of the change or 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 Table V 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[29]. The results

[29]Again, this test has a small number of observations because of the empirical fact that sponsor firms, upon hiring a trustee, only infrequently end the relationship.

in this section provide additional evidence that the significant trustee overweighting from Section IV is tied specifically to the trustee-sponsor 401(k) firm relationship.

V.B Trustee Behavior Around Negative Shocks

The sponsor firm may find its relationship with the trustee more valuable at certain times; specifically, times when there is widespread selling of the sponsor firm's stock, causing downward price pressure. 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 from all other fund families 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[30]. 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 propping up. The second measure we use is the cumulative abnormal return (CAR) around earnings announcements. The construction of this measure follows Baker et al. (2005). However, we use the [-2,2] day abnormal return (as opposed to [-1,1]) 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. The benefit of using CAR is that it measures the market reaction to an earnings announcement, which is free of a structural model of earnings (e.g. seasonal random walk), and from any systematic bias in analyst forecasts.

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

[30]In our sample, this event happens about 10% of the time.

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 ($Trustee * PctCompSold > 1$), though, consistent with the sponsor firm having some ability to exert pressure on the trustee, 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 5 of 0.1406 ($t = 3.97$) implies that the trustee increases its already overweighted stake in the sponsor firm by 11.45% (0.1406-0.0261) at exactly those times when the sponsor firm may find it most valuable. Column 2 and Column 3 run the same regression as Column 1, but separately for trustees and non-trustees. 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 3 relative to Column 2).

Columns 4-6 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[31]. 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

[31] As in other regressions, this is controlling for past year returns of the firm.

shocks is to look at the probability of selling a firm's stock. In Columns 7 and 8 of Table VI we compare the probability of other fund families selling, and the trustee selling, the sponsor firm. We do this using probit regressions where the dependent variable *Sell* is equal to 1 if the mutual fund sold the firm's stock, and 0 otherwise. We run these probit regressions 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[32]. The t-statistics in Column 7 and Column 8 are estimated using Newey-West standard errors with 4 lags. Again the main variables of interest are the interaction terms ($Trustee * PctCompSold > 1$) and ($Trustee * CAR < 0$). The negative and significant coefficient of -0.1982 ($t = -3.42$) on ($Trustee * PctCompSold > 1$) implies that trustees are 6.65 percentage points less likely to sell 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 fund'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[33]. 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

[32]We use Fama-Macbeth to avoid some statistical problems associated with the use of fixed effects in probit regressions in our framework. See Greene et al. (2002) for a discussion.

[33]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).

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 in the sponsor firm, increasing its already overweighted position at times when the mutual fund industry on aggregate is selling large amounts of the 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[34]. 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

[34]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.

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. The methodology we use is that of the loss in risk adjusted returns[35]. From the regressions in Table IV, we find that, controlling for other determinants of holdings, trustees overweight the sponsor firm stock by around 62 million dollars. To determine the effect this has on an individual, we need a measure of the average effect this has on an individual's portfolio. This is difficult, as we don't know in which funds the family is concentrating the overweighting. It is reasonable to think that many families will not overweight certain funds (e.g. index funds). In addition, a family may not want to invest in a large 401(k) sponsor firm's stock (large cap) within its small cap fund. Therefore, the overweighting may be concentrated in a subset of the family's fund offerings. There is also the question of how many funds an individual on average holds. Barber et al. (2006) find that there is substantial variation, but the median individual investor in their sample (conditioning on holding any mutual funds) holds on average 2 funds. We thus present a range of results allowing the overweighting to be spread over different numbers of the family's funds. We should note that for the employees of the sponsor firm, the negative consequence of overweighting is likely to be even larger, as they (i) have labor income tied to sponsor firm, and (ii) (on average) already have a 401(k) portfolio weighted heavily in sponsor stock.

The results are in Table VIII. We first estimate the Sharpe ratio of the trustee fund had it not overweighted the plan sponsor's stock. We call this the untilted Sharpe ratio, free from the trustee-tilted overweighting. We then calculate the tilted Sharpe ratio, and corresponding loss in Sharpe ratio, for the overweighting, varying by number of funds. In our sample, the average number of equity funds per family increases from 6 in 1993 to 13 in 2003 (from CRSP). We use the time series average of the medians, 10 funds per family in our calculations. We then calculate the risk adjusted loss per year, and over the average estimated life of a trustee relationship in our sample (29 years). Table VIII Panel A shows how these losses vary by the number of funds to which the family applies the overweighting. As expected, the more concentrated the overweighting by the fund family is, the more the investor loses. From Panel A, the effect of the average trustee overweighting on investors

[35]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.

is small. Even if the fund concentrates all of the overweighting into one fund the annualized loss in returns is 22 basis points, while the total return loss over the entire estimated trustee-sponsor firm relationship is 7.4%.

Panel B then addresses the question of which fund families impose the largest cost on investors. From Table IV, the trustee overweighting is significantly more severe in small fund families and for large 401(k) plans, consistent with a more severe conflict of interest. So, in Panel B, we calculate the loss to an investor in a fund who is a trustee of a 401(k) plan one standard deviation larger than the average plan, and who itself is one standard deviation smaller than the average fund family. As can be seen, the cost to investors increases substantially, now being 37 basis points in lost returns per year if the family concentrates the overweighting in one fund. This translates to over a 13% loss in return over the entire life of the relationship. In net, although the average effect may be small, for investors in smaller fund families who are trustees of larger plans, the cost can be a sizeable return loss over the average trustee-401(k) sponsor relationship.

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[36]. 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

[36]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).

$PctCompSold > 1$, is 2.28%. Thus, using the elasticity estimate of 6, the estimated price 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. This suggests a tangible benefit 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 cost from the 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 and for larger 401(k) plans. 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 (2006)), 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.

Barber, B., T. Odean, and L. Zheng (2006). Out of sight, out of mind: The effects of expenses on mutual fund flows. *Journal of Business. Forthcoming.*

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, 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 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.

Greene, W., C. Han, and P. Schmidt (2002). The bias of the fixed effects estimator in nonlinear models. New York 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 (2006). *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.

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: 401(k) Plan 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 aggregate of all plans in the sample. Number of plans is the average number of plans each year. Sum of Plans is in millions of dollars. GDP numbers are taken from the Federal Reserve (2005), while the mutual fund data was taken from CDA/Spectrum Institutional database. % of Family Assets is the average ratio of the sum of plan assets to the market value of all equity holdings of families in our sample. Total Market Cap is defined as the sum of the market capitalizations of (NYSE+NASDAQ+AMEX). All numbers are annual averages.

Panel A: Average 401(k) Plan Size

Year	Number of unique plans	Mean	STD	Max	Min
Full Sample	**899**	**552.90**	**1847.19**	**22530.27**	**0.0003**
1993-1998	560	460.07	1595.58	21845.84	0.0003
1999-2003	741	629.22	2027.75	22530.27	0.0005

Panel B: Sample Summary (annual averages)

Year	Number of plans	Sum of Plans (Millions)	% of GDP	% of Family Assets	% of Total Market Cap
Full Sample	392	**178,120**	**1.95%**	**9.04%**	**2.42%**
1993-1998	304	122,566	1.55%	8.87%	2.35%
1999-2003	497	244,784	2.41%	9.06%	2.46%

Table II: Mutual Fund Family Summary Statistics

Panel A: This panel is a summary of the mutual fund family data we use in the paper (top 100 families), and is taken from 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 B: This panel contains data on mutual fund fees and fees paid to companies by defined contribution plans. The mutual fund expense data is taken from the CRSP Mutual Fund database. The trustee fees and total salaries data come from a database on Form 5500 filings to the Department of Labor. These fees are in millions of dollars.

Panel A: Mutual Fund Summary Statistics

Year	Number of Families			Mean			STD		
	Full Sample	Non-Trustee	Trustee	Full Sample	Non-Trustee	Trustee	Full Sample	Non-Trustee	Trustee
Full Sample	251	197	54	12,199.47	8,856.51	29,940.18	22,820.55	15,585.60	40,280.47
1993-1998	228	184	44	8,184.97	6,025.40	20,737.88	14,638.97	8,338.10	29,535.92
1999-2003	208	165	43	17,375.13	12,625.54	39,963.82	29,470.56	21,188.89	47,430.29

Panel B: Mutual Fund Expenses and Trustee Fees

Year	Total Load		Expenses (% TNA)		12b-1 Fee		Trustee Fees	
	Mean	STD	Mean	STD	Mean	STD	Mean	STD
Full Sample	2.35%	2.37%	1.56%	0.78%	0.37%	0.40%	0.15	0.41
1993-1998	2.36%	2.36%	1.54%	0.73%	0.35%	0.40%	0.14	0.39
1999-2003	2.33%	2.37%	1.58%	0.82%	0.40%	0.41%	0.16	0.42

Table III: 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. *Diff (Spon-Ind)* is the difference between the trustee's holdings of the sponsor firm and average holdings of all other firms in the same industry, while *Diff (Spon-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. The *T-stat* is the t-statistic for the time series average difference between sponsor and matched group of similar firms. *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	T-Stat	Newey-West T-stat
MV Hold (millions)	188	24	164	22.05	11.25
% TNA	0.168	0.092	0.076	7.01	3.57
% Company	2.19	0.78	1.41	37.40	20.72

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

Variable	Diff (Spon-Ind)	T-Stat	Newey-West T-stat	Diff (Spon-Style)	T-stat	Newey-West T-stat
% TNA	0.070	7.40	3.92	0.074	7.11	3.65
% Company	0.66	17.39	15.11	0.62	16.63	16.66

Table IV: 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). The specification in Column 1 includes no fixed effects, whereas in Columns 2, 5, 6 and 7 quarter fixed effects are included. 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. For this column, *R-Squared* is the average R^2 and *Observations* is the average number of observations in each cross-section. In Column 4, we estimate the parameters for one cross-section, corresponding to the middle of our sample (June of 1998). 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, *log(ME)* and *log(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 family characteristic of the logarithm of total net assets, *log(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. *log(401(k) Size)* is the logarithm of the size of the 401(k) plan of the firm being considered. *Trustee*log(401(k) Size)* is the interaction of the Trustee categorical variable and *log(401(k) Size)*. *Trustee*log(TNA)* is the interaction of the Trustee categorical variable and *log(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).

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Trustee	0.4658***	0.3849***	0.4296***	0.4507***	0.3811***	1.0262**	0.3844***
	(0.0563)	(0.0559)	(0.0599)	(0.1109)	(0.0550)	(0.4915)	(0.0580)
log(ME)	-0.2624***	-0.2019***	-0.2204***	-0.2557***	-0.1791***	-0.1792***	-0.2048***
	(0.0116)	(0.0113)	(0.0287)	(0.0169)	(0.0137)	(0.0137)	(0.0114)
log(BM)	0.0517**	0.0211	0.0351**	0.0621*	0.0467**	0.0467**	0.0210
	(0.0261)	(0.0258)	(0.0145)	(0.0343)	(0.0183)	(0.0183)	(0.0264)
log(TNA)	0.7092***	0.8174***	0.8157***	0.8150***	0.8315***	0.8320***	0.8176***
	(0.0081)	(0.0086)	(0.0111)	(0.0122)	(0.0098)	(0.0098)	(0.0086)
Past Returns	0.0006***	0.0007***	0.0013***	0.0011*	0.0007***	0.0007***	0.0007***
	(0.0001)	(0.0001)	(0.0003)	(0.0006)	(0.0002)	(0.0002)	(0.0001)
PctInvStyle	0.0271***	0.0221***	0.0250***	0.0257***	0.0218***	0.0218***	0.0221***
	(0.0013)	(0.0013)	(0.0025)	(0.0029)	(0.0014)	(0.0014)	(0.0013)
PctInvInd	0.0281***	0.0285***	0.0312***	0.0336***	0.0306***	0.0306***	0.0287***
	(0.0032)	(0.0029)	(0.0029)	(0.0047)	(0.0032)	(0.0032)	(0.0029)
Market Weight	0.5326***	0.2368***	0.3281***	0.4958***	0.2075***	0.2085***	0.2464***
	(0.1026)	(0.0671)	(0.0627)	(0.1288)	(0.0637)	(0.0636)	(0.0677)
log(401(k) Size)					0.0047	0.0038	
					(0.0085)	(0.0084)	
Trustee*log(TNA)						-0.1029**	
						(0.0435)	
Trustee*log(401(k) Size)						0.1082***	
						(0.0295)	
Future Returns							-0.0004***
							(0.0001)
Trustee*Future Returns							0.0001
							(0.0006)
R-Squared	0.23	0.26	0.26	0.27	0.26	0.26	0.26
Observations	1715610	1715610	38991	40908	820766	820766	1695480

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

Table V: Changes In Trustee

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. The independent variables of interest in the regressions are *Beginning (1 Year)*, *Ending (1 Year)*, *Beginning (2 Year)*, and *Ending (2 Year)*. *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. Also included in the regressions are the firm characteristics of logarithm of market equity and book-to-market equity, *log(ME)* and *log(BM)*, and the logarithm of the firm's change in weight in the CRSP value-weighted market portfolio over the previous quarter, defined as *log(Mkt Weight(t)/Mkt Weight(t-1))*. *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, *log(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. *log(401(k) Size)* is the logarithm of the size of the 401(k) plan of the firm being considered. For Columns 3 and 4, the dependent variables are *log(PctSharesOut)* and *log(PctTNA)*, respectively. The independent variable of interest, *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 (not reported).

	log(shares(t)/shares(t-1))		**log(PctSharesOut)**	**log(PctTNA)**
	Column 1	Column 2	Column 3	Column 4
Ex/Fut Trustee			-0.2988**	-0.2851**
			(0.1372)	(0.1388)
Beginning (1 Year)	0.0758			
	(0.0523)			
Ending (1 Year)	-0.0607			
	(0.0408)			
Beginning (2 Years)		0.0618**		
		(0.0250)		
Ending (2 Years)		-0.0347		
		(0.0292)		
Trustee	-0.0133*	-0.0140**		
	(0.0069)	(0.0069)		
log(ME)	0.0018**	0.0018**	-0.0615	0.8960***
	(0.0008)	(0.0008)	(0.1364)	(0.1372)
log(BM)	0.0066***	0.0066***	-0.0139	-0.0042
	(0.0018)	(0.0018)	(0.1548)	(0.1490)
log(TNA)	0.0567***	0.0567***	0.1808	-0.8401
	(0.0022)	(0.0022)	(0.5864)	(0.5827)
Past Returns	0.0004***	0.0004***	-0.0003	0.0008
	(0.0000)	(0.0000)	(0.0007)	(0.0007)
PctInvStyle	0.0006***	0.0006***	-0.0101	-0.0095
	(0.0002)	(0.0002)	(0.0124)	(0.0125)
PctInvInd	0.0007***	0.0007***	-0.0212	-0.0236
	(0.0002)	(0.0002)	(0.0308)	(0.0309)
$\log\frac{\textbf{Mkt Weight(t)}}{\textbf{Mkt Weight(t-1)}}$	0.1329***	0.1329***		
	(0.0096)	(0.0096)		
Market Weight			1.8559**	2.2397**
			(0.8431)	(0.8715)
log(401(k) Size)			0.0329	0.0496
			(0.0814)	(0.0804)
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.

Table VI: Trustee Behavior Around Negative Shocks

The dependent variable in the pooled regressions in Column 1 - Column 6 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 and Column 5 are run for trustees only, while Column 3 and Column 6 are 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 $CAR < 0$. Also included in the regressions are the firm characteristics of logarithm of market equity and book-to-market equity, *log(ME)* and *log(BM)*, and the logarithm of the firm's change in weight in the CRSP value-weighted market portfolio over the previous quarter, defined as *log(Mkt Weight(t)/Mkt Weight(t-1))*. *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, *log(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. Column 7 and Column 8 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. 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 (not reported).

	Column 1 (Full)	Column 2 (Trustees)	Column 3 (Non-Trustees)	Column 4 (Full)	Column 5 (Trustees)	Column 6 (Non-Trustees)	Column 7 (Full)	Column 8 (Full)
Trustee	-0.0252***			-0.0351*			0.0136	-0.0195
	(0.0079)			(0.0183)			(0.0341)	(0.0530)
log(ME)	0.0059***	0.0045	0.0059***	0.0011	-0.0019	0.0011	0.0602***	0.0533***
	(0.0008)	(0.0053)	(0.0009)	(0.0013)	(0.0106)	(0.0013)	(0.0064)	(0.0064)
log(BM)	0.0077***	0.0235	0.0075***	0.0083***	0.0118	0.0082***	-0.0099	-0.0126
	(0.0019)	(0.0144)	(0.0018)	(0.0023)	(0.0191)	(0.0023)	(0.0067)	(0.0088)
log(TNA)	0.0132***	0.0087	0.0133***	0.0138***	0.0157*	0.0138***	0.0125	0.0065
	(0.0007)	(0.0068)	(0.0007)	(0.0009)	(0.0092)	(0.0009)	(0.0079)	(0.0086)
Past Returns	0.0004***	0.0003*	0.0004***	0.0004***	-0.0002	0.0004***	-0.0007***	-0.0013***
	(0.0000)	(0.0002)	(0.0000)	(0.0001)	(0.0003)	(0.0001)	(0.0001)	(0.0002)
PctInvStyle	0.0004***	0.0001	0.0004***	0.0005**	-0.0004	0.0005**	0.0012***	0.0020***
	(0.0002)	(0.0013)	(0.0002)	(0.0002)	(0.0023)	(0.0002)	(0.0004)	(0.0006)
PctInvInd	0.0006***	0.0025	0.0005**	0.0007**	0.0032	0.0007**	-0.0010	-0.0003
	(0.0002)	(0.0016)	(0.0002)	(0.0004)	(0.0026)	(0.0004)	(0.0007)	(0.0011)
$\log\frac{\textbf{Mkt Weight(t)}}{\textbf{Mkt Weight(t-1)}}$	0.1094***	0.2242***	0.1075***	0.1225***	0.3478***	0.1196***	-0.0247	-0.0601*
	(0.0090)	(0.0730)	(0.0090)	(0.0152)	(0.0891)	(0.0154)	(0.0250)	(0.0336)
(PctCompSold > 1)	-0.0261***	0.0794**	-0.0255***				0.0785***	
	(0.0050)	(0.0380)	(0.0050)				(0.0105)	
Pct Comp Sold	-0.0077***	-0.0002	-0.0078***				0.0078***	
	(0.0007)	(0.0049)	(0.0006)				(0.0008)	
Trustee * (PctCompSold > 1)	0.1406***						-0.1982***	
	(0.0354)						(0.0579)	
(CAR < 0)				-0.0020	0.0521	-0.0020		0.0154***
				(0.0053)	(0.0479)	(0.0052)		(0.0056)
CAR				0.0008	-0.0016	0.0008		0.0013
				(0.0005)	(0.0037)	(0.0005)		(0.0008)
Trustee * (CAR < 0)				0.0518*				0.0172
				(0.0274)				(0.0561)
R-Squared	0.01	0.01	0.01	0.01	0.03	0.01		
Observations	591510	8179	583331	266520	3099	263421		

*,**,*** 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. 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(family) 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 fund investors, assuming the mutual fund spreads the sponsor firm overweighting over different numbers of its funds. 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 the subset of trustees who are 1 standard deviation smaller than the average fund family, and have attracted a 401(k) plan 1 standard deviation larger than the average plan.

Firm and Family Statistics

	Mean Ret	Std Ret
Sponsor Firm	0.038	0.216
Fund Family	0.035	0.089
Cov(Sponsor, Family)	0.011	
Rf	0.010	
	Optimal Weighting	
W(sponsor)	0.013	
W(family)	0.987	
Optimal Sharpe ratio	0.281	

Panel A: Cost of Average Trustee Overweighting

# Funds Spread Overweighting	1	2	3	4	All
W(sponsor)	0.069	0.041	0.032	0.027	0.023
W(family)	0.931	0.959	0.968	0.973	0.977
Overweighted Sharpe ratio	0.275	0.279	0.280	0.280	0.281
SR Deviation	0.006	0.003	0.002	0.001	0.001
Std of Portfolio	0.092	0.091	0.091	0.090	0.090
Loss In Annual Returns	0.22%	0.09%	0.06%	0.04%	0.03%
Loss Over Life of Relationship	7.36%	3.11%	1.95%	1.41%	0.94%

Panel B: Cost of Overweighting of Small Family with Large Plan

# Funds Spread Overweighting	1	2	3	4	All
W(sponsor)	0.098	0.056	0.042	0.035	0.028
W(family)	0.902	0.944	0.958	0.965	0.972
Overweighted Sharpe ratio	0.271	0.277	0.279	0.279	0.280
SR Deviation	0.010	0.004	0.003	0.002	0.001
Std of Portfolio	0.094	0.092	0.091	0.091	0.090
Loss In Annual Returns	0.37%	0.15%	0.09%	0.07%	0.04%
Loss Over Life of Relationship	13.03%	5.15%	3.14%	2.25%	1.48%

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.