

WHY FOCUS? A STUDY OF INTRA-INDUSTRY FOCUS EFFECTS^{*}

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In an intra-industry setting, firm-focus is found to be positively correlated with the ability of firms to produce high-value products, while the overall effect of focus on firm performance is negative due to missed demand externalities generated by a broad product offering. In particular, it is shown that U.S. mutual funds that belong to more focused fund providers outperform similar funds offered by more diversified providers. An explanation based on alignment among a provider's activities is consistent with this result. Cash inflows into fund providers—a measure related to fund provider profitability—is, however, negatively correlated with focus in fund offerings.

I. INTRODUCTION

A CENTRAL ISSUE FACED by every firm is the breadth of its product and business portfolio. Should a firm focus its activities around a set of core products or should it diversify into a broader set of products and businesses? As firms decide on the diversity of their business and product portfolios, two sets of considerations come into play. First, with any product, a firm faces the question whether it is capable of offering this product effectively. Can it produce the product at a quality and cost that will provide a competitive amount of value to customers, while still achieving a profit for the firm? In short, does the firm have the *internal capabilities* required for offering the products in its product portfolio? Second, if the firm offers more than one product, the firm needs to take into account possible *demand interactions* among the products it offers. The demand for an individual product offered by a firm may not only be affected by that product's characteristics (e.g., its quality or price) but also by the overall product breadth offered by the firm. For instance, in the presence of 'shopping costs' (Klemperer [1992])—the costs of using a number of firms to fulfill the varied demands of a

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buyer—customers may prefer to purchase many products from one firm, even though the individual products might not be the best ones in the market.

The product focus of a firm, thus, may have two effects on firm profitability. A high product focus may allow a firm to specialize on particular products, with resulting high product quality or low cost. At the same time, a high product focus may prevent a firm from taking advantage of possible demand externalities generated by a broad product offering. As a result, limits to the optimal degree of focus may exist, even in the absence of production scope economies. To disentangle empirically these two effects of focus—in particular, to gauge the internal capability effect—it is necessary to have a performance (e.g., quality) indicator of individual products. For most industries, such data is difficult to obtain. As a result, most of the existing diversification literature has studied the direct relationship between the diversity of a firm's product offering and the firm's overall performance which, however, conflates the capability and demand effects (e.g., Wernerfelt and Montgomery [1988]; Lang and Stulz [1994]).

In contrast to most industries, for the mutual fund industry it is possible to study the two effects of product focus separately. Mutual fund providers are required to disclose the performance of each individual fund, i.e., of each product they offer. As a result, a relatively precise, annual quality measure, quantifying the financial returns provided to its customers (i.e., fund shareholders) is available for all products that are offered. Taking advantage of this industry characteristic, I analyze the two effects of product focus within the U.S. mutual fund industry over the period 1985–1996. To study the internal capability effect, I examine whether a mutual fund that belongs to a focused fund provider has higher returns than similar funds that belong to more diversified fund providers. Furthermore, to shed light on the sources of the internal capability effect, it is tested whether a mutual fund (e.g., a short-term bond fund) benefits from belonging to a provider that specializes on that particular type of fund, or whether funds benefit from merely belonging to a provider with a narrow product portfolio.

While fund performance is of particular interest to fund shareholders, fund providers are ultimately concerned with cash inflows into their funds, since their profits are, to a first approximation, increasing in the amount of assets they manage. To study the external demand effect and the overall effect of product focus, I examine the effect of product diversity on total cash inflows into the fund provider. Moreover, to gauge the possible sources for the effect of product focus on cash inflows, the effect is analyzed not only at the level of the fund provider, but also at the level of individual funds. This study thus extends the existing empirical work on diversification, which has focused on the overall effect of corporate focus on firm performance, by exploring several underlying drivers of the focus effect.

Prior studies of inter-industry diversification have generally found either a neutral or a slightly negative relationship between the degree of diversification and firm performance (for a survey, see Montgomery [1994]). In these studies, corporate focus is usually measured by a continuous Herfindahl-like measure in which the sum of the firm's squared segment sizes is divided by the square of total firm size. Studies differ in how segments are defined. For instance, Montgomery [1985] and Ravenscraft and Scherer [1987] use a firm's sales in each four-digit SIC market to measure segments, while Lang and Stulz [1994], Comment and Jarrell [1995], and John and Ofek [1995] employ the sales or assets of the self-reported business segments (as required by the Financial Accounting Standards Board's Statement of Financial Accounting Standard no. 14) as segment measures. Rose and Shepard [1997] use the same measure in studying the relationship between firm diversification and CEO compensation. Assuming that distance in the space of SIC codes correlates with relatedness of products, other studies have used a concentric index introduced by Caves *et al.* [1980] to measure diversification (e.g., Wernerfelt and Montgomery [1988]; McGahan [1999]).

Within the industrial organization literature, the study closest in structure to the analysis presented in this paper is conducted by Lichtenberg [1992], who tests for the effect of diversification on plant productivity. Lichtenberg finds that the larger the number of industries in which a parent firm operates, the lower the productivity of its plants (holding constant the number of parent-firm plants). In the finance literature, a number of studies have analyzed the impact of related and unrelated acquisitions and divestitures on firm performance. For instance, Morck, Shleifer, and Vishny [1990] show that in the 1980s, more bidders in related acquisitions had positive returns than bidders in unrelated acquisitions. Similarly, Comment and Jarrell [1995] and John and Ofek [1995] find that divesting unrelated divisions leads to increased performance, while Daley, Mehotra, and Sivakumar [1997] report that cross-industry spinoffs create more value than own-industry spinoffs.

The explanations given for these results are generally based on internal capability considerations. One line of reasoning invokes the notion of competencies that are particularly suitable to a core set of businesses. For instance, Wernerfelt and Montgomery [1988: 250] explain the 'positive focus effect' they find as 'efficiency differences firms experience in transferring competencies to widely varying markets.' Similarly, Daley, Mehotra, and Sivakumar [1997: 259] argue that 'managerial skills may be well-suited to the management of core businesses, but not to the management of non-core assets. Consequently, freeing the managers from operations unrelated to the core business should improve corporate performance.' A related type of explanation emphasizes the fit and complementarities among various choices a firm makes (Milgrom and Roberts [1990], [1995]; Porter [1996]; Siggelkow [2001]). Focus can enable a firm to align its activities in a very

specific manner, thereby enabling it to generate better products than a less focused firm. Illustrating this line of reasoning, Section II(ii) details a number of misalignments that can arise when a mutual fund provider attempts to satisfy too many customer demands with respect to different fund types.

Note, these explanations are based on an argument of ‘relatedness.’ If a business or product is too unrelated to the existing core business, it is argued that a firm may not be able to produce this product effectively, leading to low performance. At the level of the individual products, these explanations would predict that firm focus affects positively the products that belong to the core businesses of a firm, but affects negatively the products of the firm’s ‘fringe’ businesses.

A second set of explanations is based on arguments of ‘narrowness’ of the business portfolio. For instance, Meyer, Milgrom, and Roberts [1992] show that a reduction of the number of businesses a firm is engaged in can reduce influence costs within a firm.¹ In a similar vein, Rotemberg and Saloner [1994: 1331] note ‘narrowness may be attractive if the proliferation of specialized groups within the same organization generates management diseconomies. Top management might find it difficult to monitor such groups, and these monitoring difficulties might even reduce the performance of the groups that initially constituted the core of the firm.’ Using an agency-theoretic set-up, Rotemberg and Saloner [1994] further show how the narrowness of business strategies can facilitate the provision of incentives. These explanations imply that even firm-units that do not belong to a group of businesses on which the firm is focused would benefit from the narrowness of the firm’s strategy. By using variables that distinguish between relatedness and narrowness, the analysis will be able to shed empirical light on the impact of these two possible drivers of the internal capability effect.

In contrast to the internal capability effect, the demand interaction effect has not found much attention in the empirical literature on diversification. Klemperer [1992], introducing the concept of shopping costs (that is, a customer’s real and perceived costs of using several suppliers to fulfill multi-product needs) has studied demand interaction effects formally. For instance, Klemperer and Padilla [1997] show that firms may offer excessive product variety from the social standpoint. Empirically, the effect of product variety on customer demand has found more attention in the marketing literature. (For a review see Kahn [1995].) For instance, Reibstein, Youngblood, and Fromkin [1975] show that perceived decision freedom and consumption levels increase as the number of options in a consumer’s choice set increases. Similarly Kahn and Lehman [1991] report

¹ Meyer, Milgrom, and Roberts [1992] also show that influence costs are likely to be smaller for firms with related divisions. Hence, their model includes benefits of relatedness as well.

that individuals are more likely to select assortments that keep many options for future consumption open, while Hoch, Bradlow, and Wansik [1999: 529] find that individuals 'are more satisfied with and likely to choose stores carrying those assortments that are perceived as offering high variety.' In sum, product breadth has been shown to have a positive effect on product demand for individual products and for the overall demand faced by a firm.

The remainder of the paper is organized as follows: Section II provides background information on the mutual fund industry and describes possible sources for capability and demand interaction effects in this industry. Section III contains a description of the data and the variables employed in the regression analyses. Section IV reports the effect of fund provider focus on fund performance, while Section V reports the effects of product breadth on overall cash inflows into the fund provider and on the cash inflows into individual funds. Section VI concludes.

II. INDUSTRY BACKGROUND

II(i). *The organization of mutual fund families and different fund types*

Mutual funds can be thought of as products offered by investment management companies. Each mutual fund consists of the capital paid in by fund shareholders and a board of directors that is responsible for monitoring the handling of the fund's assets (see Figure 1). Formally, it is the board of directors that hires the investment management company to operate the fund. In practice, however, the investment management company decides to create a new fund, assigns a fund manager to the fund, and then selects a board of directors. Throughout the rest of the paper, investment management companies will be referred to as fund providers or as fund families. To state it in terms of the diversification literature, the mutual fund family corresponds to a corporation, the fund managers to business unit presidents, and the shares in individual funds to the products that the corporation offers (Tufano and Sevick [1997]). Lastly, it is important to note that the owners of the investment management company

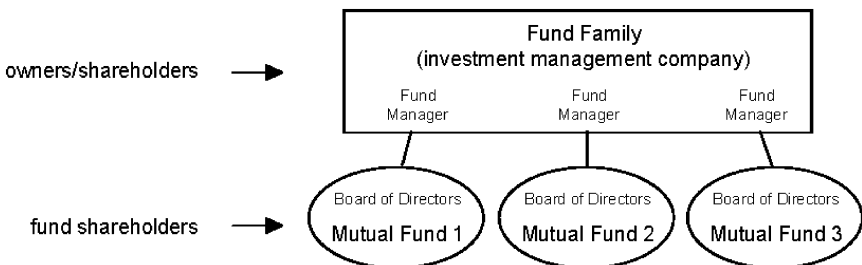


Figure 1
Organization of Mutual Fund Families

are generally distinct from the fund shareholders. Thus, while fund shareholders benefit directly from higher fund returns, the owners of the fund provider are concerned with the profits generated by the investment management company, which, as argued below in more detail, are related to the total amount of assets that are under the management of the fund provider.

To categorize the products each fund provider is offering, I employ a classification scheme developed by Morningstar, one of the leading mutual fund rating agencies. Morningstar's classification scheme is based on characteristics of the security portfolio held by each fund. For instance, a domestic equity fund is classified as 'Large Value' if the mean market capitalization of the companies in its portfolio is greater than \$5 billion and the mean price-to-earnings ratio of the portfolio is significantly below the P/E ratio of the S&P 500. Domestic bond funds are classified along the dimensions of average maturity and average risk rating. International funds are classified by the countries of which the fund is holding securities, e.g., 'Japan fund.' In total, there are 44 Morningstar categories. (For an appendix containing the full details on Morningstar's classification scheme and a list of the 44 categories, see the *Journal's* editorial web site.) Please note that in the following, the term 'categories' always refers to these Morningstar categories.²

II(ii). *Internal capability and external demand effects in the mutual fund industry*

In this section, two possible effects of product focus in the mutual fund industry are described: first, an internal capability effect, which would lead to a relationship between family focus and fund performance; and second, an external demand effect, which would lead to a relationship between the breadth of a family's product offering and total cash inflows into the family.

One possible way for family focus to influence fund performance is via the alignment of investment styles and fund types. A variety of investment and research styles exist that guide the selection of securities for a mutual fund portfolio, e.g., fundamental investing and investing using quantitative analysis. While the former involves in-depth analysis of each individual security the fund manager decides to invest in, the latter involves strictly quantitative, often computerized, screening and analysis of security prices. In general, a fund provider tends to acquire a distinctive investment style that permeates the institution. As one industry observer notes, 'Successful

² Since index funds may alleviate the problems of misalignments as described in the next section, a further 'index fund' category is constructed for the sole purpose of computing focus measures (see Section III). The performance of an index fund is still compared, however, to its peers as defined by its Morningstar category.

fund companies are often products of their managers' personalities, the organization's distinct cultures and other intangibles . . . These characteristics often color the companies' approaches to investing, marketing and dealing with shareholders' (Gasparino [1997: C1]). For instance, Fidelity is imbued with a fundamental investment style, as it has been preached and practiced by Edward Johnson II, Fidelity's owner and CEO, and by Peter Lynch, Fidelity's most prominent former fund manager. Each style, in turn, has many ramifications for how investment analysis is conducted, how performance is evaluated, and how internal reputations are created.

The investment culture within a fund family can influence the focus-profitability relationship because different types of funds can warrant different investment styles. A family offering a broad array of diverse funds may encounter difficulties either because investment styles and fund characteristics match poorly, or because the family tries to accommodate different styles within the same investment management company. For instance, Fidelity has established itself as a 'playground' for equity managers. Fundamental research is encouraged, and fund managers pride themselves on being able to find good bargains and to trade quickly in order to earn higher returns than the market. It was these 'gunslingers' who were held in highest esteem within the Fidelity hierarchy. As a result, Fidelity's bond fund managers tried to emulate this style. There was, however, much less room for this kind of investment style in the fixed-income arena, where in general low expenses, and not clever security selections, drive returns. The problems caused by this mismatch climaxed in 1994, when aggressive investing in the U.S. bond market and moves into risky derivatives and Latin American debt led to huge losses. A *New York Times* article covering this incident concluded: 'The Fidelity story also reveals some dirty little secrets that the mutual fund industry, busy selling Americans on the idea of one-stop shopping, would rather investors not know: the very things that make a company good at managing some kinds of investments may make them bad at running others' (Eaton [1995: D1]).

The Vanguard Group, the second-largest fund provider in the U.S. behind Fidelity, had its experiences with misalignments as well. In the 1980s, Vanguard started to offer real-estate funds, which required very different trading skills than it possessed. As a result, these funds performed poorly and Vanguard retreated from the business when its management realized how poorly this new offering fit with its existing activity system (personal communication with Jack Brennan, CEO Vanguard, February, 1997).

A further example of internal problems generated by frictions between different investment and research styles comes from a large Canadian mutual fund provider.³ Funds that invest mainly in blue-chip stocks and

³ I am grateful to Timothy Duncanson for providing this example.

funds that invest in small-cap stocks differ greatly in the amount of additional analysis that a fund manager has to undertake. Blue-chip stocks are already under such scrutiny by investment bank- and broker analysts that often very little additional analysis is required. On the other hand, for small-cap stock funds, analysis by the fund managers themselves, which might include road trips, is needed. In the case of this Canadian mutual fund family, the Director of Canadian Investments was managing a blue-chip stock fund and oversaw a small-cap stock fund. She could not understand the high expenses incurred from road trips of the small-cap stock fund managers and demanded that expenses be cut. As a result, research was hindered and returns suffered.

Lastly, a focus effect can arise because families that specialize in particular categories are better able to attract and evaluate fund managers who are suitable for that particular category. The converse may be even more relevant: in the hiring process, a fund provider may have difficulties evaluating fund managers for categories in which it did not accumulate any experience. Discussions with industry participants repeatedly revealed this to be a serious problem for fund families that wanted to broaden their fund portfolios beyond the core categories in which they were currently offering funds.

A few organizational solutions are available that can alleviate some of the misalignments described above, yet they have found only limited adoption in the mutual fund industry. For instance, fund providers can outsource the investment management for funds that do not fit into the investment culture of the family. In general, however, fund families are very reluctant to outsource the most profitable part of their business. For instance, Fidelity did not outsource the investment management of any fund until June 1997, when it announced that Bankers Trust would manage Fidelity's index funds.

A second mechanism to overcome misalignments is to forego active management and to rely on indexing. For instance, when Vanguard returned to the real-estate arena in 1995, it offered an index fund mirroring the Morgan Stanley Real Estate Investment Trust index. However, fund providers have been generally reluctant to offer many index funds since little room for product differentiation exists. By the end of 1996, only 4.4% of all assets in domestic equity funds and less than 1% of assets in domestic bond funds were in index funds, with Vanguard holding a 58% market share in index funds.

Besides affecting a family's ability to offer funds with high returns, product focus may also have an external demand effect. A family that offers a broad variety of funds may attract assets because investors might find it convenient to use only one fund family for all their investment needs. Tax-filing is made easier, and switching between funds is often load-free when assets are shifted between funds of the same family. Thus, families with broad product selections offer investors a broad set of options that can be exercised at low cost. As Kahn and Lehman [1991] show, consumers tend to

choose assortments not only based on whether it contains a most preferred item, but also in terms of the flexibility the assortment provides for future choice. In the present context, those investors who are not able to anticipate all their future financial needs might be attracted to families with broad product offerings. A second potential impact of product breadth on cash flows is that a broad product offering may allow a fund provider to reach otherwise non-accessible customers. In particular, corporations often include a fund family as an option in their defined contribution pension plans only if the family offers a wide range of funds. Thus, families with a broad offering of funds are potentially more able to tap into the institutional pension market than families with narrow product offerings.

III. DATA AND VARIABLES

Data were collected on all funds covered by Morningstar in its *Morningstar Mutual Funds* publication as of December, 1996. The database consists of a growing number of funds, starting in 1986 with 525 funds offered by 110 families and ending in December, 1996, with 1,313 funds offered by 198 families (see Table I). In 1986, the funds held \$310 billion in assets, which constituted about 85% of all assets in bond and equity funds. In 1996, the 1,313 funds held a total of \$1,713 billion in assets which constituted about 76% of all assets. In 1986, families offered on average 5.9 funds in 2.6 categories. The most diverse family (Fidelity) offered 62 bond and equity funds in 25 categories. In 1996, families offered on average 7.0 funds in 5.0 categories, while the most diverse family (again Fidelity) offered 118 funds in 37 categories. For all funds that existed in 1986, data was also collected for 1985 to compute lagged variables.

III(i). *Performance and focus variables*

To study the effect of family focus on fund performance, measures of performance, focus, relatedness, and narrowness are required. Since no single, 'perfect' performance measure for mutual funds exists, a number of different performance measures are computed. All measures have as their starting point the total annual return of each fund which includes dividends paid. For the first performance measure used in the analysis, total returns are adjusted to account for the fact that some funds charge a sales fee (called a 'load').⁴ From these adjusted returns, the mean of its category, as reported

⁴ Since loads are one-time fees, they have to be amortized over the average time customers hold their fund shares. Average holding times can be computed from sales and redemption data available from the Investment Company Institute's *Mutual Fund Yearbooks*. Following Sirri and Tufano [1998], fund returns are adjusted by dividing the sales load by the average holding time for its respective prospectus objective and subtracting this annualized sales load from the yearly return. A similar adjustment was made for deferred loads. Further details of the adjustments are available from the author.

TABLE I
DATA DESCRIPTION

year	no. of families	mean no. of funds in each family	max no. of funds in a family	mean no. of categories per family	max no. of categories offered by a family	no. of one-fund families	no. of funds	no. of equity funds	no. of bond funds	sample coverage
1986	110	5.86	62	2.56	25	31	525	346	179	84.8%
1987	123	6.28	74	2.95	28	35	646	413	233	82.5%
1988	137	6.20	78	3.24	29	42	755	467	288	82.5%
1989	151	6.04	82	3.43	29	47	837	506	331	83.2%
1990	159	6.23	93	3.67	31	48	889	543	346	82.2%
1991	164	6.46	96	3.92	32	48	959	587	372	81.9%
1992	172	6.60	101	4.20	33	46	1,027	640	387	80.8%
1993	183	6.87	111	4.60	37	41	1,101	694	407	78.3%
1994	189	7.02	114	4.80	37	43	1,198	779	419	77.7%
1995	197	6.97	118	4.91	37	48	1,261	839	422	76.8%
1996	198	7.03	118	4.98	37	49	1,313	885	428	75.7%

by Morningstar, is subtracted. The resulting variable is called *dcret* (difference from category return).

The second performance variable takes into account that the variance of returns differs across fund categories. This second performance variable divides the difference between the fund's performance and its category performance by the standard deviation of the returns of all funds within the category. Thus, the variable *dcretsd* (difference from category return in standard deviations) captures the degree to which a fund over- or underperformed its category, measured by the number of standard deviations its return is higher or lower than the category mean in the respective year.

The third performance measure is the 'gross return' achieved by a fund's security portfolio. Since the total return is net of fees paid by the fund, gross returns are obtained by adding the expense ratio to the total annual return.⁵ Subtracting from these gross returns the respective mean category performance and the mean category expense ratio and dividing by the standard deviation of gross returns of the category yields variable *dgretsd* (difference in gross returns in standard deviations).

As discussed in the previous section, internal capability effects are likely to be linked to the different types of funds a family is offering. As a result, the focus measure is based on the various types of funds that are offered by a family. I follow the diversification literature in employing a Herfindahl-like measure as an indicator of overall family focus.

For family k at time t define

$$(1) \quad focus_{kt} = \sum_j \left(\frac{\text{assets of family } k \text{ in category } j \text{ at time } t}{\text{total assets of family } k \text{ at time } t} \right)^2$$

where the sum is taken over all categories j of family k at time t .

In the exploration of the sources of a possible capability effect, measures of relatedness and narrowness are included in the analysis, rather than an overall focus measure. The relatedness measure captures for each fund the degree to which its family has focused on similar funds. Let fund i be in category j and a member of family k at time t . Then define

$$(2) \quad related_{it} = \frac{\text{assets of family } k \text{ in category } j \text{ at time } t}{\text{total assets of family } k \text{ at time } t}$$

One should note that this relatedness measure is not the same for all funds within a family (unless all the funds happen to be in the same category). Thus, this measure makes it possible to differentiate between funds that

⁵ The annual expense ratio is the percentage of assets deducted for fund expenses, including management fees. It does not include portfolio transaction fees, brokerage costs, and initial or deferred sales charges.

belong to a family's core businesses and funds that belong to the fringe businesses of a family. Also note that due to the absence of a distance measure (as provided, e.g., by the SIC system), this relatedness measure is binary: two funds are either related (belong to the same category) or unrelated (belong to different categories).

As (inverse) narrowness-of-strategy measure for the family as a whole, the analysis includes the number of categories in which family k offers funds at time t (variable $categories_{kt}$). The larger the variable $categories$, the broader is the family's product offering. By including the two variables $categories$ and $related$ in the fund performance regressions, it is possible to distinguish between a narrowness effect from which all funds within a family would benefit, and a relatedness benefit, which would accrue only to funds that belong to a core business of a family.

To analyze the overall effect of product focus on firm performance, a measure of firm performance is required. Since many fund providers are privately held firms (e.g., Fidelity), or are part of larger investment banks (e.g., Merrill Lynch), a direct profitability measure for fund providers is unfortunately not available. However, a reasonably good proxy can be constructed. Following Chevalier and Ellison [1997], I use cash inflows into families as a proxy for family profits, i.e., as the variable that fund providers try to maximize. As Chevalier and Ellison [1997: 1182] point out, 'because management fees in the industry are usually charged as a percentage of assets (within some size range), the value of a mutual fund (with future expected growth and the level of management fees held constant) is to a first approximation proportional to its assets under management.' As a result, Chevalier and Ellison argue that the benefits to a fund are directly proportional to the expected flow a fund is able to attract. The present analysis extends this logic to the level of the family and uses the aggregate cash flows into the family as the benefit measure for fund providers. Cash flows at the level of each fund can be estimated by the difference in fund size after adjusting for appreciation (or depreciation) of the existing asset stock (Chevalier and Ellison [1997]; Sirri and Tufano [1998]). Cash flows at the level of the family are then obtained by summing over all funds within the family:

$$(3) \quad famflow_{kt} = \sum_i [assets_{it} - (1 + totret_{it})assets_{i(t-1)}]$$

where $assets_{it}$ are the total assets of fund i at the end of year t , $totret_{it}$ is the total return of fund i in year t , and the sum is taken over all funds i within family k in year t .

III(ii). *Control variables*

The effect of family focus on fund performance has not been studied previously. However, the substantial research in the finance literature

analyzing the performance of mutual funds as compared to market indices is helpful for identifying relevant control variables (e.g., Jensen [1968]; Blake, Elton and Gruber [1993]; Gruber [1996]). Studies that have tested whether funds outperform passive market indices suggest to include variables that control for differences in (portfolio) turnover, expense ratio, sales loads, and fund size. Accordingly, the analysis includes variables *diffturn*, which measures the difference between a fund's turnover and the average turnover of its category, variable *diffexpense*, which measures the difference between a fund's expense ratio and the average expense ratio of its category, and variable *loadsum*, a dummy equal to one if the fund charged a front- or a back-end load. Since the measures of focus and relatedness both involve non-linear size terms, the model includes a flexible size specification to avoid misspecification. As a result, rather than including, for instance, the logarithm of size, which would force upon the estimation decreasing (or increasing) returns over the entire range of values, linear, quadratic, and cubic terms of fund- and family size are included. Since fund size may affect performance differently for equity and bond funds, the following two variables are created:

$$(4a) \quad \text{equity assets}_{it} = I(\text{equity})\text{assets}_{it}$$

$$(4b) \quad \text{bond assets}_{it} = (1 - I(\text{equity}))\text{assets}_{it}$$

where $I(\text{equity})$ equals to one if fund i is an equity fund and zero otherwise.

Further variables at the level of the fund include the age and the square of the age of the fund and the market share of the fund within its category. The fund's market share is included, because on one hand a manager with a large share within a category might receive preferential treatment by industry analysts, while on the other hand the manager might find it increasingly more difficult to find attractive securities. Moreover, the fund's standard deviation of its monthly returns over the year is included as a control for risk.

Further control variables at the level of the family include the sum of assets of the family within the category and the number of funds of the family within the category (of the particular fund). Families that have large categories might be able to avoid the problems of misalignment as discussed in Section II(ii). Lastly, the number of funds that exist in the category industry-wide are included as a measure of general competition, for instance, for mis-priced securities.⁶ For summary statistics of all variables for selected years, see Table II.

⁶ For all variables that include category measures, e.g., *diffexpense*, category measures as reported by Morningstar are used. Thus, category measures, e.g., the mean category expense ratio, do not represent sample means, but take into account virtually all funds that existed in the particular category in the respective year.

TABLE II
SUMMARY STATISTICS FOR SELECTED YEARS

Variable	1986					1991					1996				
	Obs	Mean	Std. Dev	Min	Max	Obs	Mean	Std. Dev	Min	Max	Obs	Mean	Std. Dev	Min	Max
<i>dcret</i>	525	0.86	7.22	-45.92	38.27	959	0.90	9.19	-29.55	43.81	1313	0.81	6.42	-32.55	36.74
<i>dcretsd</i>	525	0.08	0.56	-2.44	5.75	959	0.06	0.60	-1.82	3.70	1313	0.07	0.41	-2.05	2.69
<i>dgretsd</i>	525	0.11	0.55	-2.40	5.71	959	0.08	0.60	-1.80	3.76	1313	0.07	0.41	-2.04	2.65
<i>related</i>	525	0.25	0.31	0.00	1.00	959	0.22	0.28	0.00	1.00	1313	0.21	0.27	0.00	1.00
<i>categories</i>	525	9.45	6.41	1.00	25.00	959	12.19	8.85	1.00	32.00	1313	13.79	10.53	1.00	37.00
<i>focus</i>	525	0.37	0.26	0.13	1.00	959	0.32	0.24	0.11	1.00	1313	0.30	0.23	0.10	1.00
<i>diffturn</i>	525	-2.36	89	-1110	390	959	4.33	128	-509	2351	1313	-9.11	89	-278	1011
<i>diffexpense</i>	525	-0.14	0.37	-1.52	1.06	959	-0.10	0.46	-1.67	1.97	1313	-0.28	0.41	-1.90	1.71
<i>age</i>	525	15.01	15.18	1.17	62.50	959	12.92	13.73	0.00	67.50	1313	14.27	13.25	0.00	72.50
<i>assets</i>	525	591	1233	0.20	14400	959	634	1296	1.30	19257	1313	1305	3051	7.80	53989
<i>mshare</i>	525	0.06	0.12	0.00	1.00	959	0.03	0.07	0.00	0.71	1313	0.02	0.05	0.00	0.43
<i>stdv</i>	525	3.72	2.05	0.28	17.50	959	3.12	2.08	0.07	11.77	1313	2.60	1.68	0.09	10.01
<i>family assets</i>	525	9234	10088	0.20	32406	959	17799	23206	5.40	72942	1313	52877	92131	27.30	316912
<i>fam ass in cat</i>	525	1025	1853	0.20	14400	959	1617	3370	1.30	23988	1313	3801	9776	7.80	88849
<i>fam funds in cat</i>	525	1.65	1.10	1.00	7.00	959	2.07	2.09	1.00	13.00	1313	2.13	2.22	1.00	13.00
<i>funds in cat</i>	525	61	39	1.00	127	959	115	89	5.00	343	1313	327	261	17	1064
<i>fund flows</i>	486	184	625	-438	7263	917	73	281	-1997	2984	1296	77	550	-5770	8989
<i>catflow</i>	486	0.49	0.50	-0.45	2.59	917	0.24	0.32	-0.23	1.99	1296	0.10	0.17	-0.20	1.34
<i>family flows</i>	110	946	2476	-156	15490	164	447	1705	-1196	13312	198	518	2607	-5087	22989
<i>wav dcret</i>	110	1.01	4.72	-8.84	23.51	164	0.75	7.80	-27.47	37.34	198	0.89	5.63	-25.76	17.43
<i>av dcret</i>	110	1.13	5.47	-11.26	27.85	164	0.73	7.43	-27.47	33.51	198	0.89	5.16	-25.76	14.16
<i>av age</i>	110	10.46	9.75	0.42	58.84	164	10.91	9.92	0.52	63.84	198	13.82	10.02	2.42	68.84
<i>av diffexp</i>	110	-0.10	0.37	-1.21	1.06	164	-0.09	0.42	-1.16	1.97	197	-0.27	0.32	-0.94	0.98
<i>av stdv</i>	110	3.51	1.50	0.62	8.62	164	3.23	1.62	0.04	7.40	198	2.80	1.39	0.15	8.82
<i>av catflow</i>	110	0.49	0.39	-0.10	2.22	164	0.23	0.19	-0.14	0.88	198	0.13	0.14	-0.20	1.34
<i>av funds in cat</i>	110	64.94	32.51	4.00	127	164	116.52	65.32	5.00	343	198	333.26	183.00	23.00	1064

dcret, *diffturn*, *diffexpense*, *mshare*, *catflow*, *wav dcret*, *av dcret*, *av diffexp*, *av catflow* are in %; *assets*, *family assets*, *fam ass in cat*, *fund flows*, *family flows* are in millions of dollars.

In sum, denoting with $perf_{ikjt}$ the performance of fund i belonging to family k and category j at time t , the following regression model is estimated:

$$\begin{aligned}
 perf_{ikjt} = & \alpha_0 + \alpha_1 focus_{k(t-1)} + \alpha_2 diffturnover_{it} + \alpha_3 diffexpense_{it} \\
 & + \alpha_4 loadaddum_{it} + \alpha_5 age_{it} + \alpha_6 age_{it}^2 + \alpha_7 equity\ assets_{i(t-1)} \\
 & + \alpha_8 equity\ assets_{i(t-1)}^2 + \alpha_9 equity\ assets_{i(t-1)}^3 + \alpha_{10} bond\ assets_{i(t-1)} \\
 (5) \quad & + \alpha_{11} bond\ assets_{i(t-1)}^2 + \alpha_{12} bond\ assets_{i(t-1)}^3 + \alpha_{13} fund\ mshare_{i(t-1)} \\
 & + \alpha_{14} stdv_{it} + \alpha_{15} family\ assets_{k(t-1)} + \alpha_{16} family\ assets_{k(t-1)}^2 \\
 & + \alpha_{17} family\ assets_{k(t-1)}^3 + \alpha_{18} family\ assets\ in\ category_{kj(t-1)} \\
 & + \alpha_{19} family\ funds\ in\ category_{kj(t-1)} + \alpha_{20} funds\ in\ category_{jt}
 \end{aligned}$$

III(iii). Estimation method

Since the data is in the form of a panel, an econometric procedure that utilizes this structure is warranted. Panel estimation-techniques require more or less restrictive assumptions on the within-group correlation structure. (In the present case all observations for each fund correspond to a group.) Let $\mathbf{R}$ be the correlation matrix for modeling the within-group correlation. Let $R_{t,s}$ denote the t, s element of $\mathbf{R}$. Ordinary least squares, for instance, would correspond to letting $R_{t,s} = 1$ if $t = s$, and 0 otherwise. A random-effects model would correspond to letting $R_{t,s} = 1$ if $t = s$, and ρ otherwise; and an AR(1) model would correspond to letting $R_{t,s} = 1$ if $t = s$, and $\rho^{|t-s|}$ otherwise. To obtain more flexibility with respect to the correlation structure, the model is estimated using the technique of generalized estimation equations (GEE) as developed by Liang and Zeger [1986]. GEE is attractive in this case, since due to the large number of panels in the data, the estimation can exploit GEE's option to impose as only constraint on the correlation matrix that the diagonal elements be equal to 1 and the matrix be symmetric, i.e., $R_{t,s} = 1$ if $t = s$, and ρ_{ts} otherwise, with $\rho_{ts} = \rho_{st}$. Hence, the procedure is able to take into account possible autocorrelation between observations over time without requiring a pre-specified, restrictive autocorrelation structure.

GEE is a synthesis of the generalized linear model (McCullagh and Nelder [1989]), which assumes independence, and the linear model with estimated covariance matrix (FGLS), which requires functional independence of the mean and the variance (Ziegler, Kastner and Blettner [1998]). The estimation technique iterates between a Fisher scoring algorithm for the estimates of the coefficients and a method of moment estimation for the working correlation matrix $\mathbf{R}$. The variance of the coefficients is estimated consistently with a robust variance matrix estimator, tracing back to Huber [1967] and adapted by Liang and Zeger [1986]. (For a review of GEE, see Ziegler, Kastner, and Blettner [1998].)

IV. THE EFFECT OF FOCUS ON FUND PERFORMANCE

IV(i). *Regression results*

The effect of family focus on fund performance is explored in two steps. In the first step, it is tested whether overall (lagged) family focus has an impact on current fund performance. In the second step, it is analyzed whether relatedness or narrowness drives the focus effect. For results of the regression model analyzing the effect of overall family focus on fund performance, see the first three columns of Table III. The dependent variable in regression (1) is *dcret*, the difference between the fund's adjusted total return and the average total return of its category. In regressions (2) and (3) *dcret**sd* and *dgret**sd* are used as performance measures. In all three regressions the (lagged) *focus* variable is positive and highly significant. The p-value of the *focus* coefficient is 0.011, 0.007, and 0.013 in the three regressions. The effect is not only statistically significant, but economically relevant as well. Comparing families at the 20th and 80th percentile of the focus measure, the coefficient in regression (1) implies a size of the effect of 32 basis points a year. The coefficient on *focus* in the regression using *dcret**sd* needs to be interpreted separately for each category, since categories differ in the variability of returns. Comparing again families at the 20th and 80th percentile of the focus measure, the coefficient implies, for instance, for short-term municipal bond funds an 11 basis point advantage, while for more volatile specialty-health-care funds, the coefficient translates into an 103 basis point advantage. Averaging across all categories and weighting by category assets yields an average effect of 50 basis points. The average effect using *dgret**sd* is similar at 46 basis points.

Having documented the existence of a focus effect on fund performance, the analysis now turns to the question of the sources of this focus effect. Is the focus effect driven by relatedness or by narrowness? To provide an answer, the above regression model is estimated after replacing the variable *focus* with the variables *related* and *categories*. Results of this regression model can be found in columns (4)–(6) of Table III. The measure of relatedness is positive and significant in all three regressions, with p-values of 0.032, 0.015, and 0.024, respectively. In contrast, the coefficient on *categories* is insignificant in all three regressions. Thus, the benefit of focus appears to accrue only to funds that belong to a category of funds on which the fund family is concentrating. Mere membership in a family with a narrow fund offering does not generate a performance benefit for a fund.

What is the magnitude of the relatedness effect? Comparing two funds at the 20th and 80th percentile of *related* in 1996, the effect is, using *dcret* as performance measure, 26 basis points per year. The effect using *dcret**sd* as performance measure is, for instance, 15 basis points for short-term municipal bond funds and 138 basis points for specialty-health-care funds.

TABLE III
THE EFFECT OF FOCUS, RELATEDNESS AND NARROWNESS ON FUND PERFORMANCE

performance measure	(1) dcret	(2) dcretsd	(3) dgretsd	(4) dcret	(5) dcretsd	(6) dgretsd
focus	0.969 (2.53)	0.123 (2.69)	0.112 (2.49)			
related				0.737 (2.14)	0.155 (2.44)	0.139 (2.26)
categories				0.014 (0.77)	0.005 (1.83)	0.005 (1.64)
diffturn	0.002 (1.98)	3.60E-04 (1.87)	3.69E-04 (2.00)	0.002 (1.78)	3.27E-04 (1.78)	3.41E-04 (1.94)
diffexpense	0.086 (0.41)	-0.043 (-1.68)	0.017 (0.65)	0.098 (0.46)	-0.045 (-1.71)	0.016 (0.58)
loadddum	-0.677 (-4.83)	-0.005 (-0.16)	0.051 (1.66)	-0.657 (-4.57)	0.002 (0.06)	0.058 (1.73)
age	-0.032 (-1.89)	-4.53E-04 (-0.28)	-4.38E-04 (-0.29)	-0.035 (-2.05)	-0.001 (-0.63)	-0.001 (-0.62)
age²	3.31E-04 (1.17)	4.88E-06 (0.19)	4.54E-06 (0.19)	3.68E-04 (1.30)	1.11E-05 (0.46)	1.03E-05 (0.44)
assets (equity)	6.85E-07 (0.01)	1.43E-05 (0.81)	1.01E-05 (0.61)	-3.37E-05 (-0.29)	7.50E-06 (0.46)	4.10E-06 (0.27)
assets² (equity)	2.25E-08 (2.50)	9.10E-10 (0.88)	1.11E-09 (1.15)	2.51E-08 (2.74)	1.46E-09 (1.63)	1.60E-09 (1.87)
assets³ (equity)	-4.47E-13 (-3.17)	-2.08E-14 (-1.32)	-2.39E-14 (-1.62)	-4.85E-13 (-3.38)	-2.90E-14 (-2.16)	-3.12E-14 (-2.43)
assets (bond)	-4.07E-05 (-0.18)	3.82E-05 (0.96)	4.18E-05 (1.12)	-1.39E-04 (-0.57)	2.16E-05 (0.61)	2.70E-05 (0.81)
assets² (bond)	3.08E-08 (0.58)	-2.73E-09 (-0.30)	-3.42E-09 (-0.41)	4.85E-08 (0.87)	2.46E-10 (0.03)	-7.83E-10 (-0.10)
assets³ (bond)	-2.05E-12 (-0.70)	1.66E-14 (0.03)	5.48E-14 (0.12)	-2.84E-12 (-0.93)	-1.14E-13 (-0.23)	-6.10E-14 (-0.13)
mshare	-7.391 (-6.07)	-1.019 (-2.01)	-1.001 (-2.09)	-7.537 (-6.15)	-1.075 (-2.02)	-1.051 (-2.10)
stdv	0.247 (2.93)	0.033 (2.69)	0.029 (2.51)	0.247 (2.93)	0.032 (2.7)	0.029 (2.52)
family assets	2.35E-05 (2.09)	3.92E-06 (2.48)	3.52E-06 (2.31)	1.46E-05 (1.16)	1.85E-06 (1.51)	1.74E-06 (1.46)
family assets²	-1.03E-10 (-0.86)	-2.53E-11 (-1.76)	-2.32E-11 (-1.67)	-3.68E-11 (-0.30)	-1.27E-11 (-1.08)	-1.22E-11 (-1.08)
family assets³	1.05E-16 (0.32)	4.75E-17 (1.36)	4.36E-17 (1.29)	-4.46E-17 (-0.14)	2.12E-17 (0.71)	2.09E-17 (0.72)
family assets in cat	-7.80E-06 (-0.33)	-4.45E-06 (-2.06)	-3.45E-06 (-1.64)	-8.61E-06 (-0.36)	-4.50E-06 (-2.05)	-3.51E-06 (-1.64)
family funds in cat	-0.025 (-0.63)	-0.002 (-0.63)	-0.004 (-1.27)	-0.045 (-1.05)	-0.007 (-1.8)	-0.008 (-2.17)
funds in cat	3.56E-04 (1.12)	1.45E-04 (2.00)	1.30E-04 (1.88)	3.68E-04 (1.15)	1.56E-04 (2.07)	1.40E-04 (1.94)
constant	0.008 (0.02)	-0.174 (-1.57)	-0.156 (-1.47)	0.192 (0.52)	-0.188 (-1.55)	-0.167 (-1.44)
obs.	10511	10511	10511	10511	10511	10511
Wald test (χ^2)	149.85	98.51	54.10	147.74	85.18	46.61
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

t-values in parentheses.

On average the effect is 68 basis points. For *dgretsd* the average effect is 61 basis points.

What is the driver of this relatedness effect? Two broad classes of explanations could be advanced. Higher fund returns could have been

achieved through better security selection (a ‘competency’ argument) or through lower expenses (an ‘economies of scale’ argument). The analyses seem to point to the competency argument rather than to the economies of scale argument. First, regression (6), which uses the standardized gross returns as dependent variable, reveals that funds with high relatedness measure have higher *gross* returns than funds with low relatedness measure, i.e., the performance advantage is driven by higher returns on the underlying security portfolio rather than lower expenses. This effect also remains when the measure of expenses (*diffexpense*) is dropped from the regression (results available from the author).

Second, economies of scale potentially exist at various levels: at the level of the fund, e.g., if the fund manager’s compensation is not proportional to assets under management; at the level of the category, e.g., if research performed for one fund is shared with a fund in the same category; and at the level of the family, e.g., if the same fund shareholder accounting system is used for all funds. Regressing *diffexpense* on measures of fund-, category-, and family size reveals scale economies both at the level of the fund and at the level of the family, but not at the level of the category, the level directly related to the family’s diversity of fund offering (results available from the author). In sum, the relatedness effect appears to be driven by superior capabilities rather than by the ability of the fund provider to keep costs low by focusing only on a few categories.

IV(ii). *Alternative explanations and robustness checks*

One potential alternative explanation of the results between performance and family focus is a possible reverse direction of causality. Perhaps fund families that have poorly performing funds start to diversify. There exists some evidence in the finance and industrial organization literature that poorly performing firms start to diversify broadly (Morck, Shleifer and Vishny [1990]; Lang and Stulz [1994]) and that low-value mergers are more likely to be undertaken by firms with poor prospects for increasing their profit streams from their existing activities (You, *et al.* [1986]). To determine whether fund families that perform poorly start to broaden their product portfolio, a new variable, $\Delta focus_{k,t}$, is constructed, measuring the change in *focus* of family k between years t and $t-1$. This variable is regressed on various past average performance measures of families, controlling for family size, average fund age, average flows into categories, and average expense levels. For all performance measures, the coefficient on the past performance variable is insignificant, thus throwing doubt on this reverse-causality explanation (more details and results of all analyses reported in this section are available from the author).

Since the measure of ‘relatedness’ captures the degree of specialization of a family in a given category, reverse-causality could also be possible in the relatedness regressions: Fund families may specialize in those categories in

which their performance tends to be highest. To test whether high past performance of a family within a particular category leads to specialization of the family in this category, the (current) *related* measure is regressed on a variety of lagged family-category performance measures and other control variables. Performance at the family-category level is measured by aggregating the performance of all funds in a family within a particular category (either asset-weighted or equally weighted). Moreover, relative performance measures are computed that indicate whether the performance of a particular family-category is better (or worse) than the average performance of all categories within the same family. Hence, it is tested whether a family's comparative advantage at managing a particular fund type leads to specialization in that fund type. Regardless of how family-category performance is measured, past family-category performance is not found to have a statistically significant effect on current specialization (i.e., relatedness), thus providing no support for the alternative high-performance-leading-to-specialization interpretation. The results reported in Section V below, provide an explanation for why it may not be surprising to find no evidence for specialization. In short, fund families seem to benefit from offering funds in a wide array of categories.

Another concern relates to a possible sample selection bias: Morningstar may cover in its publication only those small families (and funds) that are successful. Since there exists a negative correlation between focus and family size, the focus measure could pick up a size effect caused by the selection bias. Similarly, small families might be covered less completely than large families. If only hot performing funds of small families are covered, it could again induce a negative relationship between family size and performance. To alleviate this selection bias problem, linear and non-linear terms for both the size of the fund and the size of the family are included in the performance regressions. An age variable, which picks up some of the selection bias effect as well, is also included. Moreover, since lagged variables are used in the regression, the performance in the first year of each new fund is excluded. Thus, first-year blips in performance, which could have caused Morningstar to cover a fund, do not influence the results. In addition, once Morningstar begins to cover a fund, it is not dropped very quickly.

To test this potential small-family bias directly, families were dropped that had only one fund or alternatively all families were dropped that had a *focus* measure equal to one. Similar results as those reported were obtained. Since many variables in the regression are computed relative to category means (e.g., *decret*, *diffexpense*), it was also checked whether the results were influenced by small categories. Dropping all funds in categories that had less than five funds had again no significant impact on the results.

Lastly, two more performance measures were computed. The first measure is based on 'Jensen's alpha,' which is derived from the standard capital asset pricing model (Jensen [1968]). The second performance variable

is an excess return measure which uses monthly performance data and is based on multi-index models suggested by Gruber [1996] and Blake, Elton, and Gruber [1993]. Similar results with respect to *focus*, *relatedness*, and *categories* were obtained with these performance measures.⁷

V. THE IMPACT OF PRODUCT BREADTH ON CASH FLOWS

The previous section reported that funds belonging to focused families have higher returns, *ceteris paribus*, than funds belonging to broadly diversified families. While fund returns are important for fund shareholders, fund providers are, as argued in Section III, mainly concerned with cash inflows. Clearly, a likely link exists between a fund's performance and its cash inflows. However, fund providers are ultimately concerned with *aggregate* cash flows into the family, i.e., with flows into *all* of the family's funds—and aggregate flows might also be affected by demand externalities among the funds that a family is offering.

The first analysis in this section tests the effect of product breadth on aggregate cash inflows into a family, controlling for product quality (fund returns), i.e., the demand effect of product breadth. In the second analysis, the overall effect of product breadth on aggregate cash inflows is examined by dropping the average product quality measure. Lastly, supplementary analyses of cash flows at the fund level shed light on the results observed at the family level.

Prior work studying the relationship between performance and inflows at the fund level (Chevalier and Ellison [1997]; Sirri and Tufano [1998]) identifies several relevant control variables for the family cash flow regressions. First of all, controls for the size of the family are needed. To allow for potential non-linearities, linear, square, and cubic terms of the lagged net assets of the family are included in the regressions. Second, to control for the quality of the products, i.e., the past performance of the funds in each family, an average family performance measure is computed. The variable $wav\ dcret_{kt}$ is the weighted average of *dcret* of all funds in family *k* in year *t*, where the performance of each fund *i* in family *k* is weighted by its

⁷ Another issue which is featured prominently in the literature on absolute fund performance and performance persistence is survivorship bias (e.g., Brown, *et al.* [1992]). In this study, the effect of the survivorship bias is ambiguous. If the hypothesis is correct that funds with high values of *related* perform better than funds with a low measure, one would expect to have more missing, poorly performing funds that were lone stragglers than funds that had high values of *related*. (Brown and Goetzman [1995] show that poorly performing funds have a greater probability of disappearing than funds with high performance.) Consequently, if more poorly performing funds with low values of *related* are missing in the data than poorly performing funds with high values of *related*, the results are biased *against* finding a relatedness effect. Conversely, if the hypothesis is incorrect, one would expect to miss more poorly performing high-relatedness funds than low-relatedness funds, and the results would be biased *towards* finding a positive relatedness effect. Given the results of the analyses, however, this bias would have to be extremely strong, because it would have to both overpower the true negative effect and generate the observed positive relationship.

relative size, i.e., by $assets_{it}/family\ assets_{kt}$. The unweighted average of $dcret$, called $av\ dcret_{kt}$ is also computed. All other control variables are weighted averages, with relative fund size as weights.

Third, the average age of funds within each family ($av\ age_{kt}$) is included. Again, there might be a non-linear relationship because new funds might receive a lot of marketing support while very old funds have reputation effects which could help increase inflows. The analysis further controls for the average expenses charged ($av\ diffexpense_{kt}$). To control for a potential dislike of investors for volatility, the weighted average of the funds' standard deviation of monthly returns is also included ($av\ stdv_{kt}$).

Two further control variables at the category level are included. First, the growth of flows into each category ($catflow$) and a weighted average for all funds within each family ($av\ catflow_{kt}$) are computed. By including $av\ catflow_{kt}$, the analysis controls for sector flows into particular categories that may have been *en vogue* in a particular year. Secondly, to assess how many competitors the funds of a family face within their categories, the average number of funds within each category ($av\ funds\ in\ cat_{kt}$) is included. As before, product breadth of families is measured by the variable *categories*, the number of categories in which a family is offering funds. For summary statistics of all variables, see Table II.

There are possibly other family-specific variables that could influence the total cash inflows, such as the amount spent on advertising. Unfortunately, such data is difficult to obtain for all families. To take into account family-specific differences, a fixed-effect regression model is estimated which controls for (constant) family differences.

In sum, letting $famflow_{kt}$ denote the flows into fund family k at time t , the following regression is estimated:

$$\begin{aligned}
 (6) \quad famflow_{kt} = & \alpha_0 + \alpha_1 categories_{k(t-1)} + \alpha_2 average\ performance_{k(t-1)} \\
 & + \alpha_3 family\ assets_{k(t-1)} + \alpha_4 family\ assets_{k(t-1)}^2 + \alpha_5 family\ assets_{k(t-1)}^3 \\
 & + \alpha_6 av\ age_{kt} + \alpha_7 av\ age_{kt}^2 + \alpha_8 av\ diffexpense_{kt} + \alpha_9 av\ stdv_{k(t-1)} \\
 & + \alpha_{10} av\ catflow_{kt} + \alpha_{11} av\ funds\ in\ category_{kt} + \varepsilon
 \end{aligned}$$

For results of the above regression, see the first two columns of Table IV. Regression (1) includes $wav\ dcret$ as control for average fund performance, while regression (2) includes $av\ dcret$. In both regressions, a positive and significant effect of product breadth on cash inflows into families can be found. Moreover, the effect is substantial. A family with one more category in its offering in the previous year attracts about \$154 million more inflows in the current year—a large effect, given that the mean inflow into families over the entire sample is \$362 million.

To assess the overall effect of product breadth on family cash flows, the average performance measure is dropped from the regression to net out

TABLE IV
THE EFFECT OF FAMILY PRODUCT BREADTH ON CASH INFLOWS INTO FAMILIES AND FUNDS

	family flows				fund flows
	(1)	(2)	(3)		(4)
categories	154.181 (4.01)	154.919 (4.03)	153.131 (3.98)	categories-core	8.524 (3.13)
wav decret	9.132 (1.55)			categories-non-core	-0.980 (-0.60)
av decret		11.042 (1.87)		low perf-core	-36.297 (-0.33)
family assets	-0.108 (-5.34)	-0.109 (-5.36)	-0.108 (-5.33)	med perf-core	184.459 (5.18)
family assets²	2.61E-06 (12.62)	2.61E-06 (12.64)	2.61E-06 (12.62)	high perf-core	322.912 (2.16)
family assets³	-7.94E-12 (-13.71)	-7.95E-12 (-13.73)	-7.95E-12 (-13.72)	low perf-non-core	149.632 (2.11)
av age	25.029 (0.72)	25.096 (0.73)	26.870 (0.78)	med perf-non-core	53.449 (3.32)
av age²	-0.547 (-0.86)	-0.537 (-0.84)	-0.583 (-0.91)	high perf-non-core	307.916 (3.21)
av diffexpense	-29.053 (-0.18)	-29.904 (-0.19)	-25.594 (-0.16)	diffexp	-33.223 (-2.96)
av stdv	-27.167 (-0.98)	-26.894 (-0.98)	-22.922 (-0.83)	age	-0.108 (-0.08)
av category flow	1008.802 (9.16)	1008.388 (9.16)	1006.770 (9.14)	age²	-0.005 (-0.20)
av funds in cat	-0.647 (-1.21)	-0.652 (-1.22)	-0.650 (-1.21)	assets	-0.059 (-1.93)
constant	-376.961 (-1.44)	-383.830 (-1.46)	-391.045 (-1.49)	assets²	1.10E-05 (2.48)
				assets³	-2.26E-10 (-3.10)
				stdv	-1.597 (-1.12)
				family assets	0.001 (0.80)
				family assets²	7.74E-09 (0.58)
				family assets³	-3.62E-14 (-1.06)
				catflow	196.419 (7.15)
				funds in cat	-0.083 (-3.04)
				constant	-38.824 (-1.99)
obs.	1783	1783	1783	obs.	10005
F-test	70.40	70.55	77.13	F-test	268.03
Prob. > F	0.000	0.000	0.000	Prob. > F	0.000

t-values in parentheses.

the potential negative effect of larger product breadth on the average performance of funds. As regression (3) shows, the coefficient on the product breadth measure remains essentially unchanged. Thus, at the family level, the indirect negative effect of diversification on cash inflows (and total fees) via reduced fund performance is only small.

Why are fund investors attracted to fund families with broad product offerings? Unfortunately, the data set is not rich enough to reach a definitive answer, but by exploring the effect of product breadth on flows at the level of individual funds, it is feasible to start an analysis of the possible underlying effects. In particular, by distinguishing whether family product breadth affects fund flows of funds that belong to a family's core businesses (i.e., those that have a high value of *related*) or funds in non-core businesses, some light can be thrown on fund investor behavior. Three possible explanations are considered, termed 'supermarket,' 'incremental sales,' and 'choice set.'

The supermarket explanation describes the following situation: if investors have real or perceived costs of using multiple fund providers ('shopping costs' in the terminology of Klemperer [1992]), investors might select families that have broad offerings, because these families allow investors to fulfill most of their investment needs with respect to mutual funds. Shopping costs could include the costs of collecting tax information from multiple fund providers, getting acquainted with various fund providers' systems for buying and selling mutual fund shares, and creating a personal consolidated financial picture from the account statements of various providers. Thus, once investors have an account with a particular fund provider, they might fulfill most of their needs within this family. As a result, in the supermarket scenario, cash flows of all funds within a family should be positively affected by the breadth of product offering. (For a formal model in which a broader product line leads to more demand for all products offered by a firm, due to shopping costs, see Klemperer and Padilla [1997].)

In the incremental sales scenario, investors select families for what families are known for, rather than for their broad product offering. Once investors have an account with a particular provider, they might also buy, however, shares in non-core funds in this family, in particular if the family offers many other categories. Thus, in the incremental sales scenario, product breadth does not attract more customers, but increases sales per customer, since customers also purchase shares in non-core funds, especially if the family offers many categories (Kotler [1994]). As a result, mainly funds in non-core categories of a family should be positively affected by wide family product breadth since they receive additional, incremental sales; core-funds receive inflows regardless of product breadth.

The third explanation is based on the idea that unless a family has a broad product offering, it is not likely to be in the choice set or the awareness set of a customer (Laroche, Rosenblatt and Brisoux [1986]). First, a broad product offering may raise the likelihood that a customer, or a financial advisor, is aware of a family. Second, a broad product offering is often a requirement to become a defined contribution pension plan provider. After having narrowed down the set of all families to a smaller choice set, investors still may only invest in those funds within each family that are in categories for

which each family is known for. 'Exotic' needs that are not a core product of any family in the choice set require potentially more information gathering and are fulfilled by selecting a fund in a family that may be even outside the original choice set. In sum, this explanation would predict that only funds that lie within a family's core categories are positively affected by product breadth, since more customers are attracted to the provider. In contrast, non-core funds do not benefit from product breadth.

To explore these three possible explanations, the effect of family product breadth on cash inflows at the fund level is analyzed. As on the family level, controls for fund size, family size, the expense ratio, category flows, and number of funds in the category are included. To control for past performance of each fund, I follow Sirri and Tufano [1998], who show that prior performance does not have a linear effect on cash flows into individual funds, and include, as they do, piecewise ranks as defined by:

$$(7a) \quad low\ performance_{it} = \text{Min}(Rank_{it}, 0.2)$$

$$(7b) \quad medium\ performance_{it} = \text{Min}(0.6, Rank_{it} - low\ performance_{it})$$

$$(7c) \quad high\ performance_{it} = Rank_{it} - (low\ performance_{it} + medium\ performance_{it})$$

where $Rank_{it}$ is the percentile rank of fund i in year t in its category, ranking funds on their adjusted total returns.

To analyze whether the effect of family product breadth is different between funds in core categories and non-core categories, the indicator variable $I(core)$ is created, which equals to one if the fund's *related* measure is larger than the sample median of *related*, and zero otherwise. (Qualitatively similar results are obtained if the median value of *related* is computed for each family in each year, and funds are divided into two groups depending on whether their value of *related* is higher or lower than the respective family-year median of *related*.) To allow for different slope coefficients for the *categories* variable and the past performance measures, the following variables are constructed for each fund i in family k in year t :

$$(8a) \quad categories-core_{kt} = I(core)_{it} categories_{kt}$$

$$(8b) \quad categories-non-core_{kt} = (1 - I(core)_{it}) categories_{kt}$$

$$(9a) \quad low\ performance-core_{it} = I(core)_{it} low\ performance_{it}$$

$$(9b) \quad low\ performance-non-core_{it} = (1 - I(core)_{it}) low\ performance_{it}$$

similarly for variables *medium performance* and *high performance*.

In sum, letting $flows_{ikjt}$ denote flows into fund i belonging to family k and category j at time t , the following regression is estimated:

$$\begin{aligned}
 (10) \quad flows_{ikjt} = & \alpha_0 + \alpha_1 categories-core_{k(t-1)} + \\
 & \alpha_2 categories-non-core_{k(t-1)} + \alpha_3 low performance-core_{i(t-1)} \\
 & + \alpha_4 medium performance-core_{i(t-1)} + \alpha_5 high performance-core_{i(t-1)} \\
 & + \alpha_6 low performance-non-core_{i(t-1)} \\
 & + \alpha_7 medium performance-non-core_{i(t-1)} \\
 & + \alpha_8 high performance-non-core_{i(t-1)} + \alpha_9 diffexpense_{it} \\
 & + \alpha_{10} age_{it} + \alpha_{11} age_{it}^2 + \alpha_{12} assets_{i(t-1)} + \alpha_{13} assets_{i(t-1)}^2 \\
 & + \alpha_{14} assets_{i(t-1)}^3 + \alpha_{15} stdv_{it} + \alpha_{16} family assets_{k(t-1)} \\
 & + \alpha_{17} family assets_{k(t-1)}^2 + \alpha_{18} family assets_{k(t-1)}^3 + \alpha_{19} catflow_{jt} \\
 & + \alpha_{20} funds in category_{jt} + \varepsilon
 \end{aligned}$$

As the results in Table IV, column (4), reveal, only funds that belong to categories on which a family focuses benefit from family product breadth. Flows into funds belonging to non-core categories do not appear to be affected by family product breadth. The results, thus, lend support to the ‘choice set’ explanation outlined above. A broad product line appears to attract customers, who then, however, mainly invest in those funds that belong to categories on which the family focuses.

The coefficients on the past performance measures strengthen the idea that investors behave differently with respect to core and non-core funds. Both Sirri and Tufano [1998] and Chevalier and Ellison [1997] report a non-linear relationship between past performance and fund inflows. Both studies find that investors respond to high performance (‘follow high returns’), but are fairly insensitive to low performance (‘stick with losers’). The present results with respect to funds belonging to core categories replicate this pattern. A fund that performed at the 90th percentile within its category in the previous year has about \$32 million more inflows in the current year (everything else held constant) than a fund that performed at the 80th percentile. Comparing funds at the 60th and 50th percentile, the flow difference is \$18 million, while for funds performing at the 20th and 10th percentile no significant difference in subsequent cash inflows can be detected. Contrast this to funds belonging to non-core categories. For highly performing funds, a very similar sensitivity of past performance on inflows can be detected. The flow difference between funds at the 90th and 80th percentile is \$31 million. A key difference can be observed, however, for low performing funds: For funds belonging to non-core categories, a significant relationship between past performance and cash inflows still exists. The flow difference between funds that performed at the 20th and 10th percentile is \$15

million. In sum, investors appear to be more sensitive to poor performance with respect to non-core funds than core funds.

The available data do not allow an investigation into whether this effect is driven by existing investors' being more sensitive to poor performance of non-core funds, leading them to pull out their assets more readily after poor performance, or by new investors who shy away more from putting money into poorly-performing non-core funds than from investing in poorly-performing core funds. Both explanations would be consistent with the 'choice set' explanation that the family-flow regressions pointed at previously. Investors do not seem to be investing in non-core funds (or keeping their investments in these funds) merely because these funds belong to families with a broad product spectrum. For these funds, past performance, regardless of its level, plays a role. For core funds, in contrast, poor past performance is more readily ignored or forgiven. For these funds, other attributes than past performance, e.g., family product breadth, appear to play a role in the investment decision process.

VI. DISCUSSION AND CONCLUSION

A commonly reported finding in the literature on diversification is that corporate focus is beneficial. While specific mechanisms that would lead to such an outcome are usually not explicitly tested, arguments concerning the suitability of a firm's capabilities are frequently offered. If corporate focus is beneficial, to what degree can the underlying logic be stretched? Is it beneficial for a firm to concentrate only on one industry, or on one market segment within an industry, or even only on one product?

To shed more light on the effects and potential limits of corporate focus, this paper shifted the analysis from inter-industry diversification to intra-industry diversification. In line with the argued effect in inter-industry studies, direct empirical evidence for a capability effect could be found: firms with higher focus are able to produce better products. In the present context, the performance of a mutual fund was shown to be positively correlated with overall family focus. Moreover, by differentiating between the relatedness and narrowness of a firm's product portfolio, the analysis probed into the sources of this focus effect. The results indicated that the performance of a mutual fund improves with the fund family's degree of focus on that fund's category. Mere narrowness does not suffice: funds that belong to focused families, yet are part of that family's fringe business, do not benefit with respect to performance from their membership in a focused family. One explanation that is consistent with these results, and consistent with field observations (Siggelkow [2002]), is based upon fit within a firm's system of choices. A focused fund family is more likely to be able to appropriately configure its activities, to design its organizational structure and incentive

system, and to assemble the necessary resources than a family that offers a broad array of different funds.

While a positive capability effect can be detected, there exists, however, in contrast to the inter-industry studies, a negative overall effect of focus on firm performance. Using total cash inflows into the fund provider as a proxy for firm performance, the analysis showed that a broad product offering is a valuable strategy for fund providers. Besides the capability effect, a second effect—demand interactions among the products offered by a firm—appears to be in play. An analysis examining the effect of product breadth on cash inflows at the level of individual funds, helped to explore the nature of this demand interaction. The explanation most consistent with the findings suggests that a broad product offering increases the likelihood that a family is in the choice set considered by investors. Once investors have reduced the number of families to a smaller choice set, they appear to purchase from each family mainly those funds that lie within each family's core categories. As a result, a broad product offering increases cash flows of only those funds that lie in the categories on which each family is focusing. In sum, whereas the effect of focus, as reported by inter-industry diversification studies, appears to hold at the capability level in the present case of intra-industry diversification, the overall effect of focus has a different sign.

How applicable might these results be beyond the current setting of the mutual fund industry? First, while inter-industry diversification studies have relied on broad notions of capabilities that may or may not be suitable to different industries, fine-grained analyses of firm's individual choices and the interactions among them (e.g., Milgrom and Roberts [1995]; Porter [1996]; Siggelkow [2001], [2002]) suggest that problems of alignment between a firm's system of activities and its product portfolio can arise even in an intra-industry context. Thus, I would venture the hypothesis that the positive effect of focus on the firm's ability to produce effectively is likely to exist in other industries as well.

The demand interaction effect, in contrast, is likely to be more industry specific. The effect is expected to be large, if shopping costs are large. In these cases, the cost savings of using only one supplier may overwhelm the costs that customers incur by obtaining slightly inferior products from one-stop shops, leading to an overall positive demand effect from a broad product portfolio. Similarly, if customers cannot fully anticipate all their needs, and transaction costs of using a single supplier are lower than using multiple suppliers, product breadth might convey an advantage. Moreover, if customers face search costs due to a large number of suppliers, large product breadth might enable a firm to enter the choice set of customers.

In the absence of such shopping or search costs, the demand interaction effects are likely to be small. More generally, it seems plausible that on average demand interaction effects are small when the product portfolio offered by a firm spans highly diverse industries. As a result, in such a case,

the positive capability effect of focus could well dominate the negative demand interaction effect, leading to a positive overall effect of focus on firm performance—the usual finding of inter-industry diversification studies. Consequently, an interesting extension of inter-industry studies would be to analyze whether a demand interaction effect can be found for cross-industry diversification into industries that offer complementary products. Such an effect could potentially explain the findings of Rumelt [1974], [1982] and Lecraw [1984] that firms with constrained, related diversification outperform single-business firms—findings which indicated that limits to focus may exist even in inter-industry settings. In sum, by distinguishing between internal capability effects and demand interaction effects, a more differentiated view arises of how firm focus affects firm performance.

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