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On the cross-subsidization within mutual fund families:

Evidence from the Swedish mutual funds market

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Abstract

Mutual funds are nowadays perceived as common investments. Only in Sweden, 94% directly or indirectly invest in mutual funds. The huge shift of assets, from traditional bank savings towards delegated asset management, indeed signifies the importance of the mutual fund industry. In this paper it is investigated whether mutual fund families purposely coordinate strategies within the family in order to enhance assets under management and thereby their overall profits. By shifting performance from low valuable funds towards high valuable funds for the family, with regards to profits, the family stand to gain on behalf of certain investors. The empirical results in this study uncover highly statistically significant results suggesting the cross-subsidization phenomenon indeed seemingly occurs in the Swedish mutual fund industry amounting to an overall average of in-between 1.08% and 4.08% yearly.

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I. Introduction

The mutual funds industry has literally exploded over the past ten years and the opportunity set of investment with regards to mutual funds, has all over the world, not the least in Sweden, been ever increasing. The amount invested has reached significant proportions, and has attracted professional as well as common investors without exception. The professional investors have benefited greatly from the enhanced opportunity set and greater diversification prospects, while common investors has been given the chance to participate in the market without the imminent need of a portfolio creation talent. During this period traditional savings methods, such as bank accounts, have been partly substituted by delegated asset management, or more specifically active delegated asset management. Moreover, this trend has been enforced by the current debate and actions in order to shift pension obligations from a "pay as you go" system towards a fully funded system, in an effort trying to avoid bankruptcy among pension systems worldwide.[1] Hence, undoubtedly the responsibility of economic independence, but also of self economic maintenance, has been and is slowly shifting towards the individual, where the mutual fund industry serves, and most likely, will serve as a cushion for this burden.

A very interesting feature of the mutual fund industry is the phenomenon of mutual fund families. A mutual fund family is a financial house which has several different mutual funds under management. Out of 2624 traded mutual funds in Sweden in 2004, only 177 mutual fund families where available, which implies an average of approximately 15 funds per family. Thus, it is evidently clear that the majority of the mutual funds belong to a family and in many cases a very large family.

Mutual fund families, *per se*, can indeed be a very fruitful source of knowledge for the targeted investors, since it offers the potential for economies of scope and scale, but also better research quality. Moreover, it can also mitigate the search cost for the investor and theoretically also lower the assigned marketing cost per fund, due to positive spill-over effects from the family brand.[2] A mutual fund family affiliation may, on the other hand, induce incentives for the mutual fund manager to sacrifice the interest of the individual fund investors to the greater benefit of the family.

[1] Theories on the failure of the existing pension system, in Kotlikoff, Smetters & Walliser (2001).
[2] Engström & Westerberg (2004) arguing that for instance, foreign-based funds with a track record similar to that of domestic funds attract fewer investors and receive less capital. Additionally, Chen, Hong, Huang & Kubik (2002) does not find, in contrary to findings on individual funds, that mutual fund families' performance erodes with size.

It may be argued that there exists an interest for families' to implicitly coordinate actions within the family, sacrificing low value funds for the family to the benefit of high value funds. The reason for such behaviour is conflicting interests between the mutual fund families and the mutual fund investors. In order to clarify this conflict of interest, imagine a mutual fund family having two different individual mutual funds under management, arbitrarily called A and B. The two respective funds are open ended mutual funds and are allocated an investment strategy and a manager. During the life-cycle of investment, the two funds will perform most likely different due to internal factors such as managerial skill, resources available and the *a priori* chosen investment strategy, but also due to external factors such as macro economic events and investor behaviour. Moreover, under the assumption that investment strategies cannot be changed drastically, since it would over through investors' choice of choosing the particular fund and strategy in the first place, and under the conjuncture skilled fund managers are scarce, the family has limited flexibility of changing the development of the funds. As a matter of fact the relative development of A and B can take three different forms. A can outperform B, B can outperform A, or A and B can perform equally well. The investors interested to invest or who has already invested in either A or B has however, through empirical research by Chevalier & Ellison (1997), a tendency towards chasing past return, resulting in a convex relationship between inflows and the performance of the funds. Additionally, Massa (2003) suggest investors tend to first choose a family and then an individual fund to invest in, which makes the family spectrum of funds in many instances the relevant benchmark for investors, rather than all the funds available in the market. Amplifying these effects is also Nanda, Wang & Zheng (2003), showing that a "star performer" fund in the family tend to produce positive spill-over effects on the inflows in the family, while there seems to be no negative effect from a poor performing fund. As a result, a mutual fund family, such as the one above, managing funds A and B, tend to inherit clear incentives of rather having A or B become a relatively better performer at the expense of the other compared to having two mediocre performing funds. Thus, it appears as if the creation of a star fund, even if a "dog" is created in the process, indeed has the potential of attracting new and higher inflows as well as positive spill-over effects compared to lost outflows, which benefits the family as a whole. Such strategies of performance shifting within the family is generally known, and from hereafter termed in this paper, as "cross-subsidization strategies". An explanation for the source of such conflict of interests suggests that the motivation for such strategies, benefiting certain funds at the expense of other, is due to the fact that the mutual fund family profit is a direct function of fees charged and assets under management. Therefore certain funds display a potentially higher value for the family compared to others. Such funds would for instance be high fee funds and high Year-to-Date return funds since they both affect the profit of the family positively to a relatively larger extent than other funds in the family. A third set of potentially valuable funds for the family ought to be

young funds, which empirically, Chevalier & Ellison (1997), has proven to have a stronger convex relationship between inflows and performance. Logically, any implementation of the above mentioned scheme would not be in the benefit or interest of the mutual fund investor. On the contrary, it would arguably imply a certain version of the principal agent problem, set forth by Jensen & Meckling (1976). More specifically where the investor take the role of the principal and the fund manager inherits the role of the agent. By obeying the fund family's strategy, the fund manager indirectly maximizes his/her own benefit. The very essence of the maximization and the incentive of a distorted behaviour are due to the fact that the manager works indirectly for the mutual funds shareholders and directly for the mutual fund family. Hence, it is in the interest of the manger to foremost obey the family strategy and additionally be perceived as a good team player. With regards to the very performance shifting, it ought to also hold that in the case of the same manager managing several funds, such incentive, ought to be enhanced. The reason may be bonus schemes, which makes the manager benefit more of having, again, one top performer, at the expense of a low performer. Even though, the most likely aggregate effect of the cross fund subsidization is zero, it severely distorts the benefit of some investors to the benefit of others. Any family, and any fund manager for that matter, should invest and manage the shareholders money in the interest of the shareholders and not in the interest of either the family or the manager. If such practices where not to be upheld it could damage and distort the fiduciary trust established within the mutual fund industry but also for the capital market as a whole.

As such, the purpose of this thesis is therefore foremost to investigate whether mutual fund families in Sweden actively pursues cross-subsidization strategies within the family, and secondly, if such strategies are undertaken, examine what economic implication it has. Even though benefits of a family affiliation are plausible, the welfare effect for the investor is highly ambiguous and difficult to measure, therefore not considered nor tested in this paper.

Overall, three different cross-subsidization strategies are considered, shifting performance from low fee funds to high fee funds, from low Year-to-Date funds to high Year-to-Date funds and from old funds to young funds. In total, 20 Swedish mutual fund families are examined holding 232 different mutual funds, over the period 2000-09-30 to 2004-12-31. The three different cross-subsidization strategies are further examined in three different dimensions. It is explored whether the cross-subsidization occur within the family, when the funds involved in the cross-subsidization are

held by the same manager and ultimately if the funds involved are PPM funds.[3] The analysis is concluded by investigating whether cross-subsidization strategies are dependent on different family characteristics and more specifically if such strategies are reliant on the relative performance of the category of the high value, respective, low value fund. The results found in this thesis seemingly suggest that Swedish mutual fund families appear to cross-subsidize performance within the family of approximately 1.08% to 4.08% yearly.

The principal contribution of this paper is therefore to shed some light over the practices within the mutual fund industry and more specifically test whether the delegated asset management industry indeed fulfils its fiduciary duty in Sweden. To my knowledge, this is the first thesis of its kind on Swedish data. Even though much has been written on mutual funds, few studies, still within an international scope, has been presented on the topic "delegated asset management". My perception is that this is due to two reasons. The first reason is that the mutual fund industry, at least in Sweden, generally is a rather "new" market with its big breakthrough as late as in the mid 90's. The second reason is that the existence and availability of good data is severely limited. Any outcome of this paper would be of great interest to the various participants within the industry.

Such participants would for instance be investors wanting to know whether their funds are managed in order to maximize their value. Obviously such insight would be crucial since many of the mutual fund investors purposely invest for their retirement. Moreover, the findings would contribute to Finansinspektionens[4] work on creating a trustworthy, transparent and frictionless market for the optimal allocation of capital. Finally, it would also benefit mutual fund families engaging in a fair and sound asset management activity since they would no longer compete on unfair ground for assets.

The remainder of this thesis is structured in the following way. Section II gives a short description of mutual funds, the Swedish pension system and the Swedish mutual fund industry. Section III provides a framework of incentives for the cross-subsidization phenomenon found in empirical studies and details the previous research within the field of cross-subsidization. Section IV outlines documented strategies in which cross-subsidization may occur. Section V refers to data used and section VI to the hypotheses tested and methodology applied. Section VII facts the empirical results and finally section VIII concludes.

[3] PPM stands for PremiePensionsMyndigheten and is the legal authority controlling the compulsory part of the Swedish public pension that individuals may invest in mutual funds. PPM funds display mutual funds supplied by the mutual fund families which are designated towards such individual pension savings.
[4] Finansinspektionen is the Swedish Financial Supervisory Authority which aims towards promoting stability and efficiency in the financial system as well as to ensure effective consumer protection.

II. Factual Background

Short on Mutual Funds

A mutual fund is composed of assets invested by the mutual funds investors. All the shares of the fund should be equally weighted and have equal right to the funds net assets. The investors' only liability towards the mutual fund is to own, buy and sell the shares as well as to participate in any appreciation or depreciation of the mutual funds net assets. As a consequence, the investors do not answer to any responsibility held by the mutual fund. The mutual fund should use the invested assets to invest according to the pre-established investment philosophy of the fund. Such strategies may be composed of different targeted investment instruments, risks, and/or geographical areas. The investment philosophy and the activity of the mutual fund and family must be approved by law (2004:46) on investment funds, which replaced the law (1990:1114) on security funds in 2004.[5]

Short on the Swedish Pension System

In 1999 the Swedish pension system was updated in order to create a possibility for individual citizens to better affect their future pension income. The system would hopefully also come to terms with the changing demographic situation of Sweden, with an ever increasing aging of its citizens. Thus, the new pension system is composed of three main pillars. Pension based on negotiated contracts between the employer and the union, individual pension savings and finally the public pension. The change has occurred primarily within the public pension. The public pension now consists of a new component, the premium pension, which entails the employee to pay 2.5% of his/her income to the PPM.[6] However, the employee can choose where and in which mutual funds he/she would like to invest his/her amount.[7] Even though the amount in percentage may seem small, it is a compulsory part, and over time, perhaps a rather significant part of each citizen's pension, which evidence the importance of transparency and correctness within the mutual fund industry.

[5] The above section is interpreted from the Finansinspektionens publication 2004:8. The above mentioned laws are in Swedish, lag 2004:46 om investeringsfonder and lag 1990:1114 om värdepappersfonder.
[6] The 2.5% is calculated on a maximum yearly income of 324 750 SEK for the year 2005.
[7] As for the year of 2005 there are approximately 681 different mutual funds to choose from.

Short on the Swedish Mutual Fund Industry

The Swedish mutual fund industry has had an incredible growth over the past ten years. In 1994 approximately 343 funds were available to invest in, while in 2004 the figure was 2613, displaying a cumulative annual growth rate (CAGR) of ~23%. Also, the aggregated market value of the mutual funds has had an immense expansion. In 1994 the value of the market was of 297 billion SEK while in June 2004 the estimated value was as high as 966 billion SEK (CAGR ~13%). Overall, during the ten year period of 1994-2004, household savings increased by 671 billion SEK, of which mutual fund savings represented approximately half (48%).

In 2004 as much as 94% of the Swedish population had investments and savings in mutual funds when including also the PPM. When excluding the PPM around 72% of the population had their investments in mutual funds and when looking at the child population of Sweden, which are men and women below the age of 18, around 67% invested in mutual funds.

The most common reason for investing in mutual funds seems to be savings for retirement and to build a capital cushion. Moreover, the Swedish investors appear to consider the risk level of the fund highly important when selecting as well as fees, investment strategy and historical performance.[8] Another important factor is the general consensus of the fund family. When it comes to relative comparison of mutual funds, the Swedish investors compare the fund with prior performance and other funds performance. The most preferred investment category is Swedish equity funds followed by European equity funds. [9]

It's evidently clear that the Swedish population over the past years has to a larger extent been gradually more exposed to the mutual funds market. Such enhanced exposure seems also present in both private as well as pension savings.

[8] Historical performance is here termed as the most common historical performance figures the average Swedish investor seeks when placing investments. Such historical performances, according to the Fondbolagens Förenings report "Fondspararna och Fondsparandet 2004", are year end performance, monthly performance as well as five year performance.

[9] The above section of stylized facts is gathered from Fonbolagens Förenings reports on fund savers and fund savings 2004 "Fondspararna och Fondsparandet 2004" as well as their report on fund savings in Sweden over a ten year perspective 1994-2004, "Fondsparande i ett 10-års perspektiv 1994-2004" .

III. Previous Research

Incentives for cross-subsidization

On the topic delegated asset management it is important to gain insight into how the mutual fund industry is structured in order to further understand the reasons for cross-subsidization strategies undertaken by mutual fund families. Massa (2000) provides such insight by exploring foremost why there are so many mutual funds available in the market. The author argues that the industry segments itself into an ever-increasing number of categories due to marketing strategies used by the asset management companies in order to exploit investors' heterogeneity. Furthermore, the author suggests that such proliferation may be due to signalling externalities, hedging externalities or simply by a "learning by doing" externality, meaning that the more know-how the managers can accumulate within a category, the higher the possibility of fund proliferation.

However, given such a feature of the industry, mutual fund families vastly supply the market with mutual funds, which have to compete for a growing but limited, amount of assets. Such assets have extensively been tested empirically to chase past return and Spitz (1970), Chevalier and Ellison (1997) and Sirri and Tufano (1998), all documents that abnormal positive return generate disproportionately more inflows than abnormal negative return would generate outflows. Also in Sweden such behaviour is found and Engström and Westerberg (2004) concludes that, similar to U.S. investors, Swedish investors indeed chase past returns. The seemingly convex relationship between inflows and performance and findings by Nanda, Wang and Zheng (2003), suggesting investors fear exiting losing investments, in line with Kahneman & Tversky's (1979) prospect theory, provides a clear framework of incentives for mutual fund families to provide star performers in order to be able to compete for assets.

Moreover, it also seems as if a fund's market share within an investment objective is not only driven by its family's policies within that objective. Instead, there are important spill-over effects from other funds within the same family as well, Kohrana and Servaes (2002). An equivalent effect is documented by Nanda, Wang and Zheng (2003), suggesting that there is strong spill-over from a star performer to other funds within the family. Thus, again the convex relationship between return and inflow may seemingly provide strong incentives for the managers and families to push certain funds at the expense of others. Connected to these results are also Chevalier and Ellison's (1995) study,

which suggest that mutual funds are more prone to increase or decrease the risk of the funds which are dependent on the fund's year-to-date return. The risk will be decreased within funds likely to end-up as good performers in order to lock in gain's and future inflows, while the risk will be enhanced for funds likely to end up bad performers. Tampering with risk might also be executed on the manager level according to Brown, Harlow and Starks (1996). The authors find that due to compensation schemes, managers of investment portfolios likely to end up as "losers" will manipulate funds risk differently than those managing portfolios likely to be "winners".

In summary, it might therefore be argued the following. Fund investors seem to chase past returns and appear to disproportionately invest in high performers compared to withdrawing money from low performers. Such behaviour creates incentives for mutual fund families to cross-subsidize within the family and thereby pushing certain funds to benefit from others. While doing so, they increase their potential inflow, they seemingly does not suffer from, while enhancing the risk of certain funds, potential bad performers and conclusively also generate positive spill-over effects. All in all it generates the possibility of a distorted behaviour within the mutual fund industry benefiting certain investors at the expense of others.

Empirical findings on cross-subsidization

As far as previous research goes, not much has been written with regards to the cross-subsidization phenomenon. However, noteworthy is Gaspar, Massa & Matos (2004) paper on favouritism within mutual fund families. The authors find that, indeed, US mutual funds appear to engage in cross-subsidization, shifting performance from low value funds for the family to high value funds, during the period 1991 to 2001. Moreover, the authors test and conclude that such actions are put into practice partly through favourable IPO allocations as well as opposite trades, benefiting the high value fund at the expense of the low value fund. All in all, the authors find that family engagement in cross-subsidization strategies enhances the performance of high value funds by approximately in the range of 0.7 to 3.3% a year at the expense of low value funds.

Also, within the field of performance shifting within mutual fund families, Guedj and Papastaikoudi (2003) document that it appears especially larger families engage in performance shifting within their families. The authors find that families seemingly allocate managers to their last year's relative best performers and not proportionally to the funds' need. The size of the family might facilitate the flexibility of any such action and it implies that cross-subsidization strategies might be more prevalent within larger families.

IV. Cross-subsidization strategies

As outlined in section III above, mutual fund families possess clear incentives of pursuing cross-subsidization strategies in order to enhance assets under management and thereby their overall profit. Evidence of cross-subsidization activities has also been, as said above, well explored by Gaspar, Massa and Matos (2004). Moreover, the authors investigated such evidence by ways cross-subsidization strategies were implemented, and found two feasible ways performance was transferred among funds within the family, namely, favourable IPO allocations and opposite trading schemes. In Sweden, the financial supervisory authority Finansinspektionen, has furthermore investigated and documented such potential activities in report (2004:8) on conflicts of interest within mutual fund families.

The report (2004:8) was issued in July 2004 and details a study Finansinspektionen conducted with regards to conflicts of interest within mutual fund families. The aim of the study was to monitor potential conflicts of interest and how such exposure was handled by the mutual fund families. The sample used for the study was nine Swedish registered fund families from different size spectrums. Eight out of the nine investigated families are covered in this thesis and manage in total 129 different mutual funds, approximately 56% of the total sample. Moreover, the eight families manage approximately a sample wide mean, during the sample period, of 80% of the total net assets, which clearly evidence the relevance of the report.

The report found that, while many conflicts of interest were handled in a satisfactory fashion, many issues were still to be solved. Examples of concerns still needed to be dealt with would for instance be that the fund family places a disproportional amount of their investment funds business within affiliated firms. Other potential problems might be handling of block orders, soft commissions, and bonus and incentives programs for managers as well as multiple positions in boards, which might lead to doubtful objectivity. [10] The problem with both block orders and bonus schemes is that it might favour certain mutual funds at the expense of others. For instance, when block orders are executed they might be distributed in an unjustified fashion and allocated in a way fruitful for bonus schemes. Incentives would thus not only exist for the family, due to the convex

[10] Soft commission is the terminology used when a fund manager deliberately places orders with a broker in exchange for items or services. The problem is of transparency of the true commission cost which is ultimately borne by the investors. Block orders is the terminology used when the fund family use economies of scale to place orders for several funds account, in order to receive better discounted prices.

relationship between mutual fund flows and performance, but also for managers due to bonus schemes and performance related fee structures. The dilemma of multiple positions within boards logically exemplifies the potential for biased decisions with regards to position taking within the market. The risk is of endeavour actions purely for personal reasons, such as for instance supporting certain firms in an unjust manor at the expense of the shareholders.

As Gaspar, Massa and Matos (2004) also explored, report (2004:8) suggests there may be more hidden favouritism within the mutual fund family in the fashion of opposite trades through the market in order to cushion the price. Such trades would implicitly suggest that the family coordinates strategies in order to provide liquidity for the family member funds. Any such form of indirect cross-subsidization clearly is difficult to detect but nevertheless highly questionable with regards to maximization of the shareholder value. Moreover, there may possibly also be doubtful distribution of "knowledge" or believes within the family benefiting only certain funds. Examples of such would for instance be allocations of "hot" IPO's within the family and the purchase of emissions in more or less affiliated companies.[11] Again, such actions are disguised and hard to quantify, however, clearly a feasible tool for any attempt of cross-subsidization.

It is evidently clear that the regulatory authorities indeed posses ideas and knowledge on what sort of conflicts of interest might occur within the fund families. The problem is that such actions may not always be regulated or even easy to define. Therefore, in some sense, the law is in many aspects more on the normative side which obviously opens up for questions. Implicative throughout the law is that "sound management" activity within the mutual fund industry is abided, which as the terminology suggests is rather diffuse in nature. Even though, many actions are forbidden and proper information required to be displayed, it is ultimately the fund family which decides on how to interpret "sound management" and how to act accordingly. Such judgements are inline with what the investor and legal authority expects, however, indeed there seemingly exist strong incentives to deviate from such expectations. In this thesis, potential strategies of cross-subsidization remains in theory, well-noted, however not tested nor considered. The reason for this is poor quality of available data and a general shortage of publicly available data in order to implement such testing. As such, this paper focuses primarily on examining whether any evidence of cross-subsidization exists in the Swedish mutual fund industry and leaves the cross-subsidization strategy exploration as a mere suggestion for further research.

[11] The allocation of IPO's might be favourable due to the theory of common under-pricing among the introductory price offerings and thus positive post IPO earnings documented by Baron & Holmstrom (1980) and Baron (1980)

V. Data

Data gathering

The primary data source used in this paper is from Morningstar Sweden AB, a database which consists of 2624 survival biased mutual funds traded in Sweden as of 2005-03-18. Survival biased mutual funds implies funds that exists throughout the whole sample period. Hence, funds that seize to exist during the sample period are not within the sample, which suggests the sample is biased towards relatively high performers during the sample period. Obviously, it would have been optimal to have a survivor biased free sample, especially for the specific time period the study is conducted on, however, such data is simply not publicly available. Regardless of this problem, foremost it is perceived the average life of a mutual fund being rather long which ought to mitigate any effect on the final sample. Secondly, since cross-subsidization schemes take place shifting performance from low valuable funds to high valuable funds within the family, any effect survivorship bias has on the subsequent cross-subsidization analysis can only result in an underestimation of the true environment and therefore an acceptable barrier.

The secondary database is the Finansinspektionens database on Swedish registered mutual funds quarterly holdings for the period 2000-09-30 to 2004-12-31 and the third source of information each individual asset managers' annual financial report.

From the primary database, the yearly management fee, which is the individual yearly fund fee the asset management company require to manage the investors' assets, buy and sell fees, which are fees imposed on the purchase or sell of mutual fund shares, as well as monthly performance is extracted. Monthly performance is calculated as the change in net asset value (NAV) in the end of the month with respect to the value in the beginning of the month, where NAV is the funds total assets minus its total liabilities divided by the funds amount of shares outstanding. Furthermore, category, which is the style/peer group the individual funds are benchmarked against, is extracted. For a more detailed visual description of styles covered, please refer to Table 1 in the Appendix. Ultimately, type (e.g. Bond, equity, Balanced, Money Market or Other), for each individual fund is obtained.

Variable description

A few words ought to be said on the different variables created in the final dataset. The dataset make use of variables such as AGE, TOTAL NET ASSETS, FUND MANAGER, FUND TOTAL FEE, MONTHLY RETURN, PREMIE PENSIONS MYNDIGHETEN FUNDS and YEAR-TO-DATE RETURN.

AGE

The Age variable is the number of days each individual mutual fund has been alive at the end of each month during the period 2000-09-30 to 2004-12-31.

TOTAL NET ASSETS

The TNA variable is constructed by contacting each family within the sample. In instances when data is not received from the families, the Finansinspektionens database on mutual funds quarterly holdings is used and a linear approximation is assumed in-between any two quarters in order to get the in-between months. In circumstances when the Finansinspektionens database lack values, the highest frequency company annual financial report is investigated in order to attain the TNA's. Clearly, such proxies are only second best estimates, however, given the fact that the method is applied for all the funds and since TNA is used primarily as a control variable, it should not alter the results significantly.

FUND MANAGER

In order to obtain each individual mutual funds portfolio manager, all of the 20 mutual fund families are contacted, and subsequently the fund manager variable for each of the 232 funds over the period 2000-09-30 to 2004-12-31 is created. In instances when, for various reasons, the mutual fund manager for the specific fund cannot be retained, the highest frequency company annual financial report is examined. The database is double-checked with a fund manager database, however on the latest and primary manager, received from Morningstar Sweden AB. In case of conflicting details, the fund family's records are chosen.

FUND TOTAL FEES

For the variable, Fund Total Fees, a proxy is created which assumes that each mutual funds total fee stay constant during the whole sample period. The Fund Total Fees is calculated as follows;

$$(1) \qquad Fund\ Total\ Fees = Management\ Fee_{Yearly} + \frac{(Buy + Sell)}{7}$$

Where, the yearly management fee is the individual yearly fund fee the asset management company requires in order to manage the investors' assets and the buy and sell fees, are fees imposed on the purchase or sell of mutual fund shares. Even though the variable Fund Total Fee is a proxy for the individual funds real total fee, it is believed to be a rather good proxy for several reasons. Firstly, due to the assumption that over the sample period it is not expected, either the management fee or the buy or sell fee, of each of the mutual funds to change considerably. Secondly, it is assumed, in line with Gaspar, Massa & Matos (2004) and Sirri & Tufano (1998), that the average investment period is seven years, which is considered to be a valid investment horizon for the average investor. Thirdly, even though such length most likely deviates from the real average horizon period, it should not matter considerably since all the funds inherit the same assumption. Conclusively, even though Gaspar, Massa & Matos (2004) includes 12b-1, which is a specific fee covering distribution and marketing and deferred fees, which are fees imposed on investors selling back the share to the fund, unfortunately such data is not obtainable on the sample. Regardless, the perception is that the most important features of the Fund Total Fee variable are captured.

MONTHLY PERFORMANCE

From the primary database each mutual funds monthly performance, in percent, is obtained

PREMIE PENSIONS MYNDIGHETEN FUNDS

A list of PPM funds was obtained from PremiePensionsMyndigheten for the sample period

YEAR-TO-DATE RETURN

The YTD is calculated as the return of the fund since January of the current year in monthly returns. As an illustration, the YTD return of March for a given fund j in 2002 is calculated as;

$$(2) \qquad YTD_{2002,j}^{March} = \left(1 + YTD_{2002,j}^{January}\right) \cdot \left(1 + Monthly\ \text{Re}turn_{2002,j}^{February}\right) \cdot \left(1 + Monthly\ \text{Re}turn_{2002,j}^{March}\right) - 1$$

Sample set delimitation

Ultimately, a comment is necessary regarding delimitations applied in order to have a workable dataset which fits the purpose of this paper. As such, all funds from the primary database registered in Sweden (Coded SE) are extracted, which is a total of 496 funds. Out of these 496 funds all funds with type coded Equity are extracted, which is a total of 358 funds. Subsequently, all non-actively managed mutual funds such as index funds, 21 in total, are removed.

Since we want to be able to compare the funds, and in order to have a realistically large sample set for each category, any category with lower than 6 funds is eliminated. All in all, 13 categories are eliminated with a total of 35 funds. The choice of relevant categories, and especially the fact that the average number of funds in the different categories is high, is important since it eventually benchmarks the individual funds in the family. The categories used in this study (see Table 1 in the Appendix), is assumed as a style measure of the funds and are 12 in total. The categories are generally well diversified, with 49 funds in the largest category (Global Large Cap Equity) while 7 funds in the smallest (Japan Large Cap Equity). The average number of funds in the different categories is 19.3. The spectrum of different categories is rather wide, ranging from different capitalization, geographical area and/or business sector. Ultimately, it is interesting to note that a decisive part of the funds in the sample belong to either of the two categories, Global or Swedish Large Cap Equity (~40%). The performance of the different categories (see Table 1), generally show a negative average return during the sample period. Interestingly, and worth mentioning is that the Central & Eastern European Equity as well as Hedge Funds were the only two categories experiencing positive returns during the sample period. In retrospect, it suggests historically less perceived risky categories, such as for instance traditional equity categories, were affected to a very large extent during this period.

In an equivalent way in order to be able to draw inference from the dataset with respect to family characteristics, any family with less than 3 funds are eliminated with a total of 51 funds. Conclusively, another 19 funds are eliminated due to non existing holdings data. The final dataset consists of 232 Swedish registered equity mutual funds. The dataset is approximately 65% of the total amount of Swedish registered equity funds and 47% of all the Swedish registered funds[12] and it consists of 20 different mutual fund families with an average of 11.6 funds per family.

[12] The calculations are based on the number of funds thus, 232/358 and 232/496 respectively.

Descriptive data

In order to understand the features of the data, descriptive statistics has been performed on the mutual fund families covered. Total net assets, age, fee charged and performance over the sample period 2000-09-30—2004-12-31 is shown in Tables 2 to 6.

To start off, Table 2 in the Appendix depicts the sample set with respect to fund families investigated. As shown in Table 2, the final sample set consists of 20 different Swedish registered mutual fund families with an average of 11.6 funds per family. In total, there are 232 different mutual funds in the dataset. The largest fund family manages 36 funds while the smallest fund family manages 4 funds. It is important to bear in mind that the fund families *per se* manages most likely several more funds than shown in Table 2. For the purpose of this study, however, only the relevant funds held by the different families are shown. Moreover, Table 2 illustrates the diversity of the sample by showing the five largest families (in nr of funds) with respect to the five smallest. Clearly, the dataset is dominated by larger families, since in total the five largest families together manage 130 funds, which is approximately 56% of the total number of funds compared to only 9% (20 funds) held by the five smallest families

Total net asset

With respect to size, Table 3 in the Appendix exemplifies that the different fund families differ quite significantly from each other, which may be of importance when investigating potential cross-subsidization strategies within the families. More specifically, the mean for each specific mutual fund family, demonstrated in Table 3, reflects the total net asset sample wide mean of all the funds held within a given family across the sample period of time. The overall sample wide mean across the spectrum of all families and throughout the complete sample period is approximately 1 101 197 301 SEK. The variation of assets managed per fund between the families is striking. During the whole sample period it ranges from approximately a maximum of 43 846 695 920 SEK to a minimum of 396 555 SEK. The figures imply total net assets under management for a given mutual fund family's individual fund a given month. In terms of diversity of the sample set, Table 3 clearly exemplifies the relatively large difference between the five largest families and the five smallest. The five largest display a sample wide mean during the sample period of 2 530 355 906 SEK while the five smallest only 246 838 692 SEK. The difference in size between the various families is important since it might imply larger families have more flexibility coordinating potential cross-subsidization strategies,

Age

Concerning the age of the fund families, it is foremost crucial to understand that the term family age implies the collective age of all the individually different mutual funds within the examined families. Family age in this context should therefore not be confused with the age of the financial house, hence the mutual fund family *per se*. Table 4, outlines the individual family age as well as the overall sample age. It is interesting to note that indeed the families have a very different age structure amongst the individual mutual funds under management. The average age of all the families' funds during the sample period is 76.2 months (approximately 6 years and three months). As for size, the age range between the individual mutual funds differ quite substantially over the overall sample set, from the oldest fund being 560 months old (approximately 47 years) to the youngest fund being only a month old. Clearly, it may seem rather peculiar that a single mutual fund is almost fifty years old. However, in this case the fund most likely represents an old investment opportunity transformed during its investment lifespan to a mutual fund. Regardless, the official inception date stays the same. In terms of age diversity within the overall sample, the five youngest families displays an average age of 27 months while the five oldest an age of 128.5 months, roughly 2.5 and 10.5 years respectively.

Fee

The fee structure, being the last variable of interest, is assumed constant over the sample period and shown in Table 5. The fees in the overall sample range from a maximum individual total fund fee of 2.93% to a minimum of 0.00%. Clearly, it is implausible any fund would charge 0.00% in fees for managing assets. However, even though the total fund fee is 0.00%, it does not necessarily imply the real total fee is actually zero. It may well be the case that specific performance fees or equivalent structures are imposed, which as stated in the variable section above, is not approximated for when assuming the total fund fee measure. The average fund fee over the total sample set and sample period is 1.33%, and when exploring the diversity of the dataset, the highest 25% charging funds charged 1.78% on average compared to the 25% lowest charging only 0.70%.

Performance

With regards to the fund family performance over the sample period, Table 6, states the expected. The severe market downturn in the beginning of the millennium more than offsets the relatively good years of 2003 and 2004 for most of the mutual fund families.

VI. Hypotheses & Methodology

Hypotheses

In line with Gaspar, Massa and Matos (2004), three major hypotheses are suggested in order to test whether fund families engage in cross-subsidization or not. For the purpose of this paper we, however, suggest two additional sub-hypothesis of the H_2 strategy of cross-subsidization hypothesis. The $H_{2\text{-}ii}$ hypothesis which tests whether cross-subsidization occurs within the family and when the funds have the same manager, and the $H_{2\text{-}iii}$ hypothesis which tests whether cross-subsidization occurs within the family and when the funds are PPM funds. As such the hypotheses are,

- H_0 *: No strategy of cross-subsidization within the family*
- H_1 *: Strategy of risk sharing within the family*
- H_2 *: Strategy of cross-subsidization*
    - $H_{2\text{-}i}$ *: Strategy of cross-subsidization within the family*
    - $H_{2\text{-}ii}$ *: Strategy of cross-subsidization within the family and when the funds have the same manger*
    - $H_{2\text{-}iii}$ *: Strategy of cross-subsidization within the family and when the funds are PPM funds*

A few words ought to be said about the difference between the hypotheses above. In hypothesis H_0 for instance, there is no coordination of strategies at all within the family, which benefits certain funds at the expense of others. In hypothesis H_1 on the other hand, such strategies do exist, however, mutually benefiting high as well as low funds. In other words, high value funds for the family equally often subsidize low value funds as the reverse is true. Such a family strategy of mutual co-insurance, or in other words risk sharing, can only be considered rational risk taking. The final hypothesis is the H_2, suggesting that the family pursues coordinated strategies in order to benefit certain perceived high value funds for the family at the expense of low value funds.

It might seemingly be a fine line between the non cross-subsidization hypotheses (H_0 and H_1) and the cross-subsidization hypotheses ($H_{2\text{-}i}$, H_{2ii} *and* $H_{2\text{-}iii}$). In order to clarify this, assume that the family conducts its own research and trades on it, which seems perfectly realistic. If such information is used symmetrically and all over the spectrum of funds without exception, it clearly is considered non cross-subsidization behaviour. It might even be the case that such information is used in an asymmetric fashion, benefiting certain funds only which might be questionable *per se*, however, it does not qualify as a cross-subsidization strategy since it is not at the expense of other funds. Ultimately though, in case information is used in order to shift systematically performance from perceived low value funds for the family to perceived high value funds it is clearly qualifying as a cross-subsidization strategy and thus what is tested in this thesis.

Furthermore, within the suggested three cross-subsidization schemes (hypothesis $H_{2\text{-}i}$, H_{2ii} *and* $H_{2\text{-}iii}$) mentioned above, we, following Gaspar, Massa & Matos (2004), examine three ways such strategies would be executed. The three practices are,

- $H_{2\text{-}a}$*: Subsidization of high fee funds at the expense of low fee funds*
- $H_{2\text{-}b}$*: Subsidization of high performing funds at the expense of low performing funds*
- $H_{2\text{-}c}$*: Subsidization of young funds at the expense of old funds*

With regards to $H_{2\text{-}a}$ it ought to hold that different funds with different fee structure generate different contribution to the family. Therefore it might be feasible to suspect that cross-subsidization could be pursued among funds with different fee structures.

The second sub-hypothesis $H_{2\text{-}b}$ reflects the fact that high performing funds attribute to a larger extent to new inflows into the fund. Thus, it seems plausible that cross-subsidization might occur among funds with different performances.

Finally, hypothesis $H_{2\text{-}c}$ suggests cross-subsidization strategies might be implemented trying to benefit younger funds at the expense of older ones. The reason for such a strategy is that the convex relationship between inflows and performance among younger funds appear stronger, according to empirical research by Chevalier & Ellison (1997).

Research Methodology

In order to test the hypotheses above, the methodology suggested and used by Gaspar, Massa and Matos (2004) is applied. More specifically the methodology is as follows.

Assume, any given family. The family most likely has certain funds that are of more value to the family compared to others (e.g. higher fees, higher performers and younger funds in our case). We denote such high value funds (**H**) and the low value funds (**L**). A direct test whether the family pursues in transferring performance (e.g. cross-subsidize) from (**L**) to (**H**) is to statistically test whether the net-of-style performance difference between (**H**) and (**L**) is significantly higher within the family compared to outside the family. We therefore denote (**H**) minus (**L**) an actual pair and hence, more specifically, expect on average equation (3) below to hold whenever there is no cross-subsidization strategy within the firm,

$$(3) \qquad H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = 0$$

What (3) says is that at time t the net-of-style performance difference between fund ($\mathbf{H}_i$) and fund ($\mathbf{L}_j$), both within family x, is zero, where the net-of-style performance is calculated as,

$$(4) \qquad H^{NofS}_{i,family\ x,t} = R(H_{i,family\ x,t}) - \overline{R}(Style\ of\ H_{i,t})$$

Thus, the net-of-style performance difference (4) represent fund ($\mathbf{H}_i$)'s return at time t subtracted by the average category (e.g. style) return fund ($\mathbf{H}_i$) is found within at time t. The average category return at time t is calculated as the average return of all the funds, inside and outside of family x, which displays the same category.

Should (3) instead deviate from zero, we expect cross-subsidization to be pursued within the family. It is, however, important to keep in mind that there may be instances when (3) deviates from zero, but still no cross-subsidization strategies occur within the family. It may simply deviate for other reasons. Therefore, in order to fully assess whether cross-subsidization occurs we want to benchmark any deviation within the family with any deviation outside the family. One way of testing such a difference is to create a matched pair to compare with the actual pair. The matched pair is constructed by taking the ($\mathbf{H}_i$) fund within the family and an arbitrarily chosen (**L**) fund from another family, which we call ($\mathbf{L}_k$), (For a description of how Actual Pairs and Matched Pairs have been

created please refer to the Appendix section on the creation of Actual and Matched Pairs). In case there is a systematic statistically significant larger deviation in the actual pair compared to the matched pair, we ought to be able to suspect cross-subsidization strategies within the family. Hence, we suggest that if equation (5) below holds we perceive the family to transfer performance from their low funds (**L**) to their high funds (**H**) in a systematic fashion.

$$(5) \qquad H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} > H^{NofS}_{i,family\ x,t} - L^{NofS}_{k,family\ y,t}$$

Hence, equation (5) more specifically imply that we suspect the family channelling performance from their low funds (**L**) to their high funds (**H**) whenever, the net-of-style difference between high funds (**H**) and low funds (**L**), at time t, on average is statistically significantly higher within the family (e.g. Actual Pair) compared to in-between the family (e.g. Matched Pair).

In terms of our hypothesis outlined above, we therefore want to test (5) with regards to high fee funds compared to low fee funds, high performing funds compared to low performing funds and ultimately young funds compared to old funds each month during the sample period 2000-09-30 to 2004-12-31.

Conclusively, and as an introduction to the empirical results outlaid in the subsequent section, descriptive statistics have been performed on the High (**H**) funds and on the Low (**L**) funds. Table 7 in the Appendix, document the different characteristics of the (**H**) and (**L**) funds, when sorted with respect to the different peer groups (Total Fees, Year-To-Date Return and Age). Clearly, the (**H**) and the (**L**) funds differ significantly along the peer groups on most accounts. Interestingly, however, when sorted by Total Fees and Age, the monthly return difference between the (**H**) and the (**L**) funds is not statistically significant. It suggests there seem to be no difference in performance between high fee and low fee funds as well as between young and old funds. The results are however in line with equivalent findings reported by Gaspar, Massa and Matos (2004) on US data.

Table 8, displays the statistical difference between Actual Pairs and Matched Pairs. The results suggest there seem to be no net difference in performance between Actual Pairs and Matched Pairs under the Total Fees and Age variable. On the other hand, with regards to the last variable YTD Return, the difference in return is highly statistically significant. The result is a first indication of cross-fund subsidization within families. Studies on US data, by Gaspar, Massa and Matos (2004), document similar result except for the age variable which the authors also find statistically significant.

VII. Empirical Results

Before testing the hypothesis suggested in the previous section it is important, and perhaps necessary, to take a step back and reconnect with the purpose of this study. Recalling from the introduction, the aim of this paper is two-fold. The primary purpose is to investigate whether cross-subsidization strategies occur within Swedish mutual fund families. The secondary purpose is, if such an effect is found, to establish any economic consequence this would imply for the investor and for the mutual fund family. We commence with our first objective,

Do Swedish mutual fund families cross subsidize within the family?

Test of cross-subsidization

In order to test if equation (5), in the research methodology section above, is statistically significant, we engineer a model (Model 1), which assesses whether cross-subsidization strategies takes place within mutual fund families. More specifically, Model 1, tests whether mutual fund families *per se* engage in cross-subsidization behaviour in-between all its funds, whether families employ cross-subsidization strategies in-between its PPM funds, and ultimately whether mutual fund managers controlling several (**H**) and (**L**) funds within the family, engage in performance distorting strategies. Model 1 is as follows,

Model 1

$$H^{NofS}_{i,\,family\ x,t} - L^{NofS}_{j,\,family\ x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager | Same_Family) + \varphi(PPM | Same_family) + \eta_1(Size\ of\ the\ funds') + \eta_2(Size\ of\ the\ funds'\ families) + \eta_3(Age\ of\ the\ funds') + \eta_4(Age\ of\ the\ funds'\ families) + \varepsilon_t$$

Where, β, λ and φ are respective dummy variables testing for if there is evidence of cross-subsidization given that the funds belong to the same family, managed by the same manager or are PPM funds. More specifically, the outcome of the three respective dummy variables, when positive,

measures the statistically significantly larger difference found in Actual Pairs compared to Matched Pairs, which indicates evidence of cross-subsidization. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category), and measures the statistically significant average difference between the high and the low funds within the respective styles. Note, therefore that any statistically significant outcome of β, λ and φ occurs irrespective of the funds having the same style. Ultimately, the different η variables are control variables controlling for different family and fund characteristics. In particular, the η variables control for the sum of age and total net assets for the specific funds in the tested pair, and for the sum of age and total net assets for the specific funds respective families.

Overall Results

Table 9 outlines the first regression results, investigating whether Swedish mutual fund families engage in performance shifting behaviours. It is clear from Table 9 that the first regression analysis suggests that overall there seem to be a statistically significant difference between high (**H**) and low (**L**) funds within families with respect to Year-To-Date return. The result is significant at the 1% level and the finding implies that mutual fund families appear to be helping high (**H**) Year-To-Date return funds within the family with low (**L**) Year-To-Date return funds of 51bps monthly (6.12% yearly). More specifically, it economically suggests families seemingly shift 3.06% yearly to the benefit of high (**H**) Year-to-Date return funds.[13] Note also that this impact occurs irrespective of the pair having the same style. No similar documentation is found overall with regards to Total Fees and Age. Empirical findings on U.S. data by Gaspar, Massa & Matos (2004), documents similar results. The authors find that also U.S. mutual fund families seemingly shifts performance from low Year-To-Date return funds to high Year-To-Date funds of the extent of 28bps monthly (3.36% yearly). With respect to Total Fees and Age, on the other hand, the results indicates no cross-subsidization between funds with different age structure, however supports the hypothesis of performance shifting between funds having different fees. The extent of the subsidization found is of 6bps monthly (0.7% yearly) and is significant at the 1% level. Such preliminary findings on Swedish data, which is supported by international findings, suggest a deeper analysis of the dataset. The analysis would not only investigate further the statistically significant difference between the high (**H**) and the low (**L**) funds within the family, with respect to Year-To-Date performance, but also establish if under specific circumstances, cross-subsidization occurs for Total Fees and Age, respectively.

[13] A statistically significant difference of 51 basis points monthly implies 6.12% yearly. However, in order for the high YTD return funds to outperform the low YTD funds by 6.12% yearly, the low YTD funds must shift approximately half (3.06%) of their performance yearly.

Family characteristic specific results

From the descriptive section above, it is obvious that the dataset is relatively diversified and therefore it is natural to examine whether cross-subsidization occurs under specific circumstances. More specifically, there tend to be a relevant difference between the top 25% and bottom 25% of the mutual fund families, which may imply very different strategic behaviour with regards to the assets under management. For instance, it is plausible that the size (Nr of funds) of the mutual fund families might affect the families' behaviour. In instance of a large family, it is feasible to imagine that the family indeed has more flexibility to allocate performance across its funds and therefore incentives to act accordingly. Furthermore, size in terms of total net assets (TNA) may also positively affect fund families incentives to cross-subsidize since more assets under management provides larger market power to allocate deals, favour from block orders and pitch for "hot" IPO's. However, also a small mutual fund family may equally likely inherit the same incentives due to the fact that the family's on-going concern is very much dependent on its assets under management in order to cover fixed costs for instance in contrast to a larger fund family. It is also arguable that families with a relatively higher fee structure have reasons to shift performance from its lower fee funds in order to retrieve more assets under management and subsequently more profits. Ultimately, age of the fund families' funds could possibly induce families to more aggressively engage in cross-subsidization strategies in order to market and push their relatively new and young funds more aggressively. With background of these four relevant and distinguished family characteristics, Model 1 is applied and the results are outlined in Table 10a, 10b, 10c and 10d.

From Table 10a it is interesting to note that larger families (in terms of TNA) appear shifting performance from low (**L**) Year-To-Date return funds to high (**H**) Year-To-Date return funds. The extent of the help is of approximately 33bps monthly (3.96% yearly). The result is statistically significant at the 5% level, controlling for family and fund specifics and is in line with the overall result found in Table 9 above. It is also interesting to note that the finding is irrespective of the pair having the same style. With respect to family specific fee structure, it is evidently clear from Table 10b that families with high fee structures appear to cross-subsidize performance from low (**L**) fee funds to high (**H**) fee funds. The statistical difference between high (**H**) fee and low (**L**) fee funds within the family is of 53bps monthly (6.36% yearly). Furthermore, families with a high fee structure seemingly push high (**H**) Year-To-Date return funds at the cost of low (**L**) Year-To-Date funds by an overall statistically significant help of 65bp monthly (7.8% yearly). Both findings are highly statistically significant at the 1% level.

Age of the family's funds appear also to be a significant determinant when it comes to cross-subsidization behaviour. Table 10c, evidence that managers of relatively young families tend to favour and push high (**H**) fee funds at the cost of low (**L**) fee funds, high (**H**) Year-To-Date return funds at the cost of low (**L**) Year-To-Date funds and young (**H**) funds at the cost of old (**L**) funds within the family by an overall extent of the help being 70bps monthly (8.4% yearly), 126bps monthly (15.1% yearly) and 84bps monthly (10.0% yearly), respectively. All findings are significant at the 5% level. Moreover, Table 10c also clearly depicts old families tending to cross-subsidize high (**H**) Year-To-Date return funds at the cost of low (**L**) Year-To-Date funds of an overall helping extent of 39bps monthly (4.68% yearly). The finding is highly statistically significant at the 1% level and occurs irrespective of the pair having the same style. Ultimately, the final family characteristic being investigated is if the number of funds within the family may statistically imply any specific cross-subsidization behaviour. Table 10d clearly suggests larger families (with respect to nr of funds within the family) appear to help high (**H**) Year-To-Date return funds within the family by an extent of help being 71bps monthly (8.4% yearly), which is highly statistically significant at the 1% level and seemingly occurs irrespective of the pairs having the same style.

With regards to other studies on cross-subsidization, most noteworthy Gaspar, Massa & Matos (2004), but also Guedj & Papastakaikoudi (2004), it is interesting to note that the results found and outlined above on Swedish data is in line with international findings. Gaspar , Massa & Matos (2004) documents family size, both in terms of Total Net Assets and in number of funds, appear to significantly affect positively cross-subsidization behaviours. The authors conclude the extent of the cross-subsidization being respectively of approximately 29 and 34bps monthly and both statistically significant at the 1% level. Furthermore, the authors suggest that their documented findings of a positive statistically significant β for old families and a negative statistically significant β for young families, which is also prevalent in Table 10c on Swedish data, indicates that the established track record of old families allows them to help young funds, while in mostly young families it's the relatively old funds that the family wants to favour in an attempt to create flagship funds.

In conclusion, from the above analysis of Model 1, it seemingly exists, on several accounts, a statistically significant difference between high (**H**) and low (**L**) funds within different type of mutual fund families investigated in this paper, something which is also in line with international research. However, to fully explore this phenomenon and in order to come to terms with specifically under which external circumstances the suggested cross-subsidization strategies occurs, a second model is constructed.

Extended test of cross-subsidization

The second model, (Model 2), is constructed to test in more detail under which circumstances cross-subsidization might occur. More specifically Model 2 is engineered to answer the question whether cross-subsidization takes place regardless of the relative performance of the funds involved. Hence, we want to know whether low (**L)** funds always transfers performance to high (**H)** funds, even though the style of the low (**L**) funds (e.g. category) has performed worse than the high (**H**) funds. Thus, we need to brake up the dummy variable β and create the following model,

Model 2

$$\begin{aligned} H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = {} & \alpha + \beta_1\left(Same_family \middle| ST_RET_{High} > ST_RET_{Low}\right) + \\ & \beta_2\left(Same_family \middle| ST_RET_{High} < ST_RET_{Low}\right) + \\ & \gamma\left(Same_style\right) + \\ & \lambda\left(Same_manager \middle| Same_Family\right) + \varphi\left(PPM \middle| Same_family\right) + \\ & \eta_1\left(Size\ of\ the\ funds'\right) + \eta_2\left(Size\ of\ the\ funds'\ families\right) + \\ & \eta_3\left(Age\ of\ the\ funds'\right) + \eta_4\left(Age\ of\ the\ funds'\ families\right) + \varepsilon_t \end{aligned}$$

As in Model 1, Model 2's parameters λ and φ are respective dummy variables testing for if there is evidence of cross-subsidization given that the funds belong to the same family and managed by the same manager or are PPM funds. Also as in Model 1, the outcome of the respective dummy variables, when positive, measures the statistically significantly larger difference found in Actual Pairs compared to Matched Pairs, which indicates evidence of cross-subsidization. The γ variable takes the value of 1, as before, if both the funds belong to the same style (e.g. category), and measures the statistically significant average difference between the high (**H**) and the low (**L**) funds within the respective styles. Again, as such, any statistically significant outcome of β, λ and φ occurs irrespective of the funds having the same style and ultimately, the different η variables are control variables controlling for different family and fund characteristics. The β variable is as before a dummy variable, however, broken down into two variables, β_1 and β_2, respectively. In particular, β_1 measure the statistical discrepancy between high (**H**) and low (**L**) funds within the family (Actual Pairs) compared to between families (Matched Pairs), given that the average style/category return of the high (**H**) fund outperforms the average style/category return of the low (**L**) fund. Complementary, the parameter β_2 measure the statistical discrepancy between high (**H**) and low (**L**)

funds within the family (Actual Pairs) compared to between families (Matched Pairs), given that the average style/category return of the high (**H**) fund underperforms the average style/category return of the low (**L**) fund.. The average style/category return is calculated as the average return of all the mutual funds individual specific return within the given style/category for the given month of estimation and more specifically in general we are interested in the signs of β_1 and β_2 respectively. All in all, there are four possible outcomes/combinations of positive and negative signs of β_1 and β_2 respectively, and if significant they imply the following cross-subsidization strategy.

a) β_1 and $\beta_2 > 0$; Strong form of cross-subsidization, and suggests low (**L**) funds, with respect to the given peer group (e.g. Age, YTD and Total Fee), transfer performance to high (**H**) funds when low (**L**) funds style outperform the high (**H**) funds. However (**L**) funds also shift performance to the high (**H**) funds when the low (**L**) funds style underperforms the high (**H**) funds.

b) $\beta_1 < 0$, and $\beta_2 > 0$; Risk Sharing behaviour, and suggests the high (**H**) funds support the low (**L**) funds whenever the high (**H**) funds style outperform the low (**L**) funds. However, low (**L**) funds transfer performance to high (**H**) funds whenever the low (**L**) funds style outperforms the high (**H**) funds.

c) $\beta_1 < 0$, and $\beta_2 < 0$; Suggests a form of reverse strategy of cross subsidization, of the high (**H**) funds helping the low funds (**L**) when the high (**H**) funds style outperform the low (**L**) funds but also when the high (**H**) funds style underperforms the low (**L**) funds. It is important to note that this strategy should be considered rather as a non-cross-subsidization finding compared to evidence of the high funds supporting the low funds, since this phenomenon is neither theoretically grounded nor tested for in this thesis.

d) $\beta_1 > 0$, and $\beta_2 < 0$; Suggests the low (**L**) funds supports the high (**H**) funds whenever the style of the high (**H**) funds outperforms the style of the low (**L**) funds and conclusively the high funds (**H**) supports the low funds (**L**) funds whenever the style of the low funds (**L**) outperforms the style of the high (**H**) funds.

Ultimately in the case when no cross-subsidization occurs within the family we expect $\beta_1 = \beta_2 = 0$.

Overall Results

Table 11 presents the primary extended tests of cross-subsidization for the peer groups, Total Fees, Year-To-Date return and Age, respectively. It is interesting to note that within the peer group variable Total Fees, it appears fund families help high fee funds of approximately 26bps monthly (3.12% yearly) at the cost of low fee funds, given that the average style return of the low (**L**) fee funds outperforms the style of the high (**H**) fee funds. The result is highly statistically significant at the 1% level. Moreover, the peer group Year-To-Date return evidence fund families seemingly shifts performance from low Year-To-Date return funds to high Year-To-Date return funds, both when the low (**L**) Year-To-Date return funds style outperform and underperforms the high (**H**) Year-To-Date return funds, which indicates a strong form of cross subsidization. The results are significant at the 1% and 5% level and suggest the overall extent of the help being 47 and 31bps monthly, (5.5%) and (3.6%) yearly, respectively. The findings are also statistically significant irrespective of the fact that the pairs have the same style/category. Ultimately, Table 11 documents fund families shifting returns from old funds to young funds whenever the average style return of the young funds (**H**) outperforms the style of the old (**L**) funds. The result is statistically significant at the 10% level and suggests the extent of the help being 18bps monthly (2.1% yearly). International documentation, Gaspar, Massa & Matos (2004) on U.S. data, confirms these findings by also statistically evidence families seemingly tending to shift performance of the extent 53 to 64bps monthly (6.36% and 7.68% respectively yearly) from low fee and low Year-To-Date return funds to high fee and high Year-To-Date return funds, given that the low (**L**) funds style/category outperforms the high (**H**) funds. These results clearly suggest that the return of the style/category indeed determines under which circumstance any possible performance shifting between high (**H**) and low (**L**) funds occur. As for the ordinary tests of cross-subsidization (Table 9, 10a to 10d) we conclude by exploring under which family characteristics the findings in Table 11 are more prevalent.

Family characteristic specific results

Table 12a, 12b, 12c and 12d, portrays the extended tests of cross-subsidization for the specific family characteristics and given the average style/category return features for the respective high (**H**) and low (**L**) funds in the peer groups. It is obvious from Table 12a that larger families (TNA), seem to strategically transfer performance from low fee funds to high fee funds within the family at the extent of help being 24bps monthly (2.88% yearly), whenever the average style return of the low (**L**) fee funds outperforms the average style return of the high (**H**) fee funds. The result is statistically significant at the 5% level and occurs irrespective of the pairs having the same style.

With respect to family Fee structure, as in Table 10b, Table 12b show supporting evidence of families with higher fee structure cross subsidize performance from their low (**L**) fee funds towards their high (**H**) fee funds. More specifically, the performance shifting seemingly occurs both when the style of the high (**H**) fee funds outperforms and underperforms the style of the low (**L**) fee funds. The performance shifting is of approximately 55 and 42bps, respectively, monthly (6.60% and 5.04% yearly), and statistically significant at the 5% level. Moreover, high fee structured families appears also to transfer performance from low Year-To-Date funds to high Year-To-Date funds, both when the style return of the high (**H**) Year-To-Date funds outperforms and underperforms the style return of the low (**L**) fee funds. The results are both statistically significant at the 5% level and suggest the extent of the help being 50 and 68bps, monthly, respectively, (6.00% and 8.16% yearly).

From Table 12c it is interesting to note that it appears old fund families help their high (**H**) fee funds at the expense of low (**L**) fee funds. Seemingly, the overall extent of help amounts to 26bps monthly, (3.12% yearly), and occurs under the condition the low (**L**) fee fund's style outperform the high (**H**) fee funds. The result is statistically significant at the 5% level. Moreover, supporting the findings in Table 10c, Table 12c, evidence old families helping their high (**H**) Year-To-Date return funds at the expense of their low (**L**) Year-To-Date return funds. Overall, the help extents to 29bps monthly (3.48% yearly), is statistically significant at the 5% level and occurs under the circumstance the average return of the high (**H**) funds' style outperforms the style of the low (**L**) funds'. Interestingly, both results are irrespective of the pairs having the same style/category.

Ultimately, investigating the effect nr of funds a family has with respect to cross-subsidization strategies, Table 12d, suggests large families seemingly shift performance through all three examined cross-subsidization strategies (from low (**L**) fee to high (**H**) fee, from low (**L**) Year-To-Date return to high (**H**) Year-To-Date return and from old (**L**) funds to young (**H**) funds). Most striking is the performance shifting taking place from low (**L**) Year-To-Date return funds to high (**H**) Year-To-Date return funds. The extent of help is of 65 and 45bps monthly, (7.80% and 5.40% yearly), when the high (**H**) Year-To-Date return funds style/category outperforms and underperforms the low (**L**) Year-To-Date return funds style/category, respectively. The results are significant at the 1% and 5% level and occur irrespective of the pairs having the same style.

Clearly, the results suggest Swedish mutual fund families appear taking advantage of the investors' behaviour of chasing past returns and acts accordingly. However, before closing the argument it is appropriate to summarize the overall findings with respect to the hypothesis posed and to put the results into perspective, not the least with regards to economic meaning.

Analysis

Table 13 to 16b summarizes the findings in this paper with respect to the hypothesis posed above and both models used. Whenever the two models (Model 1 & Model 2) are coherent in their findings, the outcome of the model with the highest granularity (Model 2) is presented. Under the circumstance the models document different results, such deviation is commented. With regards to the β parameter, β_1 & β_2 are displayed respectively next to the findings for clarification purposes.

More specifically, it has been investigated whether it can be established any evidence of performance shifting behaviour within mutual fund families in Sweden, (Strategy of cross-subsidization, hypothesis H_2), contrary to the pre-assumed theory of no cross-subsidization, H_0 & H_1. The theory of cross-subsidization (H_2) is explored in three dimensions. Firstly, whether cross-subsidization occurs in the family ($H_{2\text{-}i}$), secondly whether cross-subsidization occurs within the family and when the funds have the same manager ($H_{2\text{-}ii}$) and thirdly if cross-subsidization occurs within the family in-between PPM funds ($H_{2\text{-}iii}$). Ultimately, it has been examined whether the actual cross-subsidization occurs by shifting performance from low fee funds to high fee funds ($H_{2\text{-}a}$), by shifting performance from low YTD return funds to high YTD return funds ($H_{2\text{-}b}$) and finally by shifting performance from old funds to young funds ($H_{2\text{-}c}$). The overall evidence found in the regression analysis above with respect to the hypothesis is outlined and summarized in Table 13.

Table 13 clearly suggests that overall it seems fund families cross-subsidize from low fee funds to high fee funds (significant at the 1% level) whenever the low (**L**) fee funds' style outperform the high (**H**) fee funds'. Additionally, families shift performance from low YTD funds to high YTD funds both when the style of the (**H**) funds' outperforms (significant at the 1% level) and underperforms (significant at the 5% level) the low (**L**) funds' and when the funds have the same manager (significant at the 10% level). Thirdly, it appears families also shift performance from old funds to young funds whenever the young funds (**H**) style outperforms the style of the old (**L**) ones (significant at the 10% level). No supporting evidence is found suggesting families overall shift performance from (**L**) PPM funds with respect to either, Age, YTD and Fee, towards high (**H**) funds. Moreover, the most important findings (at the 1% significance level) with regards to family specific characteristics are revealed in Tables 14a to 16b. From the summarized findings above it's therefore evidently clear that the Swedish mutual funds market seemingly experiences cross-subsidization schemes, equivalent to results on international data (e.g. the US). In conclusion, it's interesting to note that even though the signs of results found from Model 2 argue in favour of also risk-sharing strategies, no such finding has been statistically significant.

What is the economic effect of cross-subsidization

It is ultimately necessary to economically quantify and put into perspective the findings detailed in this paper, in order to fully grasp the scope and relevance of the results.

The statistically significantly higher performance gap documented in the above sections and summarized in Tables 13 to 16b, for Model 2, averages overall between 18 and 68bps monthly for β_1 & β_2. Highly statistically significant results (at the 1% level) averages between 26 and 65bps monthly. These findings suggests that overall there is a statistically significant difference between perceived highly valuable funds such as high fee, high YTD and young funds compared to perceived low valuable funds such as low fee, low YTD and old funds, within the family in contrast to in-between families. The scope of the difference is overall of approximately 2.16% to 8.16% yearly (3.12% and 7.80% for results at the 1% level). The result implies that the fund management need to shift half of the yearly amount in order for the top quarter funds to outperform the bottom quarter funds by the average amount. More specifically, assume the highest average difference as for working example. For the top 25% of the funds to outperform the bottom 25% of the funds by 8.16% yearly, it is necessary for the family to shift 4.08% yearly. Such a scale of redistribution, around 1.02% per year,[14] of the overall assets under management is indeed economically significant with background of the Swedish mutual fund industry being approximately 966 billion SEK in 2004.

Conclusively, it is appropriate to comment on the overall welfare effect of the cross-subsidization phenomenon seemingly uncovered in this paper. It is evidently clear that implicitly by shifting performance from certain mutual funds to others, some investors will benefit from other investors loss. The question of welfare effect is however more difficult to establish due to several reasons. First of all, it is ambiguous whether the aggregate effect of families' ability to shift performance is superior or inferior compared to when performance shifting do not occur. The reason is due to the difficulty of establishing the total benefit of the fund family organization and more specifically whether any such positive outcome is indirectly channelled back towards the investors through economies of scale and scope. Therefore, before any such effect is fully explored, a very limited amount of analysis can be provided in favour or disfavour of the performance shifting strategies. Ultimately, however, the fact remains that regardless of the unclear overall welfare effect, any such strategy is most likely aimed towards enhancing the family benefit instead of the ultimate investor, which clearly displays the conflict of interest plaguing the asset management industry.

[14] 1.02% is calculated as 25%*4.08%

VIII. Conclusions

Concluding Remarks

The mutual fund industry has literally exploded over the past ten years and the opportunity set of investments with regards to mutual funds, has all over the world been ever increasing. Only in Sweden has the value of the mutual fund industry been growing from SEK 297 billion in 1994 to SEK 996 billion in 2004 and the nr of mutual funds been growing immensely from 343 to 2613. With background of this increasing industry and the ongoing restructuring of the pension system from a "pay as you go" system to a "fully funded" system, it is evidently clear that the asset management profession indeed possess a significantly enhanced role for the capital market, the individual investor and the society as a whole.

Prior empirical research has however shown that the asset management industry possibly inherits a principal agent problem, in the form of conflicts of interest between the mutual fund families and the specific individual investor. The rational for the conflict is evoked through the more than often linear relationship between a mutual funds profit and assets under management and the seemingly convex relationship between fund performance and inflows. Such an environment suggests mutual fund families may deliberately shift performance from low valuable funds for the family towards high valuable funds.

This paper therefore subsequently investigates whether such a phenomenon exists within the Swedish mutual fund industry by analysing 232 different equity mutual funds from 20 different mutual fund families during the period 2000-09-30 to 2004 12-31. More specifically, it is tested whether mutual fund families shift performance from low fee funds to high fee funds, whether families shift performance from low YTD funds towards high YTD funds and ultimately whether families shift performance from old funds to young funds. The analysis is dimensioned towards exploring whether such a strategy is pursued within the family, whether the same manager manages the perceived high and low fund and whether such shifting occurs between PPM funds aimed for the Swedish pension savers. Ultimately, the analysis is deepened to explore whether the phenomenon depend on the average style return the specific fund is placed within and conclusively if individual family characteristics affects the results. The results found in this paper clearly suggest cross-subsidization seemingly occurs in Sweden amounting on average to between 1.08% and 4.08% yearly.

Further Research

Any empirical study similar or related to the written one clearly is of importance due to many reasons. Foremost, because of the welfare importance of having a highly efficient and well functioning capital market that objectively serves the best interest of the investor. Secondly, since the delegated asset management industry is ever growing and ultimately because far from extensive research has been published within the field.

This thesis places itself among the few written papers investigating the Swedish mutual fund industry and though it extensively examines the cross-subsidization phenomenon in Sweden, it far from closes the topic. On the contrary, many issues could in further research be explored, covered and added. More specifically, the following is suggested as highly relevant to deepen and consider.

Time period

The time period available for this thesis, 2000-09-30 to 2004-12-31, obviously displays a relatively profound bear market in the Swedish equity market. Clearly, such market conditions could very well affect mutual fund families and mutual fund managers' behaviour in a peculiar fashion. Preferably a longer time period and optimally a time period spanning over bear and bull market conditions would be necessary in order to fully explore any cross-subsidization behaviour. As of now, however, the period 2000-09-30 to 2004-12-31 is at most available publicly which evidence the extreme complexity in researching the field.

Fee

With regard to fees, no history of individual mutual fund fees has been obtained, nor is available publicly, at least on Swedish data. Instead in this paper, on the basis of Morningstar Sweden AB's data, a proxy has been created assuming first a calculation of total fees, equation (1), secondly that fees remain constant throughout the period of research. Clearly, such a proxy is only a second best estimate of reality; however what has been publicly available. It is not implausible to believe that mutual fund families may change fees along the life span of a fund for marketing purposes. More importantly, however, it would be interesting to investigate whether mutual fund families alter the individual fees with respect to changing market conditions. Specifically, it would be interesting for

further research to explore whether such is the case and if so, if non-static fees alter the regression results found in this paper.

Sample

Ultimately, it is important to recognize that there are currently 2624 mutual funds traded in Sweden, spanning from different asset classes, domiciles and providers. This thesis investigates 232 out of 358 equity funds domiciled in Sweden. The reason for the sample choice is of data availability, however limits the study regarding the comprehensive effect of mutual fund families on the Swedish investor. Clearly, a full scale study covering every mutual fund investment possibility is out of scope for this thesis, but would indeed serve as an important benchmark on the efficiency of the investment spectrum available in Sweden.

Cross-subsidization strategies

In conclusion, the above mentioned highlights display areas of improvement with regards to uncovering cross-subsidization practices in Sweden. Equally important however is, once evidence of cross-subsidization has been found, to investigate profoundly how such strategies ultimately are implemented. Gaspar, Massa & Matos (2004), suggest two possible ways performance may be shifted from perceived low (**L**) funds to high (**H**) funds within the family, namely, through cross trading and preferential "hot" IPO allocations. Both methods show significant in explaining part of the cross-subsidization phenomenon found in the mutual fund industry in the U.S and therefore would be interesting to explore on Swedish data as well. With regards to both cross-trading and IPO allocation, such an investigation would consist of retrieving trading data for each specific mutual fund, something which is not publicly available. A second best alternative is to create a proxy from the documented holdings data, which is publicly available. Evidence of cross-subsidization would then be supported by opposite trades between high (**H**) and low (**L**) funds and by high (**H**) funds receiving a higher proportion of positive post return IPO deals than low (**L**) funds.

Unfortunately, as of today however, such thoughts on how to uncover and establish evidence on how cross-subsidization is implemented in practice remains a theory due to poorly consistent holdings data.

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Table 1. Category nr of funds & monthly return (%) descriptive statistics over the period 2000-09-30 to 2004-12-31

	Category	Nr of funds	Nr Obs	Min	Max	Mean	Median	Std
Largest 25%	Global Large Cap Equity	49	2335	-15,70%	12,96%	-0,96%	-0,78%	5,16%
	Sweden Large Cap Equity	43	2147	-17,56%	25,18%	-0,30%	-0,41%	7,14%
	Global & Sweden Equity	31	1563	-15,07%	16,67%	-0,64%	-0,56%	5,71%
	Sweden Mid/Small Cap Equity	21	967	-29,89%	30,23%	-0,20%	0,26%	7,19%
	Europe Large Cap Equity	17	872	-17,43%	14,33%	-0,79%	-0,36%	5,11%
	Tech. Media Telecom Sector Equity	15	775	-34,48%	54,02%	-2,09%	-1,35%	11,04%
	Nordic Equity	14	727	-18,57%	14,68%	-0,37%	-0,11%	6,30%
	Central and Eastern Europe Equity	9	468	-22,41%	20,59%	1,25%	1,78%	8,41%
	Asia ex Japan Equity	9	424	-14,11%	19,93%	-0,39%	-0,69%	6,27%
	North America Large Cap Equity	9	468	-16,37%	14,37%	-1,31%	-1,35%	5,17%
Smallest 25%	Hedge funds	8	201	-5,16%	7,57%	0,48%	0,61%	1,30%
	Japan Large Cap Equity	7	364	-14,99%	17,86%	-1,14%	-1,47%	5,78%
	Total (Total Sample)	**232**	**11311**	**-34,48%**	**54,02%**	**-0,01%**	**-0,49%**	**6,21%**
	Average Nr of funds per category	19,3						
	Total (Largest 25%)	**123**	**1636**	**-17,56%**	**25,18%**	**-0,64%**	**-0,56%**	**6,00%**
	Average Nr of funds per category	41,0						
	Total (Smallest 25%)	**24**	**1607**	**-16,37%**	**17,86%**	**-0,66%**	**-1,35%**	**4,08%**
	Average Nr of funds per category	8,0						

Table 2. Fund families & Nr of funds per family

	Family	Nr of Funds
	Robur AB	36
	Nordea Fonder AB	27
Largest 25%	SEB Fonder Aktiebolag	24
	Banco Fonder AB	22
	Länsförsäkringar Fondförvaltning AB	21
	Handelsbanken Fonder AB	20
	Skandia Fonder AB	12
	Folksam Fond AB	10
	Firstnordic Fonder AB	8
	Alfred Berg Fonder AB	7
	Öhman Fonder AB	6
	Carlson Fonder	5
	Enter Fonder AB	5
	Kaupthing Fonder AB	5
	AMF Pension Fondförvaltning AB	4
	Catella Fondförvaltning AB	4
	Erik Penser Fonder AB	4
Smallest 25%	H&Q Fond i Fond	4
	HQ Fonder Sverige AB	4
	SPP Fonder AB	4
	Total (Total Sample)	**232**
	Nr of families	20
	Average Nr of funds per family	11,6
	Min	4
	Max	36
	Total (Largest 25%)	**130**
	Nr of families	5
	Average Nr of funds per family	26
	Min	21
	Max	36
	Total (Smallest 25%)	**20**
	Nr of families	5
	Average Nr of funds per family	4
	Min	4
	Max	4

Table 3. Total Net Asset descriptive statistics (SEK) for the period 2000-09-30 -- 2004-12-31

	Fund Family	Nr Obs	Min	Max	Mean	Median	Std
	Robur AB	1754	1 096 499	43 846 695 920	4 243 599 167	2 004 484 630	5 985 940 752
	AMF Pension Fondförvaltning AB	150	101 596 494	6 815 441 246	2 482 683 333	2 634 386 145	1 990 443 285
Largest 25%	SEB Fonder Aktiebolag	1212	37 385 170	21 129 825 794	2 437 549 041	977 223 404	3 522 521 253
	HQ Fonder Sverige AB	208	193 155 000	4 339 105 000	1 792 489 219	1 888 444 833	1 266 555 664
	Nordea Fonder AB	1372	973 000	16 323 821 579	1 695 458 768	210 862 449	2 867 669 469
	SPP Fonder AB	208	10 000 000	7 823 801 929	1 630 296 986	803 472 251	1 896 306 327
	Handelsbanken Fonder AB	971	13 427 138	9 956 603 808	1 341 268 767	556 980 307	2 005 255 185
	Skandia Fonder AB	624	2 848 656	3 624 624 358	960 770 033	785 695 694	821 556 547
	Catella Fondförvaltning AB	166	151 221 237	3 276 663 320	935 087 700	422 854 266	977 568 718
	Länsförsäkringar Fondförvaltning AB	1065	20 550 816	5 196 116 115	926 539 917	507 836 276	1 090 588 511
	Folksam Fond AB	520	60 343 085	2 914 131 415	621 322 508	302 391 660	690 444 506
	Carlson Fonder	259	1 144 880	2 286 461 597	593 532 275	508 452 884	568 439 780
	Erik Penser Fonder AB	111	5 413 300	1 484 300 000	401 185 215	183 592 131	421 243 921
	Alfred Berg Fonder AB	364	1 925 750	2 012 011 589	369 840 872	251 701 993	384 086 664
	Banco Fonder AB	1144	10 627 546	3 020 417 701	358 128 754	210 335 216	471 883 672
	H&Q Fond i Fond	69	24 600 000	1 674 713 878	343 632 557	125 271 761	504 492 879
	Öhman Fonder AB	312	13 276 107	907 613 647	287 830 433	246 039 532	231 555 092
Smallest 25%	Enter Fonder AB	219	14 094 818	1 486 038 000	278 840 632	145 490 008	315 291 281
	Firstnordic Fonder AB	364	396 555	1 162 178 000	225 111 378	90 137 599	236 600 701
	Kaupthing Fonder AB	260	15 312 728	423 002 126	98 778 462	61 063 577	85 429 059
	Total (Total Sample)	**11352**	**396 555**	**43 846 695 920**	**1 101 197 301**	**645 835 831**	**1 316 693 663**
	Total (Largest 25%	**4696**	**973 000**	**43 846 695 920**	**2 530 355 906**	**1 543 080 292**	**3 126 626 085**
	Total (Smallest 25%)	**1224**	**396 555**	**1 674 713 878**	**246 838 692**	**133 600 495**	**274 673 803**

Table 4. AGE Descriptive Statistics(months) for the period 2000-09-30 -- 2004-12-31

	Fund Family	Nr Obs	Min	Max	Mean	Median	Std
	H&Q Fond i Fond	2,3	1,0	20,4	10,1	9,2	5,9
	Erik Penser Fonder AB	3,6	1,0	50,7	18,8	15,0	13,4
Youngest 25%	Enter Fonder AB	7,3	1,8	61,9	33,7	33,6	16,2
	Firstnordic Fonder AB	12,0	1,4	84,0	34,1	32,3	19,8
	AMF Pension Fondförvaltning AB	4,9	1,5	73,1	38,3	36,8	19,8
	Catella Fondförvaltning AB	5,5	2,0	83,7	51,3	52,2	19,2
	SPP Fonder AB	6,9	1,6	109,2	62,3	65,5	27,9
	Kaupthing Fonder AB	8,7	21,3	130,0	65,2	61,9	25,4
	Folksam Fond AB	17,3	6,0	125,7	66,4	67,9	32,4
	Alfred Berg Fonder AB	12,1	1,7	142,7	70,6	69,7	37,7
	Öhman Fonder AB	10,4	21,6	186,7	77,4	66,3	43,0
	Länsförsäkringar Fondförvaltning AB	35,5	1,0	171,6	79,2	71,0	47,7
	Nordea Fonder AB	45,3	1,0	328,7	83,5	48,3	78,2
	Carlson Fonder	8,6	1,0	161,7	90,3	96,3	42,7
	Banco Fonder AB	38,0	1,7	255,6	100,3	83,8	65,7
	Skandia Fonder AB	20,8	22,0	201,9	119,1	124,8	46,1
	Handelsbanken Fonder AB	32,3	1,3	560,0	119,5	94,8	115,4
Oldest 25%	SEB Fonder Aktiebolag	40,3	1,7	379,1	121,7	93,0	94,9
	Robur AB	58,4	1,2	457,6	131,9	105,4	95,7
	HQ Fonder Sverige AB	6,9	35,6	218,9	150,3	171,2	54,2
	Total (Total Sample)	**377,0**	**1,0**	**560,0**	**76,2**	**69,9**	**45,1**
	Total (Youngest 25%)	**30,1**	**1,0**	**84,0**	**27,0**	**25,4**	**15,0**
	Total (Oldest 25%)	**158,6**	**1,2**	**560,0**	**128,5**	**117,8**	**81,3**

Table 5. Total Fee (%) descriptive statistics for the period 2000-09-30 -- 2004-12-31

	Fund Family	Nr Obs	Min	Max	Mean	Median	Std
	Alfred Berg Fonder AB	363	1,60%	2,50%	1,99%	1,65%	0,41%
	Banco Fonder AB	1139	1,14%	2,71%	1,86%	1,74%	0,38%
Largest 25%	Nordea Fonder AB	1360	1,00%	2,43%	1,76%	1,74%	0,28%
	H&Q Fond i Fond	65	1,64%	1,99%	1,69%	1,64%	0,12%
	HQ Fonder Sverige AB	208	1,20%	2,93%	1,63%	1,20%	0,75%
	Kaupthing Fonder AB	260	1,40%	2,00%	1,56%	1,40%	0,23%
	Handelsbanken Fonder AB	968	0,65%	2,50%	1,54%	1,60%	0,34%
	Robur AB	1751	0,84%	2,54%	1,53%	1,54%	0,21%
	SEB Fonder Aktiebolag	1208	1,10%	1,93%	1,52%	1,50%	0,21%
	Carlson Fonder	258	1,39%	1,64%	1,51%	1,50%	0,11%
	Skandia Fonder AB	624	1,40%	1,70%	1,45%	1,40%	0,11%
	Catella Fondförvaltning AB	165	1,00%	1,50%	1,44%	1,50%	0,12%
	Firstnordic Fonder AB	359	0,00%	1,64%	1,39%	1,50%	0,45%
	Öhman Fonder AB	312	0,50%	1,70%	1,18%	1,40%	0,51%
	Länsförsäkringar Fondförvaltning AB	1066	0,45%	1,90%	0,98%	0,75%	0,51%
	Enter Fonder AB	218	0,50%	1,40%	0,83%	0,75%	0,33%
	Erik Penser Fonder AB	109	0,50%	1,00%	0,83%	0,90%	0,19%
Smallest 25%	SPP Fonder AB	207	0,69%	0,99%	0,76%	0,69%	0,13%
	Folksam Fond AB	520	0,40%	0,70%	0,64%	0,70%	0,12%
	AMF Pension Fondförvaltning AB	147	0,40%	0,60%	0,41%	0,40%	0,04%
	Total (Total Sample)	**11307**	**0,00%**	**2,93%**	**1,33%**	**1,28%**	**0,28%**
	Total (Largest 25%)	**3135**	**1,00%**	**2,93%**	**1,78%**	**1,59%**	**0,39%**
	Total (Smallest 25%)	**1201**	**0,40%**	**1,40%**	**0,70%**	**0,69%**	**0,16%**

Table 6. Yearly family performance characteristics for the period 2000-09-30 -- 2004-12-31

	2000				2001				2002			
Family	**Min**	**Max**	**Mean**	**Std**	**Min**	**Max**	**Mean**	**Std**	**Min**	**Max**	**Mean**	**Std**
Alfred Berg Fonder AB	-39,91%	-7,92%	-21,24%	12,83%	-21,27%	94,36%	14,56%	53,65%	-43,80%	10,51%	-24,83%	23,00%
AMF Pension Fondförvaltning AB	-6,43%	-5,93%	-6,18%	0,35%	-8,95%	1,07%	-4,34%	5,06%	-39,65%	-26,20%	-32,77%	6,73%
Banco Fonder AB	-40,91%	3,97%	-17,17%	10,38%	-44,80%	88,91%	-12,02%	25,24%	-66,24%	9,09%	-39,99%	15,66%
Carlson Fonder	-12,17%	-6,15%	-8,83%	2,68%	-18,70%	-10,96%	-14,99%	2,97%	-37,28%	-26,04%	-32,39%	5,13%
Catella Fondförvaltning AB	-21,74%	-8,64%	-15,24%	6,55%	-14,20%	-3,65%	-9,47%	5,36%	-37,73%	-32,86%	-35,75%	2,56%
Enter Fonder AB	-25,63%	-8,12%	-14,82%	7,84%	-44,39%	-3,98%	-17,07%	18,56%	-56,50%	-33,89%	-40,74%	10,57%
Erik Penser Fonder AB	-7,06%	-7,06%	-7,06%	-	-26,72%	-26,72%	-26,72%	-	-58,24%	-0,54%	-29,39%	40,80%
Firstnordic Fonder AB	-29,08%	-5,12%	-13,20%	10,77%	-30,34%	6,86%	-10,20%	13,14%	-51,79%	-28,32%	-35,55%	7,09%
Folksam Fond AB	-33,96%	-3,18%	-13,06%	8,10%	-36,04%	-6,13%	-14,85%	8,65%	-54,54%	-24,79%	-36,42%	8,15%
H&Q Fond i Fond	-	-	-	-	-	-	-	-	-	-	-	-
Handelsbanken Fonder AB	-40,59%	-9,31%	-16,54%	6,83%	-22,45%	3,43%	-13,58%	7,13%	-49,40%	-2,49%	-32,86%	10,95%
HQ Fonder Sverige AB	-35,14%	-11,63%	-18,53%	11,17%	-19,67%	106,94%	17,44%	59,90%	-30,86%	4,62%	-15,78%	15,02%
Kaupthing Fonder AB	-54,61%	-11,75%	-31,57%	18,97%	-43,83%	14,77%	-18,36%	21,57%	-53,68%	-21,98%	-37,44%	11,82%
Länsförsäkringar Fondförvaltning AB	-34,56%	-9,18%	-17,17%	6,15%	-59,96%	3,37%	-16,99%	12,17%	-53,06%	-27,65%	-36,05%	5,15%
Nordea Fonder AB	-24,75%	-1,19%	-11,11%	5,09%	-21,67%	8,27%	-8,64%	6,39%	-45,83%	7,50%	-35,29%	11,95%
Robur AB	-42,71%	-1,67%	-13,36%	9,10%	-32,13%	62,85%	-9,12%	16,94%	-50,09%	-4,32%	-31,58%	10,47%
SEB Fonder Aktiebolag	-55,53%	-4,61%	-16,80%	11,84%	-56,25%	9,25%	-15,29%	12,45%	-49,85%	-3,24%	-34,39%	9,71%
Skandia Fonder AB	-39,67%	-4,39%	-13,28%	9,58%	-32,87%	0,05%	-14,35%	8,51%	-48,63%	-25,22%	-34,45%	6,46%
SPP Fonder AB	-13,33%	-9,90%	-11,57%	1,57%	-14,19%	-7,68%	-10,60%	2,70%	-38,16%	-28,13%	-34,92%	4,65%
Öhman Fonder AB	-38,49%	-4,31%	-15,28%	12,25%	-30,95%	-9,26%	-14,77%	8,21%	-52,97%	-29,61%	-38,53%	7,70%
Total	**-55,53%**	**3,97%**	**-14,84%**	**8,45%**	**-59,96%**	**106,94%**	**-10,49%**	**16,03%**	**-66,24%**	**10,51%**	**-33,64%**	**11,24%**

	2003				2004				2000-09-30 -- 2004-12-31			
Family	**Min**	**Max**	**Mean**	**Std**	**Min**	**Max**	**Mean**	**Std**	**Min**	**Max**	**Mean**	**Std**
Alfred Berg Fonder AB	-0,02%	46,19%	24,47%	19,21%	-1,25%	17,73%	7,19%	8,99%	-54,73%	86,79%	-6,61%	63,34%
AMF Pension Fondförvaltning AB	8,32%	30,78%	20,21%	11,29%	5,75%	23,18%	15,71%	7,68%	-30,13%	23,18%	-5,99%	24,00%
Banco Fonder AB	-3,61%	58,76%	25,45%	15,94%	-5,61%	19,53%	12,26%	7,94%	-82,69%	78,12%	-37,40%	30,69%
Carlson Fonder	6,12%	41,62%	29,27%	13,52%	2,13%	21,22%	12,77%	6,84%	-45,27%	-6,21%	-23,11%	14,70%
Catella Fondförvaltning AB	17,05%	47,63%	32,64%	15,30%	5,83%	16,84%	11,55%	4,85%	-37,41%	5,83%	-17,98%	18,04%
Enter Fonder AB	11,57%	76,51%	38,64%	27,23%	4,71%	21,04%	14,11%	6,44%	-63,16%	10,79%	-24,05%	29,58%
Erik Penser Fonder AB	2,77%	34,76%	13,87%	15,02%	5,27%	17,81%	12,09%	5,97%	-83,41%	20,25%	-0,68%	36,29%
Firstnordic Fonder AB	7,36%	31,18%	17,73%	7,18%	-10,99%	18,41%	8,42%	10,41%	-74,84%	6,79%	-26,72%	25,31%
Folksam Fond AB	4,62%	30,26%	15,15%	8,74%	0,06%	19,33%	7,09%	7,12%	-77,12%	-19,99%	-40,34%	17,00%
H&Q Fond i Fond	4,54%	7,18%	5,88%	1,32%	-11,62%	8,60%	2,03%	9,26%	-11,62%	15,03%	6,72%	12,33%
Handelsbanken Fonder AB	4,61%	41,04%	20,83%	9,89%	-7,21%	25,38%	8,15%	8,04%	-74,02%	31,22%	-31,51%	24,53%
HQ Fonder Sverige AB	5,34%	52,57%	25,61%	19,69%	3,18%	15,39%	10,31%	5,75%	-46,28%	121,09%	14,72%	73,18%
Kaupthing Fonder AB	24,96%	54,18%	35,81%	10,99%	-7,85%	16,18%	6,45%	9,39%	-79,00%	12,29%	-43,88%	37,07%
Länsförsäkringar Fondförvaltning AB	-2,80%	47,01%	15,31%	13,57%	-10,42%	29,53%	6,29%	8,40%	-80,25%	-20,16%	-44,09%	14,18%
Nordea Fonder AB	5,96%	36,12%	17,42%	9,02%	-6,60%	26,04%	7,35%	5,04%	-60,81%	68,83%	-31,58%	22,27%
Robur AB	-0,02%	54,35%	22,69%	12,76%	-9,68%	29,21%	11,50%	10,07%	-75,76%	68,83%	-19,22%	31,96%
SEB Fonder Aktiebolag	0,90%	58,68%	21,46%	14,38%	-8,17%	32,95%	11,12%	9,79%	-83,41%	48,26%	-32,57%	27,09%
Skandia Fonder AB	0,52%	34,34%	18,76%	12,18%	-3,95%	17,11%	6,97%	1,68%	-77,81%	-17,95%	-36,37%	17,93%
SPP Fonder AB	17,18%	30,38%	21,22%	6,17%	7,71%	13,26%	9,42%	3,49%	-40,75%	-24,54%	-31,68%	7,55%
Öhman Fonder AB	5,21%	34,54%	19,07%	10,09%	-8,72%	14,69%	4,00%	1,52%	-77,43%	-17,53%	-42,51%	20,33%
Total	**-3,61%**	**76,51%**	**22,08%**	**12,68%**	**-11,62%**	**32,95%**	**9,24%**	**6,93%**	**-83,41%**	**121,09%**	**-23,74%**	**27,37%**

Table 7. Characteristics of High (H) and Low (L) funds (Total Sample)

Table 7 documents specific characteristics of High (**H**) and Low (**L**) funds, with respect to Monthly Return, Total Net Assets, Total Fees and Age, respectively. Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. The sample wide mean is shown below for the high (**H**) and low (**L**) funds respectively for each variable of interest. The p-value and significance level of the hypothesis test that the two means are equal is ultimately shown.

	Total Fees				Year-To-Date Return				Age			
	High Funds	**Low Funds**	**P-Val. Diff.**	**Sig.**	**High Funds**	**Low Funds**	**P-Val. Diff.**	**Sig.**	**High Funds**	**Low Funds**	**P-Val. Diff.**	**Sig.**
Fund monthly return	-0,38%	-0,67%	0,128		0,93%	-3,17%	<0,001	***	-0,78%	-0,47%	0,109	
Fund total net assets	1 496 979 848	1 305 113 418	0,005	***	1 198 000 350	1 744 773 931	<0,001	***	434 104 982	2 710 180 530	<0,001	***
Fund total fees	1,67%	1,16%	<0,001	***	1,50%	1,40%	<0,001	***	1,53%	1,45%	<0,001	***
Fund age	82	72	<0,001	***	90	90	0,834		31	259	<0,001	***

Where *,** and *** denotes 10%, 5% and 1% significance level respectively.

Table 8. Net Difference in Performance for pairs of High and Low funds (Total Sample)

Table 8 documents the net difference of Actual Pairs and Matched Pairs, with respect to Monthly Return, Total Net Assets and Age, respectively. Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. The p-value and significance level of the hypothesis test that the two means are equal is ultimately shown.

	Actual Pairs	**Matched Pairs**	**P-Value of Difference**	**Sig.**
Total Fees	0,01%	-0,07%	0,178	
Year-To-Date	0,79%	0,37%	<0,001	***
Age	0,05%	-0,01%	0,303	

Where *,** and *** denotes 10%, 5% and 1% significanc

On the creation of actual and matched pairs

The programming language SAS 9.1 has been utilized for the creation of both the actual and the matched pairs. More specifically, the actual and matched pairs have been constructed accordingly.

Actual Pairs

Each month for the total sample set and during the total sample period, funds within the family has been sorted with respect to their highest total fee, highest Year-to-Date performance and age, respectively. The funds have been labelled as high funds, (**H**), in case they are among the top 25% with respect to its peer group, which is the family, and as low funds, (**L**), in case they belong to the bottom 25% with respect to its peer group. Note that in case of age, younger funds are labelled as high funds. Subsequently the net-of-style return has been calculated for each fund as the fund's return the specific month subtracted by the average category return for the specific month the fund is labelled. A program has been written in SAS 9.1 which for each family and each month in a matrix fashion, calculates the net-of-style difference between the within family high and low funds. Dummy variables are created for all the actual pairs with regards to family, manager, PPM and category. The actual pairs are then conclusively stacked in a column vector.

Matched Pairs

As for the actual pairs, each month for the total sample and during the total sample period, funds within the family has been sorted with respect to their highest total fee, highest Year-To-Date performance and age, respectively. High funds, labelled (**H**), are as before funds in the top 25% with regards to the specific variable of interest. Each low fund, (**L**), in the actual pair above will subsequently be removed and replaced by a randomly chosen low fund among the total set of low funds for the specific date and the variable of interest. The new low fund is labelled (**LM**) and the new pair is labelled a matched pair. More specifically, the random generator is set to choose among low funds in the specific month which does not belong to the same family as the (**H**) fund. As in the case of the actual pairs, the matched pairs are created as the net-of-style difference between the (**H**) fund and the (**LM**) fund. Dummy variables are created with respect to family, manager, PPM and category. Conclusively, the matched pairs are together with the actual pairs stacked in a column vector. In total there are 34,340 actual pairs and 7,820 matched pairs during the whole sample period.

Table 9. Model 1: Test of cross-subsidization

Table 9 depicts the overall regression results from Model 1,

$$H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager | Same_Family) + \varphi(PPM | Same_family) + \eta_1(Size\ of\ the\ funds') + \eta_2(Size\ of\ the\ funds'\ families) + \eta_3(Age\ of\ the\ funds') + \eta_4(Age\ of\ the\ funds'\ families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β, λ and φ are respective dummy variables testing for if there is cross-subsidization given that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Total fees						**Year-To-Date Return**						**Age**					
	(1)			(2)			(3)			(4)			(5)			(6)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
α	-0.002792	-2.433433		-5.78E-05	-0.099388		0.006280	4.724663		0.003139	4.326775		-0.002488	-2.386592		-0.000114	-0.181570	
β(Same_family)	0.001000	1.129566		0.000793	1.097283		0.005140	4.933863	***	0.005451	5.550756	***	0.000406	0.501749		0.000410	0.545211	
λ(Same_manager I Same_family)	-0.002895	-3.014546	***	-0.002344	-2.552620	**	0.002663	1.433369		0.002306	1.268380		-6.98E-05	-0.099466		0.000438	0.597642	
γ(Same_style	-0.000111	-0.160978		-0.000422	-0.626097		0.003100	2.481068	**	0.003259	2.587867	***	0.000127	0.239971		2.16E-05	0.040507	
φ(PPM I Same_family)	-0.000837	-0.760025		-0.001983	-1.693822	*	-0.004339	-5.017099	***	-0.004124	-4.788104	***	0.001787	1.087868		0.001346	0.906310	
Controls	**Yes**			**No**			**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.52E-13	1.464391					-1.29E-13	-1.296679					2.64E-14	0.702382				
η_2 (Size of the funds' families)	-2.70E-14	-2.423121					1.55E-14	1.336067					-2.26E-14	-3.100866				
η_3 (Age of the funds')	8.37E-08	0.945819					-1.32E-07	-1.481135					1.32E-07	1.518301				
η_4 (Age of the funds' families)	2.82E-08	2.577754					-2.11E-08	-1.597740					2.48E-08	2.736987				
Adjusted R^2	0.004690			0.001305			0.008491			0.006969			0.002744			0.000035		
N	14052			14052			14054			14054			14054			14054		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 10a. Model 1: Family Characteristics and cross-subsidization

Table 10a depicts the specific regression results from Model 1 given family characteristics concerning families by size (TNA),

$$H^{NofS}_{i,familyx,t} - L^{NofS}_{j,familyx,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager | Same_Family) + \varphi(PPM | Same_family) + \eta_1(Size of the funds') + \eta_2(Size of the funds' families) + \eta_3(Age of the funds') + \eta_4(Age of the funds' families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β, λ and φ are respective dummy variables testing for if there is cross-subsidization given that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by size (TNA)											
	Largest 25%						**Smallest 25%**					
		(1)			(2)			(3)			(4)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	-0.002483	-1.725183		0.000696	0.895765		0.004690	0.919177		0.003372	1.738534	
β(Same_family)	0.000598	0.549590		-0.000267	-0.298817		-0.004687	-1.045654		-0.003882	-1.298677	
λ(Same_manager I Same_family)	-0.001106	-1.410201		-0.001418	-1.793613	*	0.003548	0.869002		0.003470	0.856674	
γ(Same_style	0.002397	4.222626	***	0.002100	3.777568	***	-0.004983	-1.473271		-0.004632	-1.543416	
φ(PPM I Same_family)	-0.001125	-0.766651		-0.002196	-1.399440		0.001182	0.331527		0.001248	0.356339	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	7.07E-14	0.650704					-4.31E-13	-0.535798				
η_2 (Size of the funds' families)	-2.62E-14	-1.980577					3.36E-14	0.605039				
η_3 (Age of the funds')	2.09E-07	2.053119					1.57E-07	0.405640				
η_4 (Age of the funds' families)	2.57E-08	1.831292					-4.05E-08	-0.546909				
Adjusted R^2	0.009594			0.002503			-0.008523			-0.002075		
N	7890			7890			582			582		
		(5)			(6)			(7)			(8)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.004320	2.360957		0.002727	2.645063		0.012858	2.655357		0.009398	3.804496	
β(Same_family)	0.003292	2.401793	**	0.004100	3.197230	***	0.001830	0.265800		0.004782	0.755233	
λ(Same_manager I Same_family)	-0.001324	-0.579413		-0.000609	-0.257043		0.010506	1.741840	*	0.011465	1.928714	*
γ(Same_style	0.008626	3.724745	***	0.009125	3.833873	***	-0.005960	-1.444990		-0.007637	-2.001294	**
φ(PPM I Same_family)	-0.003015	-2.872270	***	-0.002116	-2.037386	**	-0.008823	-1.622297		-0.009382	-1.720780	*
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-3.66E-14	-0.335895					-5.34E-13					
η_2 (Size of the funds' families)	4.08E-14	3.195991					3.74E-14					
η_3 (Age of the funds')	-6.37E-08	-0.613293					1.18E-06					
η_4 (Age of the funds' families)	-3.68E-08	-2.360701					-2.11E-07					
Adjusted R^2	0.013367			0.005220			0.016818			0.015550		
N	7890			7890			584			584		
		(9)			(10)			(11)			(12)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.000325	-0.242596		0.001206	1.419654		0.006019	1.414968		0.003449	1.793538	
β(Same_family)	-0.000315	-0.299485		-0.000679	-0.697954		-0.007504	-1.922280	*	-0.004147	-1.292716	
λ(Same_manager I Same_family)	1.93E-05	0.029891		-0.000119	-0.184312		0.002506	1.071936		0.002695	1.176276	
γ(Same_style	-0.000149	-0.271924		-0.000220	-0.419169		-0.002049	-0.809887		-0.002533	-1.022503	
φ(PPM I Same_family)	0.002488	1.342122		0.002115	1.527715		0.005892	1.865706	*	0.006096	1.930006	*
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-1.30E-14	-0.317495					3.61E-13	0.364731				
η_2 (Size of the funds' families)	-2.56E-14	-2.991978					-6.16E-14	-0.596719				
η_3 (Age of the funds')	9.96E-08	0.909365					1.05E-06	1.739548				
η_4 (Age of the funds' families)	2.51E-08	2.309220					-1.48E-07	-1.320166				
Adjusted R^2	0.006089			0.000157			0.011103			0.000633		
N	7890			7890			584			584		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 10b. Model 1: Family Characteristics and cross-subsidization

Table 10b depicts the specific regression results from Model 1 given family characteristics concerning families by Fee,

$$H^{NofS}_{i,familyx,t} - L^{NofS}_{j,familyx,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager | Same_Family) + \varphi(PPM | Same_family) + \eta_1(Size of the funds) + \eta_2(Size of the funds' families) + \eta_3(Age of the funds) + \eta_4(Age of the funds' families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β, λ and φ are respective dummy variables testing for if there is cross-subsidization given that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by fee											
	Highest 25%						**Lowest 25%**					
		(1)			(2)			(3)			(4)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	0.000498	0.197923		0.000456	0.404747		-0.001107	-0.239734		0.001977	0.2577	
β(Same_family)	0.005341	3.360559	***	0.002750	2.064049	**	-0.001581	-0.367457		-0.003370	0.3249	
λ(Same_manager I Same_family)	-0.009549	-4.134020	***	-0.007028	-4.142161	***	0.002024	0.823928		0.002629	0.2974	
γ(Same_style	-0.000766	-0.829040		-0.001543	-1.656305	*	-0.000913	-0.412880		-0.001501	0.4882	
φ(PPM I Same_family)	-0.004330	-0.763026		0.001059	0.198802		-0.000277	-0.075761		0.000265	0.9399	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	4.46E-14	0.257381					9.56E-13	2.026325				
η_2 (Size of the funds' families)	-4.91E-14	-2.334965					-6.94E-14	-1.644944				
η_3 (Age of the funds')	4.83E-07	2.971814					5.06E-07	0.769676				
η_4 (Age of the funds' families)	-1.09E-08	-0.593702					-2.99E-08	-0.384706				
Adjusted R^2	0.014796			0.009536			0.004187			-0.001974		
N	3950			3950			722			722		
		(5)			(6)			(7)			(8)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.013653	4.577918		0.003579	2.784755		0.003122	0.721368		0.005700	2.952955	
β(Same_family)	0.006519	3.097706	***	0.007268	3.981114	***	-0.002959	-0.629530		-0.004137	-0.979637	
λ(Same_manager I Same_family)	-0.005598	-1.856522	*	0.000554	0.219140		0.013276	2.254203	**	0.012988	2.252639	**
γ(Same_style	0.002457	1.075625		0.002103	0.992293		-0.005822	-2.001581	**	-0.006200	-2.128333	**
φ(PPM I Same_family)	0.000897	0.440720		0.000246	0.127170		-0.001075	-0.251024		-0.001633	-0.405846	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	2.96E-13	1.517847					3.56E-14	0.068919				
η_2 (Size of the funds' families)	-1.46E-13	-5.326561					-3.35E-14	-0.822667				
η_3 (Age of the funds')	-1.39E-07	-0.673847					7.35E-07	1.078484				
η_4 (Age of the funds' families)	8.52E-10	0.033231					-4.42E-08	-0.554998				
Adjusted R^2	0.039032			0.007371			0.007989			0.010083		
N	3952			3952			722			722		
		(9)			(10)			(11)			(12)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.000568	-0.229303		-0.000730	-0.603558		-0.002025	-0.454147		0.001875	0.917999	
β(Same_family)	0.002233	1.325962		0.001534	1.058638		-0.004778	-0.954226		-0.006573	-1.554655	
λ(Same_manager I Same_family)	0.001112	0.720224		0.000379	0.315735		0.009121	1.544513		0.006388	1.054990	
γ(Same_style	-0.001711	-1.777509	*	-0.001388	-1.466094		-0.000803	-0.214862		0.002055	0.639890	
φ(PPM I Same_family)	0.001093	0.189904		0.004318	0.812910		0.003069	0.692138		0.003659	0.897650	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	2.53E-13	1.951117					8.58E-13	1.179653				
η_2 (Size of the funds' families)	-3.09E-15	-0.166276					-7.36E-14	-0.979445				
η_3 (Age of the funds')	3.46E-07	1.660985					1.20E-06	1.553369				
η_4 (Age of the funds' families)	-3.03E-08	-1.705138					-7.53E-08	-0.788387				
Adjusted R^2	0.001933			0.000720			0.006503			0.001801		
N	3952			3952			722			722		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 10c. Model 1: Family Characteristics and cross-subsidization

Table 10c depicts the specific regression results from Model 1 given family characteristics concerning families by Age,

$$H^{NofS}_{i,familyx,t} - L^{NofS}_{j,familyx,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager | Same_Family) + \varphi(PPM | Same_family) + \eta_1(Size of the funds) + \eta_2(Size of the funds' families) + \eta_3(Age of the funds) + \eta_4(Age of the funds' families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β, λ and φ are respective dummy variables testing for if there is cross-subsidization given that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by age											
	Youngest 25%						**Oldest 25%**					
		(1)			(2)			(3)			(4)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	-0.000542	-0.106618		0.002013	1.033508		-0.004584	-2.462289		0.000178	0.227421	
β(Same_family)	-0.003975	-0.773313		-0.006238	-1.724219	*	3.20E-05	0.027868		0.000196	0.208449	
λ(Same_manager I Same_family)	0.007016	2.094082	**	0.008260	2.372688	**	-0.001007	-1.283441		-0.001595	-1.955302	*
γ(Same_style	-0.003923	-1.422245		-0.003817	-1.574015		0.002150	3.307705	***	0.002203	3.379573	***
φ(PPM I Same_family)	-0.000834	-0.210738		0.002809	0.758195		-0.001434	-1.017722		-0.002164	-1.454221	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.09E-12	2.170334					6.02E-14	0.509570				
η_2 (Size of the funds' families)	-4.89E-14	-0.825965					-3.53E-14	-2.503862				
η_3 (Age of the funds')	6.34E-07	0.782894					1.17E-07	1.033605				
η_4 (Age of the funds' families)	-6.84E-08	-0.655044					4.83E-08	2.952199				
Adjusted R^2	0.006111			0.002099			0.012404			0.002313		
N	576			576			7366			7366		
		(5)			(6)			(7)			(8)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.004268	0.811167		0.006461	2.885467		0.005674	2.770377		0.002833	2.773134	
β(Same_family)	-0.002192	-0.394006		-0.003891	-0.948741		0.003850	2.830482	***	0.004329	3.307815	***
λ(Same_manager I Same_family)	0.012618	2.539910	**	0.012654	2.547409	**	-0.000650	-0.259670		0.000293	0.112800	
γ(Same_style	-0.008327	-2.755047	***	-0.008588	-2.815892	***	0.007474	3.092422	***	0.008016	3.208852	***
φ(PPM I Same_family)	-0.001646	-0.434175		-0.001463	-0.385327		-0.004419	-4.050523	***	-0.003295	-3.067061	***
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-1.40E-14	-0.023377					-2.18E-13	-1.866592				
η_2 (Size of the funds' families)	-3.79E-14	-0.619559					4.74E-14	3.584613				
η_3 (Age of the funds')	4.43E-07	0.585416					-1.85E-08	-0.178591				
η_4 (Age of the funds' families)	-3.47E-09	-0.032272					-4.66E-08	-2.636187				
Adjusted R^2	0.002966			0.008473			0.016110			0.005762		
N	578			578			7366			7366		
		(9)			(10)			(11)			(12)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.001280	-0.239420		0.003376	1.453989		-0.003980	-2.562603		0.000294	0.334018	
β(Same_family)	-0.004889	-0.902583		-0.007708	-1.870116	*	-0.001244	-1.128399		-0.000445	-0.435022	
λ(Same_manager I Same_family)	0.008369	2.253005	**	0.009011	2.365742	**	-5.69E-05	-0.083117		6.36E-05	0.096035	
γ(Same_style	-0.001749	-0.796132		-0.001970	-0.977802		0.000151	0.252797		0.000330	0.566014	
φ(PPM I Same_family)	0.002084	0.507541		0.003771	0.942790		0.003293	1.955234	*	0.002747	2.213986	**
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.19E-12	1.425643					-1.58E-14	-0.392092				
η_2 (Size of the funds' families)	-1.30E-13	-1.229042					-2.98E-14	-3.343522				
η_3 (Age of the funds')	1.10E-06	1.346034					8.07E-08	0.945384				
η_4 (Age of the funds' families)	-4.22E-08	-0.342815					4.74E-08	3.769012				
Adjusted R^2	0.009959			0.003205			0.009173			0.000451		
N	578			578			7366			7366		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 10d. Model 1: Family Characteristics and cross-subsidization

Table 10d depicts the specific regression results from Model 1 given family characteristics concerning families by size (nr of funds),

$$H^{NofS}_{i,familyx,t} - L^{NofS}_{j,familyx,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manage | Same_Family) + \varphi(PPM | Same_family) + \eta_1(Size of the funds) + \eta_2(Size of the funds' families) + \eta_3(Age of the funds) + \eta_4(Age of the funds' families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β, λ and φ are respective dummy variables testing for if there is cross-subsidization given that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below

	Families by number of funds											
	Largest 25%						Smallest 25%					
	(1)			(2)			(3)			(4)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	-0.006100	-4.032320		-0.001216	-1.670864		0.000105	0.016741		0.002486	1.029982	
β(Same_family)	0.001932	1.856671	*	0.002028	2.345922	**	-0.004738	-0.840055		-0.006356	-1.634049	
λ(Same_manager I Same_family)	-0.003521	-3.416862	***	-0.002640	-2.709374	***	0.003031	0.929815		0.002863	1.039769	
γ(Same_style	1.60E-05	0.019912		-0.000579	-0.746726		0.001177	0.391600		0.000655	0.252128	
φ(PPM I Same_family)	-0.002916	-1.803015	*	-0.002902	-1.666807	*	0.005696	1.155080		0.006600	1.413724	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.01E-13	0.939148					-8.84E-13	-0.810636				
η_2 (Size of the funds' families)	-3.02E-14	-2.526893					-4.11E-14	-0.336261				
η_3 (Age of the funds')	8.67E-08	0.865703					9.04E-07	1.006079				
η_4 (Age of the funds' families)	4.58E-08	3.430837					-1.45E-08	-0.104817				
Adjusted R^2	0.009522			0.002644			-0.006352			-0.002087		
N	10702			10702			448			448		
	(5)			(6)			(7)			(8)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.006081	3.073022		0.001935	2.150319		0.001586	0.263324		0.005495	2.136306	
β(Same_family)	0.007070	5.529518	***	0.007324	6.262475	***	-0.002824	-0.445360		-0.004921	-0.946359	
λ(Same_manager I Same_family)	0.001570	0.731666		0.001308	0.639517		0.003943	0.555467		0.002960	0.467293	
γ(Same_style	0.005641	3.361863	***	0.005689	3.355633	***	0.001034	0.253221		0.000828	0.211808	
φ(PPM I Same_family)	-0.003994	-3.845582	***	-0.004588	-4.377621	***	0.008233	1.296441		0.009373	1.526320	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-1.43E-13	-1.332743					8.18E-07	0.917204				
η_2 (Size of the funds' families)	1.21E-14	0.942167					-6.03E-08	-0.438921				
η_3 (Age of the funds')	-1.37E-07	-1.273053					1.33E-14	0.115789				
η_4 (Age of the funds' families)	-2.39E-08	-1.460992					-7.48E-14	-0.085337				
Adjusted R^2	0.010739			0.009073			-0.007221			-0.001032		
N	10702			10702			450			450		
	(9)			(10)			(11)			(12)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.002864	-1.714278		-0.000507	-0.592918		-0.005240	-0.951639		0.001129	0.500935	
β(Same_family)	0.001631	1.478960		0.001312	1.349553		-0.004355	-0.778861		-0.008221	-2.096954	**
λ(Same_manager I Same_family)	-0.000680	-0.920418		0.000155	0.202611		0.003245	0.465363		0.002587	0.394647	
γ(Same_style	-4.72E-05	-0.084249		-0.000231	-0.402100		0.005979	1.003202		0.005011	0.935008	
φ(PPM I Same_family)	0.001920	0.503688		0.001849	0.634340		0.004951	0.913125		0.009140	1.742384	*
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-7.66E-15	-0.106759					4.78E-13	0.399682				
η_2 (Size of the funds' families)	-2.41E-14	-2.923632					-9.60E-14	-0.776075				
η_3 (Age of the funds')	1.39E-07	1.122403					1.46E-06	1.535694				
η_4 (Age of the funds' families)	2.53E-08	2.177578					-5.66E-08	-0.387366				
Adjusted R^2	0.003718			0.000307			0.005527			0.002486		
N	10702			10702			450			450		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 11. Model 2: Extended test of cross-subsidization

Table 11 depicts the overall regression results from Model 2,

$$H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = \alpha + \beta_1\left(Same_family \middle| ST_RET_{High} > ST_RET_{Low}\right) + \beta_2\left(Same_family \middle| ST_RET_{High} < ST_RET_{Low}\right) + \gamma\left(Same_style\right) + \lambda\left(Same_manager \middle| Same_Family\right) + \varphi\left(PPM \middle| Same_family\right) + \eta_1\left(Size\ of\ the\ funds'\right) + \eta_2\left(Size\ of\ the\ funds'\ families\right) + \eta_3\left(Age\ of\ the\ funds'\right) + \eta_4\left(Age\ of\ the\ funds'\ families\right) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β_1 , β_2 , λ and φ are respective dummy variables testing for if there is cross-subsidization under the circumstance the average style return of the high fund (**H**) outperform the style of the low fund (**L**) or if the average style return of the high fund (**H**) underperforms the style of the low fund (**L**) and that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Total fees						**Year-To-Date Return**						**Age**					
	(1)			(2)			(3)			(4)			(5)			(6)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
α	-0.002879	-2.569340		-0.000374	-0.598947		0.007043	5.408325		0.003690	4.895962		-0.002415	-2.256447		-0.000183	-0.265333	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	-9.47E-05	-0.092155		-0.000269	-0.291323		0.004667	4.371968	***	0.005167	5.177891	***	0.001849	1.899017	*	0.001883	2.024857	**
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	0.002597	2.744148	***	0.002599	3.058884	***	0.003090	2.134669	**	0.003494	2.460397	**	-0.001015	-1.028242		-0.000857	-0.909367	
λ(Same_manager I Same_family)	-0.002905	-3.031032	***	-0.002427	-2.682456	***	0.003059	1.668365	*	0.002780	1.550171		-6.47E-05	-0.094756		0.000461	0.645274	
γ(Same_style	0.000965	1.011426		0.000592	0.682478		0.004458	3.184895	***	0.004735	3.314336	***	0.000459	0.527198		0.000413	0.487217	
φ(PPM I Same_family)	-0.000776	-0.702081		-0.001897	-1.629556		-0.004188	-4.829481	***	-0.003923	-4.561141	***	0.001824	1.119052		0.001413	0.959631	
Controls	**Yes**			**No**			**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.53E-13						-1.19E-13						3.31E-14					
η_2 (Size of the funds' families)	-2.55E-14						1.44E-14						-2.37E-14					
η_3 (Age of the funds')	8.18E-08						-1.91E-07						1.26E-07					
η_4 (Age of the funds' families)	2.64E-08						-1.83E-08						2.53E-08					
Adjusted R^2	0.007603			0.003960			0.007790			0.006368			0.005099			0.002570		
N	14052			14052			14054			14054			14054			14054		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 12a. Model 2: Family Characteristics and cross-subsidization

Table 12a depicts the specific regression results from Model 2 given family characteristics concerning families by size (TNA).

$$H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = \alpha + \beta_1\left(Same_family \middle| ST_RET_{High} > ST_RET_{Low}\right) + \beta_2\left(Same_family \middle| ST_RET_{High} < ST_RET_{Low}\right) + \gamma(Same_style) + \lambda\left(Same_manager \middle| Same_Family\right) + \varphi\left(PPM \middle| Same_family\right) + \eta_1(Size\ of\ the\ funds') + \eta_2(Size\ of\ the\ funds'\ families) + \eta_3(Age\ of\ the\ funds') + \eta_4(Age\ of\ the\ funds'\ families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β_1, β_2, λ and φ are respective dummy variables testing for if there is cross-subsidization under the circumstance the average style return of the high fund (**H**) outperform the style of the low fund (**L**) or if the average style return of the high fund (**H**) underperforms the style of the low fund (**L**) and that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by size (TNA)											
	Largest 25%						Smallest 25%					
		(1)			(2)			(3)			(4)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	-0.002716	-1.870997		0.000346	0.409069		0.004244	0.895828		0.003435	1.714272	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	-0.000879	-0.697524		-0.001738	-1.536454		-0.004164	-0.898390		-0.003702	-1.040101	
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	0.002397	2.061876 **		0.001831	1.747659 *		-0.004762	-0.975161		-0.004322	-1.098403	
λ(Same_manager I Same_family)	-0.001367	-1.747465 *		-0.001624	-2.073571 **		0.001379	0.333401		0.001476	0.423071	
γ(Same_style	0.003196	2.914296 ***		0.002267	2.389313 **		-0.006366	-1.691152 *		-0.005841	-1.811572 *	
φ(PPM I Same_family)	-0.000923	-0.631549		-0.001932	-1.249118		0.001706	0.442675		0.001768	0.473427	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	7.53E-14	0.694295					-4.43E-13	-0.543036				
η_2 (Size of the funds' families)	-2.37E-14	-1.811822					3.33E-14	0.600173				
η_3 (Age of the funds')	2.11E-07	2.171065					2.13E-07	0.569643				
η_4 (Age of the funds' families)	2.34E-08	1.692880					-3.91E-08	-0.532246				
Adjusted R^2	0.014573			0.008381			-0.010343			-0.003850		
N	7890			7890			582			582		
		(5)			(6)			(7)			(8)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.005390	3.013488		0.003816	3.627454		0.011223	2.337580		0.008837	3.502037	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	0.002155	1.533891		0.003259	2.508409 **		0.004667	0.684130		0.006555	1.010318	
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	0.000857	0.498909		0.001526	0.918244		0.002827	0.348619		0.004881	0.619626	
λ(Same_manager I Same_family)	-0.001013	-0.443109		-0.000212	-0.089352		0.010589	1.943149 *		0.011942	2.319062 **	
γ(Same_style	0.008912	3.603515 ***		0.009815	3.800290 ***		-0.004924	-1.170616		-0.006214	-1.652389 *	
φ(PPM I Same_family)	-0.002887	-2.735860 ***		-0.001868	-1.797737 *		-0.009862	-1.738550 *		-0.010235	-1.792741 *	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-1.31E-14	-0.120582					-4.39E-13	-0.493122				
η_2 (Size of the funds' families)	3.95E-14	3.074474					3.36E-14	0.590799				
η_3 (Age of the funds')	-1.24E-07	-1.210548					1.26E-06	2.193502				
η_4 (Age of the funds' families)	-3.30E-08	-2.102844					-2.09E-07	-2.037687				
Adjusted R^2	0.012698			0.004334			0.016402			0.015446		
N	7890			7890			584			584		
		(9)			(10)			(11)			(12)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.000576	-0.407170		0.000893	0.936354		0.004640	1.139255		0.003116	1.623245	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	0.002151	1.746474 *		0.001538	1.315516		-0.011100	-2.684863 ***		-0.008341	-2.275427 **	
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	-0.001911	-1.492839		-0.002128	-1.726114 *		-0.001398	-0.349514		0.001275	0.355320	
λ(Same_manager I Same_family)	-2.95E-05	-0.046192		-0.000250	-0.392521		0.001125	0.496895		0.001429	0.636289	
γ(Same_style	1.15E-05	0.010345		-0.000438	-0.414441		-0.005964	-1.649646 *		-0.004513	-1.473136	
φ(PPM I Same_family)	0.002283	1.247105		0.002005	1.464667		0.004116	1.367055		0.004495	1.492450	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-7.02E-15	-0.173442					4.28E-13	0.434972				
η_2 (Size of the funds' families)	-2.80E-14	-3.336523					-7.32E-14	-0.720298				
η_3 (Age of the funds')	1.33E-07	1.225819					1.08E-06	1.804681				
η_4 (Age of the funds' families)	2.51E-08	2.339249					-1.32E-07	-1.206416				
Adjusted R^2	0.013301			0.005992			0.020020			0.010325		
N	7890			7890			584			584		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 12b. Model 2: Family Characteristics and cross-subsidization

Table 12b depicts the specific regression results from Model 2 given family characteristics concerning families by fee.

$$H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = \alpha + \beta_1\left(Same_family \middle| ST_RET_{High} > ST_RET_{Low}\right) + \beta_2\left(Same_family \middle| ST_RET_{High} < ST_RET_{Low}\right) + \gamma(Same_style) + \lambda\left(Same_manager \middle| Same_Family\right) + \varphi\left(PPM \middle| Same_family\right) + \eta_1(Size\ of\ the\ funds') + \eta_2(Size\ of\ the\ funds'\ families) + \eta_3(Age\ of\ the\ funds') + \eta_4(Age\ of\ the\ funds'\ families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β_1, β_2, λ and φ are respective dummy variables testing for if there is cross-subsidization under the circumstance the average style return of the high fund (**H**) outperform the style of the low fund (**L**) or if the average style return of the high fund (**H**) underperforms the style of the low fund (**L**) and that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by fee											
	Highest 25%						**Lowest 25%**					
	Coeff.	(1) t-stat.	Sig.	Coeff.	(2) t-stat.	Sig.	Coeff.	(3) t-stat.	Sig.	Coeff.	(4) t-stat.	Sig.
Total fees												
α	0.000882	0.360929		0.000146	0.118461		-0.001149	-0.269503		0.002124	1.152135	
β_1(Same_family I $ST_RET_{High} > ST_RET_{Low}$)	0.005488	3.042387	***	0.003901	2.195629	**	-0.002846	-0.639845		-0.005341	-1.471963	
β_2(Same_family I $ST_RET_{High} < ST_RET_{Low}$)	0.004172	2.479205	**	0.002489	1.549945		-0.000362	-0.060642		-0.002208	-0.393394	
λ(Same_manager I Same_family)	-0.009305	-4.043347	***	-0.007010	-4.159894	***	0.001329	0.653147		0.000905	0.535173	
γ(Same_style	0.002652	1.913260	*	0.000817	0.605093		-0.001505	-0.548135		-0.002810	-1.248721	
φ(PPM I Same_family)	-0.003578	-0.635167		0.000816	0.153768		-0.000183	-0.041030		0.000586	0.138656	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	8.55E-14	0.501027					9.05E-13	1.865115				
η_2 (Size of the funds' families)	-4.76E-14	-2.260325					-6.74E-14	-1.558700				
η_3 (Age of the funds')	3.46E-07	2.460407					5.31E-07	0.823583				
η_4 (Age of the funds' families)	-6.45E-09	-0.341610					-3.05E-08	-0.387861				
Adjusted R^2	0.014147			0.009867			0.003937			-0.001412		
N	3950			3950			722			722		
	Coeff.	(5) t-stat.	Sig.	Coeff.	(6) t-stat.	Sig.	Coeff.	(7) t-stat.	Sig.	Coeff.	(8) t-stat.	Sig.
Year-To-Date Return												
α	0.014869	5.082792		0.004140	3.095789		0.001492	0.356228		0.005195	2.635139	
β_1(Same_family I $ST_RET_{High} > ST_RET_{Low}$)	0.004985	2.342849	**	0.006118	3.255822	***	0.000604	0.139669		-0.001257	-0.320335	
β_2(Same_family I $ST_RET_{High} < ST_RET_{Low}$)	0.006762	2.403951	**	0.007594	2.709429	***	-0.003239	-0.480074		-0.005232	-0.762229	
λ(Same_manager I Same_family)	-0.005238	-1.742589	*	0.000837	0.330423		0.011977	2.281170	**	0.010703	2.231167	**
γ(Same_style	0.004138	1.613098		0.004203	1.769071	*	-0.005680	-1.901922	*	-0.006397	-2.113270	**
φ(PPM I Same_family)	0.001136	0.558061		0.000282	0.142808		-0.002602	-0.613938		-0.002954	-0.732973	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	3.19E-13	1.636538					3.50E-14	0.067954				
η_2 (Size of the funds' families)	-1.45E-13	-5.310990					-3.96E-14	-0.969155				
η_3 (Age of the funds')	-2.26E-07	-1.131453					7.89E-07	1.161391				
η_4 (Age of the funds' families)	1.38E-09	0.054762					-3.10E-08	-0.390512				
Adjusted R^2	0.038028			0.005674			0.007496			0.008858		
N	3952			3952			722			722		
	Coeff.	(9) t-stat.	Sig.	Coeff.	(10) t-stat.	Sig.	Coeff.	(11) t-stat.	Sig.	Coeff.	(12) t-stat.	Sig.
Age												
α	-0.000127	-0.051585		-0.000374	-0.276178		-0.002018	-0.452488		0.001875	0.917358	
β_1(Same_family I $ST_RET_{High} > ST_RET_{Low}$)	0.001628	0.819176		0.000973	0.531480		-0.005714	-1.116121		-0.007606	-1.770687	*
β_2(Same_family I $ST_RET_{High} < ST_RET_{Low}$)	0.001686	0.896037		0.001110	0.650283		-0.003986	-0.729069		-0.005703	-1.191683	
λ(Same_manager I Same_family)	0.001379	0.925418		0.000605	0.526358		0.004404	0.791047		-0.000185	-0.042447	
γ(Same_style	-0.000652	-0.396004		-0.000777	-0.490290		-0.000820	-0.219607		0.002055	0.639444	
φ(PPM I Same_family)	0.001587	0.276427		0.004465	0.840277		0.003052	0.687907		0.003634	0.890136	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	2.82E-13	2.225618					8.32E-13	1.137108				
η_2 (Size of the funds' families)	-3.72E-15	-0.196567					-7.44E-14	-0.988540				
η_3 (Age of the funds')	2.72E-07	1.400107					1.20E-06	1.553984				
η_4 (Age of the funds' families)	-2.69E-08	-1.529368					-7.40E-08	-0.772246				
Adjusted R^2	0.001229			0.000146			0.005522			0.000910		
N	3952			3952			722			722		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 12c. Model 2: Family Characteristics and cross-subsidization

Table 12c depicts the specific regression results from Model 2 given family characteristics concerning families by Age.

$$H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = \alpha + \beta_1\left(Same_family \middle| ST_RET_{High} > ST_RET_{Low}\right) + \beta_2\left(Same_family \middle| ST_RET_{High} < ST_RET_{Low}\right) + \gamma(Same_style) + \lambda\left(Same_manager \middle| Same_Family\right) + \varphi\left(PPM \middle| Same_family\right) + \eta_1(Size\ of\ the\ funds') + \eta_2(Size\ of\ the\ funds'\ families) + \eta_3(Age\ of\ the\ funds') + \eta_4(Age\ of\ the\ funds'\ families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β_1, β_2, λ and φ are respective dummy variables testing for if there is cross-subsidization under the circumstance the average style return of the high fund (**H**) outperform the style of the low fund (**L**) or if the average style return of the high fund (**H**) underperforms the style of the low fund (**L**) and that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by age											
	Youngest 25%						**Oldest 25%**					
		(1)			(2)			(3)			(4)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	0.000110	0.023177		0.002369	1.164797		-0.004461	-2.424509		-6.76E-05	-0.079344	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	-0.009633	-1.787049	*	-0.012001	-2.945601	***	-0.001948	-1.446729		-0.001934	-1.609579	
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	-0.002008	-0.335347		-0.004056	-0.781663		0.002557	2.108921	**	0.002968	2.691699	***
λ(Same_manager I Same_family)	0.003981	1.463881		0.003692	1.934743	*	-0.001394	-1.776291	*	-0.001908	-2.385160	**
γ(Same_style	-0.005401	-1.705538	*	-0.005844	-2.359900	**	0.002478	2.246929	**	0.002697	2.656673	***
φ(PPM I Same_family)	-0.000399	-0.098983		0.003093	0.815548		-0.001171	-0.830395		-0.001901	-1.293400	
Controls	**Yes**			**No**			**Yes**					
η_1 (Size of the funds')	9.70E-13	1.904818					7.04E-14	0.597573				
η_2 (Size of the funds' families)	-4.10E-14	-0.687231					-3.29E-14	-2.359653				
η_3 (Age of the funds')	6.68E-07	0.858719					1.12E-07	1.032535				
η_4 (Age of the funds' families)	-7.72E-08	-0.737910					4.44E-08	2.782424				
Adjusted R^2	0.012216			0.009306			0.020319			0.011810		
N	576			576			7366			7366		
		(5)			(6)			(7)			(8)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.001342	0.276645		0.005593	2.413713		0.006377	3.177976		0.003704	3.568851	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	0.003280	0.643576		0.000115	0.029006		0.002919	2.100134	**	0.003524	2.690215	***
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	-0.001638	-0.218680		-0.004839	-0.684810		0.002241	1.273571		0.002501	1.459363	
λ(Same_manager I Same_family)	0.011746	2.632288	***	0.010373	2.510595	***	-0.000266	-0.106414		0.000796	0.306335	
γ(Same_style	-0.007345	-2.220253	**	-0.008434	-2.569467	***	0.008065	3.173004	***	0.008728	3.274612	***
φ(PPM I Same_family)	-0.003421	-0.855033		-0.003032	-0.758273		-0.004335	-3.982296	***	-0.003086	-2.882285	***
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	9.67E-14	0.158731					-2.11E-13	-1.823033				
η_2 (Size of the funds' families)	-4.99E-14	-0.851298					4.65E-14	3.494714				
η_3 (Age of the funds')	5.98E-07	0.789262					-5.44E-08	-0.527222				
η_4 (Age of the funds' families)	9.19E-09	0.087519					-4.36E-08	-2.445795				
Adjusted R^2	0.003586			0.007253			0.015103			0.004493		
N	578			578			7366			7366		
		(9)			(10)			(11)			(12)	
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.000425	-0.085470		0.003631	1.505635		-0.004185	-2.632748		-0.000160	-0.165351	
β_1(Same_family I ST_RET$_{High}$ > ST_RET$_{Low}$)	-0.009098	-1.739338	*	-0.011026	-2.624575	***	0.001432	1.123425		0.002076	1.725252	*
β_2(Same_family I ST_RET$_{High}$ < ST_RET$_{Low}$)	-0.002660	-0.464732		-0.004542	-0.858532		-0.002844	-2.089752	**	-0.001994	-1.547460	*
λ(Same_manager I Same_family)	0.006288	1.819195	*	0.006126	1.784025	*	-3.63E-05	-0.052651		9.03E-05	0.135612	
γ(Same_style	-0.005057	-1.177869		-0.006490	-1.801803	*	-0.000335	-0.280191		0.000397	0.356837	
φ(PPM I Same_family)	0.000819	0.208586		0.001951	0.508620		0.003049	1.834028	*	0.002604	2.123242	**
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.22E-12	1.532579					-9.46E-15	-0.237043				
η_2 (Size of the funds' families)	-1.33E-13	-1.293257					-3.17E-14	-3.625677				
η_3 (Age of the funds')	1.07E-06	1.325709					7.88E-08	0.928860				
η_4 (Age of the funds' families)	-4.43E-08	-0.365838					4.74E-08	3.815564				
Adjusted R^2	0.013060			0.005536			0.016131			0.006978		
N	578			578			7366			7366		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 12d. Model 2: Family Characteristics and cross-subsidization

Table 12d depicts the specific regression results from Model 2 given family characteristics concerning families by size (nr of funds).

$$H^{NofS}_{i,family\ x,t} - L^{NofS}_{j,family\ x,t} = \alpha + \beta_1\left(Same_family \middle| ST_RET_{High} > ST_RET_{Low}\right) + \beta_2\left(Same_family \middle| ST_RET_{High} < ST_RET_{Low}\right) + \gamma(Same_style) + \lambda\left(Same_manager \middle| Same_Family\right) + \varphi\left(PPM \middle| Same_family\right) + \eta_1(Size\ of\ the\ funds') + \eta_2(Size\ of\ the\ funds'\ families) + \eta_3(Age\ of\ the\ funds') + \eta_4(Age\ of\ the\ funds'\ families) + \varepsilon_t$$

Each month for the period 2000-09-30 – 2004-12-31, funds have been ranked within the family with respect to highest Total Fees, best Year-To-Date Return and youngest Age. Funds in the top 25%, to the nearest integer, have been labelled high (**H**) funds. Funds in the lowest 25%, to the nearest integer have been labelled low (**L**) funds. Actual Pairs have subsequently been constructed by, in a matrix fashion, pair the high (**H**) and low (**L**) funds within each family for each specific month and variable of interest. The Matched pairs have been created by matching the high (**H**) funds within a family and variable of interest with a randomly drawn low fund, labelled (**LM**), from the rest of the sample set, however from a different family. All the Actual Pairs and the Matched Pairs have conclusively been stacked in a column vector as the dependent variable. β_1, β_2, λ and φ are respective dummy variables testing for if there is cross-subsidization under the circumstance the average style return of the high fund (**H**) outperform the style of the low fund (**L**) or if the average style return of the high fund (**H**) underperforms the style of the low fund (**L**) and that the funds belong to the same family, managed by the same manager or are PPM funds. The γ variable takes the value of 1 if both the funds belong to the same style (e.g. category) and the different η variables are control variables controlling for different family and fund characteristics. All the regressions have been created in E-views and corrected for by the Newey-West methodology. The t-statistic and significance level is shown below.

	Families by number of funds											
	Largest 25%						**Smallest 25%**					
	(1)			(2)			(3)			(4)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Total fees												
α	-0.006329	-4.347203		-0.001880	-2.412097		-0.000683	-0.117285		0.002385	0.946817	
β_1(Same_family I $ST_RET_{High} > ST_RET_{Low}$)	0.000989	0.835254		0.001172	1.080174		-0.000844	-0.144163		-0.002798	-0.680691	
β_2(Same_family I $ST_RET_{High} < ST_RET_{Low}$)	0.003893	3.561804	***	0.004345	4.302743	***	-0.007842	-1.027720		-0.009926	-1.449217	
λ(Same_manager I Same_family)	-0.003491	-3.401281	***	-0.002696	-2.796248	***	0.000690	0.213106		-0.000883	-0.417028	
γ(Same_style	0.002198	1.917588	*	0.001904	1.819971	*	-0.000461	-0.107741		-0.001840	-0.579102	
φ(PPM I Same_family)	-0.002707	-1.677768	*	-0.002735	-1.587489		0.005133	0.996151		0.006146	1.258800	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	1.06E-13	0.985304					-8.36E-13	-0.759611				
η_2 (Size of the funds' families)	-2.84E-14	-2.374848					-4.74E-14	-0.380483				
η_3 (Age of the funds')	8.39E-08	0.900480					9.26E-07	1.032647				
η_4 (Age of the funds' families)	4.29E-08	3.239485					-5.20E-09	-0.036446				
Adjusted R^2	0.012606			0.006567			-0.004467			-0.000827		
N	10702			10702			448			448		
	(5)			(6)			(7)			(8)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Year-To-Date Return												
α	0.007025	3.597484		0.002671	2.844002		0.002110	0.360558		0.005605	2.116271	
β_1(Same_family I $ST_RET_{High} > ST_RET_{Low}$)	0.006466	4.934816	***	0.006992	5.833246	***	-0.000336	-0.062718		-0.001897	-0.422488	
β_2(Same_family I $ST_RET_{High} < ST_RET_{Low}$)	0.004460	2.532578	**	0.004896	2.894764	***	-0.011087	-1.139503		-0.012977	-1.349531	
λ(Same_manager I Same_family)	0.001878	0.884012		0.001651	0.814531		0.001929	0.350323		-0.000351	-0.082654	
γ(Same_style	0.008005	4.173804	***	0.008253	4.245858	***	-0.000225	-0.046031		-0.000893	-0.198116	
φ(PPM I Same_family)	-0.003909	-3.745734	***	-0.004381	-4.154477	***	0.008580	1.456799		0.009282	1.611868	
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	-1.27E-13	-1.184467					7.55E-07	0.845706				
η_2 (Size of the funds' families)	1.07E-14	0.826161					-5.60E-08	-0.411852				
η_3 (Age of the funds')	-2.08E-07	-1.965808					1.38E-14	0.122141				
η_4 (Age of the funds' families)	-2.02E-08	-1.226365					-9.73E-14	-0.111713				
Adjusted R^2	0.009754			0.007876			-0.001376			0.005136		
N	10702			10702			450			450		
	(9)			(10)			(11)			(12)		
	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
Age												
α	-0.002906	-1.720279		-0.000694	-0.719696		-0.005240	-0.950583		0.001129	0.500371	
β_1(Same_family I $ST_RET_{High} > ST_RET_{Low}$)	0.003828	2.892660	***	0.003475	2.862715	***	-0.004367	-0.724939		-0.008308	-1.835309	*
β_2(Same_family I $ST_RET_{High} < ST_RET_{Low}$)	-0.000283	-0.213057		-0.000336	-0.273162		-0.004345	-0.625736		-0.008146	-1.445793	
λ(Same_manager I Same_family)	-0.000680	-0.951738		0.000179	0.239068		-0.001111	-0.172694		-0.005634	-1.069477	
γ(Same_style	0.001422	1.280508		0.001058	0.985635		0.005979	1.002102		0.005011	0.933957	
φ(PPM I Same_family)	0.001878	0.497969		0.001878	0.652141		0.004952	0.927559		0.009147	1.785403	*
Controls	**Yes**			**No**			**Yes**			**No**		
η_1 (Size of the funds')	2.62E-15	0.036994					4.79E-13	0.398556				
η_2 (Size of the funds' families)	-2.60E-14	-3.175443					-9.60E-14	-0.773692				
η_3 (Age of the funds')	1.47E-07	1.220730					1.46E-06	1.528369				
η_4 (Age of the funds' families)	2.59E-08	2.254879					-5.65E-08	-0.385756				
Adjusted R^2	0.008625			0.004643			0.003267			0.000242		
N	10702			10702			450			450		

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

Table 13. Summary of overall findings of cross-subsidization (Model 1 & Model 2)

Table 13 depict the overall findings from Model 1 & Model 2 with regards to the tested hypothesis H_2, of cross-subsidization behaviour within mutual fund families.

$$\text{Model1}: \quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2}: \quad H^{NofS}_{i,family\;x,t} - L^{NofS}_{j,family\;x,t} = \alpha + \beta_1(Same_family\,|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\,|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\,|Same_Family) + \varphi(PPM\,|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

		H_2 - Strategy of cross-subsidization					
		$H_{2\text{-i}}$ Cross-subsidization within the family (β, β_1 & β_2)	Basis Points / Significance	**$H_{2\text{-ii}}$ Cross-subsidization within the family and when the funds have the same manager (λ)**	Basis Points / Significance	**$H_{2\text{-iii}}$ Cross-subsidization within the family and when the funds are PPM funds (φ)**	Basis Points / Significance
Cross-subsidization strategy	**H_a (Total Fees)**	The results suggests performance shifting from low (**L**) fee funds to high (**H**) fee funds given that the average return of the low (**L**) fee funds' style outperforms the average return of the style of the high (**H**) fee funds'	**26** (β_2)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			1%		**NSS**		**NSS**
	H_a (YTD)	The results suggests performance shifting from low (**L**) YTD funds to high (**H**) YTD funds both when the style of the low (**L**) YTD return fund outperforms and underperforms the high (**H**) YTD return ones'	**31** (β_2) ($ST_RET_{High} < ST_RET_{Low}$) **47** ($\beta_1$) ($ST_RET_{High} > ST_RET_{Low}$)	The results suggests performance shifting from low (**L**) YTD funds to high (**H**) YTD funds given that both funds have the same manager	**31**	No supporting evidence of cross-subsidization	**NSS**
			5% ($ST_RET_{High} < ST_RET_{Low}$) **1%** ($ST_RET_{High} > ST_RET_{Low}$)		**10%**		**NSS**
	H_a (Age)	The results suggests performance shifting from old (**L**) funds to young (**H**) funds given that the average return of the young funds style outperforms the average return of the style of the old ones'	**18** (β_1)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			10%		**NSS**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 14a. Summary of detailed family specific findings of cross-subsidization (Model 1 & Model 2)

Table 14a depicts family specific results from Model 1 & Model 2 with regards to the tested hypothesis $H_{2\text{-}i}$, of cross-subsidization behaviour within mutual fund families. The Family's size and its fee structure effects on performance shifting strategies are outlined below.

$$\text{Model1}: \quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2}: \quad H^{NofS}_{i,family\;\;x,t} - L^{NofS}_{j,family\;\;x,t} = \alpha + \beta_1(Same_family\;|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\;|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\;|Same_Family) + \varphi(PPM\;|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

H_2 - Strategy of cross-subsidization

$H_{2\text{-}i}$ Strategy of cross-subsidization within the family (β, β_1 & β_2)

Cross-subsidization strategy	Family by TNA (25% largest)	Basis Points Significance	Family by TNA (25% Smallest)	Basis Points Significance	Family by Fee (25% Highest)	Basis Points Significance	Family by Fee (25% Lowest)	Basis Points Significance
H_a (Total Fees)	The results suggest that larger families seemingly shift performance from low (**L**) fee funds to high (**H**) fee funds given that the average return of the style of the low (**L**) fee funds' outperforms the average style return of the high (**H**) fee funds'	**24** (β_2)	No supporting evidence of cross-subsidization	**NSS**	The results suggest that families with higher fee structure seemingly shift performance from low (**L**) fee funds to high (**H**) fee funds both when the average return of the low (**L**) fee funds' style outperforms and underperforms the average return of the style of the high (**H**) fee funds'	**42** (β_2) ($ST_RET_{High}<ST_RET_{Low}$) **55** ($\beta_1$) ($ST_RET_{High}>ST_RET_{Low}$)	No supporting evidence of cross-subsidization	**NSS**
		5%		**NSS**		**5%** ($ST_RET_{High}<ST_RET_{Low}$) **1%** ($ST_RET_{High}>ST_RET_{Low}$)		**NSS**
H_a (YTD)	Inconclusive evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	The results suggests that families with higher fee structure seemingly shift performance from low (**L**) YTD funds to high (**H**) YTD funds both when the style of the low (**L**) YTD return fund outperforms and underperforms the high (**H**) YTD return funds'	**68** (β_2) ($ST_RET_{High}<ST_RET_{Low}$) **50** ($\beta_1$) ($ST_RET_{High}>ST_RET_{Low}$)	No supporting evidence of cross-subsidization	**NSS**
		NSS		**NSS**		**5%** ($ST_RET_{High}<ST_RET_{Low}$) **5%** ($ST_RET_{High}>ST_RET_{Low}$)		**NSS**
H_a (Age)	The results suggest that larger families seemingly shift performance from old (**L**) funds to young (**H**) funds given that the average return of the style of the young (**H**) funds' outperforms the average style return of the old (**L**) funds'	**22** (β_1)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
		10%		**NSS**		**NSS**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 14b. Detailed family specific findings of cross-subsidization (Model 1 & Model 2)

Table 14b depicts family specific results from Model 1 & Model 2 with regards to the tested hypothesis $H_{2\text{-}i}$, of cross-subsidization behaviour within mutual fund families. The Family's age and its nr of funds effects on performance shifting strategies are outlined below.

$$\text{Model1}: \quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2}: \quad H^{NofS}_{i,family\;\;x,t} - L^{NofS}_{j,family\;\;x,t} = \alpha + \beta_1(Same_family\,|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\,|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\,|Same_Family) + \varphi(PPM\,|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

H_{2} - Strategy of cross-subsidization

$H_{2\text{-}i}$ Strategy of cross-subsidization within the family (β, β_1 & β_2)

Cross-subsidization strategy		Family by Age (25% youngest)	Basis Points Significance	Family by Age (25% oldest)	Basis Points Significance	Family by Nr of funds (25% largest)	Basis Points Significance	Family by Nr of funds (25% smallest)	Basis Points Significance
	H_a (Total Fees)	No supporting evidence of cross-subsidization	**NSS**	The results suggests that old families seemingly shift performance from low (**L**) fee funds to high (**H**) fee funds given that the average return of the low (**L**) fee fund outperforms the average return of the style of the high (**H**) fee funds'	**26** (β_2)	The results suggests that the largest families in terms of number of funds seemingly shift performance from low (**L**) fee funds to high (**H**) fee funds given that the low (**L**) fee funds average style return outperforms the high (**H**) fee funds'	**39** (β_2)	No supporting evidence of cross-subsidization	**NSS**
			NSS		**5%**		**1%**		**NSS**
	H_a (YTD)	No supporting evidence of cross-subsidization	**NSS**	The results suggests that old families seemingly shift performance from low (**L**) YTD funds to high (**H**) YTD funds given that the average return of the style of the high (**H**) YTD fund outperforms the style of the low (**L**) YTD funds'	**29** (β_1)	families in terms of number of funds seemingly shift performance from low (**L**) YTD funds to high (**H**) YTD funds both when the average style return of the low (**L**) funds outperform and underperform the average style of the high (**H**) funds'	**45** (β_2) ($ST_RET_{High}<ST_RET_{Low}$) **65** ($\beta$1) ($ST_RET_{High}>ST_RET_{Low}$)	No supporting evidence of cross-subsidization	**NSS**
			NSS		**5%**		**5%** ($ST_RET_{High}<ST_RET_{Low}$) **1%** ($ST_RET_{High}>ST_RET_{Low}$)		**NSS**
	H_a (Age)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	The results suggests that the largest families in terms of number of funds seemingly shift performance from old (**L**) funds to young (**H**) funds given that the average style return of the young (**H**) funds outperform the average style return of the old (**L**) funds'	**38** (β1)	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**1%**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 15a. Summary of detailed family specific findings of cross-subsidization (Model 1 & Model 2)

Table 15a depicts family specific results from Model 1 & Model 2 with regards to the tested hypothesis $H_{2\text{-ii}}$, of cross-subsidization behaviour within mutual fund families. The Family's size and its fee structure effects on performance shifting strategies are outlined below.

$$\text{Model1}: \quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2}: \quad H^{NofS}_{i,family\;\;x,t} - L^{NofS}_{j,family\;\;x,t} = \alpha + \beta_1(Same_family\,|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\,|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\,|Same_Family) + \varphi(PPM\,|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

H_2 - Strategy of cross-subsidization

$H_{2\text{-ii}}$ Strategy of cross-subsidization within the family and when the funds have the same manager (λ)

Cross-subsidization strategy	Family by TNA (25% largest)	Basis Points Significance	Family by TNA (25% Smallest)	Basis Points Significance	Family by Fee (25% Highest)	Basis Points Significance	Family by Fee (25% Lowest)	Basis Points Significance
H_a (Total Fees)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
		NSS		**NSS**		**NSS**		**NSS**
H_a (YTD)	No supporting evidence of cross-subsidization	**NSS**	The results suggests that managers of relatively small families, in terms of TNA, seemingly shift performance from low (**L**) YTD funds to high (**H**) YTD funds	**11**	No supporting evidence of cross-subsidization	**NSS**	The results suggests that managers of families with a low fee structure seemingly shift performance from low (**L**) YTD funds to high (**H**) YTD funds	**12**
		NSS		**10%**		**NSS**		**5%**
H_a (Age)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
		NSS		**NSS**		**NSS**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 15b. Detailed family specific findings of cross-subsidization (Model 1 & Model 2)

Table 15b depicts family specific results from Model 1 & Model 2 with regards to the tested hypothesis $H_{2\text{-ii}}$, of cross-subsidization behaviour within mutual fund families. The Family's age and its nr of funds effects on performance shifting strategies are outlined below.

$$\text{Model1:}\quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2:}\quad H^{NofS}_{i,family\;\;x,t} - L^{NofS}_{j,family\;\;x,t} = \alpha + \beta_1(Same_family\;|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\;|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\;|Same_Family) + \varphi(PPM\;|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

H_2 - Strategy of cross-subsidization

$H_{2\text{-ii}}$ Strategy of cross-subsidization within the family and when the funds have the same manager (λ)

Cross-subsidization strategy		Family by Age (25% youngest)	Basis Points Significance	Family by Age (25% oldest)	Basis Points Significance	Family by Nr of funds (25% largest)	Basis Points Significance	Family by Nr of funds (25% smallest)	Basis Points Significance
	H_a (Total Fees)	Incondusive evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**NSS**		**NSS**
	H_a (YTD)	The results suggests that managers of relatively young families, seemingly shift performance from low (**L**) YTD funds to high (**H**) YTD funds	**117**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			1%		**NSS**		**NSS**		**NSS**
	H_a (Age)	The results suggests that managers of relatively young families, seemingly shift performance from old (**L**) funds to young (**H**) funds	**63**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			10%		**NSS**		**NSS**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 16a. Summary of detailed family specific findings of cross-subsidization (Model 1 & Model 2)

Table 16a depicts family specific results from Model 1 & Model 2 with regards to the tested hypothesis $H_{2\text{-iii}}$, of cross-subsidization behaviour within mutual fund families. The Family's size and its fee structure effects on performance shifting strategies are outlined below

$$\text{Model1}: \quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2}: \quad H^{NofS}_{i,family\;\;x,t} - L^{NofS}_{j,family\;\;x,t} = \alpha + \beta_1(Same_family\;|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\;|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\;|Same_Family) + \varphi(PPM\;|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

H_2 - Strategy of cross-subsidization

$H_{2\text{-iii}}$ Strategy of cross-subsidization within the family and when the funds are PPM funds (φ)

Cross-subsidization strategy		Family by TNA (25% largest)	Basis Points Significance	Family by TNA (25% Smallest)	Basis Points Significance	Family by Fee (25% Highest)	Basis Points Significance	Family by Fee (25% Lowest)	Basis Points Significance
	H_a (Total Fees)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**NSS**		**NSS**
	H_a (YTD)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**NSS**		**NSS**
	H_a (Age)	No supporting evidence of cross-subsidization	**NSS**	Inconclusive evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**NSS**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 16b. Detailed family specific findings of cross-subsidization (Model 1 & Model 2)

Table 16b depicts family specific results from Model 1 & Model 2 with regards to the tested hypothesis $H_{2\text{-iii}}$, of cross-subsidization behaviour within mutual fund families. The Family's age and its nr of funds effects on performance shifting strategies are outlined below.

$$\text{Model1}: \quad H^{NofS}_{i,family\,x,t} - L^{NofS}_{j,family\,x,t} = \alpha + \beta(Same_family) + \gamma(Same_style) + \lambda(Same_manager|Same_Family) + \varphi(PPM|Same_family) + \eta_1(Size\,of\,the\,funds') + \eta_2(Size\,of\,the\,funds'\,families) + \eta_3(Age\,of\,the\,funds') + \eta_4(Age\,of\,the\,funds'\,families) + \varepsilon_t$$

$$\text{Model 2}: \quad H^{NofS}_{i,family\;\;x,t} - L^{NofS}_{j,family\;\;x,t} = \alpha + \beta_1(Same_family\;|ST_RET_{High} > ST_RET_{Low}) + \beta_2(Same_family\;|ST_RET_{High} < ST_RET_{Low}) + \gamma(Same_style) + \lambda(Same_manager\;|Same_Family) + \varphi(PPM\;|Same_family) + \eta_1(Size\;of\;the\;funds') + \eta_2(Size\;of\;the\;funds'\;families) + \eta_3(Age\;of\;the\;funds') + \eta_4(Age\;of\;the\;funds'\;families) + \varepsilon_t$$

H_2 - Strategy of cross-subsidization

$H_{2\text{-iii}}$ Strategy of cross-subsidization within the family and when the funds are PPM funds (φ)

Cross-subsidization strategy		Family by Age (25% youngest)	Basis Points Significance	Family by Age (25% oldest)	Basis Points Significance	Family by Nr of funds (25% largest)	Basis Points Significance	Family by Nr of funds (25% smallest)	Basis Points Significance
	H_a (Total Fees)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**NSS**		**NSS**
	H_a (YTD)	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**NSS**		**NSS**		**NSS**
	H_a (Age)	No supporting evidence of cross-subsidization	**NSS**	The results suggests that old families seemingly shift performance from old (**L**) PPM funds to young (**H**) PPM funds	**30**	No supporting evidence of cross-subsidization	**NSS**	No supporting evidence of cross-subsidization	**NSS**
			NSS		**10%**		**NSS**		**NSS**

Where*,** and *** denotes 10%, 5% and 1% significance level respectively

NSS means No Sense Showing

Table 17. List of abbreviations and explanations

The below list explains shortly any abbreviation or terminology commonly used throughout the paper. The page nr where the abbreviation or terminology is first encountered in the paper is provided.

Abbreviation/Terminology	Page Nr	Explanation
Pay as you go pension system	3	The current in use pension system where younger generations fund today's pensioners
Fully funded pension system	3	The suggested future pension system where each individual to a large extent fund his or her own future pension
Mutual Fund Family	3	Refers to an asset manager, bank or financial institution supplying the market with several mutual funds
Cross-subsidization	4	Refers to the phenomenon when the mutual fund family deliberately acts to enhance the return of certain funds at the expense of others
CAGR	8	Cumulative Annual Growth Rate
Soft Commission	11	Refers to when a fund manager deliberately places an order with a broker in exchange for items or services
Block order	11	Refers to when a fund family use economies of scale to place orders for several fund accounts, in order to receive better discounted prices
IPO	12	Introductory Price Offering for a company going public
TNA	14	Refers to a funds total assets subtracted by its total liabilities. (NAV price is usually used as the value of each share in the fund)
YTD	15	Year-To-Date Return as calculated from the beginning of January a given year
12b-1 fee	15	An annual charge assessed to shareholders in order to pay for distribution, marketing, advertising and distribution costs
Deferred fee	15	Also called sales charge, is a fee that is imposed when you sell back the share to the fund
NofS	21	Refers to a funds return any given month adjusted for the average return of the category (e.g. style) the fund is placed within