Stockholm School of Economics
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Does the Swedish premium pension provide the right incentives to its stakeholders?

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Abstract:
This thesis specifically aims to investigate the Swedish Premium Pension system. An overview of the characteristics of the system and of the changes that have been made to the system during the last 10 years will be provided. Afterwards specifics of the system like the fee rebate (i.e. discount on the fees) and attentiveness of pension investors will be investigated. The effects of the fee rebates on fund managers and on the observed and true returns after and before costs for pension investors are estimated. Fund managers respond to the rebates by opening many smaller funds (less than 1 billion SEK) to avoid higher rebates. The rebates are beneficial for the pension investors, but they still participate in a zero sum game and should not expect to generate any positive alphas. The value weighted returns even indicate that pension investors have lower returns than retail investors, despite the rebates. Pension investors also exhibit inattentiveness compared to retail investors. Pension investors weakly chase positive performance but hardly react to negative performance. Both to positive as to negative returns, retail investors react more strongly. Based on these findings, several changes to the Premium Pension are suggested that could improve the functioning of the system for its stakeholders.

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1. Introduction

On 11 October 2011 Mercer published its Global Pension Index[1]. Mercer started its annual publication with the following introduction:

> *"The provision of financial security in retirement is critical for both individuals and societies as most countries are now grappling with the social and economic effects of ageing populations. Yet, a comparison of the diverse retirement income systems around the world is not straightforward. As the OECD (2011) notes: "retirement-income systems are diverse and often involve a number of different programmes. Classifying pension systems and different retirement-income schemes is consequentially difficult."*
>
> *Furthermore, comparing these systems is certain to be controversial as every system has evolved from each country's particular economic, social, cultural, political and historical circumstances. There is no perfect system that can be applied universally around the world."*

The text above indicates that current demographic changes in the world force governments to adapt their retirement systems. History also had its impact in making these systems what they currently are. In Sweden measures to adapt to the pension system to the ageing society have been taken back in 2000.

Mercer ranks the Swedish system as the fourth system worldwide. The Swedish system received a grade of B. Mercer describes the systems of countries ranked with a B as "*systems that have a sound structure, with many good features, but some areas for improvement that differentiate it from an A-grade system*[2]*"*.

1.1 Goal

The goal of this thesis is to take a closer look at certain aspects of the Swedish pension system in order to assess (from an empirical perspective) which areas are well designed and where there is still room for improvement. In contrary to Mercer's Pension Index this study will focus purely on the Swedish Premium Pension system. The areas that will be assessed include the fee rebate system (this concerns a discount premium pension participants receive on the fees of ordinary retail investors) and investor (in)attentiveness.

1.2 Approach

The approach of this thesis is different from the usual approach. To properly investigate the PPM first of all a description of the system is required. This description will include a section on the properties of the system, including various statistics, and a section specifically concerning the fee

[1] The full results and methodology for the index can be found at http://www.mercer.com/articles/1359260.
[2] An A grade system is described as a system a first class and robust retirement income system that delivers good benefits, is sustainable and has a high level of integrity. No system has received an A grade.

rebate system. This description is required to obtain a thorough understanding of the PPM and to be able to assess the findings and suggestion in the consequent empirical sections. The first part is hence a literature study used to properly describe the system and to highlight the changes it underwent.

The description of the system will be followed by a description of the data in section 4. In that section many assumptions, difficulties and approaches will be clarified.

Finally in section 5 to 7 I will look at specific parts of the system from an empirical perspective. Those parts are respectively the effects of fee rebates on fund managers, the effects of fee rebates on PPM participants and a comparison of retail and pension investor attentiveness. The analyses that need to be done for each of these sections are different. Therefore each topic is assigned a specific section about previous research, methodology and results. Each topic will be finished by a sub section called concluding remarks. In those sections the most important findings of the topic are highlighted. The tables with the results of each section can be found at the end of each section. The presentation of the results in the tables will always be in line with the way such results are presented in literature. As a consequence the presentation of results in this thesis is inconsistent. However, this method allows easier comparison to the existing literature and is therefore preferred. To properly interpret the results in the tables, it is hence advised to carefully read the captions. When referred to significance throughout this thesis a level of 5% is applied.

In section 8 this thesis will be concluded. The goal of this section is to recap shortly the most significant findings of this study. Those findings will be related to practical solutions which should improve the functionality of the Premium Pension. Section 9 will finally include a discussion of the validity of this thesis and suggestions for future research.

In this thesis the Premium Pension system will be referred to from here on as PPM. This stems from Premium Pension Myndigheten (Premium Pension Agency), the term commonly used in Sweden. When referring to Pension Investors, PPM participants or PPM investors I refer to the same group of persons. These are all the persons that participate and invest within the Swedish Premium Pension system.

2. Characteristics of the Swedish Pension System

In September 2000 the Swedish Government initiated its new pension system. The system should solve the problems of the old pension system. The old system was, as used to be common in European welfare states, a defined benefit (DB) system[3]. The problems of the former DB system were among others the (over)sensitivity to economic growth, the unsystematic and inequitable distribution of contributions and benefits, the erosion of the principle of compensation for loss of income and labour market distortions (Sundén, 2000).

The new system of Notional Defined Contribution[4] accounts supplemented by mandatory funded individual retirement accounts, leaves Sweden better positioned to confront the age wave than most European countries (Capretta and Jackson, 2007). Notwithstanding the view of Capretta and Jackson and the wide political support the system enjoyed, the setup of the system lead to much discussion.

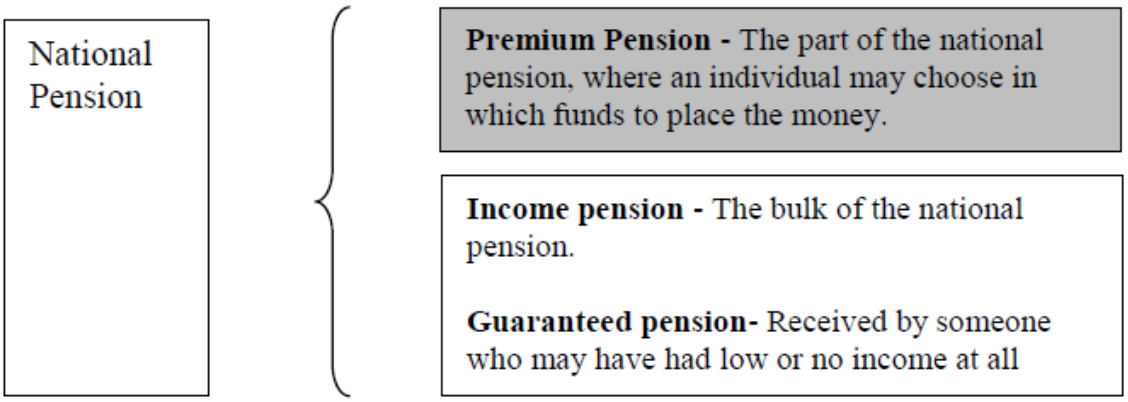

Figure 1: Schematic overview of the Swedish pension system (picture adapted from Jacobson and Lundgren).

In this thesis the focus is on the Swedish Premium Pension system. The PPM system is the smaller part of the pension system and consists of individual funded accounts. The income pension is a defined contribution scheme with a contribution rate of 18.5 percent: 16 percent of earnings will be credited to a notional account and the remaining 2.5 percent will be contributed to an individual account (Sundén, 2000). The Premium Pension Myndigheten administers these individual funded accounts.

As Cronqvist and Thaler (2004) state: the combination of free entry, unfettered competition, and free choice seems hard to quarrel with. However, if participants are not well informed or highly motivated, then maximizing choice may not lead to the best possible outcome. Sundén (2004)

[3] A retirement plan in which a retired employee receives a specific amount based on salary history and years of service, and in which the employer bears the investment risk. The employees knows in advance which amount of retirement they will receive.

[4] A retirement plan in which the employee elects to defer some amount of his/her salary into the plan and bears the investment risk. An employee does not know in advance which amount of retirement he will receive.

corroborates their opinion by mentioning that information and education are clearly important components of the Premium Pension. It is equally important to consider how the design can be modified to make it easier for participants. Participants' investment choices during the first four years clearly show that the number of options are overwhelming[5].

Cronqvist and Thaler (2004) sum up the main characteristics of the system as follows:

1. Participants were allowed to form their own portfolios by selecting up to five funds from an approved list.
2. One fund, the AP7 Sparfonden, was chosen to be a "default" fund for anyone who, for whatever reason, did not make an active choice.
3. Participants were encouraged to actively choose their own portfolios.
4. Both balances and future contributions can be changed at any time, but unless some action is taken, the initial allocation determines future contribution flows.
5. Any fund meeting certain fiduciary standards was allowed to enter the system. As a result of this process, there were 456 funds to choose from at the inception.
6. Information about the funds, including fees, past performance, and risk, was provided in book form to all participants (and not much later also on-line).
7. Funds set their own fees (except for the fees of the AP7 fund, which were negotiated with the government). The PPM tallies rebates on the feed set by the funds though.
8. Funds (except for the default fund) were permitted to advertise to attract money.
9. Sundén (2000) adds that there is a guarantee pension offered. The purpose of the guarantee pension is to ensure income security at old age. Weaver (2003) notes that the guarantee pension furthermore performs the redistributive functions carried out by the flat-rate pension and pension supplement under the old Swedish pension system. It diminishes the difference in income between high and low earning persons.

The fact that these funds were managed centrally had a number of consequences:

- The administrative costs were kept low; costs per trade are for example only 100 SEK.
- Participating funds do not have clients but received the investments as a lump sum.
- Funds that wanted to participate to the PPM system needed to comply to the rules of the Pension Authority concerning fees, reporting requirements, and information provision to the PPM participants. No entry or exit fee is required.
- The participating funds need to allow for a rebate on its normal fees, since the PPM took over many of the administrative functions.

[5] The amount of funds that could be selected increased from 456 at inception in September 2000 to 681 in Decemeber 2004.

Since the introduction of the system various changes to the system have been suggested. Some of those have been implemented. De facto, in the summer of 2004, the government appointed a commission to examine the Premium Pension and to suggest changes that should be made to the current setup (Sundén, 2004). This committee, led by Hammarkvist, came to the conclusion that the mandatory system of individual accounts works well and is reasonably cost-effective but that there is room for further simplification and cost reduction. The committee suggested among others the following amendments[6]:

- Assist PPM participants to compose a well diversified fund portfolio with low costs
- Reduce administrative costs charged by mutual funds
- Reduce the number of mutual funds offered to participants
- Transform the government's default fund into a generation (life-cycle) fund
- Consolidate pension administration

Most of the above suggestions have been implemented by now. Among others, in May 2010 AP7 Sparfonden[7] was discontinued and its assets transferred to the new state managed default alternative AP7 Såfa. The former default fund was a pure equity fund and could not be actively selected. As suggested by the Premium Pension Committee, the new AP7 fund is a generation fund[8]. Individuals are invested 150% in equities (through the use of derivatives) until they reach the age of 55 after which they will be gradually moved into fixed income investments. Some other aspects are that the fund can finally be actively chosen, an investor can only invest all his savings into the fund and the fees are among the lowest in the system (i.e. 0.15%).

The administrative costs of funds have also been reduced by changing the rules for calculating the rebates which allow less free cost withdrawal (see section 3.2) and since 2010 the PPM is part of the Swedish Pension Agency.

The only striking difference between the suggested changes and current situation is the amount of available funds which equals 799 during February 2011. A reduction of the number of mutual funds clearly has never taken place.

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[6] An extended summary of the report Difficult waters? Premium pension savings on course can be found at: http://www.regeringen.se/content/1/c6/05/19/48/72712aef.pdf

[7] The Premium Savings Fund (Sparfonden) outperformed the average of all premium pension system funds by 1.8 percentage points from the launch of the premium pension system in 2000 to 31 December 2009. See: http://www.ap7.se/en/Our-products/Previous-AP7-funds/The-Premium-Savings-Fund/#109 .

[8] A leaflet called new options for your premium pension describing the changes is available at http://www.pensionsmyndigheten.se/download/18.3e1fabfa12c58e757cc800024161/Reformeringsfolder+%28PM7630%29+eng.pdf

2.1 Growth of the Swedish Premium Pension system

The PPM was founded in September 2000. Since that date many changes have taken place. Some of those are described in the previous section. The intention of this section is to provide insights in the growth of the PPM since its inception. After reading this section, the reader comprehends the size of the system and why due to this growth regulation needed to be adapted over time.

As figure 2 indicates, the PPM has been growing steadily since its inception (except during the financial crisis in 2008). This growth can be attributed to three factors: the entrance of new participants in the labour markets (and they hence start to accumulate pension savings), the returns of the funds, and the yearly introduction of new funds by PPM participants.

Besides the increase of assets in the PPM, there has also been a widespread entry of new funds, certainly the first few years after the inception. After 2006 the total number of funds active within the PPM (including all type of funds) has stabilized between 770 and 800. All these funds represent a very large choice for Swedish pension investors.

Most fund managers have various active funds within the PPM. A restriction of 25 funds per manager applies. Hammarkvist et al. (2005) explain that when several such fund managers make up the same [fund] management group, the group's fund managers may register a combined maximum of 50 funds. The committee of Hammarkvist suggested that it should be considered to return to the limits that were set at the inception of the system[9].

While the total number of funds in the PPM and the AUM of the system increased, the total mean TNA per fund actually decreased slightly. This is partially due to the large number of investors that joined the default fund and the rise of a few very large funds. Another explanation are the higher rebates for larger funds. The rationale for fund managers to have many funds was that they are better able to benefit from the free cost withdrawal and lower rebates charged to smaller funds by having a large number of smaller funds instead of a small number of larger funds. The rebate calculation method will be explained in the next section.

Settergren (2008), director of the department of pensions at the Swedish Social Insurance Agency, indicated that some of the funds are sitting empty since it is considered good marketing for the funds to be in the catalogue and there is no cost. The PPM has considered charging funds for participating to the system but so far never applied such measures.

[9] At the inception of the PPM there was a maximum of 10 funds per fund manager and if there was a group of fund managers this maximum was 15.

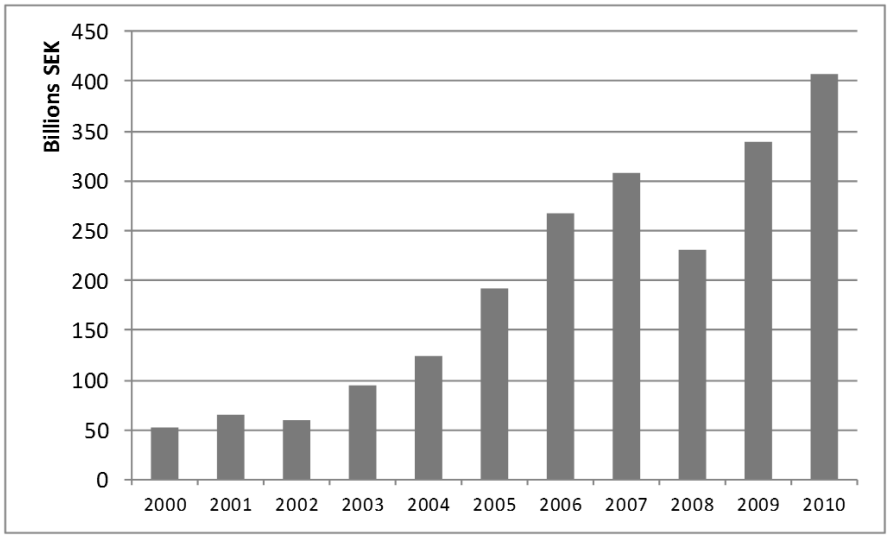

Figure 2: Development of Total TNA within the PPM (including all types of funds) at the end of each year from 2000 to 2010 in billions SEK.

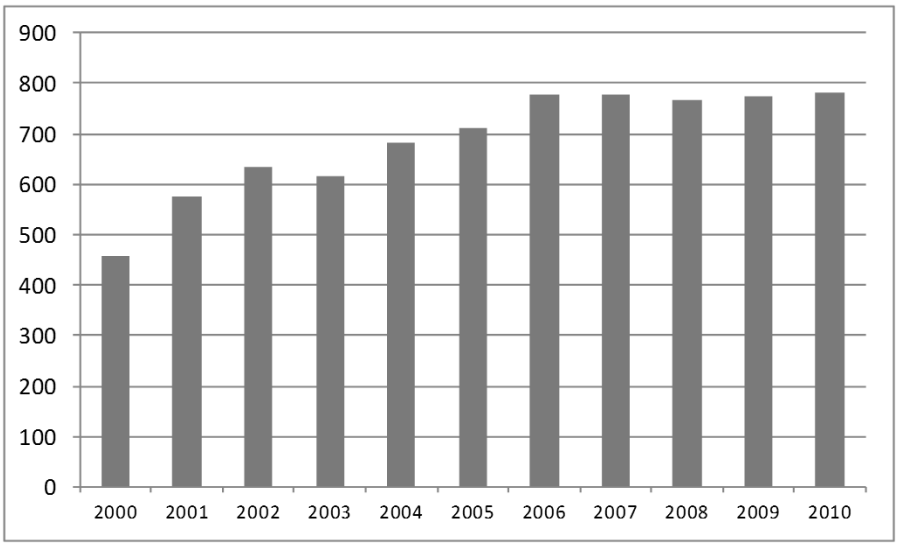

Figure 3: Development of number of available funds (including all types of funds) in the PPM from 2000 to 2010

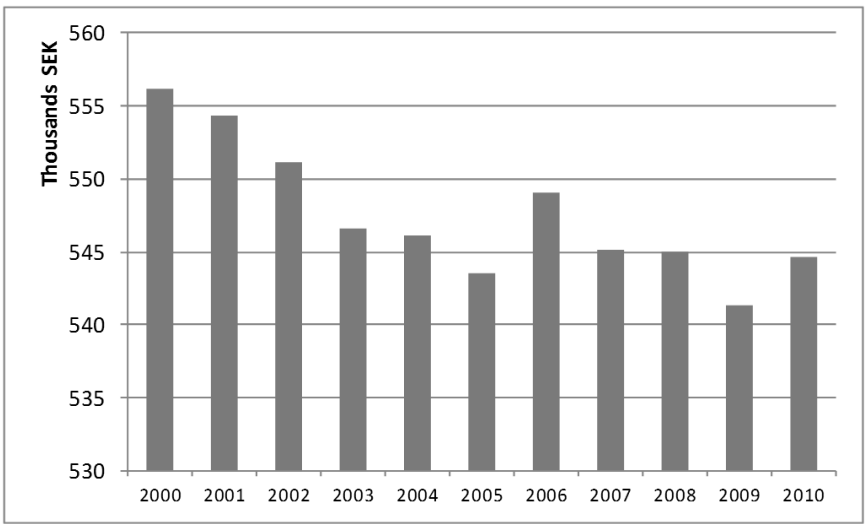

Figure 4: Development of TNA per fund (including all type of funds) in the PPM from 2000 to 2010 in thousands SEK

3. Functionality and development of the fee rebate system

All participants in the Swedish PPM get a price reduction on the 'normal' fees of these funds and all fund managers have to allow such a rebate. The Swedish PPM was set up with a central administration (i.e. a clearing house). As a consequence many functions have been centralized by the Swedish government. Fund management needs less time to complete administrative tasks and incurs lower costs. Hence fund managers are obliged, under the agreement between them and the Premium Pension Authority to offer a rebate on the fees they charge to ordinary retail investors. The pension investors benefit of this system. The rebates are calculated individually, i.e. all rebates received from one fund are reinvested for those participants who have or have had holdings in that fund during the year for which the rebate is acknowledged.

Pension investors, due to this regulation, pay two types of fees. They pay a fee for capital management to the fund managers and a fee for administration to the PPM.

In this section the pros and the cons of a clearing house will be presented. Furthermore the method of calculating the fees will be described.

3.1 Pros and cons of a central clearing house

The opinions concerning the central administration are very diverse. As an advantage of the current approach scholars mentions that the costs are low because of economies of scale. Several factors help to keep the costs of the Swedish individual account system low: centralized management, an automated administration process, bulk trading of fund switches[10], and once-a-year transfer of funds into accounts (Weaver, 2004). Furthermore the setup with a central organisation has reduced the burden for employers since they merely have to file the tax reports and afterwards the PPM takes cares of all pension savings, administration and trading.

PPM participants benefit from reduced costs. On top of the economies of scale centralization provides a stronger bargaining position to negotiate reduction of management fees and it allows to offer a very wide range of funds (whether that is an advantage can be disputed). The average capital management costs for PPM investors were 0.32% and the administration costs amounted to 0.16% in 2010. To put these numbers in perspective Diamond (1999) estimated that for an investor with a 40-year horizon, a fee of 1 percent is equivalent to a 20 percent reduction in pension benefits.

Tapia and Yermo (2007) estimated that the costs of the Swedish individual account system as percentage of total assets are the lowest in the world. Comparing Sweden to countries like Mexico and Argentina might not seem logical in first instance. However, there are not many countries in the

[10] Large amounts of trading that some performed through automated programs lead to problems forcing the PPM to find a solution to prevent mass trading. For details see:
http://www.pensionsmyndigheten.se/3659.html

world that have these individual funded account systems. Hence it is the best available comparison and furthermore the OECD has data available on those countries. On the other hand, countries like Argentina and Mexico, but also Poland, have much larger populations than Sweden. Those systems should hence benefit much more of economies of scale and offer lower fees as percentage of assets. This is clearly not the case. The setup of the Swedish system is very cost effective compared to other countries. Figure 5 furthermore shows that since the beginning of the system the costs of the Swedish system haven been much lower than any other country.

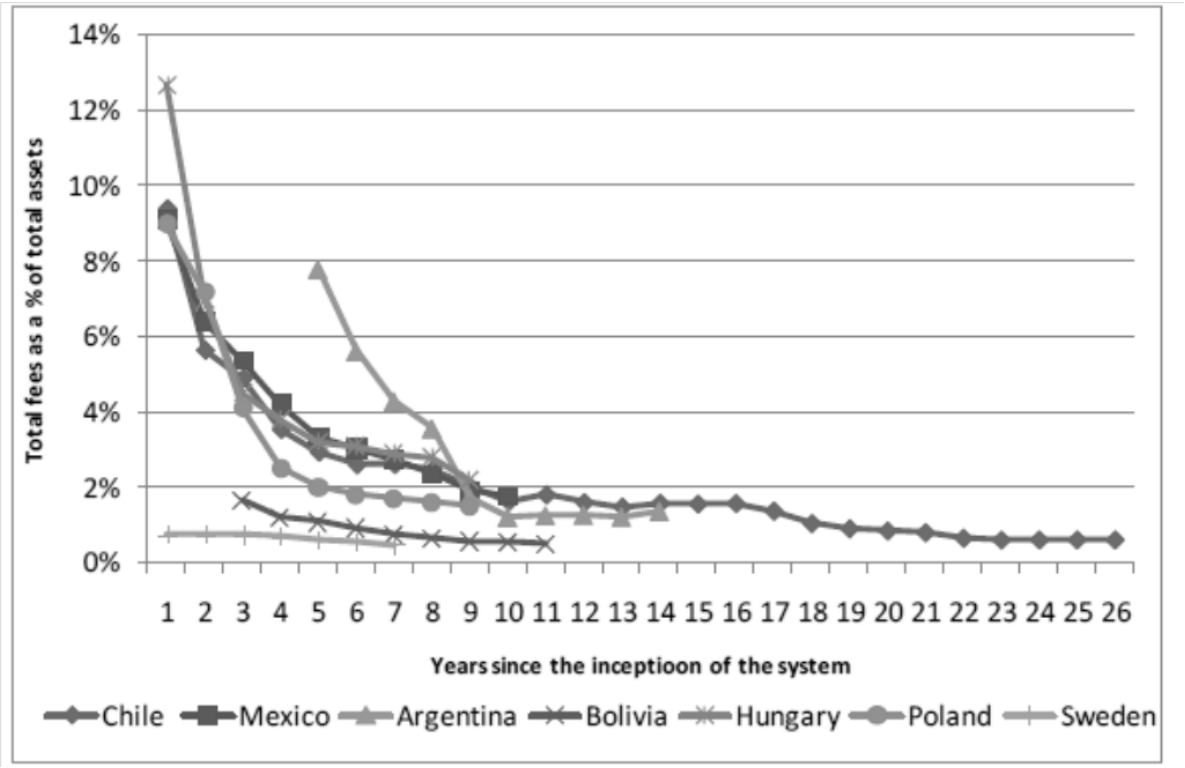

Figure 5: Overview of fees as percentage of total assets of various pension system (Tapia and Yermo, 2007), Sweden offers the lowest rates per percentage of total assets. However, on an absolute basis the Bolivian system is less expensive.

Tapia and Yermo (2007) also argue that since providers (i.e. the funds) in Sweden have no information on individual accounts, this reduces the incentive for costly sales campaigns. In the long run this should reduce the costs for PPM participants because marketing costs are indirectly charged to the clients. However, while Tapia and Yermo claim that marketing expenses have lowered, empirical evidence concerning the cause of this decline is less clear.

Marketing campaigns are far more effective when the promoter knows his clients. Costs can then be kept lower because a company can focus on a specific group. The setup of the PPM does not enable such efficient efforts. Any marketing campaign would be more expensive and those costs might withhold fund managers from such campaigns.

Nonetheless, at the inception of the new system there were many marketing initiatives of funds in order to attract more clients and also to educate and motivate people to participate actively.

Nowadays, there are indeed less marketing efforts. But what caused this decrease in marketing efforts: is it the lack of information that the funds cope with or is it merely a consequence of the decrease of active involvement of the members making it unprofitable to do such large campaigns?

As Palmer indicates in 2007, the active involvement of pension investors strongly decreased from 2000 to 2006. Palmer adds that during 2006 only 10% of the participants made an active choice. As main cause he indicates that the majority of the persons joining the PPM are so young they do not yet care about their pensions. As a consequence the share of individuals that did not make any fund selection and invested in the default fund when joining the pension system rose drastically.

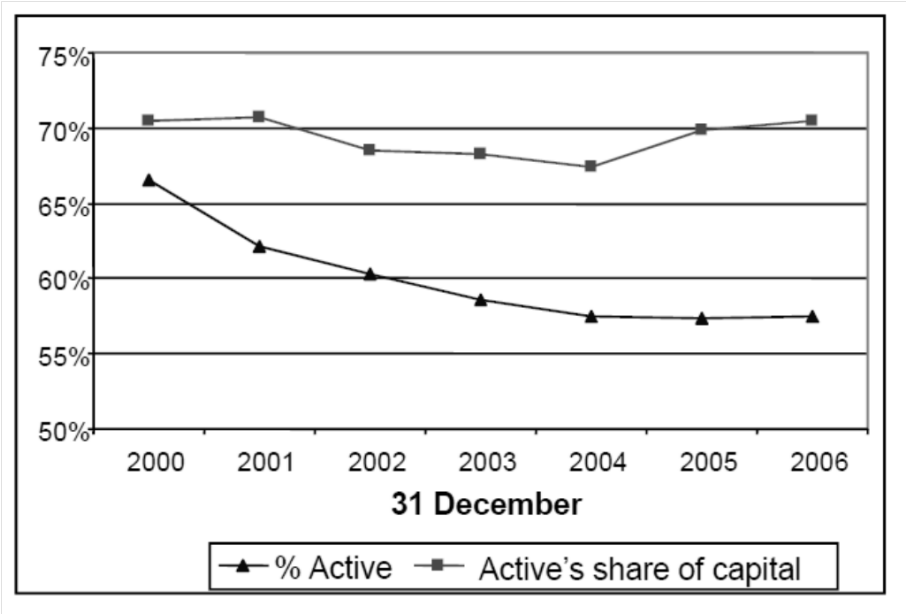

Figure 6: An overview of percentage of active pension investors and percentage of active capital in the PPM. Source: PPM.

Table 1: Share of first-time choosers that invested in the default fund. Source: PPM

2000	2001	2002	2003	2004	2005
33.0%	72.4%	85.9%	91.7%	90.6%	92.0%

In the light of the previous statistics, it is questionable whether it is worth it to start an expensive marketing campaign for the fund managers. This indicates that the cause of the diminishing marketing costs does not necessarily originate from the centralized management.

Sundén (2004) raised the question if for countries considering the introduction of an individual account system, the clearing-house model will be cost-effective. Plan administration requires a well-developed infrastructure, and implementation has been more costly and complicated than anticipated. The National Social Insurance Board (2003) estimated that if the levels of charges in 2002 remained stable over time, pensions would be 22 percent lower than they would be in a system with no charges for administration or fund management. However, administrative costs per account holder should fall and rebates from fund managers should rise as the system matures (Weaver 2004). Figure 5 shows that costs have over time indeed declined for the Swedish system.

There is a time lag in funding. Deposits into pension funds are made only twice a year. At the end of each year, the pension savings of all the persons are deposited into the system[11]. In general the funds saved during 2010 are deposited in 2011. The saved up rebates, and a redistribution of savings of persons that have passed away have to be distributed as well[12]. This in general happens between March and June each year. These amounts are not as large as the pension credit, nonetheless these amounts are substantial[13]. This implies there is a long time between the moment when contributions are earned and when they are credited to accounts—up to 24 months. To compensate the participants, they are offered the risk free rate during the whole period. Depending on the markets, this delayed entry results in a loss or gain for participants.

Braconier (2004) warns that such large lump sums could potentially disrupt bond and foreign exchange markets. However, Sweden does not have so many inhabitants and inherently such large pension savings, certainly not within the smaller Premium Pension, that a disruption of the financial system is a serious risk. For countries with a larger population and similar wealth (e.g. the United States, the United Kingdom or Germany), disruption of the markets might indeed be a risk.

Finally, the effect of rebates on (the behaviour of) the fund managers. In the Swedish system the method to calculate the rebates is explained very detailed and complex (see explanation in the appendix). Sundén (2004) summarized the effects of the regulations as follows: the size of the rebate is determined by the height of the fees and the size of the fund. In the next section there will be an explanation of how the rebates are calculated. In section 5 the effects of the rebates on fund managers will be assessed.

3.2 Fee calculation method

In this section an overview will be provided of the methods used by the PPM to calculate rebates. The explanation of the PPM of how to calculate the rebates is extensive and theoretical. The practice of calculating the fees is more comprehensive. Employees at the PPM confirm they use the schemes in tables 2.1 to 2.3 in order to calculate the fees. The latest scheme is in use since April 2007. Under the current regulation, an equity fund with a TER outside of the PPM of 1% and managing 50 million SEK has to allow a fund rebate of 0.5525%[14]. While an equity fund with 2,500 million SEK under

[11] A press article detailing the inflow of 32,1 billion SEK in December 2011 based on the wages earned during 2010: http://www.pensionsmyndigheten.se/4363.html

[12] A press article announcing that the PPM will distribute rebates and inheritance gains of 2.3 billion SEK: http://www.pensionsmyndigheten.se/3465.html

[13] Table 8 details and estimation of the size of the rebates. The PPM announced in 2010 (2011) that 1.5 billion SEK (2.3 billion SEK) was deposited to the account of the Pension Investors to distribute the discounts.

[14] $(1.00\% - 0.15\%) * 65\% = \mathbf{0.5525}\%$

management and a fee of 2% would need to accept a fee rebate of 1.3505%[15]. This is calculated by applying the free cost withdrawal of 0.15% (for a fixed income funds the withdrawal is 0.10%) and the rebate of 65% (and 75% for the amount above 1,000 million SEK) since the fund is active in the first (and in the second) interval. This implies the fund fee (i.e. capital management costs) within the PPM will be 1.00% - 0.5525% = 0.4475% and 2.00% - 1.3505% = 0.6495% respectively.

Table 2.1: Rebates per interval in the PPM since inception to April 2004

Lower limit (millions SEK)	Upper Limit (millions SEK)	Free cost withdrawal in interval	Rebate in interval
0	70	0.40%	25%
70	300	0.35%	65%
300	500	0.30%	85%
500	3,000	0.25%	95%
3,000	7,000	0.15%	95%
7,000	-	0.12%	96%

In table 2.1 the first fee calculation schedule is presented. These rules applied between September 2000 and April 2004. Depending on the fund size the fees are calculated. Each funds receives first of all a free cost withdrawal ranging from 0.40% to 0.12%. The final rebate can be as high as 96% of the fee after cost deduction in the interval starting at 7,000 million SEK.

Table 2.2: Rebates per interval in the PPM since from April 2004 to April 2007

Lower limit (millions SEK)	Upper Limit (millions SEK)	Free cost withdrawal in interval	Rebate in interval
0	70	0.40%	25%
70	300	0.35%	65%
300	500	0.30%	85%
500	1,000	0.25%	90%
1,000	3,000	0.25%	95%
3,000	7,000	0.15%	95%
7,000	99,000	0.12%	96%

In table 2.2 the fee rebates as applied from April 2004 to April 2007 are presented. In comparison with the previous schedule, an extra interval has been introduced, which increase the rebate for the interval between 1,000 and 3,000 million SEK to 95%.

Table 2.3: Rebates per interval in the PPM since April 2007

Lower limit (millions SEK)	Upper Limit (millions SEK)	Free cost withdrawal in interval	Rebate in interval
0	1,000	0.15%/0.10%	65%
1,000	5,000	0.15%/0.10%	75%
5,000	10,000	0.15%/0.10%	85%
10,000	99,999	0.15%/0.10%	90%

In table 2.3 the current regulation is explained. Depending on the fund size the rebate is applied and the maximum has been reduced to 90%. The type of assets the fund invests in sets the height of the free cost withdrawal. In comparison with previous rules, rebates and free cost withdrawals have been reduced and intervals been altered.

[15] $(2.00\% - 0.15\%) * 65\% * \frac{2}{5} + (2.00\% - 0.15\%) * 75\% * \frac{3}{5} = \mathbf{1.3505}\%$

Table 2.3 indicates that there are a few factors that influence the height of the rebate: size of the fund, height of the fee outside of the PPM and type of assets the fund invests in. Before taking a deeper look at those effects and the impact of this regulation on fund managers, a note on the changes that have taken place that led to the revised conditions.

The calculation method detailed in table 2.3 is in use since April 2007. Before this method of calculating was applied, the intervals of tables 2.1 and 2.2 were used. The second schedule is very similar to the first schedule[16]. There are many differences between the first two rebate calculation methods and the current method. Under the old regulation an equity fund managing 50 million SEK of assets and charging a fee of 1% would have given a rebate of 0.15%[17]. For a larger equity fund of 2,500 million SEK of AUM charging a 2% fee the rebate would amount to 1.538%[18]. The respective capital management costs for PPM investors of these funds would have been 0.85% and 0.46%.

The previous calculations provide insights in the consequences of the changes. A more thorough method is necessary to draw conclusions about the effects of each method. To compare the effects of these regulations graphs with either changing fund fee or changing fund size are provided. Those are the factors that indicate the height of the rebate.

Figures 7 and 8 present 4 different heights of fees outside the PPM for funds of size varying between 500 and 12.500 million SEK. Under the old regulation (figure 7), the smaller funds allowed relatively smaller rebates than currently. The increase of the rebate through size in the old system goes faster. The advantage for small funds quickly disappears. The large(r) funds in general conceded higher rebates when the old regulation still applied. In conclusion, the current regulation is more beneficial for larger funds than the previous regulation. These differences are caused by two factors. Smaller funds do not benefit from a larger free cost withdrawal any longer and large funds concede relatively lower rebates.

To check the effects of the new regulation on funds with low and high fees, 4 funds, with sizes that fall in each interval, and hence have to pay different percentage of rebates, have been selected. In figures 9 and 10 the results are depicted. Funds with low fees can and could prevent rebates if their size and fee was small enough. In the old system that was possible for fees up to 0.4%. Now it is almost impossible. The maximum free cost withdrawal is 0.15% (i.e. the AP7 default fund incurs no rebate on its fee for the equity fund it manages). However, large low fee funds were always obliged to allow a small rebate. The slope of the old regulation is steeper than the current system for the larger funds. Funds in the smallest interval have a slope that is rather similar. The

[16] There is an extra interval from 1,000 to 3,000 million SEK with a rebate of 95% in the later regulation.

[17] $(1.00\% - 0.40\%) * 25\% = \mathbf{0.1500}\%$

[18] $(2.00\% - 0.40\%) * 25\% * \frac{70}{2{,}500} + (2.00\% - 0.35\%) * 65\% * \frac{230}{2{,}500} + (2.00\% - 0.30\%) * 85\% * \frac{200}{2{,}500} + (2.00\% - 0.25\%) * 90\% * \frac{500}{2{,}500} + (2.00\% - 0.25\%) * 95\% * \frac{1{,}500}{2{,}500} = \mathbf{1.538}\%$

rebates for small funds with high fees remained the same, while small funds with low fees now have to accept higher rebates. Large funds concede fewer rebates in the higher intervals. It appears that the current system has a more equilibrated system for rebate calculation. Compared with the previous regulation, larger funds benefit relatively more of the changes. The number of intervals has decreased, explaining the less steep inclination in rebates.

Table 3: Overview of administrative costs of the PPM and capital management costs of the funds from 2000-2010 as % of total assets in the PPM.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	…	2020
Administration costs	..	..	0.30	0.30	0.27	0.22	0.16	0.13	0.16	0.19	0.16	…	0.05
Capital Management costs	..	0.45	0.44	0.43	0.42	0.42	0.40	0.33	0.30	0.31	0.32	…	0.25

Table 3 presents the administration and capital management costs for pension investors. The administration costs are incurred equally by every pension investor. The capital management costs are only indicative for the total costs of the total system. On an individual basis these costs will differ based on the funds that have been selected by the pension investors and the fees those funds charge. The long term goal of the PPM is to reduce both costs considerably in order to make pension investing inexpensive for its clients. The administrative fee should go to 0.05% while the objectivefor the capital management fee is 0.25%. The latter should be reached through that rebates that increase in a maturing system since the rebate increases with TNA. Source: PPM.

It appears that if large funds have to allow smaller rebates fees and small funds larger rebates, hereby rebates might be foregone. However, table 3 shows that average fees for pension investors decreased over time. It can hence not be the case that the total amount of rebates has been reduced. Since the majority of the funds within the system is relatively small, increasing the rebates for those smaller funds has more impact than decreasing the rebates for the larger funds. Table 4 illustrates the average and standard error of the number of equity funds in each interval of the current regulation. The vast majority, 93%, is in the smallest interval. All these funds forego a maximum of 0.1435%[19] of free cost withdrawal due to the latest changes. Table 4 furthermore indicates that a small group of funds own a major share of total TNA because only 8 funds are active in the largest interval, and these funds are at least 10 times larger than the majority of the funds in the smaller interval[20].

Table 4: Mean and standard deviation of the number of equity funds within each interval of the current fee regulation from April 2007 to FY 2010

	Mean	St. Dev
0-1,000	532.1	18.1
1,000-5,000	28.9	6.6
5,000-10,000	3.8	1.0
10,000-99,999	8.1	4.3

[19] $\left(\frac{70}{1{,}000} * 0.40\% + \frac{230}{1000} * 0.35\% + \frac{200}{1000} * 0.30\% + \frac{500}{1000} * 0.25\%\right) - 0.15\% = 0.1435\%$

[20] The 8 largest funds in March 2010 own and 40% of total TNA in the PPM.

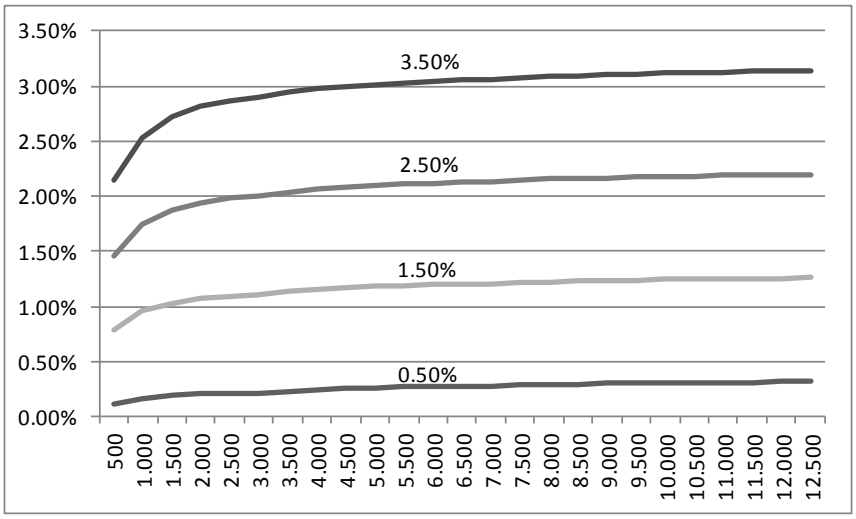

Figure 7: Rebates between April 2004 and March 2007 for fees of 0.5%, 1.5%, 2.5%, and 3.5%. On the horizontal axis the size of a fund is given, while the vertical axis indicates the rebate level for the funds.

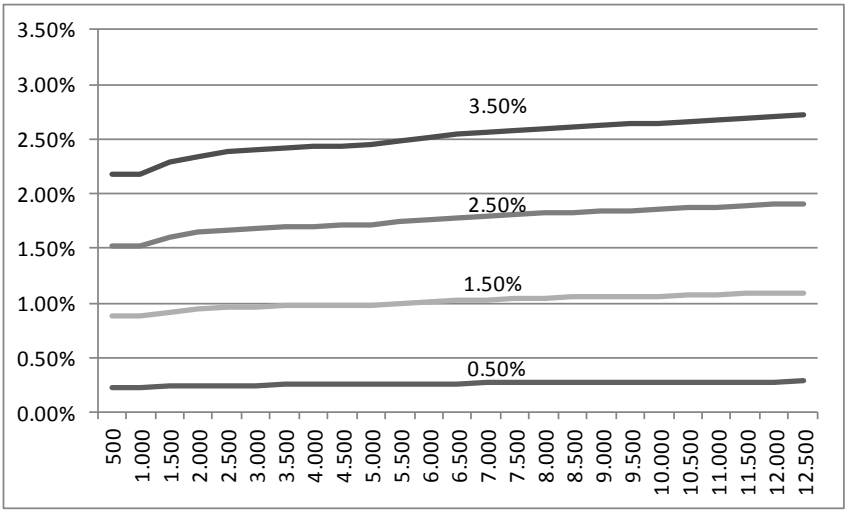

Figure 8: Rebates since April 2007 for fees of 0.5%, 1.5%, 2.5%, and 3.5%. On the horizontal axis the size of a fund is given, while the vertical axis indicates the rebate level is indicated for the funds.

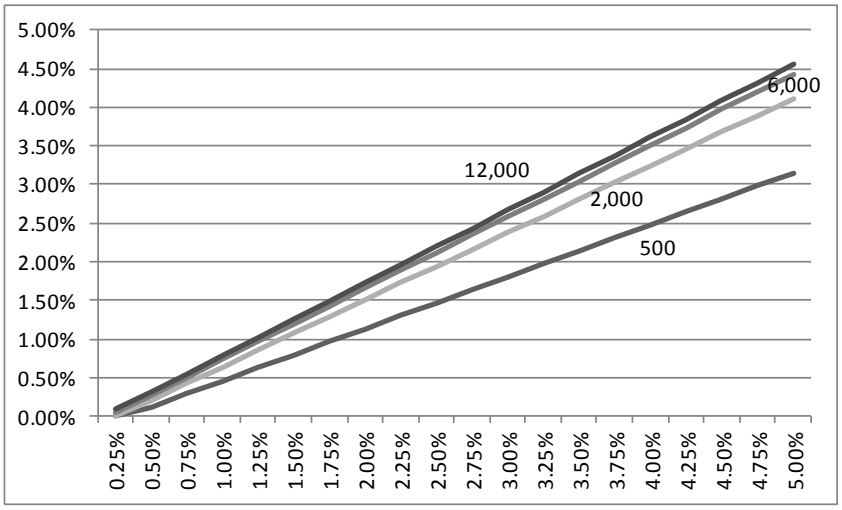

Figure 9: Rebates from April 2004 until March 2007 for funds with sizes of 500, 2,000, 6,000, and 12,000 million SEK of TNA (one fund in each interval of the current regulation). The horizontal axis indicates the level of fee outside of the PPM while the vertical axis indicates the rebate.

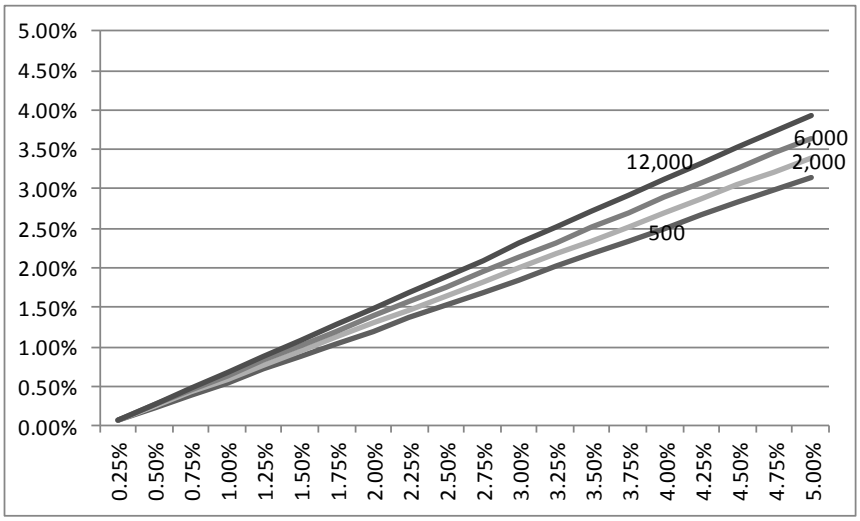

Figure 10: Rebates from April 2007 until present for funds with sizes of 500, 2,000, 6,000, and 12,000 million SEK (one fund in each interval of the current regulation). The horizontal axis indicates the level of fee outside of the PPM while the vertical axis indicates the rebate.

3.3 Fees charged in the PPM since 2007

To gain more insight in the size of the fees charged inside and outside of the PPM under the latest regulation, some histograms of the distribution of these fees will be presented. In those graphs there are active funds and inactive funds. Inactive funds are funds that will stop their operations within the PPM within 12 months of that particular observation. It might be the case that there is a clear difference between rebates of active funds and funds that are about to become inactive. Note that such a measure cannot be observed by investors.

Furthermore, to ensure only the period of the latest regime is considered, only fees after April 2007 are considered[21]. Another benefit of this method is that it does not require any assumptions about the height of the fee during the year as was necessary for the period between 2002 and 2005 (see details in section 4.1).

The fees charged to retail investors outside of the PPM in figure 11 are in general between 1.6% and 2.2% of total assets. The inactive funds seem to have a similar distribution. The average fee for active funds during this period was 1.77% while for inactive funds the average was higher at 2.02%.

The fees charged to pension investors within the PPM system in figure 12 are much lower than those charged to retail investors. In general the fees inside the PPM are between 0.5% and 0.9% of total assets. The dispersion of fees inside the PPM is larger than that of the fees outside of the PPM (standard deviation 0.13 outside versus 0.44 inside). This is caused by the fact that fee within

[21] The amount of observations lost is relatively small. Fees are only available at a monthly frequency from February 2006.

the PPM is influenced not only by the fee outside of the PPM but also by TNA and the type of investments it possesses. The average fee charged within the system is 0.75% for active funds and 0.86% for inactive funds. The average rebate that the PPM demands equals 1.02% for active and 1.17% for inactive funds. On a yearly basis this provides the following absolute amount of rebates:

	Total Amount of Rebates (million SEK)
2007	1,275
2008	1,083
2009	1,142
2011	1,733

Table 5: Total amount of rebates in the PPM in million SEK from 2007 to 2010. Amounts are calculated by multiplying the rebates per fund with the TNA in the PPM of those respective funds. These rebates include the full year of 2007 in contrary to previous data. Excluding the first quarter would reduce the comparability of the data.

Rebates will be reinvested in the same funds from which these are obtained, except when explicitly indicated otherwise by the pension investors.

As stated by both Sundén (2004) and Weaver (2004), the formula shows that the price reduction increases when fund size increases. This logically follows from tables 2.1 to 2.3. Even though at the time both authors did their research, the effect was still stronger, their conclusions remain valid. The same logic applies for the level of costs. When those increase the rebate increases. However that increase is proportional and not progressive like the increase through TNA.

The current regulation might create very special dynamics for fund managers because they are not rewarded based purely on performance. For example, a very successful manager might see such a large inflow of funds that he has to pay more rebates. Otherwise, it could be a goal for a fund manager to try to influence the size of his funds in order to only have to allow only the lower rebates of the system.

In short, the distributions of the fees show that active funds have in general lower fees than inactive fees. In section 5 by running various regressions, estimates will be made to see which factors affect fees within the PPM most. This method should allow drawing clearer conclusions on how the rebates decrease the fees of these funds and what impact that has on the behaviour of its managers. First in section 4 a description of the data will be provided.

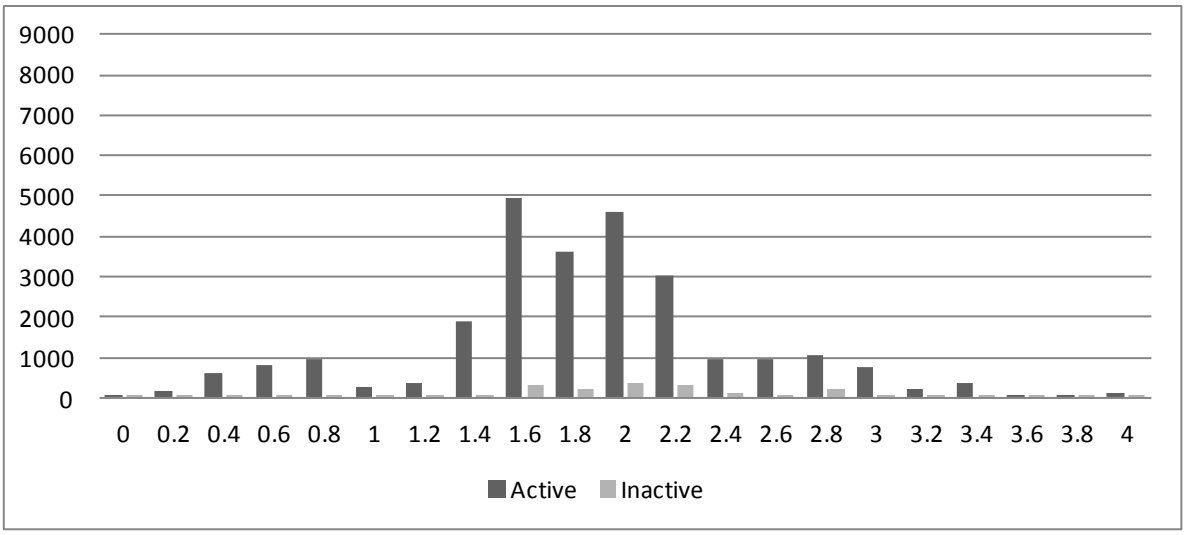

Figure 11: Fees charged outside of the PPM system to retail investors as percentage of total assets (measured between April 2007 and April 2010). Inactive funds are funds that have no more TNA within the PPM in twelve months or later.

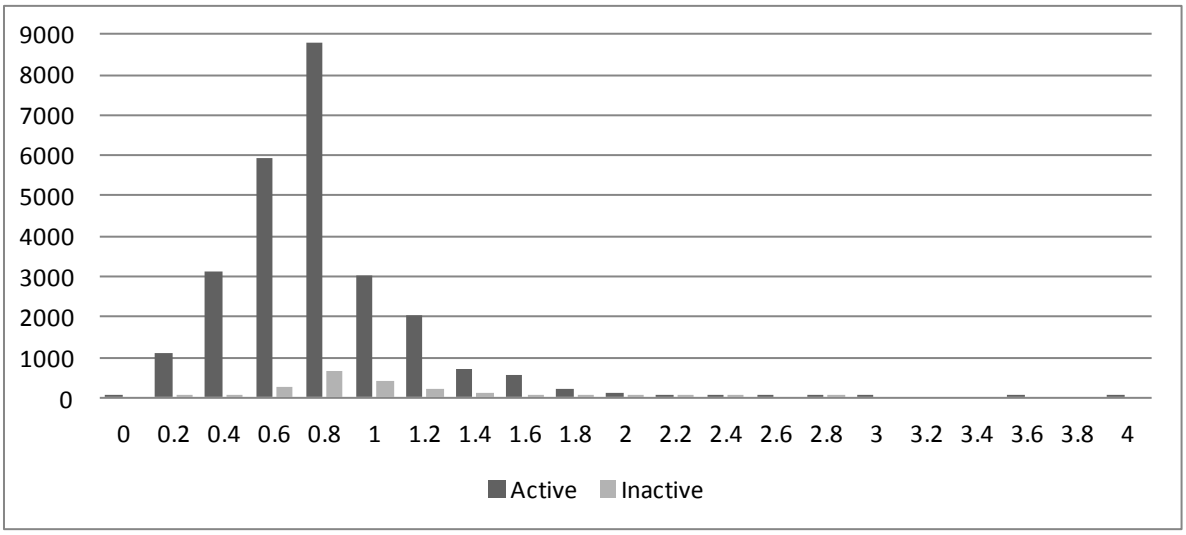

Figure 12: Fees charged inside of the PPM to pension investors as percentage of total assets (measure between April 2007 and April 2010). Inactive funds are funds that have no more TNA within the PPM in twelve months or later.

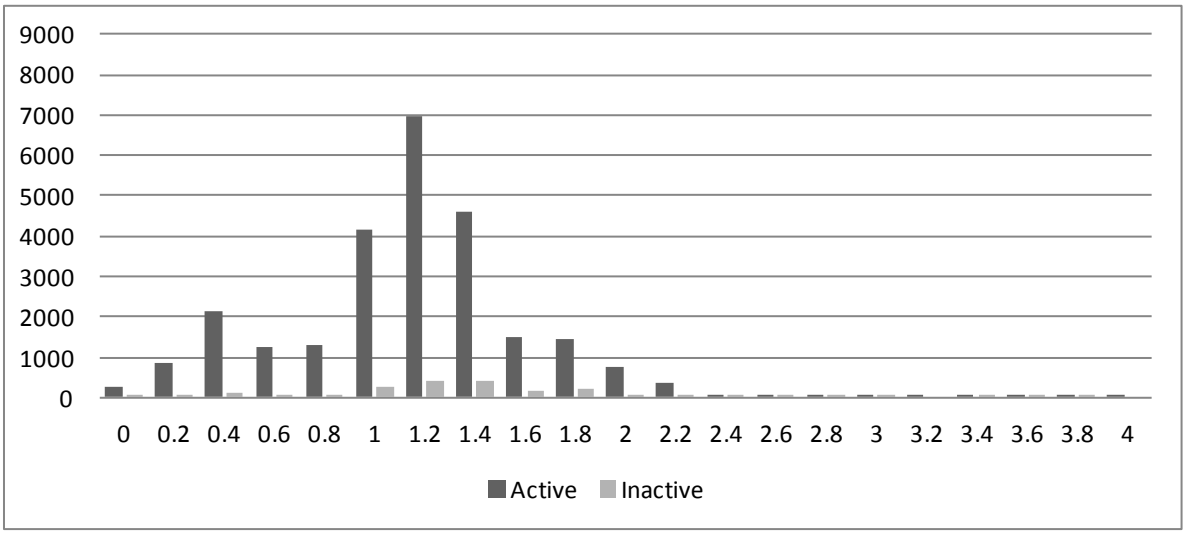

Figure 13: Rebates charged by PPM to funds as percentage of total assets (measured between April 2007 and April 2010). Inactive funds are funds that have no more TNA within the PPM in twelve months or later.

4. Data Description

In this section a description of the available data will be provided. All the necessary adjustments to the data are explained. Issues like survivorship bias and selection of the right benchmarks will be treated.

4.1 Funds in the PPM system

Since the inception of the PPM system in September 2000, 1197 funds have been active within the system. In February 2011, 799 of those funds are still actively participating to the PPM[22]. All these funds are open-ended funds[23]. The funds in the PPM system could according to the Morningstar categories be assigned to the asset classes in figure 14.

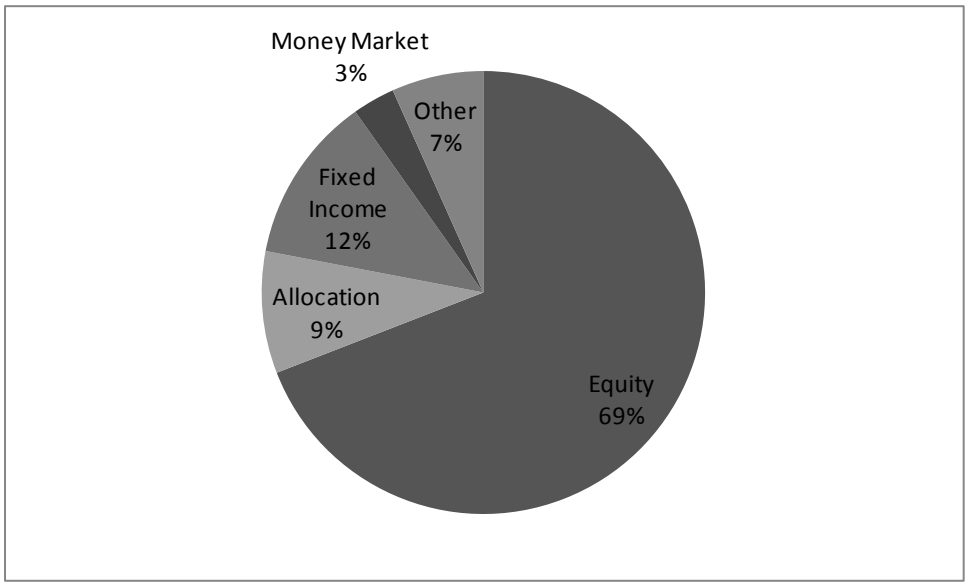

Figure 14: Overview of type of funds in PPM

The relatively large size of the category *other* is due to the that fact that setting up a link between the databases of PPM and Morning Star Direct (MSD) is complicated[24]. Both authorities uses different identification variables: PPM manages its databases by a PPM kod (a unique 6-digit code) while Morningstar Direct uses ISIN[25]. Setting up this link between both identification methods has

[22] It is difficult to judge if funds became inactive or changes names or were acquired by another company and therefore the PPM assigned different id's. It is hence difficult to estimate the total number of funds that has been active in the PPM. For details concerning all the funds within the PPM see.: http://www.pensionsmyndigheten.se/download/18.42308b75129b0e175b48000877/TOTAL+LISTAN+2011-02-15+Webben.xls

[23] An open ended funds is a collective investment scheme which can issue and redeem shares at any time.

[24] One typical complication is that Morningstar uses the same ISIN for a fund that has changed its name over time and as a consequence has over 1400 entries for PPM funds.

[25] International Securities Identifying Number; a 12-character alpha-numerical code that uniquely identifies a security; http://en.wikipedia.org/wiki/International_Securities_Identification_Number

been done manually and lead to minor inconsistencies. The majority of the funds are equity funds. More details on the contribution of TNA of these funds are provided in table 7.

Given the large amount of equity funds and possible issue of comparability between the performance of fixed income, money market, allocation and equity funds, this study will only include equity funds[26]. This is a method commonly applied in literature (e.g. Huang et al. [2007] or Dahlquist and Martinez [2010]) and allows to study the majority of the funds active in the system. The returns of all other funds will be disregarded. The sample consists therefore of 824 funds. However, given the fact that it will provide less consistent results when making calculations with funds that have less 12 months of observations[27] another 121 funds have been disregarded. Bringing the total funds included in this analysis to 703[28]. Depending on the type of analysis that is done, a different number of funds is available. The details will be provided in the applicable section.

The funds within the PPM system are predominantly located in countries in Northern Europe and most are located in Luxembourg and Sweden. Luxembourg is preferred because of its tax system while Sweden is a logical domicile due to the fact that the PPM has the same domicile.

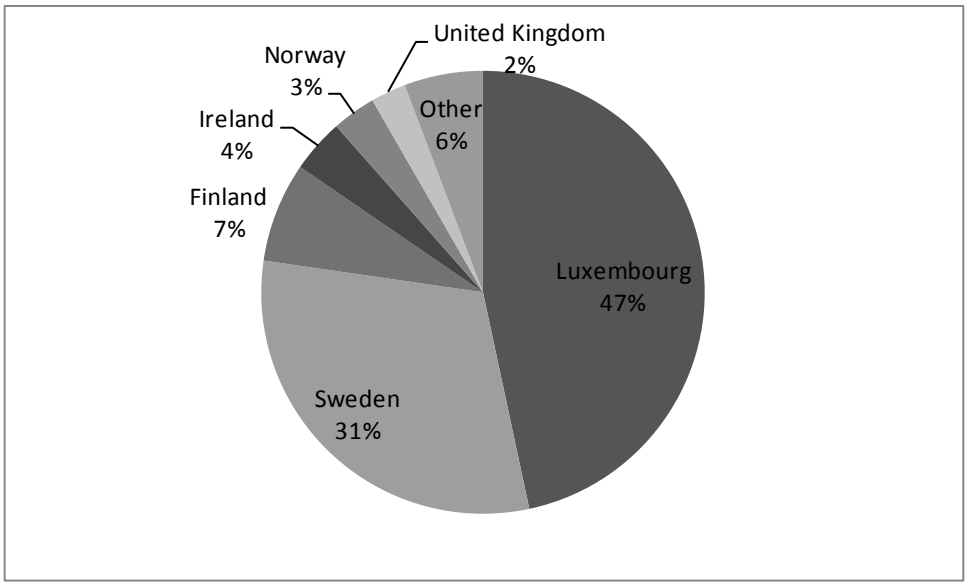

Figure 15: Overview of domicile of funds in PPM

[26] Morningstar defines equity funds as funds investing primarily in shares, based on any number of investment strategies: http://www.morningstar.co.uk/uk/glossary/default.aspx?articleid=74522&categoryid=485&group=E

[27] Since often a lag of 1 year is applied and consequently the 12 observations in the lag cannot be used, the minimum amount of observations for funds is actually 24.

[28] A reduction of 121 funds reduces the total amount of observations with only 2.7%.

Investments are mainly in European, global, emerging market or sector specific investments.

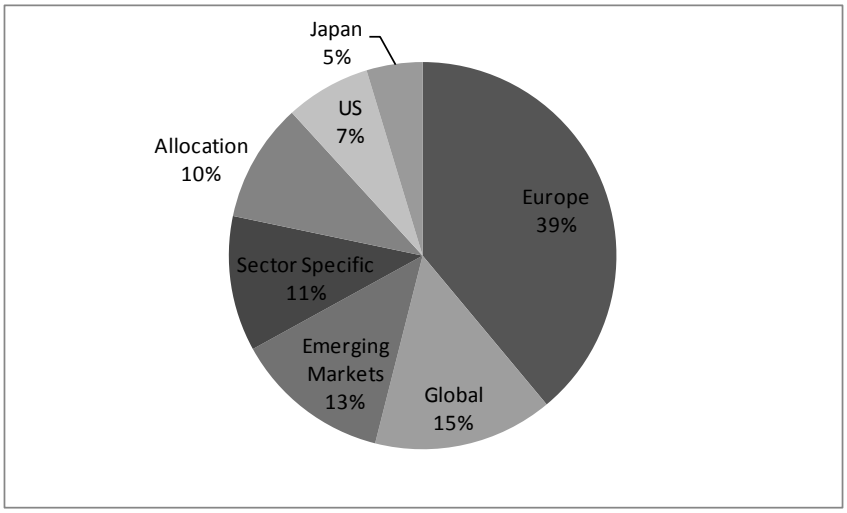

Figure 16: Overview of investing focus of funds in PPM

The data has been compiled from various resources. The following variables are available for each of the 703 funds that will be studied. Note that the period for which data is available might differ per fund, depending on the period during which the fund was active within the PPM.

Table 6: Overview of all the data variables of this analysis including frequencies, sources and description

	Frequency	Starting Date	Source*	Description
nRETex	monthly	2000-09	MSD	Net Returns outside PPM system
nRETin	monthly	2000-09	calculation	Net Returns with PPM discount**
gRET	monthly	2000-09	MSD	Gross Returns PPM funds
tnainppm	monthly	2002-12	PPM	Total Net Assets per fund in PPM
tnaexppm	quarterly	2002-12	PPM	Total Net Assets per fund outside of PPM
tnatotal	monthly	2000-09	MSD	Total Estimated Size of Funds
terinppm	monthly	2007-04	PPM	Total Expense Ratio (i.e. fees) inside of PPM
	yearly	2002	PPM	Total Expense Ratio (i.e. fees) inside of PPM
terexppm	monthly	2007-04	PPM	Total Expense Ratio (i.e. fees) outside of PPM
	yearly	2002	PPM	Total Expense Ratio (i.e. fees) outside of PPM

*MSD is Morning Star Direct

**The net returns within the PPM discount are estimated, details of method of calculation in section 4.3

The analysis starts in 2002, given the lack of data on total net assets before that date. April 2010 will be the ending date of this analysis. This choice has been made because of the change that was effectuated in May 2010. As indicated in section 2, the PPM changed the setup of its default fund. The default fund is no longer a pure equity fund but now a generation fund. The default fund forms such a large part of the TNA in the PPM[29], this change might have unforeseen consequences to the results. To ensure that such external factors do not influence the estimates, this period is disregarded.

[29] In April 2010 the Default Fund AP7 Sparfonden managed 25.8% of total TNA in the PPM

4.2 Inclusion rules

Before the data could be used a number of adjustments had to be made. A large part of these funds is active both inside as well as outside of the PPM. MSD offers data independently of whether those funds are participating in the PPM system. As a matter of fact, MSD does not have an up-to-date database which specifies which funds are active within the PPM. Data originating from MSD is a complete download of all available information on each ISIN code in the period specified by the user. As a consequence there might be returns of funds that are not (actively) participating to the PPM.

To ensure that the analysis is only done on funds active within the PPM, the TNA in the PPM (tnainppm) is used as the standard. This statistic is provided by the PPM and hence indicates which funds are active and are being picked by the PPM participants. Any observation for which no TNA in PPM is available is deleted from the sample.

Another benefit of applying this method is that when funds join the PPM, those new funds might not directly obtain clients. While the fund is eligible, it takes time for investors to invest money into the new fund. There are cases in which it took more than 3 months for the first PPM participants to invest in a fund. Otherwise, as mentioned in section 2.1 some funds are even idle in the system but remain registered because of the marketing potential. The before mentioned funds control no TNA within the system. The chosen method of disregarding all returns when no TNA is present within the PPM ensures that even returns of funds that participate of the PPM but do not have any TNA are not considered.

While the TNA was used as a proxy for activity within the PPM, it was also found that there were various unreliable estimates in the TNA[30]. Therefore, of each fund that had a single unreliable estimate, all observations were deleted. Despite this thorough check of the data, this analysis still includes a large part of the total PPM. In table 7 the total number of funds and total TNA in the PPM and in the retail market is presented. These statistics only account for funds that are active in that specific month (i.e. March 2010). Nonetheless, the table provides good insight into the availability of data and the consequences of only working with equity funds.

For the retail market only those funds are included that are also active within the PPM system. Table 7 hence provides no proper estimation of the total size of the retail market, which will be much larger. The table indicates that in March 2010 the analysis includes at least over 60% of the total TNA of equity funds in each market.

[30] For example fund 275495 jumped from 13,079 million SEK to 1,695,796 million SEK within a quarter. Only 5 quarters later this amount had been reduced again to 5,038 million SEK to consequently change to 1,147,880 million SEK and 5,588 million SEK.

The default fund has been mentioned separately for two purposes. First of all to indicate its large size. It is a quarter of the total TNA of the PPM system. Furthermore, for the analysis in section 5 the default fund had to be excluded. This way the impact of such a measure becomes clear.

Table 7: Funds in the retail market and PPM as of March 2010

	Retail Market		PPM	
	Number of Funds	Total Net Assets (SEK billions)	Number of Funds	Total Net Assets (SEK billions)
All funds				
Equity Funds	516	2,407.5	574	281.7
Fixed Income Funds	106	409.6	114	20.9
Other Funds	81	328.3	91	51.5
Total	703	3,145.3	779	354.1
Sample				
Equity Funds	437	1,474.2	437	171.9
Fraction of all equity funds	84.6%	61.1%	76.1%	61.0%
Default fund	N/A	N/A	1	91.9
Fraction of all equity funds	N/A	N/A	0.2%	32.6%

In table 7 an overview of the number of funds and TNA (SEK billions) within the retail market and PPM is provided. While March 2010 is not the last period of the analysis, it is the last month in which a complete overview of all data is available. Therefore it is chosen to provide the data on this moment. The retail market is actually larger than indicated in this table since these estimates only include funds that are active on both the retail as the PPM market. Any retail fund that is not participating to the PPM is hence excluded from these estimates. Funds have been categorized by equity, fixed income and other funds. The default fund of the PPM receives special attention since it is so large. Furthermore, for some purposes this fund is excluded from the analysis, while for other it is included. This way the impact of such a decision becomes clear.

4.3 Returns

The definitions provided by MSD for gRET and nRETex are the following.

nRETex: Expressed in percentage terms, Morningstar's calculation of total return is determined each month by taking the change in monthly net asset value, reinvesting all income and capital-gains distributions during that month, and dividing by the starting NAV. Reinvestments are made using the actual reinvestment NAV, and daily payoffs are reinvested monthly. Unless otherwise noted, Morningstar does not adjust total returns for sales charges (such as front-end loads, deferred

loads and redemption fees), preferring to give a clearer picture of a fund's performance. The returns do account for management, administrative, 12b-1 fees and other costs taken out of fund assets.

gRET: Gross Returns are calculated by taking the total return and backing out the most recent net expense ratio. Gross returns for separate accounts are collected from the firms.

As can be seen above, there are actually 3 definitions of returns. It is important to remember that each of these funds of course only have one return. The difference furthermore between gross and net is also straight forward. Net of fees means that the fees charged to the clients have been subtracted, while gross returns still includes these fees. The special characteristics of the PPM system nonetheless demand a third category. As mentioned in section 1, funds offering services within the PPM system need to allow for a rebate. In short, if a fund is active both outside and inside the PPM system, it will charge lower (higher) costs to clients inside (outside) of the PPM system.

The total expense ratio inside the PPM (*terinppm)* and outside of the PPM (terexppm) are the fees incurred by respectively the pension and retail investors. This data is provided by the PPM. terinppm takes into account the rebates for pension investors. A more accurate division of the fees would be welcome but is not available. MSD provides only current but no historical fees.

The data on TER that has been supplied by the PPM is available at a monthly frequency from February 2006 (except June 2006). However, due to changes in the regulation, the fees before April 2007 were calculated differently. It is hence difficult to draw any conclusions regarding the entire period. Additionally there has been a change in regulation in April 2004, which increases the difficulty of making estimates about the fees (see section 3.2 for details).

There are no fees known before the last quarter of 2002 and the administration fee of the PPM is not specified before 2002. Approximating properly the administrative costs of the PPM in 2000 and 2001 is impossible. The period before 2002 is hence disregarded.

Finally the estimates of the fees from 2002 to 2005 are supplied with an irregular frequency. The PPM supplies these fees with sequence ids. Each change (induced by either growth of TNA or a higher/lower fee charged by the fund managers) is represented by such an id. It is not indicated when exactly the change took place and therefore it is not possible to ascertain in which period the particular fee was applied. Therefore, for the period from 2002 to 2005, the assumption is made that the latest fee provided during that year, was valid during the whole year.

To take the benefit of the fee rebates into account, the net returns in the PPM (nRETin) were created. This measure is not observed by PPM investors. The rebates granted to the pension investors are reinvested once a year (see details in section 3.1). Between the moment that the rebate is received by the PPM and that the money is injected into the PPM, this money is deposited at the PPM. During this period the pension investor only receive the risk free rate on these savings. The

pension savings are also only distributed to the system once a year. This method was chosen to keep the costs of the system low.

Hence in order to calculate *nRETin* from the *nRETex* the *terexppm* was added and consequently terinppm and administrative costs were subtracted. This method omits the growth of these funds by the risk free rate as offered by the PPM[31].

All the TER are provided as an annual measure. In order to obtain the monthly fee each TER was divided by 12. The following formula is hence applied to obtain nRETin:

$$nRETex + (terexppm - terinppm - administrative\ fee\ PPM)/12 = nRETin \qquad (1)$$

Given the previous remarks concerning fees, to ensure reliability of data and to assess the impact of the assumptions made, there will be two types of results. Estimates will be made for the entire period from 2002 to 2010 and for the period from 2006 to 2010. For the latter period, many observations are lost but the reliability increases since no assumptions have to be made. Furthermore, in the period from 2000 to 2005 the PPM grows from 50 to 200 million SEK. This initial growth might affect the estimates.

4.4 Risk free rate

As proxies for the risk free rate the following rates have been used. The applicability of each risk free rates depends on the model and will be specified.

Table 8: Proxies for Risk Free rate including currency, frequency and sources

	Maturity	Currency	Frequency	Source
STIBOR	1m	SEK	Monthly	Sveriges Riksbank
US T-Bill	3m	USD	Monthly	Datastream
EURIBOR	1m	EUR	Monthly	Datastream

All returns provided by MSD are denoted in SEK. Therefore it suffices to use STIBOR 1 month as proxy for the risk free rate. In order to obtain the excess rate of return the monthly risk free rate is subtracted from all returns and also from the returns of the indexes. Since the interest rates are annual, the rate of each month is divided by 12 before subtracting it.

The maturity of these risk free rates are different. Nonetheless, all these bonds are the most liquid bonds offered by the respective governments. Therefore these bonds most closely approach a risk free investment and the difference in maturity is no issue.

[31] A review shows besides that the *terexppm/12* + nRETex is in most cases (almost) equal to *gRET*. This implies the data of PPM and MSD is consistent and accurate.

4.5 Survivorship Bias

Survivorship bias does not play a role in this study. Morningstar provides data of funds that still exist but also data of funds which have been discontinued over time. Likewise for the PPM.

4.6 Indices

As a proxy for the market the SIXPRX and MSCI AC World (from now on referred to as MSCI) indices have been used. For these indices data is available on monthly basis during the entire study. The characteristics of each index follow.

- *SIXPRX* (SEK) presents the average performance on the Stockholm stock market adjusted for the placement restrictions that apply to equity funds. These indices thus apply to comparisons of performance of funds that invest in Swedish equities. SIXPRX includes dividends. SIXPRX takes into account the restriction preventing investment funds (UCITS) from investing more than 10 percent of their assets in shares in one and the same company. If a company represents a higher proportion of the stock markets' market capitalisation than 10 per cent, the excess is allocated pro rata to the other listed companies, which thus represent a slightly higher share of the adjusted index than is the case.[32]
- The *MSCI ACWI (All Country World Index) Index* (USD) is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. The MSCI ACWI consists of 45 country indices comprising 24 developed and 21 emerging market country indices. The developed market country indices included are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. The emerging market country indices included are: Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey.[33]

The choices of these two indexes has been done after carefully assessing other alternatives which included among others combinations with MSCI World and the AP7 Sparfonden. The SIXPRX properly captures the Swedish market. The Swedes will most likely suffer from home bias[34] and

[32] http://www.fondbolagen.se/en/Statistics/Indices/

[33] The MSCI ACWI index is available as with a gross and net measure. In this study the gross measure is applied. The definition of gross according to MSCI is: Gross total return indices reinvest as much as possible of a company's dividend distributions. The reinvested amount is equal to the total dividend amount distributed to persons residing in the country of the dividend-paying company. Gross total return indices do not, however, include any tax credits. See: http://www.msci.com/products/indices/tools/index.html#ACWI

[34] A phenomenon in the literature among others described by Karlsson and Nordén [2007]

hence prefer Swedish funds. The MSCI AC WI on the other hand, captures a variety of returns from 45 countries. Figure 16 indicates the focus of the funds in this analysis is diverse and international. These properties are hence captured by the MSCI index. The combination of these two indexes should hence provide a good proxy for the markets on which PPM funds are active.

4.7 Exchange rates

The monthly exchange rates of SEK-USD and SEK-EUR are available. These have been used to assess if an investor has better returns if he would exchange his funds at the beginning of the month and convert them back at the end of the month. The source for these exchange rates is Thomson DataStream.

The following formula is applied to calculate the return while investing a currency:

$$\frac{x_t\ (1+ R_{f,t+1})}{x_{t+1}} - 1 \qquad (2)$$

Where x_t is the exchange rate of the currency at time t.

Furthermore is the MSCI AC World denoted in dollars and needed to be converted to SEK.

5. Rebates: the Fund Manager Perspective

This section aims to explain the effects of the current rebate regulation on fund participation and on the behaviour of fund managers. It might be the case that the current regulation is advantageous for small or large funds or funds with low or high fees. First previous research and methodology will be treated. Afterwards the methodology will be presented and the results will be discussed.

5.1 Previous research: fund managers and fees

The rules for the calculation of the fee rebate show that the rebate increases when either fund size or fees increases. But what has been documented in literature about fee setting? Is there any research on a relationship between fund size, the height of fees, costs and/or performance?

Barber et al. (2003) argue that investor should always invest in low fee funds. There is little or no evidence that active management (i.e. high fees) can outperform indices. According to Barber et al. there is, but also Gruber (1996) and Carhart (1997) find, a negative relation between a funds's operating expense ratio and performance. It seems clear that there is a positive relation between operating expenses and fund size. Every fund that grows, incurs larger operating expenses. This implies there is a negative relation between funds size and performance. PPM actually provides incentives for funds to remain smaller, which is in line with these theories.

Indro et al. (1999) explain that there is an optimal size for funds. Growth of size initially provides cost advantages (e.g. cost of research and administration are disproportionate to size). However, if a fund grows further, transaction costs, liquidity, and information asymmetry become problematic and inverse the effect. Edelen (1998) is firm in his conclusion and states the very act of providing a liquid equity position to investors at low cost, arguably the primary service of an open-end mutual fund, can cause an informed fund manager to have negative abnormal returns.

Berkowitz and Kotowitz (1993) note that contracts which pay the fund company a fixed fraction of assets under management implicitly contain a performance compensation element. This element stems from the fact that new money flows into a fund when the fund does well, and money flows out of funds when the fund does poorly. The PPM actually mitigates this performance incentive by charging larger rebates to larger funds.

Christoffersen and Musto (2002) propose that mutual funds' fees, based on cross-section of money market mutual funds, are set taking into account the elasticity of the demand for their shares. Funds facing less elastic demand charge higher fees. Funds with worse past performance face less elastic demand, since only performance-sensitive investors leave funds following bad performance. If pension investors are indeed inattentive, fund managers within the PPM can benefit from this or possibly are already benefitting from this phenomenon.

Berk and Green (2004) believe that managers increase the size of their funds, and their own compensation, to the point at which expected returns to investors are competitive going forward. This is based on the assumption that investing is a zero sum game. This could imply that with the rebates, PPM participants should have higher returns and possibly invest in a positive sum game.

Ruiz-Verdú and Gil-Bazo make various suggestions as to what might influence the relationship between fees and risk adjusted returns (e.g. marketing costs, learning economies, economies of scale, efficiency, salaries). They expected that since the main service provided by a mutual fund is portfolio management, fees should reflect funds' risk-adjusted performance. It follows that there should be a positive relation between before-fee risk-adjusted expected returns and fees. In contrast to their prediction, they find a puzzling negative relation between before fee risk-adjusted performance and fees in a sample of U.S. equity mutual funds: funds with worse before-fee risk-adjusted performance charge higher fees.

In their conclusion Ruiz-Verdú and Gil-Bazo show that competition for the money of performance-sensitive investors leads to an equilibrium in which funds that expect to earn higher returns (“good” funds) reduce their fees up to the point at which they effectively price funds that expect lower returns (“bad” funds) out of the performance-sensitive segment of the market. This would lead to a negative sum game (i.e. expected break even for the good funds and expected losses

for the bad funds). Often bad funds raise their fees to extract rents from performance-insensitive investors as suggested by Christoffersen and Musto.

Research agrees that low fee funds are a better investment than high fee funds. The research above furthermore gives no clear indication of what the effect of the current rules might be on fee setting by fund managers. The best way to approach this issue is from the empirical perspective.

5.2 Methodology: regressing TER in PPM on other factors in the PPM

Previous sections have given many insights in the height of fees and the changes that took place in the PPM since its inception. It remains unclear, which factors influence the height of the rebate most and if those factors also provide incentives for fund managers to change the management of their funds. To obtain better insight into the effects of the calculation method of the rebates in the PPM, the following regression is applied:

$$TERinPPM_{i,t} = \alpha_t + \beta TERexPPM_{i,t} + \gamma Return_{i,t} + \delta TNA_{i,t} + \varepsilon Inactive_{i,t} + \epsilon \qquad (3)$$

Where TERinPPM is the fee charged to pension investors for fund i at time t

TERexPPM the fee charged to retail investors for fund i at time t

Return is the demeaned annual raw return for fund i at time t[35]

TNA is the log of the size of fund i at time t

Inactive is a dummy that becomes 1 if fund i has no more TNA in the PPM within the next 12 months and hence is about to become inactive

For this analysis a total of 556 funds will be used. All funds for which TER ex PPM was unknown have been disregarded. Note that while funds might not be active outside the PPM, those funds nonetheless have a TER ex PPM. This is the fee the fund would charge without the rebate.

The inactive dummy is unobservable for pension investors. Rationale to add this dummy is to see if there is indeed a positive relation between funds that quit the PPM and their fees. All models will be estimated with fixed year effects. That means dummies for each year are added. This approach increases the Adjusted R-squared stats considerably[36]. It will also be checked if adding size dummies to the above regressions changes the results. The size of the dummies has been chosen following the intervals of the current fee regulation as in table 2.3. Three dummies were added to the system and the largest dummy was omitted since it was encoded naturally.

[35] The raw return equals the net return outside of the PPM. Return inside the PPM will not be used since that measure is not observed by the fund managers nor is it relevant for them.

[36] On the following link an extensive description of fixed effect models and the options stata offers to execute such calculation is provided: http://www.jblumenstock.com/courses/econ174/FEModels.pdf.

5.3 Results: the effects of factors on the fee inside the PPM

The estimates of the inactive dummy indeed indicate that fees of funds that are about to leave the PPM on average increase. There is a positive and significant relation between TERinPPM and the inactive dummy. This confirms the findings of the previous section. Question remains why the fees for funds that are about to stop participating to the PPM are slightly higher. One possible explanation might be that funds actually leave the system because their fees are relatively (too) high.

The results in table 9 indicate that TER ex PPM, TNA in PPM and returns have a significant effect on the TER in PPM. Section 3.2 already made clear that TNA in PPM and TER ex PPM should impact TER in PPM. TNA in PPM should have a negative relation to the fee in PPM and TER ex PPM a positive relation to the fee. Both relations are confirmed by the results.

The effect that raw returns have is indirect. Good returns would attract more TNA and bad returns would attract less TNA. Hence through the growth of TNA the returns might impact the height of the fee. Similar to the TNA in PPM, returns are actually negatively related to fees. If this is indeed the explanation why returns influence fees, this would imply at least some pension investors chase performance. To provide more credibility to this explanation, it has been controlled if lagged returns actually have a stronger effect. Lags of 1 and 3 months have been tested. Returns lagged 1 month produced only significant coefficient for regression 3 in table 9 and returns lagged 3 months were always insignificant (i.e. regression 3, 5 and 6 in table 9). R-squared decreased for all lags of 1 month to 0.717 and for 3 months to 0.642. These findings do not reinforce the assumption about the effect of returns on TNA. It remains nonetheless the most likely explanation given that the raw returns are measured over a longer period than all other variables and hence includes part of history.

Another explanation would be that funds that generate higher returns, charge higher fees. However, this explanation would require a positive relation between returns and TER in PPM.

It is further remarkable to notice that regressions with returns have much stronger explanatory power than any other combination. Regression 5 does not have more explanatory power than regression 3. In regression 5 TNA in PPM has even become completely insignificant.

For most regressions, the size dummies had no effect, in regression 6 there was a noteworthy change though. While the TNA in PPM was insignificant without the size dummies, with those dummies it became significant. This indicates that part of the explanatory power of TNA in PPM is related to these size dummies. Apparently if the majority of the funds is active within one interval, the impact of TNA in PPM on the TER in PPM reduces. Within an interval TNA in PPM has no effect. Table 4 indicated that most funds are active in the smallest interval.

This finding describes a possible tactic of fund managers to reduce rebates. Fund managers can run maximally 25 funds within the PPM. Depending on the amount of assets a fund managers controls, it is then optimal to have as many funds as possible in the lowest intervals. Assume a fund

management company has 25 billion of SEK under management and it would charge 1% of fee outside of the PPM. If this fund would have only one fund it would incur a rebate of 73%. However, if that same fund management group would divide its assets over 25 funds the total rebate would only be 55%. That saves this hypothetical fund management company 45 million SEK annually. This argument omits any possible benefits from economies of scale for larger funds. However, as Indro et al. indicated, growth for funds has advantages and disadvantages i.e. there is an optimal size. It remains hence unclear what the possible effect of such a growth in size could be. Therefore these aspects will not be discussed and I only look at the specific effect of the fee rebates.

The free cost withdrawal is also a factor that determines the fee within the PPM. The effect of free cost withdrawal has not been tested since the sample only includes equity funds, and only fixed income funds receive a different amount of free cost withdrawal.

5.4 Concluding remarks: small funds to avoid higher rebates

To draw any conclusions about possible actions of fund managers related to the rebate rules two other statistics, besides the presented results, are important.

1. The PPM represents about 12% of total assets of these fund managers
2. The majority of the funds own less than 1 billion SEK[37].

This information makes it unlikely that fund managers adapt their outside fees to increase gains for the PPM. It would however not be unlikely that size and sometimes performance is influenced in order to prevent higher rebates.

Concerning TER ex PPM. The fees are charged to customers that are mostly outside of the PPM. Increasing the fee, to obtain a higher fee after the rebate, will most likely not be beneficial. Retail investors are more price sensitive than pension investors. So while a higher gain is potentially made within the PPM, the loss will be larger outside the PPM. Fund managers are most likely more inclined to join the system with lower fee fund, given that the absolute rebate then remains lower.

Fund managers can have a large group of funds. This allows them to manage large pools of assets without incurring higher fee rebates. In a reaction to these rules, it seems likely that fund managers have decided to open more funds than they would normally. Since the inception of the PPM, the number of funds increased much. For fund managers it makes sense to keep their funds below the threshold of 1 billion SEK. The data indicates that most fund managers actually achieve this. Furthermore, for funds approaching the 1 billion threshold it might make sense to temporarily

[37] A closer look at the fund holdings in April 2010 actually shows that many funds control large pools of TNA divided over a number of different funds. E.g. Swedbank manages 46 funds with a total TNA 53.4 billion SEK. No funds are in the highest interval, 2 are in the interval that imposes a 85% rebate, 14 in the interval of rebates of 75% and the remaining funds in the lowest category. Likewise SEB manages 6.7 billion SEK in 21 funds. Only one fund incurs a rebate of 75%, all other funds are in the lowest interval of 65%.

reduce their returns. In doing that they would nonetheless run the risk that the more performance sensitive retail investors might leave the fund.

The impact of the rebates on fund managers' behaviour is hence mostly felt through the number of funds they manage and the size of those funds. Trying to reduce the rebates through fees outside of the PPM or returns, they run the risk of losing the more profitable clients outside the PPM.

Table 9: Internal Fees on External Fees, Returns, TNAin and Inactive

	(1)	(2)	(3)	(4)	(5)	(6)
TER ex PPM	0.395*	0.367*	0.361*	0.394*	0.361*	0.357*
(% of TNA)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
TNA in PPM		-0.022*			-1.57 e-04	-7.68 e-04*
(log)		(0.001)			(2.82 e-04)	(2.49 e-04)
Raw Returns			-2.70 e-04*		-2.69 e-04*	-1.92 e-04*
(annualized and demeaned)			(6.25 e-05)		(6.25 e-05)	(5.70 e-05)
Inactive				0.037*		
(dummy variable)				(0.004)		
Constant	0.234*	0.206*	-0.212*	0.237*	-0.212*	
	(0.006)	(0.006)	(0.002)	(0.006)	(0.003)	
Adjusted R-squared	0.621	0.643	0.843	0.621	0.843	0.849

In table 9 the coefficients and the robust standard errors of various regressions are presented. All coefficients that are significant at a level of 5% are marked with an asterisk. TER ex PPM is expressed as percentage of total assets, TNA in PPM is the log of the size of each fund and the returns have been annualized and consequently demeaned. Inactive is a dummy that indicates whether a fund will be active in the next 12 months. All coefficients indicate that the factors are significant, however estimated jointly they sometimes become insignificant (i.e. regression 5). The inactive dummy is significant and indicates a positive relation between fees and funds that become inactive. The difference between regressions 5 and 6 is that in regression 6 dummies for the size for each interval of the fee regulation have been added. Regression 5 does not include those size dummies. Therefore in regression 6 there is no constant mentioned.The results are based on a sample of 556 funds from April 2007 to April 2010.

6. Rebates: the Pension Investor Perspective

In this section the rebates will be assessed from the pension investors' perspective. It is interesting to investigate if the fees are large enough for pension investors to generate positive returns and beat the market consistently. This section will start with some background on previous research on investing. Consequently the methods for measuring performance will be explained and the results of these measures detailed.

6.1 Previous research: Investing a negative, zero or positive sum game

Sweden was among the first countries to implement a system with a central clearing house. It remains interesting if it will be successful and how we judge its success. For PPM participants the most important question remains if the discount on their fees will allow them to generate positive alphas after costs. If (Jensen's) alpha is significant and positive, then the strategy being considered has a history of generating returns on top of what would be expected based on other factors alone. Positive alphas would hence indicate gains larger than can be expected based on the risk profile. The more positive and significant alpha an investor can obtain, the higher his return.

Fama and French (2010) describe the market (and the financial world) as follows: suppose that when returns are measured before costs (i.e. fees and other expenses), passive investors get passive returns, that is, they have zero α (abnormal expected return) relative to passive benchmarks. This means active investment must also be a zero sum game - aggregate α is zero before costs. Thus, if some active investors have positive α before costs, it is dollar for dollar at the expense of other active investors. After costs, that is, in terms of net returns to investors, active investment must be a negative sum game. (Sharpe [1991] calls this the arithmetic of active management.)

Fama and French find that the value weighted portfolio of active funds that invest primarily in U.S. equities is close to the market portfolio, and estimated before expenses, has an α that relative to common benchmarks is close to zero. Since the value weighted portfolio of active funds produces α close to zero in gross (pre-expenses) returns, α estimated on the net (post-expenses) returns realized by investors is negative by about the amount of fund expenses. This implies that if a fund has positive α returns (pre-expenses), another fund has negative α returns (pre-expenses) i.e. a negative sum game (post-expenses). For the PPM investor living in such a universe this implies that on average he makes a loss.

In contrary to Fama and French, Berk and Green claim that we live in a different world. Berk and Green (2004) believe that high performance is rationally interpreted by investors as evidence of the manager’s superior ability. New money flows to the fund to the point at which expected excess returns going forward are competitive. This process necessarily implies that investors cannot expect to make positive excess returns. In their opinion, the response of fund flows to performance is simply evidence that capital flows to investments in which it is most productive.

Fama and French (2010) summarize the universe of Berk and Green as follows: in their world, a fund is endowed with a permanent α, before costs, but it faces costs that are an increasing convex function of AUM. Investors use returns to update estimates of α. A fund with a positive expected α before costs attracts inflows until AUM reaches the point where expected α, net of costs, is zero. Outflows drive out funds with negative expected α. In equilibrium, all active funds (and thus funds in aggregate) have positive expected α before costs and zero expected α net of costs.

6.2 Methodology: measuring performance of funds

The local and the global CAPM can be used to measure the performance of funds. The returns are measured on an equal and value weighted basis.

Equal Weights (EW)

To calculate the equal weights the number of funds per month is counted. Consequently to obtain the weight each funds gets assigned a weight of 1/total number of funds. Then the returns are multiplied by the weight to obtain the equal weighted returns.

EW fund returns indicate whether funds on average produce returns different from those implied by their exposures/risk to common factors in returns

Value Weight (VW)

Value weights can normally be assigned by calculating the total monthly TNA and dividing consequently the fund specific TNA by the total TNA. VW returns tell us about the fate of aggregated wealth invested in funds.

Nonetheless, given the available data this method has certain drawbacks. For the funds in the PPM there is no problem. TNA is known monthly for the entire period. However, to calculate the weight for returns of the funds outside of the PPM and the gross returns *tnaexppm* is only available on a quarterly basis and starting October 2002. Therefore I make the following assumptions:

- The quarterly weights serve as a proxy for the monthly weights.
- Returns are disregarded before 2002. This reduces the number of available observations to 100. For comparison, the same period will be used for EW returns.
- For robustness the returns are also measured with quarterly regressions. That will reduce the number of available observations to 30, giving less power to the calculations. It is not necessary to calculate the EW at a quarterly frequency since no assumptions were made for the EW returns.
- For the gross returns the weights are calculated by creating total TNA:

$$Total\ TNA = TNA\ in\ PPM + TNA\ ex\ PPM \quad (4)$$

- For the EW method 703 funds and for the VW method 639 funds are available.

After the weights have been calculated, the averages are estimated by multiplying each return with its weight and summing up the total monthly returns. This results in 100 observations for each EW and VW return. To ensure only the excess rate of returns is taken into account, from all these averages the risk free rate (STIBOR 1m) is subtracted regardless of the model applied.

The regressions to obtain the alphas are executed by using two different methods, respectively local and global CAPM. Furthermore various indexes are used as proxy for the market return.

Local CAPM

In this study I will apply Jensen's α (i.e. CAPM). Since for the global CAPM the indexes are denoted in different currencies, the currencies will also be specified for the local CAPM.

$$E(R_{i,SEK}) - R_{f,SEK} = \propto_i + \beta_i(E(R_{m,SEK}) - R_{f,SEK}) + e_i \quad (5)$$

Where $E(R_{i,SEK})$ is the expected return on fund i denoted in SEK

$R_{f,SEK}$ is the return on a Swedish risk free asset, i.e. STIBOR 1m

$\propto$ is the intercept in the regression model i.e. Jensen's Alpha

$R_{m,SEK}$ is the return of the market denoted in SEK

$\beta_i = \frac{Cov\,(R_i,R_m)}{Var(R_m)}$, is the systemic risk or sensitivity to the market excess return

e_i is the random error term

For this model the SIXPRX index and the MSCI AC World index denoted in SEK are used as proxies for the market. The MSCI AC World returns are provided in USD and exchanged to SEK. The model is hence applied in the following form:

$$E(R_{i,SEK}) - R_{f,SEK} = \propto_i + \beta_i(E(R_{SIXPRX,SEK}) - R_{f,SEK}) + \gamma_i(E(R_{MSCIAC,SEK}) - R_{f,SEK}) + e_i \quad (6)$$

Global CAPM

In essence this model works the same as the local CAPM. There is one large difference setting both methods apart. While in the Local CAPM all returns were in SEK, for the global CAPM returns can be denoted in different currencies. The model is originally used by Calvet et al. (2006). When comparing the MSCI index with the performance of the PPM funds, the returns are respectively denoted in USD and SEK. Consequently the risk free rate that is deducted is respectively T-bill 3 months and STIBOR 1 month. The general model is defined as follows:

$$E(R_{i,SEK}) - R_{f,SEK} = \propto_i + \beta_i(E(R_{m,USD}) - R_{f,USD}) + e_i \quad (7)$$

Where $E(R_{i,SEK})$ is the expected return on fund i denoted in SEK

$R_{f,SEK}$ is the expected risk free return of Swedish assets, i.e. STIBOR 1m

$\propto$ is the intercept in the regression model i.e. Jensen's Alpha

$R_{m,USD}$ is the return of the market denoted in USD

$R_{f,USD}$ is the risk free rate of American assets, i.e. T-bill 3m

$\beta_i = \frac{Cov\,(R_i,R_m)}{Var(R_m)}$, is the systemic risk or sensitivity to the market excess return

e_i is the random error term

For this model all regressions will be done using SIXPRX, MSCI AC World and the exchange rate of the USD to SEK. For the SEK/USD exchange rate the assumption was made that while exchanging, an investor would invest in the USD risk free rate. The specified model becomes:

$$E(R_{i,SEK}) - R_{f,SEK} = \propto_i + \beta_i\left(E\left(R_{SIXPRX,SEK}\right) - R_{f,SEK}\right) + \gamma_i\left(E\left(R_{MSCIAC,USD}\right) - R_{f,USD}\right) + \delta_i\left(E\left(R_{SEK/USD}\right)\right) + e_i \quad (8)$$

6.3 Results: the characteristics of the PPM universe

PPM investors want to generate positive returns. The best way to verify if the funds in the PPM return positive alphas before and after costs is by using CAPM. Fama and French in their analysis also use other factors than just the market (Fama French 3 factor model [1993] and Carhart 4 factor model [1997]). I will omit these models here since the factors (HML, SMB and MOM) are not available for Sweden.

The results for EW returns between 2002 and 2010 indicate that only the gross returns for the entire period have a t-coefficient which is significant for both models. This implies that fund managers are able to generate positive alphas before costs. Pension and retail investors are interested in returns after costs. In the local CAPM model, even the constant of the net in PPM is significant, on the contrary, in the global CAPM the net in PPM constant becomes insignificant. Both models have similar power according to the adjusted R-squared statistic. Apparently performance approaches the point of generating significant positive alphas, depending on the benchmark. In the shorter period both constants for the returns in PPM are insignificant. Pension investors should not expect to generate any positive alphas. Retail investors clearly cannot count on positive alphas. All alphas net ex PPM are insignificant for each model and period.

In the period from 2006 to 2010 all constants are insignificant. The data in this second period should be more accurate since I do not have to make any assumptions to calculate the net returns in the PPM. Both the net returns outside of the PPM and the gross returns are known since 2002 and are not affected by these assumptions. Nonetheless, also the t-stats of these returns declined. The cause of the change should hence be a different factor than the used assumptions. Given that the recent financial crisis heavily affected pension fund performance in 2007 and 2008 the likelihood of generating positive alphas must have declined overall. The annual alphas in table 13 confirm that during 2008, indeed some negative alphas were generated. The coefficients of the factors are very

similar for both periods. This implies that the assumptions made to estimate the fees were correct enough and give a good picture of reality.

As Fama and French (2010) explain, the intercepts for EW fund returns indicate whether funds on average produce returns different from those implied by their exposures to common factors in returns. Whereas VW returns tell about the fate of aggregate wealth invested in funds.

Table 11 presents the VW returns and shows a partially different picture than the EW returns. The constant of the gross returns for the global CAPM is still significant, even between 2006 and 2010 i.e. fund managers generate positive alphas before costs. The local CAPM however shows that even before costs, both investors do not receive significant returns. All returns after costs are insignificant. Nor pension nor retail investors should expect positive returns after costs.

The EW returns showed that the exposure to the markets of retail and PPM investors are similar. The VW returns indicate that the preferences of both investors are different. The funds outside of the PPM have a stronger positive relation with the MSCI than the funds in the PPM. Those on the contrary show a stronger positive relation with the SIXPRX, which only includes Swedish funds. A high correlation with the MSCI was expected from the information in figure 16 and also from the EW returns. Swedes have the possibility to invest in global funds but clearly prefer Swedish funds as indicated by the high(er) degree of correlation with the SIXPRX for the VW results. Swedish pension investors are more inclined to invest in funds from their own country and hence suffer from a home bias.

The consequences from pension investor investment choices are reflected in the VW alphas. The EW returns indicate that for the same risk exposures, the alphas of pension investors are higher. However all VW returns for the pension investors are lower than those of the retail investors. Pension investors do not invest as well as the retail investors.

The rationale to include the quarterly returns is that by providing the quarterly results, no assumptions for the VW are made since TNA ex PPM is available at a quarterly frequency. These results are hence used to check for robustness. Downside is that the amount of observations decreases. The differences inside and outside of the PPM are underlined more strongly in the quarterly results. For the local CAPM the constant of the SIXPRX is even insignificant for the gross and net ex PPM returns. While I would say that the little number of observations actually impedes drawing any strong conclusions from this data, the adjusted R-squared of all regressions have increased. In general, the quarterly returns are in line with the monthly returns. The assumptions alter the coefficients slightly but the conclusion based on those results would remain the same. Therefore it is concluded the assumptions for the monthly estimates are sufficiently reliable.

6.4 Concluding remarks: PPM investing a zero sum game with bad investment choices

The results of the EW and VW regressions show that the pension investors, despite their rebates, invest in a Berk and Green world. The alphas they obtain are insignificant and this indicates they cannot beat the market and that their alphas are not different from zero. Pension investors cannot expect positive returns after costs and on average receive negative returns. Investing in the PPM universe is a zero sum game where money flows to those most skilled, most lucky or both.

PPM investors make wrong investment choices as clearly reflected in the EW and VW returns. EW returns indicate better returns for pension investors for the same risk exposure but the VW returns show pension investor obtain lower returns than retail investors since they do not invest their money well.

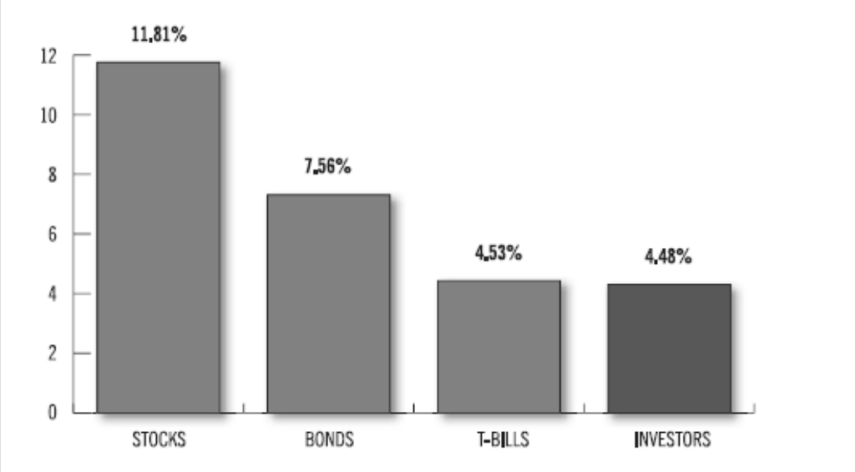

Figure 17: Annualized returns in the US between 1988 and 2007.

Pritchard (2008) confirms the tendency of pension investors to make bad investment choices in the US market. In figure 17 the returns of pension investors are lower than the risk free rate on the US market. Pritchard concludes that individual investors do a poor job managing their investments. 401(k) participants are investors turbo-charged with an on-line trading platform without commissions and tax consequences. A recipe for disaster.

According to Pritchard the best solution to prevent low returns for pension investors are advisor-managed portfolios. Traditional DB pension plan achieved proper asset allocation by utilizing the expertise of professional investment advisors and following the Modern Portfolio Theory. Advisor-managed portfolios free participants from the asset allocation burden but allow self-direction. Such portfolios provide well-diversified, risk-based portfolios. Each portfolio is a single-choice, all-or-nothing option. Participants only determine their individual comfort with risk. The current default fund actually fulfils those requirements and could be used as the preferred advisor managed portfolio of the PPM.

Table 10: Monthly EW Returns

	Local CAPM				*Global CAPM*		
October 2002 to April 2010, 100 months, 703 funds							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
*12 * a*	2.066	2.489	4.022	*12 * a*	1.667	2.097	3.609
	1.77	2.14	3.44		1.45	1.83	3.14
b	0.269	0.268	0.274	*b*	0.230	0.230	0.234
SIXPRX [SEK]	9.39	9.38	9.54	*SIXPRX [SEK]*	7.20	7.20	7.30
c	0.768	0.769	0.764	*c*	0.825	0.825	0.824
MSCI AC World [SEK]	18.83	18.91	18.68	*MSCI AC World [USD]*	17.93	17.98	17.89
d				*d*	0.077	0.076	0.079
USD/SEK				*USD/SEK*	2.48	2.44	2.56
Adjusted R-squared	0.959	0.959	0.959	*Adjusted R-squared*	0.961	0.961	0.961
Januaryy 2006 to April 2010, 51 months, 609 funds							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
*12 * a*	0.618	1.318	2.524	*12 * a*	0.357	1.060	2.269
	0.33	0.71	1.38		0.20	0.59	1.27
b	0.288	0.287	0.293	*b*	0.251	0.251	0.257
SIXPRX [SEK]	6.92	6.90	7.11	*SIXPRX [SEK]*	5.55	5.53	5.72
c	0.782	0.783	0.783	*c*	0.819	0.820	0.819
MSCI AC World [SEK]	12.30	12.30	12.42	*MSCI AC World [USD]*	12.51	12.5	12.61
d				*d*	0.080	0.079	0.078
USD/SEK				*USD/SEK*	1.80	1.79	1.78
Adjusted R-squared	0.949	0.949	0.950	*Adjusted R-squared*	0.951	0.951	0.952

In table 10 the estimates and accompanying t-stats of the monthly equal weighted returns of the local CAPM and global CAPM for funds participating to the Swedish PPM are presented. There are three different type of measures, namely net returns ex PPM, net returns in PPM (i.e. with the rebate and administrative fee) and gross returns. The two different time periods have been chosen since from February 2006 all TER are known on a monthly basis while before these are only known at a irregular frequency. The shorter period should hence provide more reliable results. The constants of the gross values for the period from October 2002 for both methods and the net returns for pension investors in the local CAPM are statistically significant. Those returns hence generate positive alphas. In general the t-stats of the second period are much lower. From economic intuition one could assume that the influence of the crisis in this period is much larger and it was hence more difficult to generate positive alphas. While focusing on the longer period, it becomes clear that after costs it remains fairly difficult to generate any positive and significant alphas. Therefore it seems the PPM exists in a Berk Green universe. This is a universe where after costs active investing is a zero sum game. Pension investor should, despite their rebates, not expect to generate any positive alphas after costs.

Table 11: Monthly VW Returns

	Local CAPM				*Global CAPM*		
October 2002 to April 2010, 92 months, 639 funds							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
*12 * a*	4.004	2.946	5.772	*12 * a*	4.692	3.442	6.385
	1.53	1.48	2.61		1.80	1.76	2.95
b	0.238	0.400	0.299	*b*	0.200	0.362	0.252
(SIXPRX [SEK])	3.68	8.12	5.46	*SIXPRX [SEK]*	2.80	6.77	4.26
c	0.708	0.495	0.616	*c*	0.752	0.544	0.676
(MSCI AC World [SEK])	7.53	6.92	7.73	*MSCI AC World [USD]*	7.43	7.16	8.07
d				*d*	-0.591	-0.450	-0.521
(USD/SEK)				*USD/SEK*	-6.87	-6.51	-7.32
Adjusted R-squared	0.799	0.876	0.845	*Adjusted R-squared*	0.802	0.882	0.854
January 2006 to April 2010, 52 months, 596 funds							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
*12 * a*	3.018	1.819	4.242	*12 * a*	3.967	2.530	5.078
	1.11	1.15	1.75		1.44	1.48	2.07
b	0.299	0.431	0.313	*b*	0.271	0.422	0.285
(SIXPRX [SEK])	4.82	12.00	5.67	*SIXPRX [SEK]*	4.07	10.18	4.81
c	0.794	0.626	0.738	*c*	0.794	0.605	0.738
(MSCI AC World [SEK])	8.37	11.39	8.72	*MSCI AC World [USD]*	8.41	10.29	8.78
d				*d*	-0.616	-0.477	-.0564
(USD/SEK)				*USD/SEK*	-6.59	-8.19	-6.77
Adjusted R-squared	0.895	0.964	0.910	*Adjusted R-squared*	0.895	0.958	0.910

In table 11 the estimates and accompanying t-stats of monthly value weighted returns for the local CAPM and global CAPM for funds participating to the Swedish PPM and the retail market are presented. There are three different type of measures, namely net returns ex PPM, net returns in PPM (i.e. with the rebate and administrative fee) and gross returns. The two different time periods have been chosen since from February 2006 all TER are known on a monthly basis while before these are only known at a irregular frequency. The shorter period should hence provide more reliable results. The measurements could only start in October 2002 because before that period the TNA outside of the PPM and the administrative fee was unknown. All after costs constants have become insignificant, that indicates that fund managers seem unable to beat the market after costs. In the global CAPM the fund managers seem to be able to generate positive returns before costs, confirming the EW results. Pension and retail investors should not expect to make any unexpected returns based on their risk profile. It becomes apparent from these measures that the focus within the PPM is clearly different from the focus outside of the PPM. While there are many similarities between the net ex PPM and the gross measure, the net in PPM is different and shows a strong positive relationship with the Swedish index. The results also show us that the funds by dollars invested are more correlated to a world than a Swedish index for PPM investors.

Table 12: Quarterly VW Returns

	Local CAPM				*Global CAPM*		
October 2002 to January 2010, 30 quarters, 639 funds							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
*12 * a*	2.136	1.976	7.470	*12 * a*	6.407	4.833	11.002
	0.41	0.56	1.63		0.99	1.18	2.17
b	0.235	0.390	0.305	*b*	0.121	0.274	0.180
SIXPRX [SEK]	3.00	7.34	4.38	*SIXPRX [SEK]*	0.99	3.36	1.77
c	0.916	0.689	0.784	*c*	1.018	0.799	0.907
MSCI AC World [SEK]	8.46	9.40	8.17	*MSCI AC World [USD]*	6.49	7.64	6.98
d				*d*	-0.821	-0.609	-0.718
USD/SEK				*USD/SEK*	-6.44	-7.17	-6.79
Adjusted R-squared	0.936	0.917	0.945	*Adjusted R-squared*	0.914	0.959	0.936
January 2006 to January 2010, 17 quarters, 596 funds							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
*12 * a*	4.901	5.901	9.590	*12 * a*	7.251	7.474	11.738
	0.60	1.14	1.25		0.86	1.54	1.52
b	0.270	0.398	0.283	*b*	0.147	0.282	0.161
SIXPRX [SEK]	2.31	5.43	2.59	*SIXPRX [SEK]*	1.05	3.50	1.25
c	0.875	0.726	0.825	*c*	0.977	0.822	0.928
MSCI AC World [SEK]	5.13	6.80	5.20	*MSCI AC World [USD]*	5.29	7.72	5.47
d				*d*	-0.689	-0.550	-0.647
USD/SEK				*USD/SEK*	-4.13	-5.71	-4.22
Adjusted R-squared	0.925	0.971	0.931	*Adjusted R-squared*	0.926	0.976	0.934

In table 12 the the estimates and accompanying t-stats of the quarterly VW returns of the local CAPM and global CAPM for funds participating to the Swedish PPM are presented. There are three different type of measures, namely net returns ex PPM, net returns in PPM (i.e. with the rebate and administrative fee) and gross returns. The two different time periods have been chosen since from February 2006 all TER are known on a monthly basis while before these are only known at a irregular frequency. The shorter period should hence provide more reliable results. The reason to also include quarterly values is that no assumptions have to be made concerning the TNA outside of the PPM which is only available on a quarterly basis. The quarterly results show a similar tendency to the coefficient of the markets of the monthly VW returns. However, since the number of observations has decreased, it appears the results for the quarterly regressions have become more extreme (e.g. the SIXPRX is sometimes no longer significant in some instances and the constants for the short period have become larger). It is remarkable to see that the Adjusted R-squared stats of these quarterly returns are all higher than those of the monthly VW returns.

Table 13: Annual Alphas of EW and VW Returns

	Local CAPM				*Global CAPM*		
Monthly EW Returns							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
2006	-2.001	-1.723	-0.430	*2006*	1.115	1.396	2.939
	-0.50	-0.22	-0.05		0.27	0.34	0.68
2007	5.535	6.056	7.312	*2007*	8.099	8.565	9.992
	1.72	1.88	2.27		2.20	2.36	2.66
2008	-1.253	-0.307	0.832	*2008*	-0.260	0.688	1.800
	-0.23	-0.06	0.16		-0.05	0.13	0.35
2009	5.892	6.775	7.524	*2009*	3.990	4.872	0.470
	1.14	1.31	1.47		0.59	0.73	0.84
Monthly VW Returns							
	Net ex PPM	*Net in PPM*	*Gross*		*Net ex PPM*	*Net in PPM*	*Gross*
2006	0.171	1.772	1.881	*2006*	0.902	4.050	2.678
	0.03	0.54	0.36		0.20	1.43	0.67
2007	9.651	6.426	10.324	*2007*	10.470	7.103	10.952
	2.05	2.67	2.42		2.18	2.8	2.54
2008	1.883	-0.118	2.983	*2008*	2.798	-0.454	3.884
	0.22	-0.26	0.40		0.32	-0.09	0.50
2009	11.317	5.357	11.427	*2009*	8.635	4.394	9.191
	1.58	1.49	1.85		1.24	0.78	1.45

In table 13 the yearly alphas and t-stats based on monthly EW and VW returns of the period between 2006 and 2009 are presented. The year 2010 and quarterly regression are excluded since there are too little observations to run a regression. The alphas indicate that in 2006 and even more in 2008 it was difficult to generate positive alphas for the funds. It is furthermore remarkable to see that while for the EW returns, returns are always more positive for pension investors for the VW returns, the retail investors actually obtain more positive returns. Results are based on the returns of 609 and 596 funds for the equal and value weights respectively.

7. Investor (In)attentiveness

In this section it will be analyzed whether pension investors are less attentive than retail investors. This will be done by gauging the reaction of both type of investors to the performance of the funds. So, do funds flow into (out of) funds that have performed well (poor) in the last months? To start an overview will be presented of previous research on the flow-performance relationship. Afterwards the methodology will be explained and the results presented.

7.1 Previous Research: the flow-performance relationship

Chevalier and Ellison (1997), Sirri and Tufano (1998), and Huang et al. (2007) have identified a convex flow-performance relation: mutual fund investors tend to invest in funds with stellar performance and do not penalize poor performance equivalently. Their research is all based on the U.S. Equity market. According to Huang (2007) the model used to prove this relationship is based on two assumptions: First, investors learn about unobservable managerial ability from realized fund performance. This assumption, common to most existing models of mutual fund flows, implies that fund flows chase after past performance due to investors' Bayesian updating process. Second, investors face participation costs when investing in mutual funds. They show that participation costs can lead to different flow responses at different performance levels and can cause cross-sectional variations in the flow-performance relationship.

The first assumption applies to the PPM, the second less. Switching costs of the PPM are low and these 'participation' costs might not withhold investors from trading. A lack of trading can originate from a lack of knowledge or motivation. Dahlquist and Martinez (2010) analyzed the Swedish pension system and concluded that investor inattention is a hidden cost of choice.

The analysis of Huang et al. (2007) is based on actively-managed domestic equity mutual funds. They eliminate balanced, bond, money market, international, and index funds. This corroborates the selection of only equity funds that has been made. Main differences between both studies are the focus of Huang on the U.S. equity market and the number of observations[38].

One interesting aspect of the dataset of the PPM is that there is actually information available on two different groups that invest in the same funds. On the one side there are the PPM participants which have low knowledge of investing but face low trading costs and fees. On the other side, there are retail investors investing which are in general characterized by increased knowledge compared to the PPM participants. They do face higher trading costs and fees. It is hence possible to compare the flow-performance relation of both groups and analyse the differences.

Dahlquist and Martinez (2010) explored how retail and pension investors respond to past fund performance. Dahlquist and Martinez state: as the funds offered in the PPS are also offered to retail investors, our comparison of the flow-performance relationship for retail versus pension investors is direct and explicit. If pension investors are particularly inattentive, as the literature suggests, they would expect the flow-performance relationship to be less convex for the pension investors. Flow performance is a proxy for investor inattentiveness based on the assumptions that first of all survey evidence indicated that returns are the primary reason why investors switch funds. Secondly, Berk and Green (2004) concluded that if the only fund information that investors possess is

[38] The sample of the analysis of Huang is taken over a longer period from 1981 to 2001.

past performance, and they rationally use it to infer manager skill, fund assets should chase performance.

The results of the analysis of Dahlquist and Martinez indicate that pension investors respond less than retail investors to past performance. Pension investors are less attentive. Dahlquist and Martinez give an extensive description of the consequences of the behaviour of pension investors by using the Robur Contura fund as an illustration. In this case, pension investors invested in the Robur Contura fund at the inception of the PPM when the fund generated high returns. When performance dropped afterwards, few persons switched funds. Consequently the investors not only made losses but also missed out on higher returns of other funds. This case illustrates that pension investors achieve inferior investment performance due to their lower responsiveness.

Dahlquist and Martinez suggest that the Swedish Pension System could be improved by introducing a "back to default" clause for "active" investors who do not confirm their choice of last year. Losses from investor inattentiveness will be prevented because the investor automatically moves to the default fund. It will provide incentives for the fund managers to improve their performance and generate returns similar to the return of the default fund. Most likely, given the pension investor inattentiveness these returns should even be so remarkably positive as to be able to attract the attention of the pension investors.

7.2 Methodology: measuring responsiveness of investors

In this section I follow the example of Dahlquist and Martinez (2010) since their approach is appropriate for my objectives. Their analysis is based on a sample of 283 equity funds in the PPM between October 2000 and July 2008. The difference in the number of funds that are used is due to the fact that the data is compiled from different sources. I expect to get results similar to the findings of Dahlquist and Martinez.

Dahlquist and Martinez explain that they only gauge the cost of poor investments by assessing risk adjusted returns. They do not consider the cost of selecting a portfolio with a risk-return profile that does not correspond to the risk appetite of the investors (e.g. Brennand and Torous, 1999, and Benartzi and Thaler 2001). They neither assess the cost of choosing under diversified portfolios (e.g. Canner et al., 1997, and Calvet et al., 2006).

Dahlquist used two methods to calculate flows. Absolute flow is defined as the quarterly change in total net assets minus appreciation. This is given by:

$$AbsoluteFlow_{i,t} = TNA_{i,t} - TNA_{i,t-1}(1 + R_{i,t}) \quad (9)$$

This measure captures the fund growth in excess of the growth that would have occurred if no new funds had flowed in but dividends were reinvested. Since this measure is positively related to fund

size, given that larger funds attract higher inflows regardless of performance, a measure to compensate for this tendency is required.

Relative flow is defined as the absolute flow relative to the total net assets:

$$RelativeFlow_{i,t} = AbsoluteFlow_{i,t} \,/\, TNA_{t-1} \tag{10}$$

This measure controls for a potential size effect. The change in flow will be measured on a quarterly basis due to availability of data. According to Dahlquist and Martinez, these quarterly results should not be seen as a significant restriction. Many studies of the flow-performance relationship use annual data.

Huang et al. (2007) analyzed the flow and performance relationship in the US equity market and applied another measure. This measure is the flow of the fund relative to TNA of the fund:

$$RelativeFundFlow_{i,t} = AbsoluteFlow_{i,t} \,/\, TNA_{i,t-1} \tag{11}$$

This measure, as Dahlquist notes, is (often) volatile. Therefore it is suggested to exclude smaller funds or to winsorize the distribution[39]. Dahlquist and Martinez discussed this method but decided not to apply it[40]. The preference to include all funds led to the decision not to include this measure[41].

Dahlquist and Martinez (2010) use the following regression to estimate the relationship between flow and performance:

$$Flow_{i,t} = \alpha_t + \beta Performance_{i,t-1} + \gamma^t Controls_{i,t-1} + \varepsilon_{i,t} \tag{12}$$

Where $Flow_{i,t}$ is either the absolute or relative flow and $Performance_{i,t-1}$ is a performance measure of fund *i* at date *t-1.* As performance measure (annual) raw returns, (annual) risk adjusted returned and rankings are used. The ranking ranges from 0 to 1 and is based on annual raw returns. Another performance measure that is also discussed in the paper of Dahlquist are risk adjusted returns. Dahlquist applied this performance measure and indicated that results were in line with the other results. The results were however not presented. In this analysis the risk adjusted returns will be presented and discussed.

[39] Huang et al. (2007) actually winsorized the top and bottom 1% of their observations.

[40] Dahlquist and Martinez motivate their choice as follows: A fund's absolute flow relative to its total net assets is very volatile, particularly for small funds. Accordingly, some studies apply filters to exclude small funds. We prefer to include as many funds as possible, but to evaluate the flow-performance relationship using more robust flow measures. Using the relative fund flow measure typically yields intermediate results, lying between those obtained using absolute and relative flows.

[41] Test have been run with this relative fund flow measure on the database, among others after winsorizing 2,5%, however all performance measure became insignificant.

To estimate risk adjusted returns, I applied an approach similar to the one detailed by Gil-Bazo et al. (2008). In contrary to Gil-Bazo et al. I will only estimate Jensen's Alpha by using market returns as the single risk factor. To proxy for the market return I used the SIXPRX index and the MSCI index. To obtain a panel of fund risk-adjusted performance estimates, the following two stage estimation procedure is suggested by Gil-Bazo.

In the first stage, for every month of the analysis fund excess returns[42] are regressed on the factors, where at least 24 observations are available. The coefficients of the proxies will be used to estimate the implied return of each fund over time. Then, in the second stage the funds' risk adjusted performance in each month is estimated as the difference between the funds' excess return and the realized risk premium.

Dahlquist and Martinez used a different measure for returns for pension investors. Dahlquist applied returns that are observed (i.e. net returns ex PPM). However pension investors actually receive a rebate and inherently have lower costs and higher returns. To account for both types of returns the pension investors receive in this analysis both the true return (i.e. including the rebate and administrative fee) and the observed return will be provided.

The $Controls_{i,t-1}$ suggested by Dahlquist are the log of total net assets of a fund and a dummy variable for the quarter money is injected interacting with the log of total TNA. All the control variables are lagged 3 months, except if specifically mentioned otherwise. TNA has been taken as the log of TNA in millions SEK. The relative flows are expressed in percentages since these indicate the absolute flow relative to the total net assets.

Dahlquist and Martinez add the dummy since they assume money is injected once a year into the PPM. The impact of the inflow of money, at which moment rebates are distributed to the system, is large. This dummy should mitigate this effect.

Dahlquist introduces the MoneyInflow dummy by mentioning that new money is injected to the PPM once each year. However, new funds flow into the PPM twice a year as explained in section 3.1 Dahlquist and Martinez seem to only take into account the rebate redistribution, given the moment they indicate the inflows takes place. The dummy in this study indicates both inflows (i.e. pension credit and rebates).

Some tests have been run to determine whether it is best to work with a single dummy that indicates both types of inflow or with two separate dummies. The results provided by the single dummy were the only results that were significant. Furthermore, some tests were performed with this dummy interacting with the fund's TNA instead of the total TNA. Funds differ in size and depending on their size, total inflow to a fund changes. Results of the dummy interacting with the

[42] The fund excess return refers to the raw return minus the risk free rate, in this case 1 month STIBOR.

funds total TNA provided higher Adjusted R-squared stats and both methods returned significant t-stats. Based on these results the approach with the dummy that indicated both moments of inflow and that interacts with the funds' TNA has been selected.

A final control variable that Dahlquist uses are lagged flows. The economic rationale for including lagged flows is unclear; it is a way to statistically control for observed persistence in flows. The coefficients of lagged flows in their study are significant in the retail market but not in the PPM in their research. Including the lagged flows makes the difference in responsiveness of pension and retail investors to flows smaller. Similar effect should be expected in this analysis. In this sample a lag of 6 months for the flows gave more significant coefficients and increased Adjusted R-squared for the results. Hence a lag of 6 months will be applied.

Huang et al. (2007) in contrary to Dahlquist and Martinez use a different performance measure and extra control measures. As a performance measure they include a ranking which assigns funds to certain investment objectives to classify those to high (top quintile), medium (3 middle quintiles), and low performance groups (lowest quintile). The rankings of Huang are furthermore based on 3 year returns. Huang also considers participation costs. To estimate the impact of participation costs on the flow-performance sensitivity at different performance levels, they let the performance rank interact with a proxy for lower participation costs$\left(LPC_{i,t-1}\right)$.

As control variables Huang et al. suggest to use the total risk of a fund measured by the standard deviation of returns over the performance estimation period, fund age measured by the natural logarithm of (1 + age) and its interaction with performance, and the lagged total fee ratio. According to previous studies other non–performance-related variables also affect flows and their sensitivity to performance. Given that the results of Dahlquist and Martinez were significant it is most likely not necessary to include any of the measure chosen by Huang. If the results are however not as expected it might be worth considering these measures.

In addition to previously deleted funds due to lack of history or unreliable estimates, for this analysis all funds have been deleted that have no TNA outside of the PPM. This approach is chosen since retail investor cannot invest in for example the AP7 funds. Including such funds would reduce the comparability of the responsiveness of both types of investors. 512 funds are available for this analysis during the entire period. This method has the downside that it does not fully represent the switching that takes (or does not take) place within the PPM. For example, the default fund of the PPM has to be disregarded due to the previous decision. Given that the AP7 funds are the default fund and it is generally not chosen actively, discarding this fund from the analysis, would actually overestimate the degree of attentiveness from pension investors. Nonetheless, to make the estimates as comparable as possible this approach is the preferred.

The cross sectional flow-performance sensitivity estimated in each quarter is likely to be auto correlated. To account for this problem robust standard errors will be calculated.

To account for any possible fixed quarter effects, a fixed effects model will be used for the estimations. Comparison between the fixed effects model and an ordinary linear regression indicated that the fixed effects models have stronger explanatory power. To obtain results for each quarter (except one) a dummy is added similar to the method applied for the regressions in section 5. The coefficients of these dummies will not be provided.

7.3 Results: retail and pension investor (in)attentiveness

In general the results are in line with previous studies. Those document a convex flow performance relation and that pension investors are inattentive compared to retail investors. All performance measures show that retail investors react stronger to past performance. The statistically significant results of the rankings show that while both types of investors react to performance, the reaction of the retail investors is stronger. If a fund moves up from 0 to 1 in past ranking, that leads to an extra inflow of 1.78 million SEK for retail investors and 0.07 million SEK for pension investors in the consequent quarter.

The trend is similar to the results of Dahlquist, however the reaction he documented was different, a move up in past ranking leads to an extra inflow of 0.64 million SEK for retail investors and 0.15 million SEK for pension investors. An explanation for this difference could be the number of funds included. The number of funds included in this analysis is almost the double of Dahlquist. It is hence possible that the difference between the worst and best performing fund is larger and this explains the difference between the measured reactions for retail investors.

The crisis might also impact the results. Therefore, therefore I present estimates with the same cut-off point as is chosen in the analysis of Dahlquist (i.e. June 2008). The results change indeed. The retail investors in the shortened period react with an inflow of 2.60 million SEK and the pension investors with 0.13 million SEK when moving up in rank from 0 to 1. The difference for the retail investors becomes larger but the pension investors exhibit a similar reaction to Dahlquist's in the shortened period.

The coefficients for the relative flows regressed on rankings are all significant. I can reject that the reaction in both markets is the same[43]. Regressions in system III indicate that retail investors reward moving up from rank 0 to 1 in this quarter with an inflow of 0.016% of all assets managed in the upcoming quarter. For pension investors that amount equals 0.006%. Dahlquist documents

[43] Dahlquist results for relative flows regressed on ranking are insignificant in the pension market and he can hence not reject that the reaction between retail and pension investors is equal and merely judges about the economic effect.

inflows of respectively 2.3% and 1.0% for the same move up in rank. It remains unclear why the reaction for the absolute flow is stronger and for the relatively flow weaker compared to Dahlquist's findings. The shortened period without the impact of the crisis document a stronger reaction (0.026% and 0.012% respectively) but the difference remains large.

The results for the log of TNA and are similar to Dahlquist's for the retail market for the entire period. They indicate a negative relationship between flows and TNA. Larger funds tend to lose more assets than do smaller funds, as implied by the negative coefficients. Dahlquist's coefficients on the retail market are significant, mine are not. The shortened period exhibits positive and negative coefficients for the log of TNA.

In the pension market first of all is there a positive relation between flows and TNA. Larger funds hence receive more funds than smaller funds. The functioning of the PPM confirms that funds that have larger TNA will also have larger inflows through the distribution mechanisms of the PPM. However, it should have actually been the money inflow dummy that captured the effect of these inflows. In contrary to expectations, the money inflow dummy is negative. There is no obvious explanation for the observed coefficients.

In tables 16 and 17 the results of the regressions with annual raw returns are presented. Results in table 16 indicate that the coefficients for the pension market are insignificant. However, in table 17 the coefficients are significant in system I, II and IV. Otherwise, the reactions are similar to previous findings. A 1% increase in annual returns in the past quarter would lead to an inflow 36,000 SEK into the retail market in the current quarter. The equivalent for the pension market would be 710 SEK. The difference in responsiveness is larger. Dahlquist's study documented inflows of respectively 1.3 million SEK and 0.25 million SEK. The estimates in table 17, without the period of the crisis included, indicate an inflow of 50,000 and 2,000 SEK respectively. While both results indicate that retail investors respond stronger to performance, the cause of the large difference between the study of Dahlquist and this study remains unclear. The crisis had its impact given the difference in both results, but is clearly does not solve this puzzle.

Finally in tables 18 and 19 the results for the regressions with the risk adjusted returns are presented. These results resemble the raw returns. All performance coefficients are insignificant for the pension market, except for the second system in the shorter period. There is a stronger reaction to performance in the retail market. A 1% increase in risk adjusted returns will lead to an inflow of 49.000 SEK in the retail market and an inflow of 250 SEK in the pension market during the entire period. Retail investors are more aware of risk adjusted performance.

The adjusted R-squared statistics for all types of measures are similar. In general the relative flows increase the power of the models for the pension market. A similar reaction is not noted on the retail market. In that market the addition of the lagged flows affects the adjusted R-squared.

Indicating there is more persistence in flows on the pension market. The lagged flows are besides in general only significant in the retail market.

The differences between the measures for the observed and true returns on the pension market are small. The coefficients of the regressions on ranking show that the true measure exhibits less responsiveness. That the coefficient for the true measure becomes smaller is logical. Higher returns are regressed on the same flows, so responsiveness decreases. It is noteworthy that there is (almost) no difference between the responsiveness to raw returns and risk adjusted returns for both measures. This implies that the discount pension investors receive would not lead to any change in behaviour. The results do not show that pension investors understand that the rebate provides a large gain in the long term.

The previous results do not provide any possibility to judge if the flow-performance relationship is convex. To gain more insight into this flow performance relation a piecewise linear model has been estimated. The analysis has been done by creating two new variables: one variable that only yields positive returns or zeros. The other variable includes negative returns or zeros. By regressing this positive and negative variable on the flows, the specific reactions to positive and negative returns are measured. The breakpoint of these regressions has been chosen at 0. As Dahlquist explains the choice of the breakpoint is ad hoc but allows easy interpretation of the results.

The results of these regressions are presented in tables 20 and 21. Retail investors always have a significant reaction to positive returns. In a few cases they also show to respond significantly to negative performance. However, in those cases the reaction to negative performance is always smaller than to positive performance. In the shortened period in system I and III, retail investors appear to react stronger to negative performance. However, the reaction to positive performance in those systems is significant, while the reaction to negative performance is insignificant. Retail investors hence exhibit a convex flow performance measure.

The results for pension investors are different. In the period including the crisis they do not react significantly to positive or negative performance. Though statistically insignificant, they even respond stronger to negative performance according to the coefficients. The shortened period shows a picture that is more in line with literature. The reaction to positive performance is significant in system II. Furthermore, the reactions to positive performance are in system I, II and III larger than to negative performance. Hinting at a convex flow performance relationship, but it is far less clear than in the case of retail investors.

All other results of the piecewise linear regressions show a similar pattern as discussed for the previous regressions and will hence not be discussed.

7.4 Concluding remarks: pension investors are inattentive

The main findings of the previous section are that pension investors are clearly less attentive than retail investors. Four different performance measures have been tried and each time the retail investors react stronger to past performance than pension investor. This makes it doubtful if pension investors understand how to respond to developments the market.

While comparing this study to Dahlquist's two facts are remarkable: in most cases the responsiveness to performance in this study is much smaller than in Dahlquist's study. Furthermore, the difference in responsiveness between both types of is investors larger in this study. There are three factors different between both studies: the number of funds included, the period between 2000 and 2002 and the period between 2008 and 2010. The only difference that could be controlled for is the last factor. It showed that the difference between both studies became smaller but remained large by excluding the period from June 2008 to 2010 from the analysis. More important though is that while there are remarkable differences in the absolute results, the qualitative conclusions drawn based on those results in both studies are in line. It is hard to determine why these results show such differences. More detailed information would then be required concerning Dahlquist's study.

Finally, the retail investors clearly exhibit a convex flow performance measure. Retail investors hence react more to positive performance than to negative performance. For pension investors this relationship is not as clear, but the results of the shortened period do hint at a convex flow performance relationship even for the pension investors.

Results also indicate that it is possible that the investors in times of crisis react too quickly to performance. They do not have the patience to wait nor the knowledge to assess what happens in the market. Therefore their reaction is so strong and so volatile it affects the estimates for the entire period as is indicated by the large difference in results of both periods. This implies that during a crisis pension investors in panic react excessively. Making it even more disadvantageous to let pension investors invest their own savings during a crisis. The alphas in table 13 actually point in the same direction. The VW returns for pension investors are by far the worst in 2008.

Table 14: Flows on past performance - rankings - October 2002 to March 2010

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Ranking	177.652*	6.946*	7.059*	141.641*	6.520*	6.660*	1.60 e-04*	6.21 e-05*	6.26 e-05*	1.40 e-04*	6.26 e-05*	6.31 e-05*
(lag 3m)	(25.878)	(2.774)	(2.748)	(25.903)	(2.829)	(2.811)	(2.25 e-05)	(2.63 e-05)	(2.61 e-05)	(2.35 e-05)	(2.63 e-05)	(2.62 e-05)
Flows				0.148*	0.025	0.025				0.090*	-0.004	-0.004
(lag 6m)				(0.033)	(0.044)	(0.044)				(0.041)	(0.030)	(0.030)
TNA	-7.222	2.885*	2.883*	-10.775	2.805*	2.802*	-1.69 e-06	3.98 e-05*	3.98 e-05*	-3.96 e-06	4.00 e-05*	4.00 e-05*
(log and lag 3m)	(9.132)	(0.515)	(0.514)	(8.938)	(0.483)	(0.483)	(7.68 e-06)	(5.18 e-06)	(5.18 e-06)	7.72 e-06	(5.09 e-06)	(5.09 e-06)
Money Inflow		-2.644*	-2.639*		-2.602*	-2.596*		-2.26 e-06*	-2.26 e-06*		-2.27 e-06*	-2.26 e-06*
(dummy and lag 3m)		(0.962)	(0.960)		(0.950)	(0.948)		(5.50 e-06)	(5.48 e-06)		(5.50 e-06)	(5.48 e-06)
Adjusted R-squared	0.016	0.043	0.043	0.035	0.044	0.044	0.018	0.083	0.083	0.030	0.083	0.083

In table 14 the results of the quarterly flow performance regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. Ranking, TNA and Money Inflow have been lagged 3 months. The ranking measure is based on annual raw returns and received a score from 0 (1) for worst (best) performance. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. Results indicate that retail investors are more attentive than pension investors. The response of the retail investors to performance is for any kind of system stronger than the reaction of pension investors. The results are based on the returns of 512 equity funds in the period between October 2002 and March 2010.

Table 15: Flows on past performance - rankings - October 2002 to June 2008

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Ranking	259.462*	12.692*	12.841*	223.517*	13.607*	13.771*	2.57 e-04*	1.21 e-04*	1.23 e-04*	2.38 e-04*	1.28 e-04*	1.30 e-04*
(lag 3m)	(36.699)	(3.210)	(3.202)	(35.775)	(3.181)	(3.177)	(3.38 e-05)	(3.75 e-05)	(3.75 e-05)	(3.43 e-05)	(3.69 e-05)	(3.68 e-05)
Flows				0.196*	-0.083	-0.083				0.087	-0.066*	-0.066*
(lag 6m)				(0.039)	(0.045)	(0.045)				(0.048)	(0.021)	(0.021)
TNA	4.406	3.004*	3.008*	-4.259	3.328*	3.333*	5.70 e-06	5.25 e-05*	5.25 e-05*	1.91 e-06	5.65 e-06*	5.65 e-06*
(log and lag 3m)	(13.227)	(0.532)	(0.532)	(12.804)	(0.560)	(0.560)	(1.19 e-05)	(7.26 e-06)	(7.26 e-06)	(1.21 e-05)	(7.59 e-06)	(7.58 e-06)
Money Inflow		-0.211*	-0.211*		-0.218*	-0.218*		-4.09 e-06*	-4.09 e-06*		-4.14 e-06*	-4.14 e-06*
(dummy and lag 3m)		(0.080)	(0.080)		(0.085)	(0.085)		(1.53 e-06)	(1.53 e-06)		(1.60 e-06)	(1.60 e-06)
Adjusted R-squared	0.019	0.076	0.076	0.055	0.081	0.081	0.024	0.123	0.123	0.038	0.127	0.127

In table 15 the results of the quarterly flow performance regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. Ranking, TNA and Money Inflow have been lagged 3 months. The ranking measure is based on annual raw returns and received a score from 0 (1) for worst (best) performance. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. Results indicate that retail investors are more attentive than pension investors. The response of the retail investors to performance is for any kind of system stronger than the reaction of pension investors. The results are based on the returns of 464 equity funds in the period between October 2002 and June 2008.

Table 16: Flows on past performance - raw returns - October 2002 to March 2010

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Raw Return	3.611*	0.071	0.071	2.855*	0.060	0.061	3.07 e-06*	5.99 e-07	5.86 e-07	2.65 e-06*	6.11 e-07	5.97 e-07
(lag 3m)	(0.654)	(0.077)	(0.077)	(0.633)	(0.078)	(0.078)	(5.11 e-07)	(6.86 e-07)	(6.69 e-07)	(5.25 e-07)	(6.68 e-07)	(6.68 e-07)
Flows				0.147*	0.026	0.026				0.090*	-0.003	-0.003
(lag 6m)				(0.033)	(0.044)	(0.044)				(0.041)	(0.030)	(0.030)
TNA	-8.148	2.938*	2.939*	-11.437	2.859*	2.859*	-2.21 e-06	4.04 e-05*	4.04 e-05*	-4.34 e-06	4.05 e-04*	4.05 e-04*
(log and lag 3m)	(9.052)	(0.512)	(0.512)	(8.876)	(0.481)	(0.481)	(7.66 e-07)	(5.20 e-06)	(5.20 e-06)	(7.70 e-06)	(5.12 e-06)	(5.12 e-06)
Money Inflow		-2.681*	-2.680*		-2.639*	-2.639*		-2.30 e-05*	-2.30 e-05*		-2.30 e-05*	-2.30 e-05*
(dummy and lag 3m)		(0.933)	(0.932)		(0.919)	(0.919)		(5.24 e-06)	(5.24 e-06)		(5.24 e-06)	(5.23 e-06)
Adjusted R-squared	0.016	0.043	0.043	0.036	0.043	0.043	0.018	0.082	0.082	0.030	0.082	0.082

In table 16 the results of the quarterly flow performance regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. Returns, TNA and Money Inflow have been lagged 3 months. The returns are annual raw returns. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. Results indicate, like the rankings, that retail investors react more strongly to positive performance. One striking difference with the rankings is that all coefficients for the performance measure for pension investors have become insignificant. This indicates that it is hard to reject that the hypothesis that this coefficient is larger than zero. However, economic intuition remains and indicates that retail investors react more strongly to past performance. The results are based on the returns of 512 equity funds in the period between October 2002 and March 2010.

Table 17: Flows on past performance - raw returns - October 2002 to June 2008

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Raw Return	5.008*	0.197*	0.199*	4.211*	0.223*	0.225*	4.78 e-06*	1.86 e-06	1.86 e-06	4.36e-06*	2.08 e-06*	2.08 e-06*
(lag 3m)	(0.988)	(0.097)	(0.097)	(0.950)	(0.098)	(0.098)	(8.14 e-07)	(1.01 e-06)	(1.01 e-06)	(8.18e-07)*	(9.93 e-07)	(9.90 e-07)
Flows				0.195*	-0.084	-0.084				0.086	-0.067*	-0.067*
(lag 6m)				(0.039)	(0.045)	(0.045)				(0.048)	(0.021)	(0.021)
TNA	4.285	3.055*	3.062*	-4.321	3.372*	3.381*	5.90 e-06	5.30 e-05*	5.31 e-05*	2.26e-06	5.69 e-05*	5.70 e-05*
(log and lag 3m)	(13.025)	(0.525)	(0.527)	(12.647)	(0.550)	(0.551)	(1.18 e-05)	(7.29 e-06)	(7.29 e-06)	(1.20 e-05)	(7.62 e-06)	(7.62 e-06)
Money Inflow		0.025	0.027		0.029	0.032		-1.09 e-06	-1.07 e-06		-1.10 e-06	-1.09 e-06
(dummy and lag 3m)		(0.174)	(0.175)		(0.177)	(0.177)		(2.58 e-06)	(2.58 e-06)		(2.63 e-06)	(2.63 e-06)
Adjusted R-squared	0.020	0.075	0.075	0.055	0.080	0.080	0.023	0.123	0.123	0.037	0.126	0.126

In table 17 the results of the quarterly flow performance regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. Returns, TNA and Money Inflow have been lagged 3 months. The returns are annual raw returns. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. Results indicate, like the rankings, that retail investors react more strongly to positive performance. In contrary to the raw return estimates for the longer period, only the coefficient for the performance measure for pension investors in system III is insignificant. This indicates that it is hard to reject that the hypothesis that this coefficient is larger than zero. However, economic intuition remains and indicates that retail investors react more strongly to past performance. The results are based on the returns of 464 equity funds in the period between October 2002 and June 2008.

Table 18: Flows on past performance - risk adjusted returns - October 2002 to March 2010

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Risk Adjusted Return	4.945*	0.026	0.025	4.166*	0.065	0.065	4.52 e-06*	-1.46 e-06	-1.53 e-06	3.84 e-06	4.91 e-07	4.66 e-07
(lag 3m)	(0.085)	(0.095)	(0.095)	(0.891)	(0.102)	(0.102)	(7.54 e-07)	(9.99 e-07)	(1.01 -06)	(7.94 e-07)	(8.36 e-07)	(8.39 e-07)
Flows				0.146*	0.023	0.023				0.909*	-0.010	-0.010
(lag 6m)				(0.033)	(0.043)	(0.043)				(0.043)	(0.018)	(0.019)
TNA	-10.796	3.214*	3.215*	-12.139	2.790*	2.790*	-9.30 e-06	5.59 e-05*	5.59 e-05*	-4.72 e-06	4.01 e-05*	4.01 e-05*
(log and lag 3m)	(8.878)	(0.481)	(0.481)	(8.857)	(0.464)	(0.464)	(1.05 e-05)	(6.23 e-06)	(6.24 e-06)	(9.07 e-06)	(5.01 -06)	(5.02 -06)
Money Inflow		-2.766*	-2.766*		-2.630*	-2.629*		-2.72 e-05*	-2.73 e-05*		-2.31 e-05*	-2.31 e-05*
(dummy and lag 3m)		(0.873)	(0.873)		(0.871)	(0.871)		(4.74 e-06)	(4.77 e-06)		(4.83 e-06)	(4.84 e-06)
Adjusted R-squared	0.017	0.047	0.047	0.035	0.043	0.043	0.014	0.107	0.107	0.024	0.082	0.082

In table 18 the results of the quarterly flow performance regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. Risk Adjusted Return, TNA and Money Inflow have been lagged 3 months. The risk adjusted is based upon annual raw returns. Each fund was assigned Betas to the market by executing regressions. Those betas were used to calculate the implied return. The risk adjusted return is the difference between the annual excess return and the implied excess return. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. Results are completely in line with the raw returns: All performance measures for the pension investors are insignificant while the retail investors have significant coefficients for the performance measures. As a result I can again only judge from economic intuition, which indicates that retail investors are more attentive than pension investors. The results are based on the returns of 512 equity funds in the period between October 2002 and March 2010.

Table 19: Flows on past performance - risk adjusted returns - October 2002 to June 2008

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Risk Adjusted Return	6.962*	0.147	0.149	6.440*	0.299*	0.302*	7.02 e-06*	-1.42 e-06	-1.47 e-06	6.56 e-06*	2.46 e-06	2.45 e-06
(lag 3m)	(1.369)	(0.132)	(0.132)	(1.547)	(0.152)	(0.152)	(1.31 e-06)	(1.72 e-06)	(1.74 e-06)	(1.45 e-06)	(1.44 e-06)	(1.44 e-06)
Flows				0.192*	-0.080*	-0.080*				0.087	-0.048*	-0.048*
(lag 6m)				(0.039)	(0.041)	(0.041)				(0.051)	(0.013)	(0.013)
TNA	0.658	3.578*	3.580*	-3.334	3.378*	3.384*	-5.15 e-06	7.76 e-05*	7.76 e-05*	3.57 e-06	5.58 e-05*	5.58 e-05*
(log and lag 3m)	(12.461)	(0.498)	(0.499)	(12.524)	(0.538)	(0.540)	(1.72 e-05)	(9.70 e-06)	(9.06 e-06)	(1.48 e-05)	(7.28 e-06)	(7.28 e-06)
Money Inflow		-2.758*	-2.758*		-3.001*	-3.001*		-1.05 e-04*	-1.05 e-04*		-6.86 e-05*	-6.86 e-05*
(dummy and lag 3m)		(0.427)	(0.427)		(0.407)	(0.407)		(1.65 e-05)	(1.65 e-05)		(9.52 e-06)	(9.52 e-06)
Adjusted R-squared	0.019	0.082	0.082	0.052	0.079	0.079	0.015	0.139	0.139	0.026	0.125	0.125

In table 19 the results of the quarterly flow performance regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. Risk Adjusted Return, TNA and Money Inflow have been lagged 3 months. The risk adjusted is based upon annual raw returns. Each fund was assigned Betas to the market by executing regressions. Those betas were used to calculate the implied return. The risk adjusted return is the difference between the annual excess return and the implied excess return. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. All performance measures for the pension investors, except system II, are insignificant while the retail investors have significant coefficients for the performance measures. As a result I can again only judge from economic intuition, which indicates that retail investors are more attentive than pension investors. The results are based on the returns of 464 equity funds in the period between October 2002 and June 2008.

Table 20: Flows on past performance - negative and positive raw returns - October 2002 to March 2010

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Positive Returns	3.510*	0.085	0.087	3.660*	0.119	0.121	3.13 e-06*	1.59 e-07	1.62 e-07	3.22 e-06*	1.17 e-06	1.18 e-06
(lag 3m)	(0.704)	(0.082)	(0.083)	(0.739)	(0.091)	(0.092)	(5.63 e-07)	(7.34 e-07)	(7.36 e-07)	(5.86 e-06)	(7.75 e-07)	(7.79 e-07)
Negative Returns	-0.049	-0.144	-0.139	-2.404*	-0.183	-0.179	-4.23 e-07	-1.03 e-06	-1.03 e-06	-2.29 e-06*	-1.70 e-06	-1.70 e-06
(lag 3m)	(1.058)	(0.092)	(0.090)	(1.018)	(0.099)	(0.098)	(8.82 e-07)	(8.77 e-07)	(8.61 e-07)	(8.85 e-07)	(9.38 e-07)	(9.23 e-07)
Flows				0.141	0.238	0.238				1.13 e-07*	-0.009	-0.009
(lag 6m)				(0.031)	(0.042)	(0.042)				(2.71 e-08)	(0.019)	(0.019)
TNA	-7.040	2.708*	2.710*	-11.180	2.583*	2.586*	-5.80 e-06*	4.88 e-05*	4.88 e-05*	-4.16 e-06	3.72 e-05*	3.73 e-05*
(log and lag 3m)	(8.142)	(0.427)	(0.427)	(8.545)	(0.447)	(0.447)	(9.42 e-06)	(5.47 e-06)	(5.47 e-06)	(8.54 e-06)	(4.80 e-06)	(4.79 e-06)
Money Inflow		-2.689*	-2.686*		-2.721*	-2.721*		-2.49 e-05*	-2.49 e-05*		-2.38 e-05*	-2.38 e-05*
(dummy and lag 3m)		(0.891)	(0.892)		(0.876)	(0.876)		(4.64 e-06)	(4.64 e-06)		(4.95 e-06)	(4.94 e-06)
Adjusted R-squared	0.013	0.044	0.044	0.034	0.043	0.043	0.012	0.100	0.100	0.026	0.081	0.081

In table 20 the results of the quarterly flow performance piecewise linear regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. For the returns, two seperate variables have been created to represent only positive or negative returns. This will allow to make estimates specifically on the reaction to either positive or negative returns. Both types of return, TNA and Money Inflow have been lagged 3 months. The returns are annual raw returns. Results indicate another time that retail investors react more actively to past performance. To positive performance their reaction is always significant while to negative performance only in the system II and IV is their reaction to negative performance significant. None of the performance coefficients of the pension investors are significant. However, economic intuition again shows they react less to past performance. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. The results are based on the returns of 512 equity funds in the period between October 2002 and March 2010.

Table 21: Flows on past performance - negative and positive raw returns - October 2002 to June 2008

	Absolute Flows						**Relative Flows**					
	I			**II**			**III**			**IV**		
	Retail	PPM		Retail	PPM		Retail	PPM		Retail	PPM	
		true	*observed*		*true*	*observed*		*true*	*observed*		*true*	*observed*
Positive Returns	3.257*	0.097	0.097	3.528*	0.195*	0.196*	3.29 e-06*	-2.01 e-07	-2.03 e-07	3.68 e-06*	1.74 e-06	1.74 e-06
(lag 3m)	(0.873)	(0.084)	(0.084)	(0.960)	(0.097)	(0.097)	(7.44 e-07)	(9.12 e-07)	(9.09 e-07)	(8.42 e-07)	(9.81 e-07)	(9.79 e-07)
Negative Returns	5.463	0.010	0.036	2.154	-0.176	-0.145	4.12 e-06	-1.64 e-06	-1.42 e-06	1.69 e-06	-4.20 e-06	-4.03 e-06
(lag 3m)	(3.892)	(0.286)	(0.291)	(4.075)	(0.294)	(0.298)	(2.88 e-06)	(3.99 e-06)	(4.08 e-06)	(3.00 e-06)	(4.06 e-06)	(4.14 e-06)
Flows				0.197*	-0.077	-0.077				0.090	-0.046*	-0.046*
(lag 6m)				(0.039)	(0.040)	(0.040)				(0.050)	(0.012)	(0.012)
TNA	3.833	2.981	2.984	-1.997	3.081*	3.085*	-1.42 e-06	6.74 e-05*	6.74 e-05*	5.14 e-06	5.14 e-05*	5.15 e-05*
(log and lag 3m)	(11.173)	(0.415)	(0.416)	(12.110)	(0.499)	(0.500)	(1.51 e-04)	(7.88 e-06)	(7.87 e-06)	(1.39 e-05)	(6.90 e-06)	(6.90 e-06)
Money Inflow		-0.254	-0.254		-3.277*	-3.278*		-1.78 e-06	-1.78 e-06		-7.07 e-05*	-7.07 e-05*
(dummy and lag 3m)		(0.157)	(0.156)		(0.428)	(0.427)		(2.19 e-06)	(2.19 e-06)		(9.38 e-06)	(9.37 e-06)
Adjusted R-squared	0.013	0.075	0.075	0.049	0.077	0.077	0.011	0.130	0.130	0.024	0.122	0.122

In table 21 the results of the quarterly flow performance piecewise linear regressions for the retail and the pension market are presented. Both the absolute and the relative flow are considered. The absolute flows are in millions SEK while the relative flow measure are percentages. The coefficient of all the factors and the robust standard errors are provided. The apostrophe indicates all variables which are signigicant at the 5% level. The difference between the PPM true and observed measure are the rebates and administrative fees. In the true measure the discount is included while in the observed measures these discounts are not included. For the returns, two seperate variables have been created to represent only positive or negative returns. This will allow to make estimates specifically on the reaction to either positive or negative returns. Both types of return, TNA and Money Inflow have been lagged 3 months. The returns are annual raw returns. Results indicate another time that retail investors react more actively to past performance. To positive performance their reaction is always significant while to negative performance their response is insignificant. The performance coefficients of the pension investors are significant for the positive reactions in system II. However, economic intuition again shows they react less to past performance. The TNA is the log of the TNA inside or outside of the system. Money Inflow is a dummy interacting with the log of TNA. This dummy indicates when money enters the PPM which happens twice a year. Systems II and IV, in contrary to systems I and III, include flows that have been lagged 6 months. The results are based on the returns of 464 equity funds in the period between October 2002 and June 2008.

8. Conclusion

The current pension system positions Sweden well to cope with the demographic changes that are taking place. The PPM functions well as an organisation. The costs of administration and capital management decrease and approach the objectives set at inception. However, the PPM experiences lower active participation rates yearly despite the initiatives they employ to involve citizens[44].

The main conclusions of this study are threefold:

1. Fund managers are able to avoid higher rebates by opening many small funds and distributing their assets among those. 92.8% of the funds participating to the PPM have TNA lower than 1 billion SEK and incur the lowest level of rebates (i.e. 65%). Fund managers do not reduce rebates through changing their fee outside of the PPM.
2. Despite the rebates the pension investors cannot expect to generate positive alphas after costs. Larger rebates are required to change pension investing from a zero sum game to a positive sum game. While the EW returns indicate larger returns for pension investors, the VW returns are always smaller for pension investors compared to retail investors! Investor choices affect returns through home bias and a lack of education, motivation, or patience.
3. Pension investors are particularly inattentive. Response to positive returns is small, while a reaction to negative returns seems absent. Compared to retail investors investing in the same funds, their reaction to performance is many times smaller. A 1% increase in annual returns in the past quarter would lead to a inflow 36,000 SEK and 710 SEK into the retail and pension market in the next quarter. Both exhibit a convex flow performance relationship, even though evidence for pension investors is considerably weaker.

To mitigate the effects found in this study, the PPM could apply the following measures:

- *Reduce the maximum of funds allowed per manager or fund management group*

Reducing the maximum number of funds allowed per manager will have various effects. First of all it will force fund managers to consolidate their funds. Larger funds will have to allow larger rebates which will benefit pension investors. Besides, the managers need to focus on less strategies which might reduce capital management costs. Furthermore, it will be easier for pension investors to make a choice by decreasing number of funds that can be picked.

To accelerate the reduction in the number of funds it is an option to set a minimum amount of TNA a fund should control within the PPM, similar to a measure as proposed by Hammarkvist

[44] Among other the Pension Authority launched an app, opened an help desk on facebook and offers many sessions to inform and educate participants. See: http://www.pensionsmyndigheten.se/3682.html, http://www.pensionsmyndigheten.se/4532.html, and http://www.pensionsmyndigheten.se/4133.html.

(2005). If the fund cannot achieve this threshold within the time limit, the fund is deregistered. Charging funds for participating to the PPM could have similar effects.

- *Back to default mechanism 2.0*

Dahlquist and Martinez suggested a 'back to default' mechanism in 2010. This mechanism should reset the choices of pension investors annually, if investors do not confirm their active choices. A good moment to ask such confirmation would be when new funds are distributed to the system. Investors that do not confirm their choice will then automatically be placed back into the default fund along with their new inflows. This suggestion is well thought trough and will mitigate the problem of pension investor inattentiveness.

Such regulation will even function better if the reset only takes place when the performance of the fund the pension investor has selected underperforms a certain benchmark. This approach will reward fund managers for good performance by new inflows. Simultaneously pension investors are rewarded for making good selections and supported when making bad selections.

- *Do not encourage active investment*

The goal of the PPM was to actively involve Swedish citizens in their pension savings and to offer them a choice of a wide range of funds. Offering the possibility to choose how to invest pension savings is a liberal principle. However, encouraging people to make an active choice is nor liberalism nor beneficial (as indicated both by the results in section 6 as by Pritchard [2008]).

Pritchard suggests offering advisor managed funds. Such portfolios provide well-diversified, risk-based portfolios. Each portfolio is a single-choice, all-or-nothing option. Participants only determine their individual comfort with risk. The current default fund actual fulfils all the requirements. However, as Settergren (2008) indicates there is no reason to see why [members] will make a better active choice. But it is politically incorrect to give them this choice. That attitude should be changed as soon as possible. Offering people the option to choose is liberal, but forcing them to choose is clearly not in their best interest.

To accelerate this attitude change the PPM could consider re-introducing trading costs. This measure will only burden the small group that trades actively while the large majority of participants, that do not trade at all, will experience lower administrative costs. This measure will furthermore impose a threshold for people to trade and might push them back to the beneficial default fund.

In conclusion, while the PPM is well functioning, there is always room for improvement. In such cases as Sundén (2004) notes it is important to consider how the design can be modified to make it easier for participants. The provided suggestions will all work in the advantage of the pension investors and position them even better for their future as pensioner.

9. Discussion

In this section the weaknesses of this study will be discussed and possibilities for future research will be suggested.

9.1 Suggestions

While the suggestions to improve this system are mostly practical, implementation will require some more efforts. For example, an estimation of the optimal number of funds allowed per management group would be required. Such a decision is very dependent on the rebates charged to those funds and what the optimal number is to make a choice for PPM participants. Furthermore as Indro et al. indicated, there is an optimal size for fund with respect to the costs they incur. That size should be taken into account as well.

For the back to the default mechanism 2.0, the decision of which benchmark to apply will be complicated. There are many types of assets, implying various benchmarks will be necessary. A solid description of the motivation for the selection of benchmarks but also how much underperformance will be allowed, needs to be provided and discussed between stakeholders before the measure can be implemented.

The measure of not encouraging people to actively invest is relatively easy to implement. The system is actually ready for such a change since the default fund fulfils all the properties of a adviser managed portfolio. However, the large complication of implementing this measure will be the politicians. How can their attitude be changed and how can we make then think again from the perspective of the participants instead of in political dogmas? That is not the domain of a finance student.

9.2 Reliability of results

The reliability of data has not always proven to be high. Particularly the TNA (in and outside of the PPM) posed problems. Those problems were solved by deleting all unreliable estimates. This process has been done manually. As a results it might be that the smaller, less obvious errors still impact the results. Due to these errors, many funds have been excluded from this analysis. This makes the findings less representative for the entire system. Furthermore, due to the different frequencies of some of fees in and outside the PPM assumptions were made to perform the analyses. Those assumptions have been checked for robustness. Nonetheless more consistent date would have improved the reliability of my findings.

Another difficulty that I came across are the constant changes to regulation. First of all, when a system is just implemented it is obvious changes will be made to solve unforeseen problems e.g. al changes to regulation impact the results through returns, fees and flows. In this analysis the first 2

years of the PPM are not included, diminishing the impact of such changes at the inception of the system. It does however make the findings less representative for the entire period. Such problems were also encountered while coping with the changing to the default fund. Therefore, another 12 months of observations were excluded, only reducing reliability and representativeness of the findings for the system as it is currently. Besides, while I shortened the period to control for external changes, for examples the changes to the calculation of the rebates still have effect on the estimates.

Secondly, the documentation of the regulation (and changes to that regulation) within the PPM is not always complete. One of the employees mentioned that before 2004 fee rebates were not reinvested. It remains unclear what did happen with these rebates. The same applies for the change in the maximum amount of funds a manager is allowed to run within the PPM. It remains unclear when such this change took place. It would have been very beneficial if the PPM would have had a database with all the changes that were effectuated and the motivation to implement such decisions. This would shed much more light on the whole matter allowing to make more precise estimates and assumptions.

9.3 Suggestions for future research

For future research there is still much ground to cover. The interesting thing about the Swedish pension system is that the availability of data is large. The dataset I used could be extended by combining it with the LINDA database providing many insights on specific pension investors. Looking at the PPM system from an institutional perspective questions come to mind as whether cost and choice structure are optimized. Furthermore the rate of people that participate to the default fund constantly increases. What are the consequences of this development in the long term for the setup of the PPM and for the pension investors (that invest actively)? Certainly now the default fund has such an attractive investment proposition, the answer to this questions becomes more relevant.

One topic that has also been discussed often is which amount of funds would be optimal for pension investors? Currently the almost 799 funds give large choice but also complicate the decision making process. In the light of such research it would also be interesting to investigate which type of funds (or fund characteristics) could indicate performance in the PPM and if those factors are different from the retail market. That would make it easier for investors to select funds.

In other words, there is much to be done and investigated about the PPM. Constant changes to the society and the financial world will never allow there to be a perfect pension system. Pension systems will always need to be flexible and adapt to their environments.

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11. Appendix

11.1 Calculation of PPM rebates[45]

The method explained below is applied since April 2007. Before that time, the rebates were calculated differently. The fees are calculated daily, tallied on a quarterly basis but reinvested only once a year. Depending on the in- or outflows of money in funds the rebates can change many times a year (up to 20 times according to the data of the PPM).

The calculation of the PPM rebates are based on two essential fund characteristics: *total cost withdrawal (K)* and *fund value (Fv)*.

The definition of total cost withdrawal is the total of the costs withdrawn according to the fund's profit and loss statement, not including transaction costs, interest expenses, exchange losses, and withholding tax. The amount shall relate to costs charged during the immediately preceding financial year and be expressed in the fund's currency.

The fund value is determined with the following expression:

$$\frac{management\ fee\ in\ the\ fund\ currency}{management\ fee\ in\ percentage} \times 100$$

Based on these values the fund's *cost withdrawal coefficient (TK)* is calculated by:

$$TK = \frac{K}{Fv}$$

For funds with a performance based management fee the formula is adapted:

$$TK = \frac{K + 4Kf}{Fv}$$

Where *Kf* is the management fee expressed in the fund's currency and it is defined as the fund's management fee including withdrawn costs (i.e. free cost withdrawal) in the performance-based portion for the immediately preceding quarter. The amount shall not include any transaction costs, interest expenses, exchange losses or taxes.

[45] All information in this section is based on Appendix B to the General Terms and Conditions, 1 January 2010 of the Swedish Pension Agency

Calculating the *TK* is only the first step in the process of calculating the discount. While the *TK* is expressed in the fund's currency, the invoice will always be in SEK. The formula used to calculate the price reduction:

$$Price\ reduction = \frac{\sum_i R_i\ (TK - FRI_i) \times EXP_i\ \times\ A_i}{365}$$

Where *i* is the interval in question

R_i is applicable discount level as defined by the table below in Column C and based on fund i

FRI_i is the free cost withdrawal within an interval as defined in Column B in the table below

EXP_i is the Swedish Pensions Agency's exposure in an interval and determined by:

= $(\ddot{O}G_i - UG_i)$ if Manager value > $\ddot{O}G_i$

= $(Manager\ value - UG_i)$ if UG_i < Manager value ≤ $\ddot{O}G_i$

= 0 if Manager value $\leq UG_i$

Where $\ddot{O}G_i$ and UG_i are the upper and lower bound for an interval as defined in the table 6.3 in the first column and second column.

$Manager\ value$ is lastly defined as the value of The Swedish Pensions Agency's holding in the Manager's funds on the date in question.

A_i is the fund's share of the Manager value.

Funds which, as per 31 December of the preceding calendar year, invested their entire assets in fixed-income securities or liquid funds, are referred to below as fixed-income funds. The funds which did not invest their holdings in accordance with the above are referred to below as other funds.