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Disclosure of Superannuation Fees and
Charges
Hazel Bateman

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Disclosure of Superannuation Fees and Charges *

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**Dr Hazel Bateman
School of Economics
The University of New South Wales
Sydney 2052
H.Bateman@unsw.edu.au**

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Disclosure of Superannuation Fees and Charges

Executive Summary

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Executive Summary

While the choice of fund legislation has stalled, greater choice in superannuation is inevitable. In order to make appropriate superannuation choices, consumers (potential and existing superannuation fund members) must be adequately informed as to the nature, risks, costs and benefits of the superannuation alternatives. This research considers the appropriate disclosure of fees and charges. Such research is timely given the imminent commencement of the Financial Services Reform legislation.

The aim of this paper was to consider how superannuation charges, imposed to recoup the costs of superannuation, can be effectively disclosed to consumers. The paper commences with a discussion of the legislative framework – the proposed choice of fund legislation and the Financial Services Reform Bill as it relates to disclosure of fees and charges (Section 1). This is followed by estimates of the costs associated with Australian superannuation (Section 2) and a critical comparison of the alternative charging regimes used to recoup these costs (Section 3). Following a brief discussion of the international experience (Section 4), the charge regimes of Australian industry and retail funds are analysed (Section 5). Drawing upon the findings reached so far, the paper concludes with a range of proposals for informative disclosure of fees and charges (Section 6). A single metric informing consumers of the impact all fees and charges on expected final retirement income appears to be an appropriate measure.

The main findings are detailed below:

- **Costs:** In 1998-99 the average annual administrative cost of Australian superannuation was \$700 per account or 1.72% of assets. However, there was considerable variation between types and characteristics of superannuation funds. At face value these differences were quite large, but after controlling for asset size, membership, benefit type and market structure, costs were similar for industry funds, public sector funds and corporate funds, but around 50% higher for retail funds.

- **Charges:** The costs associated with superannuation are recouped by the imposition of fees and charges. Fees and charges take a variety of forms, including flat rate or percentage charges on contributions, assets under management or on the benefit at retirement. The exact menu of fees and charges differs markedly across alternative superannuation arrangements, and often includes a number of alternative fee and charge types. When a combination of types of fees and charges apply, it is difficult to gain any sense of their net impact. Further, the impact of the alternative types of fees and charges differs along the time profile of fund membership. Therefore, in order to facilitate a sensible comparison of alternative funds or investment strategies, the disparate charging schedules must be converted to a single measure. Possible metrics includes: aggregate dollar amount, % of contributions, % of assets or % reduction of retirement accumulation. In each case ALL fees and charges associated with superannuation must be included.
- **International experience:** Most countries with mandatory saving for retirement have taken the approach of prescribing regulations rather than prescribed disclosure. It is likely that they have more to learn from us than visa versa.
- **Australian experience:** Industry funds and master trusts (as examples of the different types of Australian superannuation fund) are shown to have quite different charge regimes. Industry funds have a simple (and fairly uniform) practice of imposing a flat rate administration charge and a % assets charge. Master trusts tend to impose a variety of fees and charges – typically flat rate and percentage contribution charges and % asset charges – which differ significantly with the scale of the plan. The use of different charge types also means a differing time profile of charges. Under current practice it is difficult compare aggregate charges without an understanding of sophisticated computer software that would allow the conversion of a variety of fees and charges to a comparable figure.
- When the fees and charges of industry funds and master trusts are converted to a single metric it appears that in some instances there are large differences in aggregate charges. Under reasonable assumptions, the fees and charges associated with a typical industry fund would reduce the expected retirement

accumulation by around 10%. However, for the typical master trust this metric could range from 10% for the very large scale plans to around one third for the small plans accessed by individuals or very small companies (see Table 8).

- **Options for informative disclosure:** The paper suggests that informative disclosure should involve (at least) a single metric, preferably the percentage reduction in retirement accumulation (qualified in terms of the underlying assumptions). Such a measure would allow comparison of aggregate fees and charges of superannuation funds with quite different charging regimes, take account of both fees and charges and the associated rates of return, avoid misconceptions associated with other possible measures and, most importantly, inform consumers of the of fees and charges on their income in retirement. However, any disclosure regime needs to be balanced against consumer preference for a more simplistic (but far less informative) indicator.

1. Background

The Australian government is pushing for greater individual choice of superannuation arrangements. While there are pros and cons of this form of policy reform, choice *per se* is not the subject of the current research. Choice requires consumers (existing and potential fund members) to decide where to put their superannuation contributions. In order to make appropriate choices (and not be subject to unnecessarily high charges), consumers must be adequately informed. This can come from the complementary sources of consumer education and appropriate disclosure of fees and charges, or prescribed regulation of fees and charges. Current Australian policy emphasises the former approach and the government is legislating to improve and unify the disclosure requirements.

Choice of fund

The policy of choice of fund was first announced in 1996 and a detailed proposal included in the 1997 Budget. Specific proposals for choice of fund were introduced into Parliament in 1997 and then reintroduced 12 months later. The Bill passed the House of Representatives in February 1999, but has failed to pass the Senate on several occasions¹ - most recently in August 2001². Choice of fund policy is currently on hold.

It is noted, however, that while the proposals for choice related to *choice of fund* – *choice of portfolio* is probably more relevant. In the absence of legislative directives, choice of portfolio itself is increasing. Around two thirds of all industry funds currently offer portfolio (or investment) choice.

¹ Under the draft legislation it was proposed that an employer would be able to meet their choice of fund obligation to employees by electing one of three choice of fund models:

- Limited choice of at least 4 funds which must consist of at least one public offer fund, an RSA, an industry fund and an in-house corporate fund (if they exist):
- Unlimited choice, which requires employees to nominate their preferred fund; or
- Negotiating a Certified Agreement or an Australian Workplace Agreement covering superannuation between employees and employers, or, alternatively, a fund proposed by an employee and agreed by the employer, in writing.

² Even though the Government had been holding discussions with the Democrats since late 2000.

Disclosure

In an environment of greater superannuation choice, informative disclosure is essential. For superannuation, disclosure should operate to protect consumers by enhancing their ability to assess the alternative superannuation arrangements (be they funds or investment options) and make informed decisions.

Under the existing laws, disclosure is covered by provisions in the Superannuation Industry Supervision (SIS) Act, the Retirement Savings Accounts (RSA) Act and the Insurance Act. In particular, the SIS Act and associated regulations require disclosure of information by public offer funds, while the regulations covering the 'operating standards' require for disclosure of certain information to members and prospective members of other superannuation funds.

These provisions are being reviewed and significantly expanded under the *Corporate Law Economic Reform Program (CLERP)*. The initial *Corporate Law Economic Reform Program Paper No. 6 (CLERP 6)* proposed an integrated regulatory framework for all financial products that would provide consistent regulation of functionally similar markets and products. The subsequent Consultation Paper *Implementing CLERP 6 'Financial Products, Service Providers, and Markets – An Integrated Framework'* proposed a regulatory framework for the licensing of financial product markets and service providers, conduct and disclosure of service providers and financial product disclosure³.

The Consultation Paper proposed two alternative 'point of sale' disclosure regimes.

- Regime A: A disclosure regime which would apply to all financial products except securities (including managed investments) and would involve 'point of sale disclosure' with further information available on request and a requirement for product issuers to prepare a 'Financial Product Information Statement'.
- Regime B: A disclosure regime under which superannuation and life insurance would be treated under the 'fundraising' provisions of the Corporations Law and information would be made available to a client via a point of sale

³ This new regulatory framework would replace Chapters 7 and 8 of the Corporations Law and bring in elements of the Superannuation Industry (Supervision) Act 1993, the Retirement Savings Act 1997 and the Banking (Foreign Exchange) Regulations.

document, with further information available in a prospectus prepared by the product issuer and lodged with ASIC.

Submissions were invited to assist with the preparation of the draft legislation.

In February 2000, the Government released the draft CLERP 6 legislation – the *Financial Services Reform (FSR) Bill*. The route taken was a variant of disclosure regime ‘A’ as set out in the Consultation Paper. This approach takes the middle ground between the full due diligence approach taken in the ‘fundraising’ provisions of the Corporations Law and the Key Features Statement approach taken in relation to superannuation. The approach seeks to balance the need for the purchaser to have sufficient information to make an informed decision and compare products, against the concern that they may be provided with more information than they can comprehend. Importantly, the provisions in the draft Bill aligns the disclosure obligations for managed investments, superannuation and the investment components of life insurance (as was supported in the submissions on the Consultation Paper)⁴.

It was originally anticipated that the revised legislation would be introduced into Parliament in September 2000 with a commencement in January 2001, but there has been delays. Commencement is now planned for October 2001 (and subject to a two year transitional period).

In relation to disclosure, the FSR Bill provides a general outline, but the actual disclosure requirements will be set out in regulations and/or codes authorised by ASIC. The Explanatory Memorandum to the FSR Bill indicated that the draft regulations released by the ISC in 1998 (in relation to Key Features Statements) would form the basis for detailing the new disclosure arrangements to apply to superannuation.

⁴ Disclosure requirements for superannuation: superannuation products (as defined in paragraph 764(1)(g) of the SIS) are brought within the Part 7.8 disclosure regime.

The superannuation industry responded favourably to the Exposure Draft. In particular ASFA agreed with the decision to follow Alternative A, but expressed the reservation that the starting point for superannuation disclosure was the Key Features Statement (ASFA 2001a)

The Financial Services Reform Bill was finally tabled in Parliament in April 2001. The new FSR Bill maintains the main elements set out in the February 2000 Exposure Draft, whereby most superannuation funds are deemed financial service providers and are required to be licensed. As with all issuers of financial products, superannuation funds will be required to give consumers full information about any product they are offering through a standardised disclosure document, the 'Product Disclosure Statement' (PDS). The requirements of the PDS will be prescribed through regulation.

Other provisions include:

- In some circumstances a superannuation fund would not need to provide a member with a PDS for up to 3 months after they joined the fund.
- Self managed super funds will be explicitly exempted from most of the requirements of the Act through regulation.
- The regulations will be subject to a thorough consultation process, and the Treasury will establish an FSR Implementation Consultative Committee to consider the regulations.

However, in the absence of 'choice of fund' legislation the applicability of the FSR Bill is unclear.

In conjunction with the tabling of the FSR Bill, ASIC has prepared a number of policy proposal papers. Relevant here is *FSRB Policy Proposal Paper No 4 (PPP4) - Disclosure: Product Disclosure Statement (and other disclosure obligations)*, released in April 2001. PPP4 concludes that the PDS is to contain sufficient information so that a retail client may make an informed decision about whether to purchase a financial product and to allow for comparison of financial products.

In particular a PDS should include:

- (a) Fees payable in respect of a financial product;
- (b) The risks of a financial product;
- (c) Benefits of a financial product;
- (d) Significant characteristics of a financial product⁵.

Comments on this policy proposal (FSR Bill and Policy Proposal Paper No. 4) were due in early June 2001 and are being used to develop a draft policy statement, to be released shortly.

The remainder of this paper considers the disclosure of fees and charges in the context of informing the current policy debate.

2. Costs of Australian superannuation

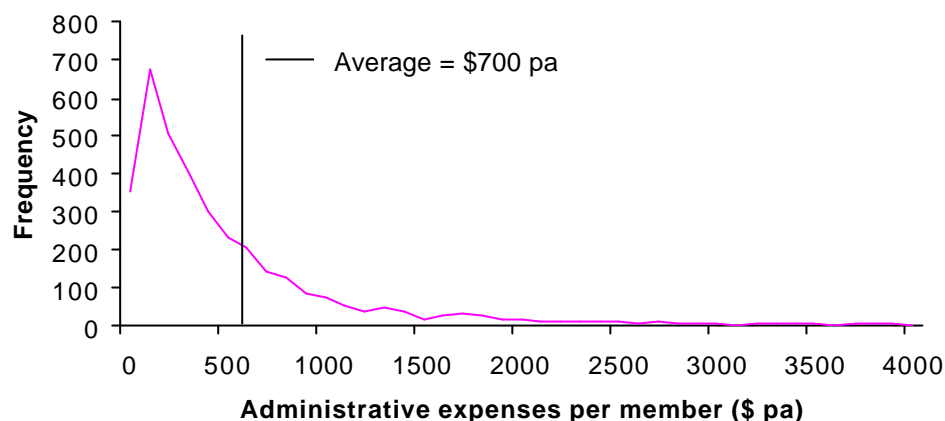
Administrative costs relate to the three main functions involved in the organisation and management of superannuation – the collection of contributions and the administration of individual accounts; the investment of assets; and the payment of benefits. Within each of these there may be marketing and regulatory and compliance requirements. As well, costs would be associated with additional services be provided on a fund-by-fund basis. In other words, the term ‘administrative’ is all encompassing – it includes all costs associated with superannuation.

Some idea of the administrative costs associated with Australian superannuation can be gained from analysis of data provided annually to the Australian Prudential Regulatory Authority (APRA) in superannuation fund annual returns. Using the 1998-99 annual returns, Figure 1 and Table 1 report administrative expenses per member, while Figure 2 and Table 2 considers administrative expenses as a percentage of assets. For the APRA annual returns, administrative expenses’ refers to all expenses of an administrative and investment management nature.⁶

⁵ Importantly, neither the FSR Bill 2001 nor the associated PPP4 refer to the inclusion of a single figure that is indicative of all fees and charges on a product.

⁶ But does not include investment management fees associated with unitised investment instruments where these amounts are reflected in the net investment returns from these products.

Figure 1: Annual administrative expenses per member (1998-99)



Source: Derived from APRA Annual Returns (1998-99)

Table 1: Annual administrative expenses per member (1998-99)

| Superannuation fund characteristic | Average |
|---|----------------|
| Fund type | |
| Corporate | 700 |
| Industry | 154 |
| Public sector | 543 |
| Retail | 546 |
| Other | 863 |
| Market structure | |
| Public Offer | 493 |
| Other | 726 |
| Plan type | |
| DB | 851 |
| DC | 642 |
| Fund size (assets) | |
| < \$1mill | 570 |
| \$1mill - \$5mill | 1,068 |
| \$5mill - \$10mill | 694 |
| \$10mill - \$50mill | 601 |
| \$50mill - \$200mill | 370 |
| > \$200mill | 374 |
| Fund size (members) | |
| < 10 | 1,111 |
| 10 – 99 | 770 |
| 100 – 999 | 396 |
| 1,000 - 9,999 | 311 |
| >10,000 | 167 |
| Total | 700 |

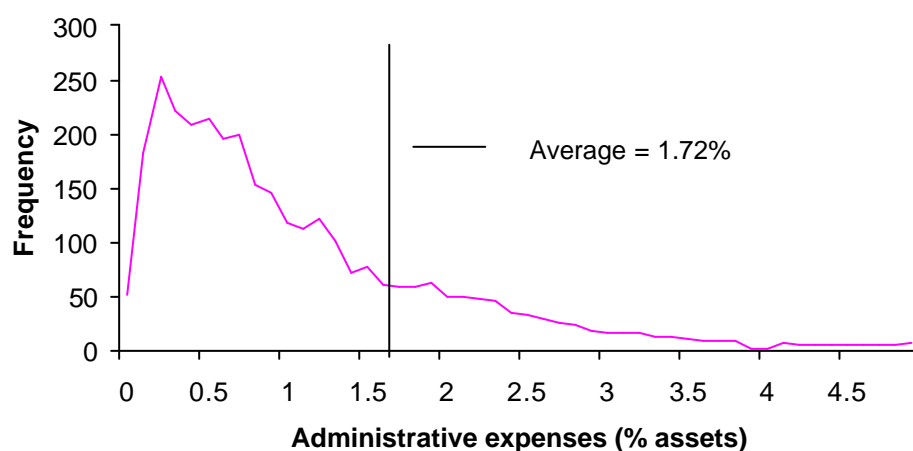
Source: Derived from the APRA Annual Returns (1998-99).

In 1998-99 average annual administrative expenses per member is estimated at \$700 per annum. However, this mean conceals substantial variation – as revealed by the very long right tail in Figure 1. There are also striking differences in mean administrative expenses across types and size of superannuation funds (see Table 1).

- Industry funds report annual per member administrative expenses of less than ¼ of the mean.
- Reported administrative expenses per member are lower in public offer and defined contribution funds.
- Administrative expenses per member fall significantly with increases in both fund assets and fund members.

Administrative expenses can also be summarized in terms of a percentage of assets (see Figure 2 and Table 2). Under this metric, annual administrative expenses as a percentage of assets averaged 1.72% of assets – but again, this is subject to substantial variation as indicated by the variation by fund type in Table 2 and the long right tail in Figure 2.

Figure 2: Annual administrative expenses, % assets (1998-99)



Source: Derived from the APRA Annual Returns (1998-99)

There are significant differences in administrative expenses as a percentage across types and size of superannuation fund (see Table 2): expenses are highest for retail funds public offer funds and funds providing DC benefits.

Table 2: Annual administrative expenses, % assets (1998-99)

| Superannuation fund characteristic | Average |
|---|----------------|
| Fund type | |
| Corporate | 1.80 |
| Industry | 1.28 |
| Public sector | 1.10 |
| Retail | 2.13 |
| Other | 1.46 |
| Market structure | |
| Public Offer | 2.16 |
| Other | 1.67 |
| Plan type | |
| DB | 1.07 |
| DC | 1.98 |
| Fund size (assets) | |
| < \$1mill | 3.09 |
| \$1mill - \$5mill | 1.23 |
| \$5mill - \$10mill | 1.00 |
| \$10mill - \$50mill | 0.86 |
| \$50mill - \$200mill | 0.85 |
| >\$200mill | 0.91 |
| Fund size (members) | |
| <10 | 1.43 |
| 10 – 99 | 2.68 |
| 100 – 999 | 1.16 |
| 1,000 – 9,999 | 1.74 |
| >10,000 | 1.25 |
| Total | 1.72 |

Source: Derived from the APRA Annual Returns (1998-99).

However, this simple tabulation may be misleading. For example, using the average annual administrative expenses metric, it appears that the expenses associated with industry funds are 22% of the expenses associate with corporate funds, but using the administrative expenses as a proportion of assets metric, it appears that corporate funds are only 40% more expensive than industry funds. This and other inconsistencies between the two metrics are largely due to the different stages of maturity of the alternative types of superannuation fund – notably that industry funds,

retail funds and funds providing DC benefits are likely to be less mature (and therefore incur higher costs when measured as a percentage of assets).

These problems can be addressed with a multivariate analysis of the data. This allows us to estimate administrative expenses while controlling for (that is, keeping constant) other relevant factors (such as membership, asset size, benefit type etc).

Using the same data set Bateman and Mitchell (2001) find that:

- After controlling for asset size, membership, benefit type and market structure, there is no significant difference in the expenses associated with industry funds, corporate funds, public sector funds and other funds.
- The administrative expenses associated with master trusts are around 50% higher than for the other types of superannuation funds.

The Bateman/Mitchell analysis also indicates significant scale economies in the Australian superannuation industry. Across all Australian superannuation funds, it is estimated, that a 1% point growth in members (holding assets constant) raises costs by only 0.4%, while a 1% point growth in assets (holding members constant) would raise costs by only 0.5%.⁷

However, the data set is subject to a number of qualifications. It is possible that the administrative and investment expenses reported in the annual returns may underestimate actual costs for corporate superannuation funds and some public sector superannuation funds, where employers bear the costs or provide and/or subsidise the associated infrastructure. Further, where investment management is out-sourced, the investment management fees may be reflected in lower net returns, rather than being explicitly included in the item 'administrative and investment expenses' in the annual returns.

Further information on administrative costs can be gained from the regular survey of administration and investment costs conducted by the Association of Superannuation Funds of Australia (ASFA).⁸ The 2001 survey suggests a similar

⁷ Additional years of APRA data are available but have not yet been fully analysed.

⁸ The Association of Superannuation Funds of Australia (ASFA) frequently conducts surveys of administrative and investment costs. The latest was conducted in 2001. Of the 300 ASFA member funds sent questionnaires, 60 responded. These accounted for 12% of the overall assets of the

pattern of costs to the APRA data, but the dollar amounts are somewhat lower as investment costs are not included (Connor 2001). The main findings are summarised in Table 3.

Table 3: Average administration cost per member pa (1999-2000)

| Fund characteristics | Average cost per member (\$ pa) |
|-----------------------------|--|
| Members | |
| < 1,000 | 334.88 |
| 1,000 - 10,000 | 217.36 |
| 10,001 - 30,000 | 77.48 |
| 30,001 - 100,000 | 88.40 |
| >100,000 | 51.48 |
| Fund type | |
| Corporate | 146.64 |
| Industry | 54.08 |
| Public sector | 60.32 |
| Total | 66.56 |

Note: No retail funds responded to the survey.

Other than the APRA annual returns and the incomplete ASFA administration and investment costs survey, the best source of data on administrative costs would be the individual annual reports of superannuation funds – but with over 3000 superannuation funds, this is a time consuming exercise.

3. Impact of fees and charges

Any administrative costs associated with superannuation will be reflected in administrative charges, which reduce the rate of return which might otherwise be realised from superannuation saving. Expressed as a percentage of assets under management, seemingly small charges have a large impact on retirement benefits. By way of example, suppose a superannuation fund member contributes 9% of earnings for 40 years and receives a 5% real rate of return on these contributions. A charge of 1% of assets would reduce the accumulation at retirement by around 22%, while a charge of 2% of assets would reduce the accumulation at retirement by

superannuation system.

nearly 40%.⁹ Individuals would then be faced with more charges when they invested this accumulation to provide an income stream for retirement.

Administrative charges may affect choice of superannuation fund, investment strategy or retirement income product. As well the time profile of administrative charges may impact upon decisions to work and save. Finally, high administrative charges reduce the credibility of superannuation and related retirement provision policies.¹⁰

Charge regimes

Administrative costs may be recouped by a variety of charge types. Charges can be imposed on contributions, assets under management and/or the accumulation at retirement (that is, benefits). The charges may be ongoing or one-off and applied at a flat or variable rate. Possible charge types include:

- Flat rate (dollar amount) or percentage charges on contributions.
- Flat rate (dollar amount) or percentage charges on assets.
- Flat rate (dollar amount) or percentage charges on the accumulation at retirement (that is, the retirement benefit).

If charges were to reflect costs in a 'new' superannuation plan, a likely scenario could be: a high entry fee to reflect start-up costs, an ongoing (possibly flat) account administration charge, an investment fee to reflect the costs of funds management and an exit fee.

In practice, multiple charges are levied which may not reflect the profile of costs and, at any point in time, administrative costs and charges may differ. While costs and charges are likely to converge in the long run, the administrative charges facing retirement savers may reflect a range of additional factors including industry structure, institutional practices and the regulatory arrangements. For example, it is

⁹ Other assumptions include inflation of 0%, continuous contributions, no taxes and no insurance premiums.

¹⁰ A comprehensive discussion of this in the context of US proposals is set out in Diamond (1998).

possible that for retail funds there is cross subsidisation from other parts of the business¹¹.

Let us consider the nature of a number of common charge regimes.

1. % assets charge: charges as a percent of assets under management (for example, 0.5%, 1% and 2% of assets).
2. Flat rate contribution charge: flat rate weekly charge (for example, \$1 per week).
3. % contribution charge: charges as a percent of contributions (for example, 4% of contributions).
4. Exit/benefits charge: flat rate or percentage charge on benefits (for example, 4% accumulation at retirement).

We can assess the impact of these alternative charge regimes in terms of:

- Aggregate charge (in dollars).
- Charge as a percentage of contributions.
- Charge as a percentage of assets.
- Charge as a percentage of the retirement accumulation.

The aggregate and annual impacts of the common charge regimes are discussed below.

% assets charge

Table 4 summarises the impact of illustrative assets charges of 0.5%, 1% and 2% pa. The annual impact of a 1% assets charge is identified in Figure 3.

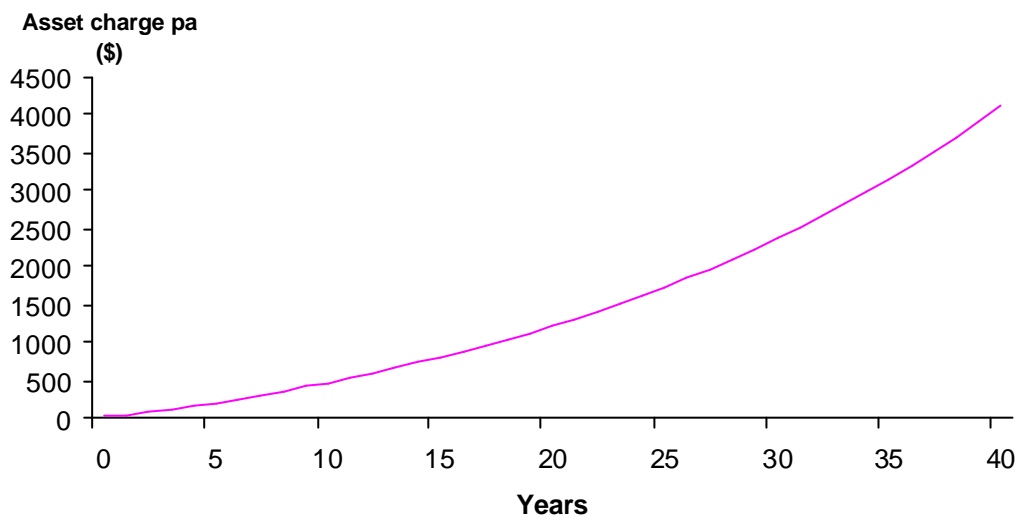
For 40 years of retirement saving, a 0.5% asset charge would reduce the retirement accumulation by around 12%, a 1% asset charge would reduce the retirement accumulation by around 22% and a 2% asset charge would reduce the final

¹¹ This is speculative only.

accumulation by nearly 40%. On top of this the final accumulation is reduced by superannuation taxes, the superannuation surcharge and insurance, and any further taxes and charges when the accumulation is converted into a retirement income stream.

Figure 3 illustrates the impact (dollar amount pa) of a 1% asset charge over the entire 40 year period of membership.

Figure 3: Time profile of asset charge of 1%, \$pa^(a)



Notes: (a) Assumptions – 9% contributions to a DC superannuation fund, real wages growth of 1%, 0% inflation, no taxes or insurance premiums. Assets charge is the only charge applied.

Table 4: Impact of percentage asset charges

| Year | 0.5% asset charge | | 1% asset charge | | 2% asset charge | |
|--|-------------------|----------------|-----------------|----------------|-----------------|----------------|
| | \$ charge | % contribution | \$ charge | % contribution | \$ charge | % contribution |
| 1 | 18.90 | 0.53 | 37.80 | 1.05 | 75.60 | 2.1 |
| 5 | 105.34 | 2.81 | 208.50 | 5.57 | 408.43 | 10.90 |
| 10 | 241.83 | 6.14 | 472.21 | 14.83 | 900.45 | 22.87 |
| 15 | 417.37 | 10.09 | 803.45 | 19.42 | 1489.97 | 36.01 |
| 20 | 641.79 | 14.76 | 1217.24 | 27.99 | 2193.09 | 50.43 |
| 25 | 927.37 | 20.29 | 1731.81 | 37.89 | 3028.43 | 66.25 |
| 30 | 1289.38 | 26.84 | 2369.35 | 49.32 | 4017.55 | 83.63 |
| 35 | 1746.86 | 34.60 | 3156.78 | 62.52 | 5185.38 | 102.70 |
| 40 | 2323.53 | 43.78 | 4126.85 | 77.76 | 6560.74 | 123.63 |
| Charge as a percentage of retirement accumulation | 12% | | 22% | | 39% | |

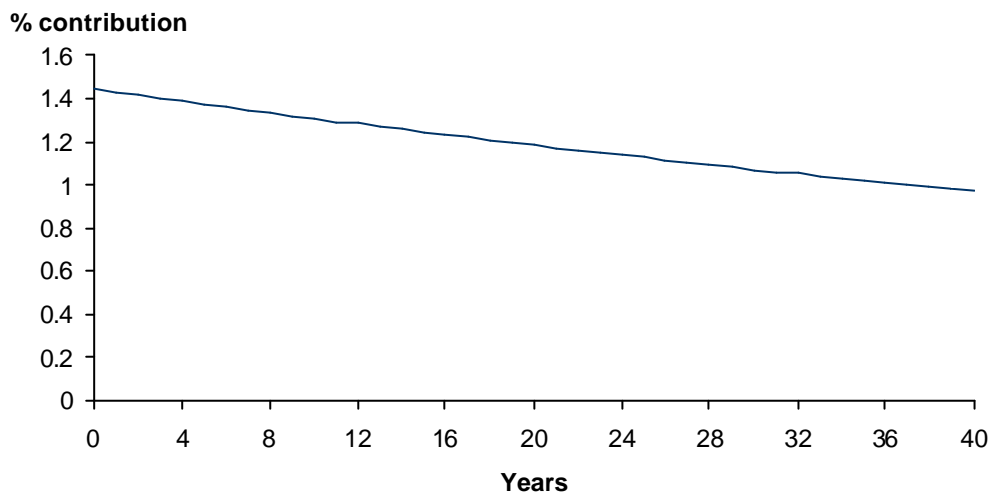
Assumptions: as for Figure 3.

Percentage charges on assets have a greater impact in the later years of retirement saving. For example, a 1% charge on assets is equivalent to 6% of the contribution in year 5, 49% of the contribution in year 6 and 78% of the contribution in years 40. Similarly, the dollar amount of a 1% asset charge would increase from \$105 pa in year 5 to \$2,324 pa in year 40.

Flat rate contribution charge

The impact of a flat rate contribution charge (expressed as a proportion of contributions) is illustrated in Figure 4. A constant charge of \$1 per week (or \$52 per year) is assumed. Flat rate contribution charges have a minimal impact in later years as the assets grow.

Figure 4: Time profile of flat rate contribution charges, % contribution ^(a)

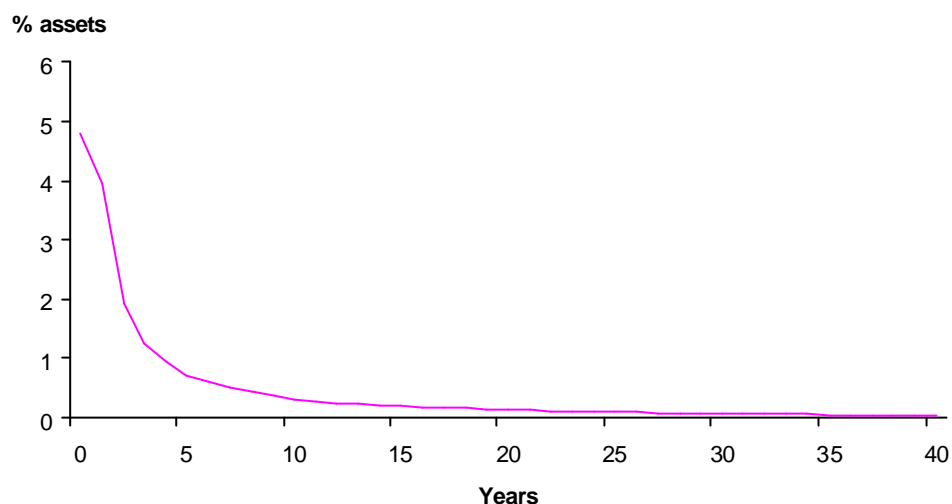


Notes: (a) Assumptions: as for Figure 3. Flat rate contribution charge (of \$52 pa) is the only charge applied.

% contributions charge

Figure 5 summarises the impact of percentage contribution charges. A charge of 4% of each contribution is assumed.

Figure 5: Time profile of a 4% contribution charge, % assets



Notes: (a) Assumptions – as for Figure 3. % contribution charge is the only charge applied.

Charges as a percent of contributions have a greater impact in the earlier years of the retirement saving and a minimal impact in later years as the assets grow.

Comparison of charges

Given the wide variety of charge types both within and between superannuation funds, investment options and products, it is difficult to gain a sense of the relative magnitudes of aggregate charges. For example, in which of the following two funds would aggregate charges be greater? A superannuation fund with \$1 per week flat charge plus a 1% asset charge or a superannuation fund with a 4% charge on contributions, a \$30 pa flat rate contribution charge and a 0.7% charge on assets under management.

Therefore, any sensible comparison of administrative charges requires the standardisation of the metric under which they are calculated. Unless all charges are expressed as a dollar amount, a percentage of contributions, a percentage of

benefits, or as a percentage of assets under management, it is difficult to gain any sense of their relative magnitudes.

With a number of simplifying assumptions, it is possible to convert a combination of different types of fees and charges to a single metric. That is a combination of flat rate and percentage charges on contributions, assets and benefits can be expressed as either a flat rate dollar amount per annum (or in aggregate), % contributions pa, % assets pa or % reduction in accumulation at retirement. (The relevant analysis is summarised in Appendix 1).

The issue then becomes a question of the appropriate measure to use for the purpose of disclosure of fees and charges. This issue will be considered later.

Relationship between charge types

Using the abovementioned methodology we can identify a number of broad relationships between the alternative charge types.

- A percentage charge on contributions reduces benefits by the same percentage. That is, a 10% charge on contributions would reduce the retirement accumulation (that is, benefits) by 10%.
- The relationship between % assets charges and % contributions and benefits charges depends upon a number of factors including years of membership, rate of return and the quantum of percentage charges.
- Contributions charges are front loaded, which means that the impact on member balances is greater in the earlier rather than the later years of membership. Asset charges are back loaded, which means that the impact on member balances is greater in the later rather than the earlier years of membership.

These relationships are illustrated in Table 5 and Figure 6 below.

Table 5 illustrates the relationship between % asset and % contribution (and benefit) regimes under alternative contribution periods (20 and 40 years) and real rates of return (5% and 10%)¹².

Table 5: Relationship between alternative charge types ^(a)

| | Charge as proportion of assets under management (%) | Equivalent ^(b) contribution or benefit charge (%) | |
|---------------------------|---|--|-----------|
| | | (r = 5%) | (r = 10%) |
| 20 years of contributions | 0.5 | 6 | 6.5 |
| | 1.0 | 11 | 12 |
| | 2.0 | 21 | 23 |
| | 3.0 | 29 | 32 |
| 40 years of contributions | 0.5 | 12 | 14 |
| | 1.0 | 22 | 26 |
| | 2.0 | 39 | 45 |
| | 3.0 | 51 | 58 |

(a) Assumptions – as for Figure 3. Charge rates are constant over time.

(b) The present value of administrative charges is equivalent for each charge regime.

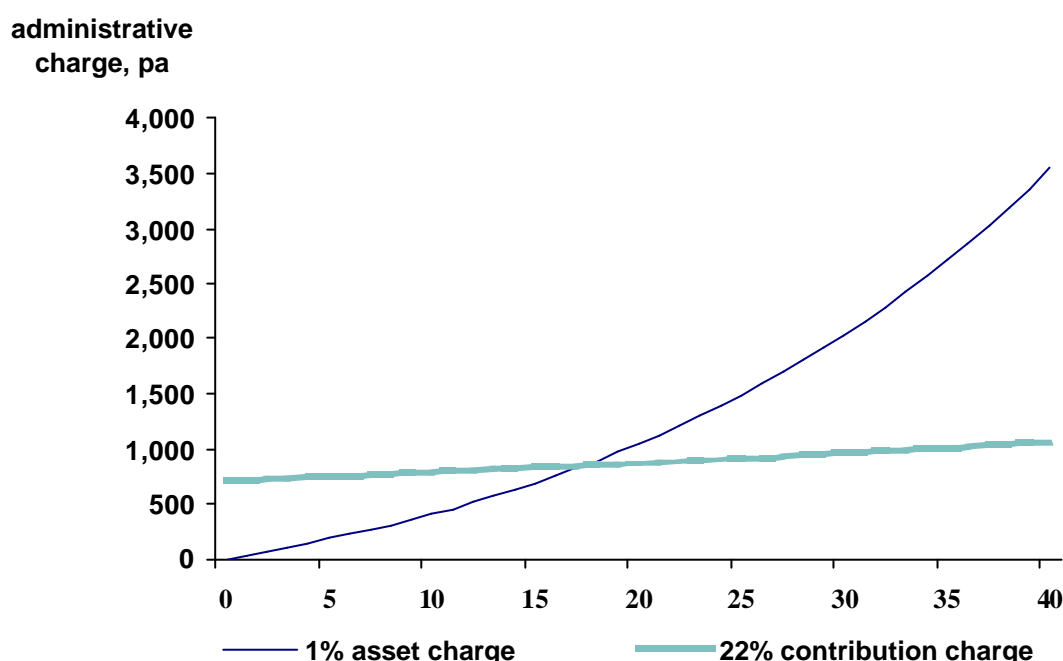
For 20 years of continuous contributions (and an annual real rate of return of 5%), a 1% per annum assets charge would reduce the retirement accumulation by 11%. This is equivalent to an 11% contribution charge (or an 11% benefits charge). For 40 years of contributions, the 1% asset charge would reduce the retirement accumulation by 22% - equivalent to a 22% charge on contributions or benefits. Where the rate of return increases to 10%, a 1% assets charge over 40 years would be equate to a contribution or benefits charge of 26%. It is clear that the relationship

¹² We make the simplifying assumption that the charge rates are constant over the entire accumulation phase.

between alternative charge types and their impact on retirement accumulations varies by charge type, length of accumulation period, and rate of return.

A related difference is the time profile of % asset charges compared with % contribution charges. Figure 6 compares the dollar amount paid in % asset charges and % contribution charges over 40 years of retirement saving. The illustrative charge rates of 1% per annum of assets or 22% of contributions generate an equivalent present value of charges over the 40 year accumulation period.

Figure 6: Time profile of % assets and % contribution charges ^(a)



Notes: (a) Assumptions – as for Figure 3. The present value of aggregate administrative charges is equivalent over the entire accumulation phase.

While the present value of administrative charges is equivalent under both the contribution and asset charge regimes, there are quite different impacts on account balances in any given year. Under the given assumptions, a 1% per annum assets charge for 40 years is equivalent to a 22% contributions charge on every contribution. However, in year 5 the 1% assets charge is equivalent to 5.3% of the annual contribution, in year 25, 36% of the annual contribution, and in year 40, 74% of the annual contribution. It follows, that contribution charges have a greater impact on those with a short contribution period, while asset charges have a greater impact the longer the contribution period (and therefore, the larger the asset base).

Other points of comparison

In addition to the time profile of charges, major difference between asset charges and contribution (and benefits charges) relates to transparency. The impact of a contribution or benefits charge on retirement accumulations is straightforward: a charge of x% of contributions or benefits will (in the absence of withdrawals such as taxation or insurance premiums), reduce the retirement accumulation by x%. Similarly, an exit charge of x% would directly reduce the final accumulation by x%. However, the impact of asset charges, being a function of the charge rate, the accumulation period and the rate of return, is much less transparent. It was shown earlier that, in general, the longer the contribution period and the higher the rate of return, the greater the impact of a given charge rate on the retirement accumulation. However, it is not clear that this would be evident to the average superannuation fundmember. Transparency would be further impeded where composite charge regimes were used.

Behavioural Impacts

Finally, the different charge types may have different impacts on retirement saving behaviour. For the individual, contribution charges – which are high as a proportion of assets in the formative years of retirement saving - may be a disincentive for labour force participation or participation in mandatory/voluntary superannuation. Assets charges, which assume greater importance over time as the asset base grows - may act to bring forward the retirement decision. But, for the retirement saving providers (superannuation funds), contribution charges allow set-up costs to be covered, while asset charges ensure a smooth flow of revenue.

Conclusion

A number of charge regimes are available to recoup the costs associated with superannuation. Each would have a different time profile of impact and a different aggregate effect. Where a combination of types of fees and charges apply, it is difficult to gain any sense of their net impact. In order to facilitate a sensible comparison of alternative funds or investment strategies, the disparate charging schedules must be converted into a single measure. Possibilities include: flat rate

dollar amount, % of contributions, % of assets and % of benefits (that is percentage reduction of retirement accumulation). For the purpose of adequate disclosure of fees and charges – which is the appropriate measure?

4. International Experience

As private provision of retirement income is becoming increasingly important around the world, many other countries are dealing with the similar issues of purported high or excessive charges and appropriate consumer education/information/disclosure. These are important issues: with incomplete knowledge, consumers may make poor choices – which will affect their long-term income security.

Two broad approaches are possible – prescribed regulation and prescribed disclosure. For countries with compulsory private retirement saving (along the lines of Australia's superannuation guarantee) prescribed regulation appears more prominent.

Regulation of charges

Charges can be regulated by type and amount. International practice – summarised in Table 6 - ranges from the unregulated (such as Australia and Hong Kong), to considerable regulation (see Sweden and Bolivia).

Australia is an example of freely determined administrative charges with the exception of 'member protection' offered to small amount accounts.¹³

Until recently, charges in the United Kingdom had also been freely determined. However, following the 'miss selling controversy' so called 'stakeholder' pensions have been introduced. Asset charges are regulated with a ceiling of 1% assets.

¹³ Which ensures that administrative charges cannot reduce accounts below \$1,000 - although amounts for taxes, losses and insurance can be deducted.

Table 6: Regulation of administrative charges – international comparison ^(a)

| Charge regulations | Country |
|-------------------------------------|--|
| No restrictions | Australia ^(b) , Hong Kong, United Kingdom (except stakeholder pensions) |
| Cross subsidies to low-paid workers | Mexico |
| Limits on charge type | Argentina, Chile, Colombia, Peru, Hungary |
| Partial ceiling on charges | Poland |
| Variable ceiling on charges | Sweden |
| Fixed ceiling on charges | El Salvador, Kazakhstan, United Kingdom (stakeholder pensions) |
| Competitive bidding | Bolivia |

(a) Derived from Whitehouse (2000), Table 1.

(b) Except on small amount accounts (of less than \$A1, 000) where the fees and charges are waived.

Some countries regulate charge types:

- Chile has banned asset management charges: only charges on contributions and transfers are permitted.
- In Mexico charges must be approved by regulators and must apply equally to all members, while in Colombia charges can only take the form of a percentage of contributions.
- Peru disallows flat rate charges on contributions or assets under management, while Argentina allows flat rate charges on contributions and entry fees, but no asset management fees.

A number of other countries regulate the charge amounts:

- Pension funds in Poland can levy proportional charges on both contributions and assets, but the asset-based charge is limited to 0.6% pa.

- In Kazakhstan fees cannot exceed 1% of contributions plus 10% of the fund's investment return.
- In Sweden, only mutual funds, which satisfy minimum charge requirements, are allowed to participate in the private mandatory retirement saving arrangements.¹⁴
- Finally, when Bolivia introduced private mandatory retirement saving in 1997, asset management rights were auctioned off to two investment companies, chosen partly on their ability to minimise fees. In 1999 fees were 0.5% of wages (or 5% of incoming contributions) plus 0.23% of assets.¹⁵ However, there have been no marketing costs, as contributors were assigned to an investment company and have not been allowed to switch, and the assets are largely invested in government bonds (James *et al.* 1999).¹⁶

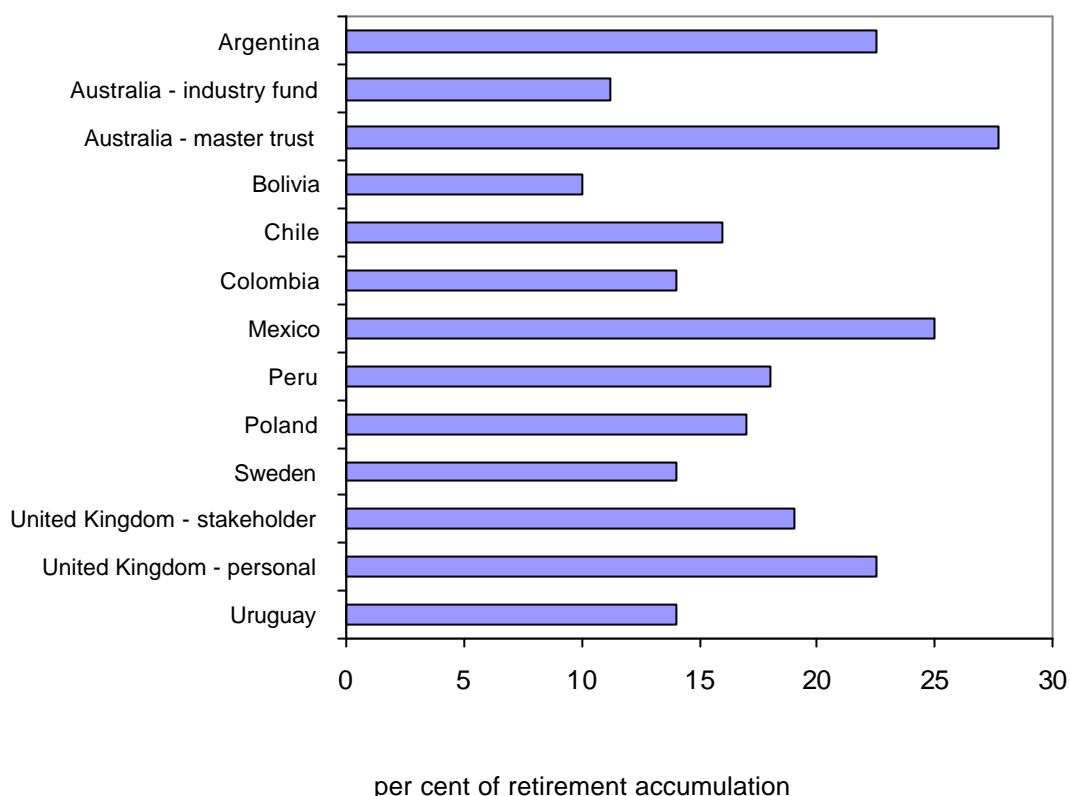
Despite the trend towards greater regulation, charges still remain high in some countries. Figure 7 summarises the international experience. Administrative charges are lowest in Bolivia, followed by Australia (industry funds), Colombia, Sweden and Uruguay. Administrative charges are highest in Argentina, Mexico, the United Kingdom (personal pensions) and for Australian master trusts (offered to retail customers).

¹⁴ The formula used to determine charges, depends on the price charged for voluntary savings in the mutual fund, the value of the mandatory contributions attracted and the total value of mandatory pension assets managed.

¹⁵ Over the accumulation phase of mandatory saving, this corresponds to 0.47% assets per year.

¹⁶ However, this may change: switching was allowed from 2000 and new firms can enter the market after 2002.

Figure 7: Total administrative charges - international experience



Note: Australian master trusts refers to a small plan.

Source: Bateman, Kingston and Piggott (2001).

Lessons for Australia

While Australian policymakers may not wish to take the regulatory route or cap charges, there are still lessons to be learnt from the overseas experience – particularly in relation to transparency. In some Latin American countries – Chile, Colombia, El Salvador and Peru – charges are imposed on top of the mandatory contribution. Potential members are quoted an annual charge of say, x% of the contribution (or even earnings) and the charge is paid by members ‘in addition’ to the mandatory contribution. This process ensures that members are fully aware of the amount of the administrative charge¹⁷.

Transparency would also be achieved where there is full and meaningful disclosure of fees and charges. This is considered further in Section 6.

5. Superannuation charges - Australian experience

While there are five broad types of superannuation fund in Australia – corporate, public, industry, retail and self-managed - the following analysis refers mainly to industry and retail funds. These have the most accessible and complete information on fees and charges. As well, because industry funds and master trusts take differing approaches to charging, such a comparison is instructive.

The typical charge regimes for industry funds and master trusts are summarised in Table 8.

Table 8: Typical charging schedules for superannuation funds ^(a)

| Typical industry fund | Typical master trust |
|---|--|
| <p style="text-align: center;">Administration charge (flat rate dollar amount)</p> <p style="text-align: center;">+</p> <p style="text-align: center;">Investment management fee (% of assets under management)</p> | <p style="text-align: center;">Contribution fee (% of each contribution)</p> <p style="text-align: center;">+</p> <p style="text-align: center;">Member fee (flat rate dollar amount)</p> <p style="text-align: center;">+</p> <p style="text-align: center;">Administration fee (% of assets under management)</p> <p style="text-align: center;">+</p> <p style="text-align: center;">Investment management fee (% of assets under management)</p> <p>[Group and size discounts may apply to reduce member fee and administration fee]</p> |

(a) Estimates based on industry fund and master trust information for 2000-01.

Industry funds

Industry funds have adopted a fairly uniform charge regime; generally comprising flat rate account management charges deducted from accounts and percentage

¹⁷ And the mandatory contribution itself is not dissipated by charges.

investment management charges, deducted from returns. Some industry funds impose different account management charges for active and inactive accounts and for different contribution types. Few industry funds charge for exits, but with increasing portfolio choice, some funds have introduced switching charges.

In 2000 administration charges for employer contributions ranged from around \$15 to \$90 per account per annum. Typically the annual administration charge for active accounts is around \$1 per week (\$52 per annum). Currently there are almost no direct marketing costs incurred by industry funds as they generally have a captive membership.¹⁸ However, as a result of recent policy proposals industry funds are increasingly becoming open (or public offer funds) in order to expand their membership base.

Investment management charges are more difficult to determine. Reporting of aggregate investment fees is not required and industry funds tend to use a variety of asset managers with fees varying between asset types. Anecdotal evidence suggests that the asset management charges for the largest industry funds in 2000 were of the order of 0.3 to 0.7% of assets under management.

Master trusts

Master trusts are a form of retail superannuation fund. They are used by individuals, small employers who do not wish to establish company superannuation plans, and increasingly by large companies wishing to contract-out of pre-existing corporate superannuation schemes. The administrative charges of master trusts are less uniform and there is considerable variation by plan size. Charges fall into two categories – product charges, and investment and fund charges. Product charges may include contribution charges, member charges and transfer and terminating fees. Investment and fund charges refer to ongoing management charges, investment charges, switching charges, fund expenses and trustee and custodian fees. The illustrative master trust used for this comparison is specifically designed for medium to large employers. Charges include: a % contributions fee of up to 4.5% of contributions, a flat rate contribution (member) fee which reduces with plan size, an annual % asset administration fee of up to 0.95% of assets and additional %

¹⁸ Due to their origins in award superannuation.

asset management charges for each investment option. These latter charges range from 0.4% pa for an in-house capital secure fund to 1.08% pa for an externally managed international share fund. There are no exit fees but switching charges apply to some investment options. Importantly, discounts are available for large plans and in some cases a tailored charging schedule would be negotiated.¹⁹

Comparison

The charges identified above reveal little about the difference in aggregate charges between typical industry funds and master trusts. The industry fund charge regime is a flat rate contribution charge plus a % asset charge, while the master trust charge regime comprises a flat rate contribution charge, a % contribution charge and two variants of assets management charge. However, given a number of assumptions relating to the size of the contribution, the contribution period and the rate of return, we can convert the disparate charging schedules, to any of the four metrics identified in Section 3. That is: aggregate dollar charge, % contribution charge, % assets charge, or percentage reduction in retirement income (% benefits). The results are summarised in Table 8 and Figures 8 and 9.

The analysis of industry funds shows that, over the accumulation phase of superannuation, and for a typical range of investment charges (0.3-0.7% of assets), the reduction of retirement accumulations range from 8.1% to 16.1%. This equates to contribution charges in the range 6.8% to 13.4% of contributions and assets charges in the range 0.37% to 0.77% of assets under management.

¹⁹ It is likely that these would eliminate the contribution charge and the annual asset management fees.

Table 8: Industry Funds and Master Trusts – charges under alternative assumptions ^(a)

Industry Fund

| Total charges | | Equivalent assets charge (%) | Equivalent contributions charge (%) | Decline in retirement accumulation (%) |
|------------------------------|-------------------------|-------------------------------------|--|---|
| Investment charge (%) | Flat rate charge | | | |
| 0.3 | \$52 pa | 0.37 | 8.1 | 6.8 |
| 0.5 | \$52 pa | 0.57 | 12.2 | 10.2 |
| 0.7 | \$52 pa | 0.77 | 16.1 | 13.4 |

Master Trusts

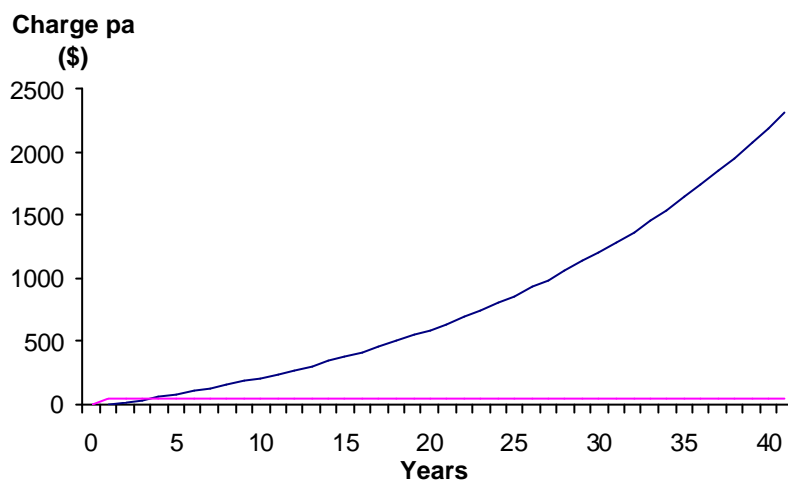
| Plan type | Equivalent assets charge (%) | Equivalent contributions charge (%) | Decline in retirement accumulation (%) |
|--------------------------------|-------------------------------------|--|---|
| Very small plans | 1.81 | 27.7 | 33.4 |
| Large plans | 1.30 | 21.4 | 25.7 |
| Very large plans | 0.96 | 16.4 | 19.6 |
| Contracted-out corporate plans | 0.4-0.7 | 7.3-12.3 | 8.8-14.8 |

Assumptions – as for Figure 3, with 0% pa inflation and the inclusion of superannuation taxes (a contributions tax of 15%, an effective earnings tax of 8%). Insurance premiums are ignored. Note that with the introduction of taxes, the equivalence between the contribution charge rate and the benefit charge rate no longer holds.

What do these charges mean over the working life of the contributor? Figures 10 and 11 summarise the time profile of charges for typical industry funds and master trusts. It is noted that in later years the \$1 per week administration charge is completely dominated by the (little advertised) asset charge.

Figure 8: Time profile of charges – typical industry fund

(\$52 pa flat fee plus 0.5% pa asset charge)



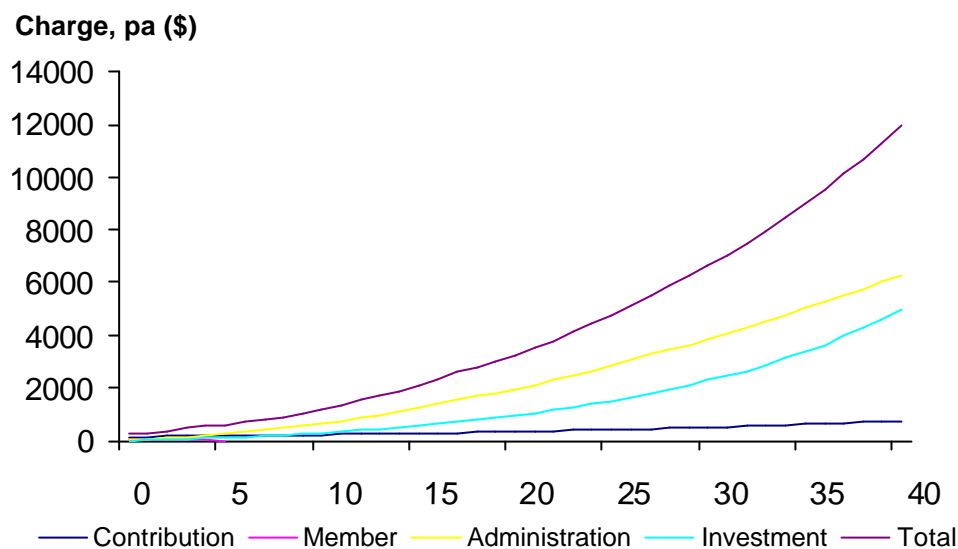
Assumptions: as for Table 8, with 3% inflation.

Master trusts

The time profile of charges associated with master trusts is summarised in Figure 9. It is clear that aggregate administrative charges differ markedly by plan size. For the small plans, the overall impact of the current charge regime is to reduce the retirement accumulation by one third. However, this impact reduces the larger the plan (in terms of both members and assets). For large plans, the overall impact is a reduction in the retirement accumulation of about one quarter and for very large plans by 20%.

However, it is becoming increasingly common for large companies to contract-out their superannuation arrangements to master trusts. In these circumstances a schedule of fees and charges would be individually negotiated. In some circumstances the overall impact would be comparable to that of an average industry fund.

Figure 11: Very small master trust plan



Assumptions – as for Figure 8.

Concluding comments

The comparison of charges associated with industry funds and master trusts – just 2 of the 5 types of superannuation fund in Australia, raises a number of issues.

Master trusts and industry funds have quite different charge regimes. Industry funds are quite uniform, while master trusts include a greater variety of charge regimes (with differences by scale of plan and across different master trusts). Use of different charge types also means a differing time profile of charges. This makes it difficult to compare aggregate charges without access to (and an understanding of) sophisticated modelling software that would allow the conversion of a variety of fees and charges to a single metric.

This raises the following question. In an environment of increasing member choice (of fund and investment strategy) how should funds disclose (report) fees and charges so that consumers understand their impacts.

6. Options for informative disclosure

The preceding discussion suggests a range of factors that need to be taken into account in the reporting and disclosure of superannuation fees and charges. At the outset, however, two issues are emphasised that should inform any disclosure requirements. First since superannuation is saving for retirement, consumers should be aware of the potential impact of any fees and charges on their income in retirement. As well, since at least some superannuation is mandatory and therefore has broad coverage, there will be many unsophisticated investors. It is therefore essential that disclosure is simple to understand.

Disclosure by charge type or as a single metric?

Different charge regimes apply for alternative superannuation funds and for alternative investment strategies within a given fund. In many cases a number of charge types are used. The issue for disclosure is whether it is sufficient to explain the impact of each charge separately or whether these should be converted to single metric for comparison? In either case, it is essential that ALL fees and charges be included²⁰.

For example, for separate disclosure of fees and charges the following categories could be used:

- Charges on contributions.
- Charges on assets.
- Charges on benefits (ie, exit charges).
- Other.

However, it may be more informative to convert combinations of fees and charges to a single metric. If a single metric were used, should it be?

- Dollar amounts.
- Percentage of contribution.
- Percentage of assets.
- Percentage of accumulation at retirement.

²⁰ For example, the widely used Management Expense Ratio (MER) would be inappropriate as this

Among the alternative single figure metrics:

- *Dollar amounts* may appear simple to understand, but provide no indication of the impact of fees and charges on the retirement accumulation. This would be particularly so in the event of a high cost, but high return investment strategy.
- *Percentage of assets* may be understood to finance and investment professionals, but the true implications are unlikely to be understood by many consumers: few would realise that a 1% asset charge over 40 years could reduce their retirement accumulation by over 20%.
- *Percentage of contribution* may be easier to understand, but may appear too penal: for example, a charge of 22% contributions may sound greater than a 1% assets charge (although aggregate charges over 40 years would be equivalent)²¹.
- *Percentage reduction in accumulation at retirement*. In some circumstances this would be the same as a % of contribution charge – but is likely to be more informative given the long-term nature of superannuation. This metric could take into account differing expected rates of return associated with alternative investment options (and therefore differing fees and charges). The factor of most relevance to consumers should be the extent to which fees and charges are likely to erode their income in retirement.

A single metric specified in terms of the percentage reduction in the accumulation at retirement would be the most informative. This avoids the misperception problems associated with dollar amounts and percentage of assets or contributions, allows account to be taken of both the fees and charges imposed and the associated likely rate of return, and allows comparison of superannuation funds with quite different charge regimes.

only accounts for expenses associated with the investment function.

²¹ This is the approach taken in many Latin American countries with newly introduced compulsory retirement saving schemes.

Unfortunately, while the presentation of a single figure would make the comparison of alternative funds or plans easier, it may be misleading to consumers due to the large number of qualifying assumptions. For example, when converting a combination of different charge types to a single metric, one needs to make assumptions about the expected years of contributions, future rates of return and future movements in types and amounts of fees and charges. In the analysis in this paper a constant rate of return and no change from current fees and charges is generally assumed.

Disclosure of the time profile of charges as well as aggregate charges

The preceding analysis (section 3) shows that the time profile of charges is quite different for different charge types. Put simply, charges on contributions are front loaded and charges on assets and benefits are back loaded. Should consumers be informed of these impacts?

Can we learn anything from the international experience?

Most other countries with mandatory saving for retirement have opted for prescribed regulation rather than prescribed disclosure and have introduced regulations covering both charge types and charge amounts. While it would not be appropriate for Australian policymakers to follow this route, we should take note of the greater transparency achieved. For example, in Chile charges are set at x% of contributions and are paid for the members IN ADDITION to the mandatory contributions. Consumers are therefore well aware of the impact of fees and charges in dollar terms (but would have little understanding of their impact on final retirement incomes²²).

Guidelines for disclosure

The FSR Bill and associated legislation are currently in process. While some indication can be obtained from the *ASIC Policy Proposal paper No. 4 – Disclosure: Product Disclosure Statement (and other disclosure obligations)* the likely direction of the forthcoming regulations is unclear.

²² On the assumption that the amount of fees and charges would otherwise be saved for retirement.

Consumer testing

However, to assist with consultations on this issue, consumer testing of alternative disclosure formats has been undertaken by the superannuation industry.

ASFA (via Ageing Agendas) undertook a project in 2000 to consumer test disclosure documentation in the form of Key Feature Statements. The findings of this research emphasised ..'the need for standardised, simple and uncluttered presentation of information that may be interpreted easily by a lay person and that makes comparison of products possible. Standardisation should include headings, terminology and order of presentation. Further, if there is going to be use of tables and illustrations to demonstrate fees or returns then standardisation is important to permit comparisons' (ASFA 2000). In relation to comparisons of fees, the use of percentages was seen as a barrier to understanding, and dollar illustrations were considered to be an essential element in comprehension and assessment. The broad finding was that the comparative information needed to be presented in very simplified formats.

A more recent study by IFSA (Sweeny Research 2001) canvassed consumers preferred means of reporting fees and charges. For the consumers surveyed:

- 54% thought fees should be expressed 'as a percentage of the investment and in actual dollar terms'.
- 24% thought fees should be expressed 'in actual dollar terms'.
- 12% thought that it would be appropriate to 'show the investment balance after fees have been deducted'.
- 7% thought that it would be appropriate to express 'fees as a percentage of the investment'.
- 3% didn't know.

7. Concluding comments

This paper suggests that informative disclosure should involve (at least) a single metric, preferably the percentage reduction in retirement accumulation (qualified in terms of the underlying assumptions). Such a measure would allow comparison of aggregate fees and charges of superannuation funds with quite different charging regimes, take account of both fees and charges and the associated rates of return, avoid misperceptions associated with some of the other measures and most importantly inform consumers of the of fees and charges on their income in retirement. However, any disclosure regime must be balanced against consumer preference for a more simplistic (and far less informative) indicator.

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Appendix 1: A formal analysis of fees and charges

Consider an individual contributing to a superannuation fund over a period of T years. A contribution C is made at the beginning of each year, which earns a real rate of return of $r\%$ per annum.

Assuming a percentage charge on contributions of b_C , and a discount rate R which is assumed to be equal to the real rate of return r , the present value of the administrative charges over the T years of retirement saving, PVC_C , is given by

$$PVC_C = \sum_{t=1}^T \frac{b_C C_t}{(1+R)^t} . \quad (\text{A.1})$$

Similarly, if instead we assume a percentage charge on assets under management of b_A , the present value of administrative charges, PVC_A , is given by

$$PVC_A = \sum_{t=1}^T b_A \left[\frac{\sum_{x=1}^t C_x (1+r)^{x-t} (1-b_A)^{x-t}}{(1+R)^t} \right] . \quad (\text{A.2})$$

Finally, if we assume a percentage charge on the final accumulation (benefits) of b_B , the present value of the administrative charges, PVC_B , is given by

$$PVC_B = b_B \frac{\sum_{t=1}^T C_t (1+r)^{T-t}}{(1+R)^T} . \quad (\text{A.3})$$

A number of results follow.

Firstly, if we set $PVC_A = PVC_B$

$$\sum_{t=1}^T \frac{b_C C_t}{(1+R)^t} = b_B \frac{\sum_{t=1}^T C_t (1+r)^{T-t}}{(1+R)^T} \quad (\text{A.4})$$

and rearrange, we find that equation A.4 reduces to $b_C = b_B$. This result implies that for a given present value of charges (and in the absence of taxes, or other

withdrawals such as insurance premiums) a percentage charge on contributions of b_C is equivalent to a percentage charge on benefits equal to b_B and will lead to a decline in the retirement accumulation of b_C per cent.²³

Further, if we set $PVC_C = PVC_A$ and rearrange, we can specify a relationship between b_C and b_A (and consequently b_B and b_A) as follows:

$$b_C = b_A \left\{ \frac{\sum_{t=1}^T \left[\frac{\sum_{x=1}^t C_x (1+r)^{x-t} (1-b_A)^{x-t}}{(1+R)^t} \right]}{\sum_{t=1}^T \frac{C_t}{(1+R)^t}} \right\} . \quad (\text{A.5})$$

The relationship between b_C and b_A thus depends on the accumulation period T , the pattern of contributions C and the real rate of return r .

²³As compared to the no tax case.