Economies of Scale: The Case of KiwiSaver Fees

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Abstract:

New Zealand's KiwiSaver was introduced in 2007 to bolster low retirement savings rates and improve the quality of living in retirement. As a defined contribution scheme, fees play an important role in determining its success in building retirement savings for investors. The level of KiwiSaver fees has been the subject of on-going debate, including whether fees have decreased as membership and funds under management have increased, i.e. economies of scale. We examine whether the economies of scale that may be present for fund managers have been passed onto members via reduced fees. We employ a sample of 121 KiwiSaver funds over 2013-2017 and relate fund fees to assets under management and the number of participants in the fund. Findings suggest fees as a percentage of assets under management have decreased, albeit marginally for aggressive and growth funds. We find evidence of economies of scale as funds mature, and increase in size, leading to the decreasing costs for members.

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1. INTRODUCTION

For personal retirement savings schemes to be effective, people need to maximise the amount of savings that they will have at retirement. This is especially true for defined contribution schemes, where the net return that people earn on their money, along with their level of contributions, will determine the size of their retirement nest egg. While returns are uncertain, one factor that people can control is the impact that fees have on their savings. This is particularly important given the overwhelming lack of evidence to suggest that higher fee funds earn high returns consistently.

Mutual funds incur expenses while managing people's money. While some fees depend on the amount of money being managed, especially transaction costs, at least a portion are relatively fixed. For instance, the cost of computer systems to administer client accounts should not depend on the number of accounts. Therefore, as funds increase in size, based on either the assets under management (AUM) or the number of investors, the costs incurred by the fund should increase at a smaller rate. Put differently, as funds get larger the economies of scale that they experience should reduce the fees that they charge. Latzko (1999) argues that while it is more difficult to manage a large fund than a small one, it is unlikely to be twice as hard to manage a fund that is double the size of another.

Economies of scale exist in situations where there are large fixed costs of production. As the level of production increases, these fixed costs can be spread over more output reducing the per unit cost of production. Within the fund management area this suggests that as the size of the assets under management increase, provided you have large fixed costs, the cost of managing that money should decrease. Various avenues should exist for creating economies of scale within mutual funds. For instance, the various systems required to run a fund should be readily scalable, meaning administration of a fund for 1,000 members should be similar to the costs for the system to manage 100,000 members. Additionally, the cost of administering the

same number of accounts should be the same irrespective of the size of account balances (Latzko, 1999). There should also be substantial cost savings available in the costs of investing funds, especially with regards to investing in other funds where investing larger sums should result in substantial rebates and discounts. However, while substantial economies of scale may be available to fund managers, the extant literature is mixed on whether we see economies of scale in fees.

New Zealand-based KiwiSaver was introduced in 2007 to address a significant lack of personal retirement savings for New Zealanders, as concerns mount that the government pension scheme may be unsustainable into the future.[1] The advent of KiwiSaver also resulted in a considerable boost to the local funds management industry, introducing hundreds of thousands of new members and $46.5 Billion in AUM as at March 2018 (Morningstar, 2018). Additionally, it is estimated that in 2017 KiwiSaver fund managers earnt $354 million in fees (Financial Markets Authority, 2017). However, in recent years there has been an increasing discussion around whether the level of KiwiSaver fees is appropriate. Additionally, there is little evidence to suggest that KiwiSaver funds are experiencing any real price competition, arguably resulting in fees that are higher than they should be. Ideally, savvy investors would shop around for the best value, placing downward pressure of fees. High fees were expected while KiwiSaver was new, when AUM and member numbers were low, but ten years on the debate on fees continues. Given the considerable growth in both AUM and membership, we would expect to see a decline in fees to recognise the considerable economies of scale experienced by KiwiSaver funds. However, to date, the evidence on declining fees has been mixed with one study finding average fees are similar to the level they were in 2008 (St. John 2014), while another study concluded that fees were declining by 3 basis points per year, but that it could be due to low-

[1] Attributed to demographic factors such as aging populations, rising life expectancy and intergenerational inequity.

cost default fees (Heuser *et al.* 2015). The important question of whether we see evidence of economies of scale in KiwiSaver fees remains unanswered.

To examine whether there is evidence of economies of scale in KiwiSaver funds, we collect data on cash and multi-sector KiwiSaver funds between 2013 and 2017. We start from 2013 due to a regulatory change in 2013 that required funds to begin disclosing fees as total expense ratios. Our final sample includes 469 fund-year observations for a sample of 121 funds across 21 fund families. For each fund-year, we collect the annual fee, total expense ratio (TER), assets under management (AUM) and number of participants as at the end of the September quarter each year. We apply two regression approaches to estimate the level of economies of scale based on the natural log of fees, AUM and number participants, controlling for number of additional factors that may influence fees (following Latzko, 1999 and Bateman and Mitchell, 2004). We calculate the average fee as a percentage of AUM is 1.28%, higher than the cost of equivalent US and Australian funds.

Our results provide evidence that there are economies of scale. Specifically, if we hold AUM static, an additional participant increases fees by just 18c, while holding the number of members static, each extra dollar of AUM increases fees by 80c. When we look at the impact of the size of the fund in terms of AUM and number of members we find that economies of scale decrease as a fund adds additional members and increase as AUM increase.

The rest of the paper is structured as follows. Section 2 contains a discussion of the literature around economics of scale in the administration of mutual funds. Section 3 introduces the KiwiSaver scheme and discusses some of the evidence around KiwiSaver fees. Section 4 sets out the methodology we employ and details of our sample. Section 5 conducts the empirical analysis and addresses whether economies of scale are present for the case of KiwiSaver. Section 6 concludes the paper.

2. LITERATURE REVIEW

Much of the research regarding mutual fund fees has examined whether higher fees result in better fund performance, or what are the determinants of fund fees. However, questions of how mutual fund fees change over time, and specifically whether we see evidence that economies of scale are passed on to fund investors via reduced fees, remain relatively open.

The literature has predominantly focused on economies of scale for US mutual funds. Latzko (1999) argues that economies of scale should result in a negative relationship between the assets under management of a fund and its fees. This relationship has been shown in a number of US-based studies including Ferris and Chance (1987), McLeod and Malhotra (1994) and Malhotra and McLeod (1997). Latzko (1999) then goes further, using a translog cost function to estimate the level of economies of scale and concludes that most funds have cost elasticities of between 0.8 and 0.9, or each additional dollar of AUM results in an increase of costs by 80-90 cents.

Beyond the US, Bikker *et al*. (2012) also show evidence of economies of scale for funds in the Netherlands and Australia (and the US). In contrast, they find no evidence of economies of scale for Canadian funds. Bikker and de Dreu (2009) confirm economies of scale in Dutch pension funds, while James *et al*. (2001) find the same for Chilean pension funds. For Australia, Malhotra *et al*. 2001 finds evidence of economies of scale in funds with more than $30 million in assets, but not in smaller funds. Bateman and Mitchell (2004) also find evidence of economies of scale in both the AUM and the number of participants.

However, the evidence of economies of scale is not universal. In addition to Bikker *et al*. (2012) failing to find evidence of decreasing fees for Canadian funds, Marti *et al*. (2009) also find that economies of scale are not present in Spanish pension funds. They find instead that larger funds

charge larger management fees. Given the mixed results of previous studies, it is an open question whether we can expect to see economies of scale in fund fees for KiwiSaver funds.

3. KIWISAVER BACKGROUND AND FEE STRUCTURE

KiwiSaver is an opt-out voluntary work-based pension plan, which came into effect in 2007 in New Zealand (OECD, 2008), with the aim of improving retirement incomes and expanding national savings (St.John, 2014). All NZ citizens and permanent residents under the age of 65 are eligible to join. Specifically, upon entering the workforce, or switching job, a new employee has a short window (up to ten weeks) in which they can withdraw from KiwiSaver. KiwiSaver by design simplifies investor decision-making by requiring investors to make just three decisions. Namely, how much to contribute[2], which fund manager they would like to manage their money, and the level of risk of the portfolio they will invest in. For those members who did not make an active decision regarding KiwiSaver, but also do not opt-out, they are assigned to a conservative fund managed by one of the 'default' providers[3] at a contribution rate of 3% of pre-tax income. Employers are required to contribute 3% of income for all members and the government contributes 50c for every $1 that the employee (excluding the employer's contributions) contributes to a maximum of $520 per year.

The opt-out scheme and initial 'bonus' contributions[4] have resulted in KiwiSaver membership far exceeding initial expectations, resulting in 2.8 million members across all funds, representing nearly 80% of eligible people. While the opt-out scheme has resulted in fantastic inclusion rates, a failing of the scheme has been the lack of *active* participation from members. For instance, while the default funds were originally envisioned as a short-term landing pad

[2] As at July 2018 current contribution rates for employees are 3, 4 or 8%. However, changes have been announced that will allow members to elect to contribute 6 or 10%.
[3] Initially there were six default providers but this was increased to nine in 2017. Members are assigned at random to one of the default providers.
[4] Initially KiwiSaver start-up benefits included a government contribution of $1,000 on membership, $1 for $1 government contributions to a maximum $1040 per year (on employee contributions), and employers being required to contribute 4%. Over time a series of regulatory changes have reduced these benefits.

while investors considered the options available to them, nearly 500,000 people remain enrolled in the default funds – many of them since KiwiSaver's inception. Further, many members who selected a KiwiSaver fund initially are viewed as taking a 'set and forget' approach, with low rates of movement between funds and fund managers (providers). Despite regulator efforts to try and encourage active engagement with KiwiSaver, progress has been slow, with arguments that a lack of investor engagement has led to poor competition between funds, particularly in relation to fees.

As a defined contribution scheme, the level of a given investor's retirement savings in KiwiSaver depends on the contributions the member makes, the level of risk they take and the resulting returns they earn, and on the level of fees they are charged. Specifically, high fees will reduce the level of savings both directly, by the value of the fees, and indirectly, by the potential compounding returns that are lost. Bateman, Kingston and Piggott (2001) highlight the indirect impact that fees have on reducing the amount available at retirement. They demonstrate that over a 40-year horizon, a 1% difference in the level of fees results in the cheaper fund amassing 27% more at retirement. It is also worth noting that KiwiSaver members' money is invested with private fund managers. Currently there are around 25 fund managers operating in the New Zealand market, although this number has fluctuated because of provider consolidations and the introduction of new managers (Inland Revenue, 2017). In 2018, KiwiSaver providers are expected to earn a total of nearly $500 million in fees. Given the dramatic impact of fees on eventual savings, money is managed by private fund managers and the level of fees appears high, there is an ongoing discussion by stakeholders, including regulators, in the NZ media regarding the appropriateness of KiwiSaver fees.

Currently, KiwiSaver fees comprise of two components: an annual membership fee which typically falls between $NZ20 and $NZ49.8 per year, and a variable fee charged as a percentage of a member's assets under management (Sorted, 2017). The variable fee covers several

individual charges that are based on the AUM including the manager's fee (typically the largest component), other administration fees including trustee fees, and any performance-based fees.[5] Within the New Zealand context, one commentator has noted that over the lifetime of a typical KiwiSaver member, the total amount of fees charged will be around $50,000.[6] Additionally, OECD data places the operating fees of KiwiSaver funds as a percentage of AUM in the top third of all countries (OECD, 2013), suggesting KiwiSaver fees are high.

Our interest, however, is conflicting evidence that fees are decreasing, despite significant increases in members and assets under management (totalling $46.5 Billion as of March 2018, Morningstar, 2018). The New Zealand Treasury produced a report in 2015 investigating KiwiSaver, including the level of fees (Heuser et al., 2015). While they argue that KiwiSaver fees are lower than for Australian funds (which is true in terms of dollar fees), it is less clear if you consider fees as a percentage of AUM, and they show weak evidence of economies of scale at around 3 basis points per annum. They do acknowledge that the economies of scale could simply be attributed to the existence of low-cost default providers and that the fees for other funds may not have reduced at all. In contrast, Tibshraeny (2016) argues the average total expense ratio of funds has remained stable at around 0.87% since inception, despite significantly increased members and AUM, suggesting no economies of scale are present in the fees charged.

Efforts to increase the visibility of fees, and therefore increase compeition between providers, appear to have had limited impact. In 2013 regulators required all funds to report total expense ratios, improving fee comparability between providers. Over the following 12 months it was

[5] Performance-based fees are additional charges that occur should the fund better a pre-determined hurdle rate. These are less common for KiwiSaver funds with only two fund managers charging performance fees in their own right, and a number of individual funds passing on the performance fees of the external funds they invest in.
[6] Sam Stubbs of Simplicity KiwiSaver, quoted in the NZ Herald Business article "KiwiSaver fees may shock, warns Commission for Financial Capability" on 27 March 2018.
(https://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=12021055)

noted that "while the minimum fee observed on a standard profile had not changed at all, the maximum and average fees charged had in fact increased slightly over the past 12 months" (BusinessDesk, 2014). This appears to run contrary to the stated goal of the 2013 regulations. Given the conflicting evidence on KiwiSaver fees, it is not clear if there have been economies of scale, despite strong theoretical arguments to suggest there should have been considerable reductions in the level of fees over time.

4. METHODOLOGY

To investigate whether scale economies exist for KiwiSaver funds we employ two separate methodologies, following previous literature. Both approaches relate mutual fund fees to the factors of production, specifically the assets under management (Latzko, 1999; Bateman and Mitchell, 2004), and the number of participants in the fund (Bateman and Mitchell, 2004). We estimate the fees charged by funds by collecting information on the annual member fee and the total expense ratio (*TER*) charged each year, in addition to the total assets under management (*AUM*) and the number of members. *Total fees* is then estimated as

$$Total\ Fees_{i,t} = TER_{i,t} * AUM_{i,t} + Participants_{i,t} * Annual\ Fee_{i,t}\ . \qquad (1)$$

We then calculate the natural log of the total fees, the assets under management and the number of participants and employ two regression models. The first follows Bateman and Mitchell (2004) in Australia and estimates:

$$\ln(fees_{i,t}) = \alpha_0 + \alpha_1 \ln(AUM_{i,t}) + \alpha_2 \ln(Participants)_{i,t} + \alpha_3 X + \varepsilon_{i,t} \qquad (2)$$

where *X* is a vector of control variables. In their study, Bateman and Mitchell (2004) use several factors related to superannuation funds in Australia, such as whether a fund is defined benefit or contribution. As many of these distinguishing features do not exist in the New Zealand context, we focus on the risk category of the fund (i.e. whether it is a cash, conservative,

moderate, balanced, growth or aggressive fund), whether the fund is bank affiliated, and whether it is default (conservative) fund. These variables are all dummy variables that take the value 1 if the fund is of a given risk category, or is bank affiliated, or is a default fund. If economies of scale exist, then we would expect α_1 and α_2 in equation 2 to be significantly less than 1.

The second approach we follow is that of Latzko (1999), who uses a translog cost function to examine the economies of scale within several settings, including banks. While the Bateman and Mitchell (2004) approach is intuitively easy to interpret, the translog cost function approach allows the cost elasticities for individual funds to be estimated. This allows us to investigate the impact that different characteristics of funds, such as their size, number of participants or risk category, have on their ability to generate economies of scale. We estimate the translog cost function as

$$\ln(fees_{i,t}) = \alpha_0 + \alpha_1 \ln(AUM_{i,t}) + \frac{1}{2\alpha_2 \ln(AUM_{i,t}^2)} + \alpha_3 \ln(Participants_{i,t}) +$$

$$1/2\alpha_4 \ln(Participants_{i,t}^2) + \alpha_5 X + \varepsilon_{i,t} . \quad (3)$$

We can then estimate the cost elasticities from this relationship,

$$\delta(fees)/\delta(AUM) = \alpha_1 + \alpha_2 \ln(AUM) \quad (4)$$

$$\delta(fees)/\delta(Participants) = \alpha_3 + \alpha_4 \ln(Participants) . \quad (5)$$

In addition to the fund control variables we include based on Bateman and Mitchell (2004), we also control for the average fees for funds in the same risk category. Also, given it is often claimed that higher fees are rewards to fund managers with stronger past performance, we control for funds' returns over the past 12 months. As resources may be shared across several funds, the assets of the family may have explanatory power over and above that of the funds'

assets (Latzko, 1999), we control for the AUM for the funds' family. Finally, we also employ year and fund family fixed effects and calculate clustered standard errors by fund.

5. DATA

To identify our sample of KiwiSaver funds, we collect a list of all available KiwiSaver funds from the Morningstar Quarterly KiwiSaver Surveys.[7] Specifically, we look at the report produced for the September quarter each year. We collect data on all funds that operate within the cash, conservative, moderate, balanced, growth and aggressive risk categories. Apart from cash funds, these are all multi-sector funds. We exclude non-cash single sector funds as there are a limited number of funds operating within each category, for instance there are three single-sector property funds and four Australasian equity funds. While KiwiSaver has existed for 10 years, we only collect the funds that have been operating over the past 5 years. Prior to 2013, Morningstar did not calculate the total expense ratio (TER) for KiwiSaver funds and as such, fee information pre-2013 is inconsistent with that post-2013. We also exclude funds that lack information related to fee structure or where the number of members cannot be found. The resulting dataset is 469 fund-year observations covering 121 unique funds, and 21 fund families. The largest fund family by number of funds is AMP, who offer 21 different KiwiSaver funds, many of which simply reinvest in other funds. The smallest families are Summer Investments and FANZ, with one KiwiSaver fund in our sample each.

For each fund, we collect yearly information from the Morningstar surveys relating to the assets under management, the past 1-year return, the yearly member fee and the total expense ratio as a percentage. We then hand-collect the number of members in each fund from each KiwiSaver fund's quarterly fund update, available from the individual providers' websites. We then calculate the total fees being charged by multiplying the annual member fee by the number of

[7] See https://www.morningstar.com.au/Funds/KiwiSaverReports .

members and adding the total expense ratio multiplied by the assets under management (equation 1).

5.1 Summary Statistics

Sample summary statistics are presented in Table 1. Specifically, we split the sample along three dimensions; the risk category of the fund, whether the provider is bank affiliated or not, and whether the fund is a default conservative fund or not. It is well known that higher risk category funds are more expensive to manage and so have higher fees. Our results support this, with both the total expense ratio (*TER*) and the annual fee getting larger on average as you move up the risk categories. For instance, the average fee for a conservative fund is $28.47 per annum as a member fee and 75 basis points for the *TER*, while the average moderate fund charges $29.85 and 96 basis points.

<<TABLE 1 HERE>>

Regarding the other key variables, cash funds have the lowest number of members on average, at around 11,500 investors each. This is followed by aggressive funds. The largest risk category is conservative with just over 55,000 members each, this is nearly double the next largest category, growth. An ongoing concern for regulators has been the failure of many auto-enrolled KiwiSaver members to make an active decision regarding their fund type, and switch to a more appropriate risk category. Due to the large number of members in each, the conservative funds have the largest AUM on average at over $537 million and earn the highest average fees. However, the average balance is the lowest of all the categories. The balanced and moderate funds have the largest average balances, and subsequently the balanced fund has the second highest total fees. The higher average balance in the balanced funds compared to the growth funds may be a result of older aged members who are on relatively higher incomes, resulting in more contribution-based inflows.

We also consider whether a fund is bank affiliated. Considerable evidence has shown that bank affiliated KiwiSaver funds are generally larger due to many also being default providers and marketing their KiwiSaver funds directly to their retail banking customers. Additionally, it should be cheaper for bank affiliated KiwiSaver funds to attract and interact with a pool of potential customers, specifically those customers who do not have their KiwiSaver with their bank. As shown in Table 1, bank affiliated funds are considerably larger than non-bank funds, with around four times as many customers and over three times the assets under management (*AUM*). However it is also worth noting the average balance of the non-bank funds is nearly half again as large. With regards to the fees, bank affiliated funds are cheaper than non-bank funds, with the average annual fee $3.32 lower and the *TER* 28 basis points lower per year. Due to being considerably larger, the bank affiliated funds earn larger overall fees, three times larger than those of non-bank funds.

Finally, we also split the sample into default and non-default conservative funds. Regulators have appointed nine providers who can offer a default KiwiSaver scheme (originally there were six, with more providers added in 2017). A member will be automatically enrolled in a default conservative fund should they fail to choose their own KiwiSaver fund. This occurs most frequently when people start working, or switch employers, and fail to opt-out of KiwiSaver within the required timeframe. Given these members are automatically assigned to a provider, there are no advertising costs associated with recruiting investors into these funds and it is reasonable to expect this alone would result in lower costs. Table 1 supports our conjecture, with a considerable difference in the costs of the default vs. non-default providers. A default member will pay $26.82 per annum plus 54 basis points of their assets under management, while a non-default conservative fund member will pay $30.16 per annum and 0.97% of the AUM, nearly double the variable cost. However, while default funds were intended as a short-term option for new members before they actively choose a more appropriate fund type, there

are nearly four times the number of default members on average compared with non-default funds. Interestingly though, default members have two-thirds of the average balance of a non-default member. On average, even with the lower costs, the default funds earn over double the fees of their non-default competitors.

6. EMPIRICAL RESULTS

6.1 KiwiSaver Fees

We start our analysis by looking at the level of KiwiSaver fees based on two metrics. First, the average dollar fee per member, that is how much the average KiwiSaver member for a given fund would pay. Second, the average fee as a percentage of the assets under management. These measures allow us to investigate how KiwiSaver fees have changed over time. Table 2 presents summary statistics on the level of fees for each metric across each risk category, for bank vs. non-bank affiliated funds, and for default vs. non-default conservative funds.

<<TABLE 2 HERE>>

The first set of columns presents the results for the average dollar fee per member. Much of the media attention has focused on the dollar value of fees charged, which is why we present these values. It is also worth noting that from 2018 KiwiSaver fund managers are required to specify the dollar value of fees that a given member is charged in that member's personal statement. We observe that as the level of risk involved in the fund increases, the greater the fee charged. Cash funds on average charge around $98 per year, with a median that is very similar. Balanced and growth funds have very similar fee levels, both charge around $211 per year to their members over the 2013-2017 period. Aggressive funds in contrast charge much less, $186 per annum. This is likely a consequence of the markedly lower average balances for aggressive funds, shown in Table 1. Also clear is the wide differences between the funds in terms of the fee charged. For instance, the largest range is for the moderate funds, where the cheapest fund

charges just $49.38 per person, while the most expensive charges $653.40. The cheapest fund, Westpac Moderate Fund in 2015, charged members $20.25 per annum, one of the lowest annual fees, and had a *TER* of 0.54%. In contrast, the most expensive fund was AMP Nikko AM Conservative fund in 2016. While AMP runs this fund, 100% of member funds are invested in the Nikko AM fund. This is an extremely small fund with just $400,000 in AUM and 8 participants. Members are charged $23.40 per annum and 1.26% of the AUM. Because of the large average balance per person, $50,000 compared with $5,395 (Westpac), members pay considerably higher fees than other funds. As expected, we also observe that non-default conservative funds are more expensive than default conservative funds, $148.21 vs. $71.33, and bank affiliated funds are cheaper than non-bank affiliated funds, $196.35 vs. $132.93.

The second set of columns considers fees as a percentage of AUM. As expected, we see clear evidence that as the risk level of a fund increases the fees charged also rises. A cash fund on average charges 0.97% of the AUM while an aggressive fund charges on average 1.72% of AUM. We also observe a considerable variation in the percentage costs with the most expensive funds charging between three and eight times the fees of the cheapest funds. Additionally, there appears to be a small right-hand skew resulting from the markedly higher fees charged by a few funds. We also observe that the non-bank funds are on average 29 basis points more expensive than bank funds while non-default conservative funds are 33 basis points more expensive.

<<TABLE 3 HERE>>

Table 3 presents both the average fee per person, and the percentage fee for each of the past 5 years. As we are interested in observing how fees have changed over time, we remove those funds that do not have observations for all five years. Doing so removes the impact that changes in the sample, such as the introduction of new funds, might have. With regards to the average

fee per person, we see clear evidence that fees are increasing over time. Specifically, the average fee has increased between 23.24% for cash funds and nearly 60% for growth funds. With the exception of the aggressive fund, we see evidence that the higher returns we would expect more risky funds to earn result in fees increasing at a greater rate. Higher returns increase the AUM at a faster rate, allowing the fund manager to then charge higher fees based on the *TER*. Bank and non-bank funds have grown at similar rates, while default fund fees have grown markedly slower compared with non-default. This may indicate that default providers feel obliged to restrict fees more than non-default providers.

The pattern for percentage fees is quite different to that of the dollar values, with evidence to suggest that there are economies of scale present. Specifically, for all funds we see that the percentage fee has decreased over the past five years. Conservative fees have seen the largest decrease, going from 1.38% to 1.03%, a drop of nearly 30%. In contrast, growth and aggressive funds have seen much lower decreases, less than 10% in both cases. A potential explanation is that the fixed annual fee is a smaller portion of the fee structure for riskier funds. Additionally, if funds were unable to reduce their total expense ratios (the variable portion of fees) due to the costs of trading in share markets being relatively fixed then we would expect to see smaller decreases in the percentage fee as the percentage of shares in the asset allocation increase. Bank affiliated funds have been more successful in reducing their fees, 22% vs. 13% for non-bank. Banks have benefited from being able to attract considerably more members over time, which may explain the increased reduction, especially if there are economics of scale. We also observe no difference in the reduction in the costs between default and non-default funds, both seeing a 28.77% reduction.

6.2 Multivariate Regression Analysis

We use two methods to investigate the presence of economies of scale. Following Bateman and Mitchell (2004), we relate the natural log of the total expenses to the natural log of the assets under management, and the natural log of the number of members along with several control variables. Additionally, following Latzko (1999) we also estimate a translog cost model. While the first approach allows us to see the presence of economies of scale overall, the translog model allows us to estimate individual cost elasticities per fund which we can then use to see if the economies of scale are consistent across all funds. For instance, Latzko (1999) finds that cost economies are similar for all funds irrespective of the size of the fund.

<<TABLE 4 HERE>>

Table 4 presents the results employing a similar approach to Bateman and Mitchell (2004). Specifically, we relate the natural log of total fees to the natural log of assets (*Log AUM*) under management and the natural log of the number of members in a fund (*Log Participants*). If there are economies of scale being demonstrated, then we would expect the regression coefficient for these two variables to be significantly different from 1. Therefore, unlike the control variables, we test whether *Log AUM* and *Log Participants* is different from 1. We control for the past year's return, the assets under management of the fund family and the average of the fees of the funds' specific risk category, the risk category of the fund, whether it is a default fund, and if it is bank affiliated.

Column 1 of Table 4 considers only the relationship of the AUM against the total fees. Interestingly we see no significant difference from one, suggesting that for each dollar increase in AUM, fees increase by one dollar. This suggests that there are no economies of scale in relation to the AUM when we do not consider the number of members. When we consider only the number of members we see some evidence of economies of scale. Specifically, each

additional member increases the total fees by 93 cents. When we control for both the AUM and the number of members we see clearer evidence of economies of scale. Specifically, holding the number of participants static, each extra dollar of AUM increases total fees by 80 cents, while holding the AUM static and adding an additional member increases total fees by just 18 cents. When we compare our results with the results shown by Bateman and Mitchell (2004) in the context of Australian superannuation funds, we observe marked differences. They found coefficients of around 0.46 and 0.37 for AUM and the number of participants respectively. These suggest that Australian funds can generate considerably greater economies of scale in relation to the size of the AUM, but less in relation to the number of members than NZ KiwiSaver funds. The smaller decrease in relation to the AUM is somewhat consistent with evidence presented by the New Zealand Treasury who found a very small negative coefficient between the *TER* and the natural log of AUM.

In relation to the control variables, we observe that the coefficient for the average fund type expenses is positive and significant. This indicates that funds in risk categories with higher average fees tend to have higher total fees. Of note, while this variable is significant, the individual risk categories are largely insignificant. Specifically, after controlling for the average fees of funds within the same risk category, the risk category has no additional explanatory power on a funds' total fees. The only exception is conservative funds, which even after controlling for the average fees of conservative fees have a positive and significant coefficient, suggesting that conservative funds are significantly more expensive than cash funds (the base case in this regression). Neither past returns nor the fund family AUM are significant. As noted by Latzko (1999), given many of the back-office resources of a fund are shared with other funds in the same fund family, it maybe that there are economies of scale that cannot be simply explained by the fund size. In this case, however, we see no evidence of such additional economies of scale. Likewise, we do not see a relationship between past returns and

the level of fees charged, despite managers suggesting that higher fees are compensation for higher performance. When we control for both AUM and the number of members we also do not see a relationship between the level of fees and whether a fund is bank affiliated or not. Default conservative funds do charge cheaper fees. This may be the result of not needing to advertise for members or due to facing greater scrutiny from regulators. As noted in Table 4, the regression model we employ explains nearly all the variation observed in the fees.

<<TABLE 5 HERE>>

Table 5 uses a variation on the translog cost production function, as shown in equation X, following Latzko (1999). This is a common method of assessing economies of scale and includes the square of the relevant variables, in this case the AUM and the number of participants. Once equation 3 is estimated, the coefficients can be used to estimate the cost elasticities as per equations 4 and 5. The coefficients and their significance in Table 5 are consistent with the results in Table 4. With regards to the AUM and participants variables, it is more informative to discuss the cost elasticities which are presented in Table 6.

<<TABLE 6 HERE>>

Table 6 presents the overall cost elasticities for all the funds, and presents the average cost elasticities by size, number of members, risk category, default vs. non-default, and bank vs. non-bank funds. The average cost elasticities for the total sample match the regression coefficients from Table 4, 0.81 for AUM and 0.18 for the number of participants. We observe little difference in the AUM cost elasticity or the member cost elasticity for the risk category. Additionally, for default and bank affiliated we see a small difference in the member cost elasticity whereby non-bank and non-default funds have lower cost elasticities. When we consider the impact that the size of the fund has on the cost elasticities, we see evidence that larger funds generate more economies of scale. While the smallest category of funds, those

with less than $NZ 10 million in AUM, has a cost elasticity of 0.85, suggesting each new dollar of AUM generates an increase of 85 cents in each fee, for the largest funds, those with over $NZ 500 million, it is 0.77. Interestingly, the impact of increasing the number of members shows the opposite relationship. As the number of members increases, the economies of scale decrease. For instance, for the smallest funds, an additional member increases total fees by just 11 cents, while for the largest category, those with more than 50,000 members, an extra member increases total fees by 24 cents.

Overall the results are consistent with the presence of some economies of scale. However, the economies of scale are markedly lower than what has been observed in Australia, especially for increases in the size of the fund. While this demonstrates that funds are heading in the right direction with regards to fees reducing over time, whether the level of fees is currently appropriate remains an open question.

7. CONCLUSION

This study examined whether there is evidence of economies of scale in New Zealand-based KiwiSaver fees between 2013 and 2017. Prior studies have argued that, given the significant fixed costs of managing a fund, increasing the size of the assets under management or the number of members should result in reduced costs. If the market is competitive then fund managers will either use the reduced costs as a way of attracting additional net inflows, earning themselves greater fees, or be forced to reduce fees by competitors. Significant questions have been raised in New Zealand both about the level of fees and whether there is sufficient price competition to drive fees lower over time. While we cannot make conclusions about the level of fees, we do explore whether we see evidence of economies of scale being passed on to members. Using both the regression model of Latzko (1999), who uses a translog cost function,

and Bateman and Mitchell (2004) we find evidence of economies of scale. However, the economies are lower than observed in Australia in the Bateman and Mitchell (2004) study. We also observe that as funds under management grow the cost elasticities of AUM increase, while as the number of members increase the cost elasticities of the number of members decreases. This evidence suggests costs are reducing year on year, although it does not settle the question of whether fees started out too high, as has been suggested. Evidence around the profitability of fund managers would be required to establish this point, information that is currently not available.

8. REFERENCES

Bateman, H., Kingston, G., and Piggott, J., (2001). *Forced Saving: Mandating Private Retirement Incomes.* Cambridge: Cambridge University Press.

Bateman, H., and Mitchell, O., (2004). New Evidence on Pension Plan Design and Administrative Expenses: The Australian experience. *Journal of Pension Economics and Finance* 3, 63-76.

Bikker, J., and de Dreu, J., (2009). Operating Costs of Pension Funds: The impact of scale, governance and plan design. *Pension Economics and Finance* 8, 63-89.

Bikker, J., Steenbeek, O., and Torracchi, F., (2012). The Impact of Scale, Complexity and Service Quality on the Administrative Costs of Pension Funds: A Cross-Country Comparison. *Journal of Risk and Insurance* 79, 477-514.

BusinessDesk. (2014). *KiwiSaver fees up, despite new disclosure regulations*

Ferris, S. and Chance, D., (1991). Mutual Fund Distribution Fees: An empirical analysis of the impact of deregulation. *Journal of Financial Services Research* 5, 25-42.

Financial Markets Authority, (2017). *KiwiSaver Annual Report 2017.* *https://fma.govt.nz/assets/Reports/FMA-KiwiSaver-Report-2017.pdf*

Heuser, A., Kwok, J., Snethlage, D and Watts, D., (2015). *Review of the KiwiSaver Fund Manager Market Dynamics and Allocation of Assets*. Treasury Paper. Retrieved from https://treasury.govt.nz/publications/tp/review-kiwisaver-fund-manager-market-dynamics-and-allocation-assets-html

Inland Revenue. (2017). *KiwiSaver*. Retrieved from Inland Revenue: http://www.kiwisaver.govt.nz/new/benefits/kick-start/

James, E., Smallhout, J., and Vittas, D., (2001). Administrative Costs and the Organisation of Individual Retirement Account Systems: A comparative perspective. In Holzmann, R., and Stiglitz, J. *New Ideas about Old Age Security: Towards sustainable pension systems in the twenty-first century.* Washington, DC: World Bank, 254-307.

Latzko, D., (1999). Economies of Scale in Mutual Fund Administration. *Journal of Financial Research 22*, 331-339.

Malhotra, D., and McLeod, R., (1997). An Empirical Analysis of Mutual Fund Expenses. *Journal of Financial Research* 20, 175-190.

Marti, C., Matallin, J., and Fernandez, M., (2009). Determinants of Pension Plan Fees in Spain. *Applied Economics* 41, 2153-2168.

McLeod, R., and Malhotra, D., (1994). A Re-Examination of the Effect of 12-b Plans on Mutual Fund Expense Ratios. *Journal of Financial Research* 17, 231-240.

Morningstar, (2018). *KiwiSaver Survey March Quarter 2018*. https://www.morningstar.com.au/s/documents/kiwisaver_survey_2018Q1_final.pdf

OECD. (2008). *Pension Country Profile: New Zealand.* OECD.

OECD. (2013). *OECD Pensions at a glance.* OECD.

Sorted. (2017). *Must-knows of KiwiSaver Fees*. Retrieved from KiwiSaver Fund Finder: https://fundfinder.sorted.org.nz/must-knows-of-kiwisaver/#fees

St.John, S. (2014). What Has New Zealand's Retirement Policy Framework to Offer the International Debate? *Policy Quarterly* 10, 29-34.

Tibshraeny, J. (2016). Treasury says KiwiSaver members need to become more financially literate to shop with their feet and pressure providers to drop their fees. *Interest*.

Table 1: Summary Statistics

	Obs.	TER	Annual Fee	Average Balance	Participants	AUM	Total Fees
Cash	65	0.60	32.33	10,844.29	11490	87,900,000.00	731,840.80
Conservative	77	0.75	28.47	10,313.66	55380	537,000,000.00	4,742,779.00
Moderate	80	0.96	29.85	16,183.24	25804	273,000,000.00	2,858,563.00
Balanced	95	1.05	30.10	17,381.98	23087	331,000,000.00	3,910,243.00
Growth	105	1.15	30.62	15,837.38	28914	298,000,000.00	3,861,791.00
Aggressive	47	1.38	34.00	11,812.38	18493	213,000,000.00	3,475,857.00
Non-Bank	317	1.07	31.67	15,522.77	13471	168,000,000.00	2,035,838.00
Bank	151	0.79	28.35	11,436.04	58875	584,000,000.00	6,187,938.00
Non-Default Conservative	38	0.97	30.16	12,673.13	23157	217,000,000.00	2,927,132.00
Default Conservative	39	0.54	26.82	8,014.69	86776	848,000,000.00	6,511,871.00

Note: *TER*, *Annual Fee* and *AUM* are taken from the September Quarter Morningstar KiwiSaver Survey each year. *Participants* are taken from the September Quarterly Fund Update for each fund. We take the Morningstar classification for each fund. *Total Fees* is calculated as the (TER*AUM + Annual Fee * Participants).

Table 2: KiwiSaver Costs By Members and Assets

	$/Member					$/AUM (%)				
	Mean	Median	Std Dev	Min	Max	Mean	Median	Std Dev	Min	Max
Cash	98.43	98.08	39.10	36.99	186.53	0.97	0.90	0.32	0.53	1.77
Conservative	109.77	93.93	59.89	10.50	356.40	1.16	1.07	0.49	0.36	2.85
Moderate	186.96	178.60	107.48	49.38	653.40	1.19	1.14	0.29	0.69	2.53
Balanced	211.15	204.44	92.27	52.66	436.08	1.29	1.26	0.34	0.41	2.53
Growth	211.93	200.77	99.18	69.46	520.90	1.41	1.34	0.35	0.57	2.43
Aggressive	185.94	172.49	58.78	96.13	325.95	1.72	1.58	0.58	0.42	3.36
Non-Bank	196.35	180.08	95.81	10.50	653.40	1.36	1.29	0.46	0.36	3.36
Bank	132.93	105.58	86.29	32.18	479.67	1.07	1.10	0.26	0.53	1.78
Non-Default Conservative	148.21	131.74	61.20	68.90	356.40	1.32	1.20	0.41	0.42	2.40
Default Conservative	71.33	74.61	22.09	10.50	115.05	0.99	0.85	0.51	0.36	2.85

Note: *$/Member* is calculated by taking the total fees for fund in a given year and dividing it by the number of members that fund had in that year. *$/AUM* is calculated by taking the total fees for a particular fund in a particular year and dividing it by the AUM for that fund in that year.

Table 3:

KiwiSaver Costs By Member and Assets By Year For Those Funds with Data from 2013-2017

	$/Member					
	2013	2014	2015	2016	2017	% Change
Cash	92.96	93.66	101.69	116.39	117.28	23.24%
Conservative	86.13	89.46	97.19	110.05	118.39	31.81%
Moderate	146.62	168.19	194.17	221.36	243.72	50.82%
Balanced	158.36	185.20	198.89	226.19	275.97	55.54%
Growth	150.15	192.78	206.07	241.97	272.15	59.47%
Aggressive	141.09	159.31	172.07	183.83	242.45	54.14%
Non-Bank	149.19	176.35	190.37	217.52	248.67	51.09%
Bank	80.97	86.69	109.34	118.55	140.87	55.38%
Non-Default Conservative	100.31	104.32	117.77	136.40	145.62	37.27%
Default Conservative	71.96	74.61	76.60	83.71	91.16	23.65%
	% AUM					
Cash	1.14	0.99	0.93	0.90	0.86	-28.19%
Conservative	1.38	1.21	1.12	1.06	1.03	-29.25%
Moderate	1.28	1.17	1.13	1.10	1.11	-14.25%
Balanced	1.41	1.33	1.32	1.19	1.26	-11.25%
Growth	1.44	1.37	1.36	1.32	1.34	-7.20%
Aggressive	1.85	1.85	1.86	1.63	1.77	-4.42%
Non-Bank	1.46	1.37	1.34	1.24	1.28	-13.16%
Bank	1.22	1.08	1.06	1.02	0.98	-21.91%
Non-Default Conservative	1.80	1.56	1.46	1.39	1.35	-28.77%
Default Conservative	0.96	0.86	0.77	0.73	0.72	-28.77%

Note: *$/Member* is calculated by taking the total fees for a fund in a given year and dividing it by the number of members that fund had in that year. *$/AUM* is calculated by taking the total fees for a given fund in a given year and dividing it by the AUM for that fund in that year.

Table 4: Regression Coefficients

	Log Total Fees	Log Total Fees	Log Total Fees
Log AUM	0.9946		0.8073**
	(0.753)		(5.17)
Log Participants		0.9273***	0.1833**
		(13.18)	(121.99)
Av Fund Type Expenses	86.0510***	60.1672*	80.6303***
	(3.782)	(1.947)	(3.803)
Past Return (p.a.)	0.0030	-0.0102	0.0006
	(0.760)	(-1.520)	(0.169)
Fund Family AUM	0.0000	0.0000*	0.0000
	(0.503)	(1.660)	(0.996)
Conservative	0.2447***	0.2399**	0.2278***
	(3.556)	(2.068)	(3.963)
Moderate	-0.0703	0.4769***	0.0274
	(-0.769)	(3.140)	(0.279)
Balanced	-0.0779	0.5466***	0.0279
	(-0.700)	(3.009)	(0.238)
Growth	-0.0900	0.4706**	0.0066
	(-0.674)	(2.217)	(0.050)
Aggressive	-0.1923	0.3975	-0.0909
	(-1.163)	(1.310)	(-0.572)
Default	-0.4114***	-0.4176**	-0.4180***
	(-3.358)	(-2.255)	(-3.441)
Bank-Affiliated	0.0266	-0.3126***	-0.0418
	(0.625)	(-3.290)	(-0.852)
Constant	-5.0480***	4.7815***	-3.2595***
	(-16.345)	(19.227)	(-3.640)
Observations	446	446	446
YEAR FIXED EFFECTS	YES	YES	YES
FUND FAMILY FIXED EFFECTS	YES	YES	YES
R-squared	0.990	0.975	0.991
Adjusted R-sqaured	0.989	0.973	0.990

Note: Presents the regression coefficients for eqn. 2. *Log AUM* is the natural log of the funds' assets under management in that year. *Log Participants* is the natural log of the number of members a fund has in a particular year. *Av Fund Type Expenses* is the average of the fees charged by all the funds in the same risk category as fund *i* in year *t*. *Past return* is the funds' returns over the past 12 months. *Fund Family AUM* measures the total AUM of the fund manager that runs fund *i* in year *t*. *Conservative, Moderate, Balanced, Growth*, and *Aggressive* are dummy variables that equal one if fund *i* is categorised as that type of fund by Morningstar. *Default* is a dummy variable that equals one if fund *i* is a default conservative fund in year *t*. *Bank-Affiliated* equals one if the fund is part of a fund manager that is controlled by a New Zealand bank. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Table 5: Translog Regression Coefficients

	Log Total Fees	Log Total Fees	Log Total Fees
Log AUM	1.0129***		0.7986***
	(40.653)		(10.051)
1/2*Log AUM^2	0.0114		-0.0097
	(1.161)		(-0.464)
Log Participants		0.9278***	0.2134***
		(22.681)	(3.665)
½*Log Participants^2		0.0002	0.0201
		(0.013)	(0.898)
Av Fund Type Expenses	82.4349***	60.0924*	77.2950***
	(3.738)	(1.972)	(3.750)
Past Return (p.a.)	0.0034	-0.0102	0.0008
	(0.871)	(-1.524)	(0.226)
Fund Family AUM	0.0000	0.0000	0.0000
	(0.193)	(1.635)	(0.938)
Conservative	0.2502***	0.2399**	0.2202***
	(3.669)	(2.060)	(3.657)
Moderate	-0.0589	0.4771***	0.0324
	(-0.662)	(3.144)	(0.339)
Balanced	-0.0619	0.5469***	0.0419
	(-0.578)	(3.036)	(0.374)
Growth	-0.0705	0.4710**	0.0216
	(-0.544)	(2.214)	(0.171)
Aggressive	-0.1685	0.3980	-0.0710
	(-1.023)	(1.312)	(-0.458)
Default	-0.4271***	-0.4179**	-0.4301***
	(-3.270)	(-2.153)	(-3.378)
Bank-Affiliated	0.0146	-0.3131***	-0.0674
	(0.400)	(-3.295)	(-1.553)
Constant	-0.6374***	-0.7505***	-0.6352***
	(-3.882)	(-3.387)	(-4.136)
Observations	446	446	446
YEAR FIXED EFFECTS	YES	YES	YES
FUND FAMILY FIXED EFFECTS	YES	YES	YES
R-squared	0.990	0.975	0.991
Adjusted R-squared	0.990	0.973	0.990

Note: Presents the regression coefficients for eqn. 3. *Log AUM* is the natural log of the funds' assets under management (AUM) in that year. *Log Participants* is the natural log of the number of members a fund has in a particular year. *Av Fund Type Expenses* is the average of the fees charged by all the funds in the same risk category as fund *i* in year *t*. *Past return* is the funds' returns over the past 12 months. *Fund Family AUM* measures the total AUM of the fund manager that runs fund *i* in year *t*. *Conservative, Moderate, Balanced, Growth*, and *Aggressive* are dummy variables that equal one if fund *i* is categorised as that type of fund by Morningstar. *Default* is a dummy variable that equals one if fund *i* is a default conservative fund in year *t*. *Bank-Affiliated* equals one if the fund is part of a fund manager that is controlled by a New Zealand bank. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Table 6: Cost Elasticities - AUM

Cost Elasticities - AUM	Obs	Mean	Median	Std Dev	Min	Max
Total	469	0.81	0.80	0.02	0.77	0.88
Cash	65	0.82	0.82	0.02	0.80	0. 87
Conservative	77	0.80	.080	0.02	0.77	0.87
Moderate	80	0.81	0.81	0.02	0.78	0.88
Balanced	95	0.81	0.80	0.02	0.78	0.88
Growth	105	0.81	0.81	0.02	0.78	0.86
Aggressive	47	0.81	0.81	0.02	0.79	0.86
Non-Bank	318	0.82	0.82	0.02	0.78	0.88
Bank	151	0.80	0.80	0.02	0.77	0.85
Non-Default Conservative	38	0.81	0.81	0.02	0.79	0.87
Default Conservative	39	0.80	0.79	0.02	0.77	0.85
<10 Mill AUM	79	0.85	0.84	0.01	0.83	0.88
<100 Mill AUM	152	0.82	0.82	0.01	0.81	0.83
<500 Mill AUM	147	0.80	0.80	0.00	0.79	0.81
>= 500 Mill AUM	91	0.77	0.79	0.00	0.77	0.79
Cost Elasticities - Participants						
Total	469	0.18	0.19	0.04	0.04	0.26
Cash	65	0.17	0.16	0.04	0.08	0.22
Conservative	77	0.20	0.22	0.04	0.08	0.26
Moderate	80	0.17	0.18	0.05	0.04	0.25
Balanced	95	0.18	0.20	0.04	0.06	0.24
Growth	105	0.18	0.18	0.04	0.08	0.26
Aggressive	47	0.18	0.18	0.04	0.09	0.24
Non-Bank	318	0.17	0.18	0.04	0.04	0.25
Bank	151	0.21	0.22	0.03	0.10	0.26
Non-Default Conservative	38	0.18	0.20	0.05	0.07	0.23
Default Conservative	39	0.22	0.21	0.03	0.14	0.26
<500 Members	63	0.11	0.11	0.02	0.04	0.13
<1,000 Members	40	0.14	0.14	0.00	0.13	0.15
< 10,000 Members	127	0.17	0.17	0.01	0.15	0.19
< 20,000 Members	79	0.20	0.20	0.00	0.19	0.21
<50,000 Members	77	0.22	0.21	0.01	0.21	0.22
>50,000 Members	83	0.24	0.24	0.01	0.23	0.26

Note: Cost elasticities were calculated as per eqn. 4 based on the coefficients calculated in Table 5.