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THE COST DIFFERENTIAL BETWEEN UNIT-LINKED POLICIES AND MUTUAL FUNDS

by Angelo Nunnari* and Agostino Tripodi**

Abstract

This study estimates the cost differential between investing in unit-linked insurance policies and investing directly in the same underlying mutual funds, using information from product prospectuses. The cost of investment is measured at the level of the single underlying investment fund by the Reduction in Yield (RIY). Using Monte Carlo simulations, the analysis controls for factors such as fund type, investment amount, holding period and investor age. The main findings indicate that the simulated cost of unit-linked policies is generally significantly higher than that of mutual funds purchased on the retail market, mainly due to higher ongoing costs. The cost differential ranges from 0.5 to 2.5 per cent and is higher when investing in money market funds, ETFs, and policies distributed by financial advisors. Our findings hold when controlling for the actuarial component of insurance policies, possible policy rebates, the costs of portfolio reallocation and the actual portfolio allocation of insurance companies. The extra costs of unit-linked policies may be justified by advisory services and other additional features that insurance companies may offer. It could also reflect information and cost transparency issues or limited competition in the distribution of savings products.

JEL Classification: D14, G22, L11.

Keywords: unit-linked insurance policies, investment funds, cost comparison, households investments, Monte Carlo simulations.

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* Bank of Italy, Directorate General for Economics, Statistics and Research – Financial Stability Directorate.

** IVASS, Research and Data Management Directorate, Research and Statistics Division.

1. Introduction and main results[1]

In the last 15 years, Italian households increased significantly their exposure to financial markets mainly by investing in asset management products. In particular, household investments in insurance life policies (with-profit or unit-linked) and investment funds as a percentage of their financial wealth rose respectively from 10.8 and 8.6 per cent in 2007 to 14.4 and 12.8 per cent in December 2023). Premiums yearly underwritten of unit-linked insurance policies (life products whose investment risk is borne directly by the underwriter) reached a peak of 44 billion euros in 2021 after a prolonged period of very low interest rates; since the second half 2022, following the start of the tightening cycle of monetary policy, their popularity partially decreased, as returns from treasury bonds and *traditional* insurance products became more attractive.

Despite the widespread diffusion of managed savings products, retail investors may not always be able to assess the impact of their costs on investment returns. Specifically, the cost borne by a household for holding an insurance product or an investment fund varies greatly across contracts[2] as it depends on several types of charges and the specific characteristics of the investment. This raises a number of regulatory issues regarding product transparency, consumer protection and the degree of competition in the insurance industry[3]. Moreover, given the close similarity of unit-linked products and mutual funds, the relative cost competitiveness of the two instruments is an important factor for the development of their markets.

In this study we compare the costs of a sample of unit linked insurance policies with those of equivalent investment funds. In order to make the exercise as clean as possible we focus only on unit linked policies that invest in external funds (i.e., funds also available for investment on the retail market). In this case, in fact, a retail investor faces two financially equivalent options: underwriting a unit-linked policy whose capital is invested in a specific mutual fund or, alternatively, directly investing in the retail shares of that same fund. This allow us to compare their costs by controlling for the financial characteristics of each product.

For each instrument (insurance policy or investment find) we simulate the impact of all the main fees charged by both asset managers and distributors (based on information extracted from products' prospectuses) on the investment return ("reduction in yield", RIY). We then compute the differential between the "reduction in yield" of an investment in an insurance policy in our sample and that of the corresponding retail fund. We use a Monte Carlo simulation to properly account for the stochastic nature of returns, controlling for type of fund, amount invested, holding period and age of the hypothetical investor. We then analyze the distribution of the simulated cost differential across funds, policies and companies. Finally, we investigate which product characteristics are associated with an increase in the cost differential and which types of fees contribute the most to it.

We find that on average the simulated cost differential between a unit linked policy and the underlying investment funds is positive, with the first and the third quartile equal to 1.0 and 1.7 per cent respectively. Most of the differential is explained by the fact that insurance products have higher ongoing costs than mutual funds. Initial costs (paid upfront by investors) are on average more expensive for mutual funds

[1]The views expressed in this paper are those of the authors and do not reflect those of the Bank of Italy and IVASS. We thank for the helpful comments and suggestions Riccardo Cesari, Marco Cosconati, Antonio Rosario De Pascalis, Stefano De Polis, Alessio De Vincenzo, Giovanni Guazzarotti, Sabrina Pastorelli and all the participants at the *Comitato IVASS-Banca d'Italia* meetings. We also thank Lanfranco Lunghi who participated in the early stages of this work.

[2] According to ESMA (*Annual report, 2023*) in EU the charges of UCITS ranges from an average of 0.9 for bond funds to an average of 2.6 for Real Estate funds. According to EIOPA (*Costs and Past Performance Report*, EIOPA, December 2023), the cost of Italian unit-linked products ranges from about 1 per cent to above 5 per cent. ESMA and EIOPA estimates cannot be directly compared as the underlying hypothesis are not homogeneous.

[3] Cfr. Luigi Federico Signorini, speech at ANIA annual assembly, 4 July 2023.

than for unit linked policies, but their incidence over total costs is contained. The simulated cost differential varies greatly depending on the characteristics of the contract (investment amount, holding period and age of the policy underwriter) and the type of funds the policy premium is invested in. For example, the cost differential is higher for policies invested in money market funds (because lower-risk funds have generally lower fees), for exchange traded funds (since ETFs do not apply initial costs on retail investors), and for insurance policies distributed by financial advisors (whose distribution fees are on average higher than those distributed by banks). The cost differential is instead lower when policies are invested funds' classes reserved to institutional investors. Our results are confirmed when controlling for the actuarial component of insurance policies, possible policy rebates and costs of portfolio reallocation. We also compute a volume-weighted average cost differential based on company unit linked portfolios and show that the main results are robust when accounting for actual investment choices.

Our simulation of the cost differential is based on the information included in the products' prospectuses and on specific hypotheses about the characteristics of the individual contracts actually signed (that we do not observe). We also assume that the investor can replicate the investment portfolio of the unit linked policy (buying the same funds) without having to bear any extra costs of advisory or security custody account services. Our analysis shows how the distribution of the differential across funds varies under different hypothesis and possible investment choices and it is not meant to provide a point estimate of the actual cost differential borne by retail investors.

Our results show that under specific circumstances the extra costs of unit-linked policies can be quite significant; however, we are not able to assess the implication of this evidence on the welfare of retail investors (since we do not dispose of individual, contract-level data). On the one side, the extra cost borne by the retail investor can be seen as a compensation for the implicit advisory services offered by the insurance company or for the additional features eventually offered by the insurance contract (e.g. death coverage, non-seizability of the capital invested, exemption from the inheritance tax, etc.). On the other side, it can reflect a certain degree of stickiness in investors' behavior (possibly linked to demand complementarities or the fact that retail investors are not able to properly assess and compare the costs different saving products) and its impact in terms of reduced industry competition. In the latter case, policies fostering information and cost transparency or incentivizing competition in the distribution of saving products might contribute to a reduction of costs for the retail investor.

The paper develops as follows. In section 2 we illustrate the cost structure of unit linked policies and mutual funds, discussing their differences and their similarities. In sections 3 and 4, we describe the dataset and the methodology used in the analysis. In sections 5 and 6 we discuss our main results and some robustness checks.

2. Unit-linked policies and mutual funds: markets and products

Our analyses focus on the segment of the unit linked market, where underwriters invest in external investment funds that are also available for sale in the retail market. Since unit linked policies and funds are similar retail investment products, in principle we should not find any significant difference in costs once we control for other institutional or contractual characteristics.

In the last eight years written premium of unit-linked policies in Italy cumulated at 258 billion euros (31% of global written life premium), while retail net investments in funds were 193 billion. The share of policies with external funds out of total premium of unit-linked products increased in the last years to approximately 50 per cent. In terms of costs, in 2023 the average RIY of unit-linked products with

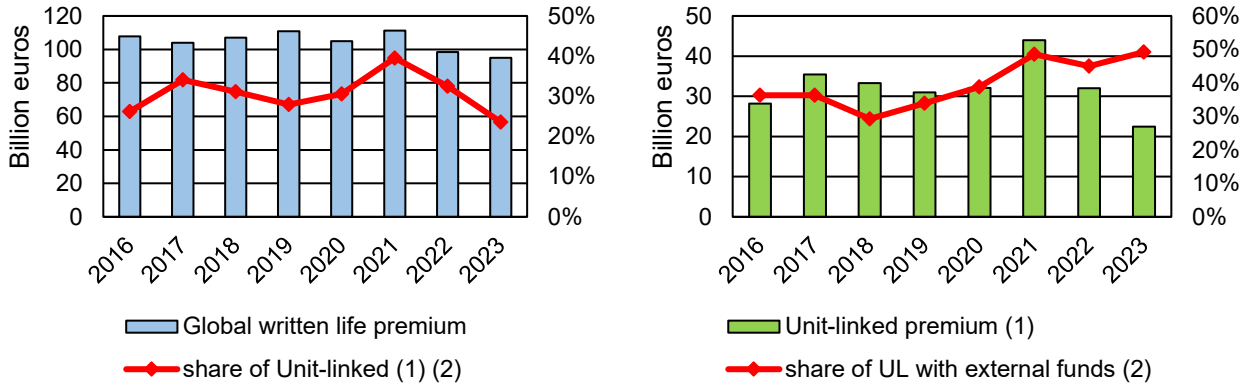
external funds was 3.4 percent as opposed with 2.6 percent for those with internal funds and 1.7 per cent for traditional policies[4].

Figure 1: Premium underwritten of unit-linked products

(billion euros; percentage)

(a) premium underwritten and share of unit-linked contracts

(b) share of external funds within unit-linked contracts



Note: (1) It comprehends both unit-linked sold as stand-alone and as hybrid products. (2) Right scale
Source: IVASS

2.1 The cost structure of unit-linked policies and investment funds

The cost structure is quite similar for both products, although the jargon and the components that they remunerate may be different. We can summarize it in three main steps of value extraction: initial, ongoing and exit fees. For more details on the single components see the Annex A.1 Costs.

Table 1: Main fees and bonuses by type of product

	Unit-linked policies	Mutual funds
Initial charges	• Policy fee • Loading cost	• Service fees at entry • Entry charges
Ongoing charges	• Annual management charges[1]Ongoing fund's charges	• Ongoing fund's charges
Exit charges	• Surrender charge	• Exit charges • Service fees at exit
Other charges or bonuses	• Coverage fee[2] (either within ongoing or up-front fees) • Initial bonus • Death bonus	

Note: (1) Annual management charges (in Italian, costi di gestione e salvaguardia*) do not remunerate the activity of asset management but the maintenance of the list of available funds on behalf of the underwriter and the liquidation of funds which may undergo extraordinary processes, as for instance asset freezing or block of surrenders. (2) Fees for the death benefit coverage of unit-linked products that may be included either in the loading cost or in the annual management charges.*

2.2 Similarities between unit-linked policies and mutual funds

Unit-linked policies and mutual funds have many similarities. Apart from the death benefits coverage provided by the insurance policy, both are popular collective retail saving products delegating a management company and allowing clients to benefit from the economies of specialization and diversification. In the case of unit-linked policies with external funds, a retail investor could in principle

[4] Data from the *Fairmat* database

actually achieve the same financial objective by either investing in a unit linked policy or alternatively in the funds linked to the policy (through a bank, a financial advisor, or an online platform).

The two products are therefore similar under the following three main aspects.

Autonomy of the investors. In both cases, the investor selects autonomously the funds where to invest (assisted or not by a financial advisor). The list of funds available within an insurance product is similar to the catalogue of mutual funds supplied by intermediaries.

Freedom in selling or retaining quotes. In both cases, the investment can be redeemed or reallocated at almost any moment. The only additional limitation for insurance clients is the usual presence of a minimum holding period of one year.

Similar way of investing. In both cases, the actual asset allocation of the underlying funds is delegated to a professional management company which must follow a transparent regulation and a pre-defined management style.

2.3 Advantages of holding a unit-linked policy with respect to an investment fund

Policies may offer some advantages respect to mutual-funds that one should consider when comparing investments costs. First, a policy may offer the opportunity to invest in funds different from those offered by a specific bank or personal advisor. Furthermore, under the Italian law, the capital invested in an insurance product is non-seizable in the event of insolvency, it is not attachable from the authorities and it is exempt from the succession tax[5] upon death of the underwriter. Policies can eventually offer additional services as active management mechanisms or forms of financial protection[6].

2.4 Assumptions and limitations of the analysis

There are several caveats that one needs to be aware of when interpreting the results of our analysis. In particular, we need to rely on specific assumptions as we do not have real world information at a contract level.

Specifically:

- We assume that the investment in mutual funds is conducted either directly or through an intermediary (e.g. a bank) but without the assistance of a financial advisory. Financial advice is a service acquired and paid for independently from other investment services by the retail investor; it is not widespread in the Italian market. Symmetrically, in the case of a unit linked policy we assume that the underwriter does not apply for any of the insurance contract additional financial options comparable to a financial advisory service, e.g. the automatic management of the investment[7].
- We do not consider the impact of the inheritance tax exemption of policies upon death of the insured[8]. The fiscal treatment of investment income is the same for both unit linked and funds and it is not considered in the analysis[9].
- We assume that the client is able to replicate the investment portfolio of the policy (buying the same funds) and she/he has already opted for a security custody account in the bank which is needed to buy any financial instrument other than a plain bank deposit. The ongoing costs of a

[5] It is worth noting that inherited wealth, of any kind, under the franchise threshold (1 milion euros) on each heir is always exempt from the respective tax.
[6] These services are offered at the cost of an additional fee that we subtract from the costs of the unit-linked policy.
[7] Several policies offer the possibility to opt for premium services as the *Stop Loss, Take Profit, automatic rebalancing.*
[8] However, the benefit starts with a total wealth above 1,000,000 and the maximum level of premium we use in the simulation is 500,000 euros.
[9] In an "administrate savings regime" they both pay 26 percent of the profits and the 0.2 percent of recurring stamp duty.

custody account (e.g. periodical reporting costs, dividend payment fees, etc.) are heterogeneous across intermediaries (sometimes it is supplied for free).

- On a precautionary basis, we set the entry costs for mutual funds at the highest level of the interval reported in funds' prospectuses, as we do not have information on the actual costs applied (as they depend on the specific agreement between the asset management company and the distributor).
- Over-performance fees applied by both insurers and funds are not considered as their net impact on the differential tends to be zero. In fact, unit-linked policies based on external funds do not set their specific over-performance fee as the allocation of the underlying funds is done by a third party, the management company. The latter tends to set them at the same level across all the classes (either institutional or retail).
- In the simulation we exogenously set the holding period of the investment, the age of the investor/underwriter and the parameters of the returns distribution in order to obtain a *ceteris paribus* comparison between the two form of investment.
- Apart from the death benefit coverage, we exclude any additional insurance coverage (either compulsory or discretionary). These insurance coverages carry additional costs that we coherently do not include in the analysis.
- We assume that the investor selects only one investment option at a time, as we do not have data on the actual investment choices, and we compute a cost differential for each policy-fund combination. As a robustness test we compute a weighted average cost differential based on the actual company-specific aggregate portfolios underlying the unit linked products.
- We assume that the investor/underwriter never rebalance her/his portfolio, but in a robustness check we control for the impact on our results of a hypothetical number of portfolio switches.
- In our base simulation we do not consider rebates agreed by the insurer and the fund's management company on a case by case basis as we do not have this contract level information; however, we control for a hypothetical level of rebates as a robustness check.

3. Data

3.1 Data sources

The list of all active single premium unit-linked policies with external funds and for each of them the list of funds available for the underwriters have been extracted from the *Fairmat* database. The rest of the characteristics of the insurance products (in particular, the level of each type of fee) have been obtained by reading contract conditions.

Relevant information on mutual funds (in particular, the level of each type of fee) has been retrieved through the Morningstar Direct database. Prospectuses issued by the management companies of the funds were used for identifying for each fund the share classes sold respectively to retail and institutional investors.

3.2 Descriptive statistics

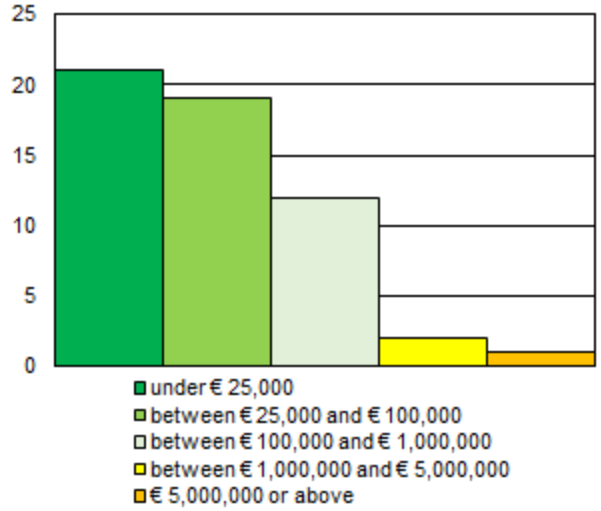
The sample analyzed includes all the 64 single premium, unit linked policies with external funds distributed in the Italian market in November 2022 and issued by companies still operating at the end of 2023. We excluded 22 products issued by two foreign companies because of either incomplete

information or a too restricted client base[10]. The final sample includes 42[11] products, corresponding to 55 separate tariffs (the units of our analysis) and issued by 16 companies, mainly part of *bancassurance* groups.

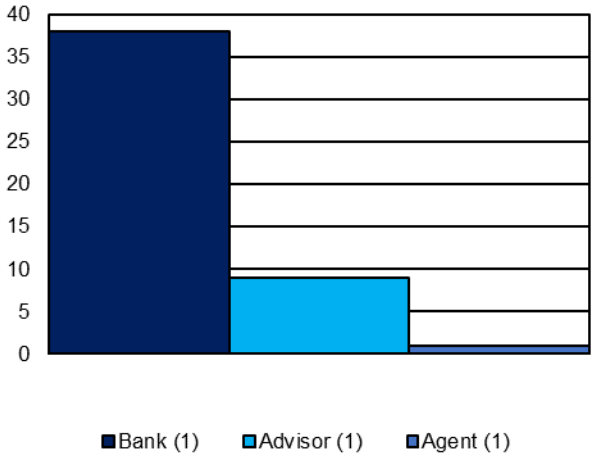
About three-quarters of the tariffs in our sample (Figure 2) are targeted to retail underwriters, with a minimum premium below € 100,000; only 4 tariffs have a minimum premium above € 1,000,000.

Figure 2: Characteristics of the unit-linked policies included in our sample: target market and distribution
(number of tariffs)

(a) distribution of tariffs by minimum premium



(b) distribution of tariffs by distribution channel



Note: (1) contracts that are distributed through different channels are counted more than once, therefore the total is higher than the number of tariffs (7 tariffs are jointly distributed by banks and advisors and 1 by agents and banks).

Typically, a unit-linked policy gives the option to the underwriter to choose how to invest the premium choosing among a list of predefined funds. Some policies also offer tariffs allowing to invest in predefined portfolios of external funds[12]. Overall, in our sample there are 10,717 available investment options (distinct combinations of policies and funds/portfolios) and 2,344 unique funds' share classes[13].

The synthetic index of costs, reduction in yield, of each unit-linked policy invested in a specific fund (or in a fixed portfolio of funds) is compared to that of the corresponding mutual funds' share classes sold in the retail market[14].

[10] Twenty products are offered by a cross-border company specialized in private clients (over 1 million of minimum premium) and limited distribution network in Italy; for 2 products the conditions of the contracts were not available for download on the website.

[11] Each product may have one or more tariffs (or contracts) connected to the same set of funds, or sharing the same product structure and the same kind of life coverage. A tariff may be structured either to target certain clients with discounted charges (e.g. minimum premium to access the contract, reinvesting from another contract from the same company or distributor, etc.) or with a dedicated list of funds different from the rest of the product architecture.

[12] Our sample includes 16 tariffs that offer a total of 113 fixed portfolios of funds. Moreover, there are 19 tariffs that offer internally managed funds along with external ones. Internal funds are not considered in the analysis as they cannot be directly acquired in the retail market.

[13] Mutual funds may have different share classes depending on the targeted market segment. Unit-linked policies generally invest in premium share classes or classes targeted to institutional investors, which have lower fees compared to classes targeted to retail investors. For instance, let's take the fund *AA SGR fixed income investment grade* included in two unit linked products offered by two different companies. One company has a contract with the *AA SGR* which let it use the class *I* reserved to institutional investors; the other has a contract which allow it to buy the *(P)* premium class. Retail investors have access to the associated retail class (R): *AA SGR fixed income investment grade R*. However, all classes have the same underlying asset allocation.

[14] We excluded from the analysis 146 funds since we did not find the corresponding retail class: 101 funds have a retail class valued in a different currency than the policy, other funds are not present in the Morningstar database.

Table 2: Fees and bonuses: descriptive statistics[1]

(in percentage points; observations in units)

	Mean	Std. Dev	Min	1st quartile	Median	3rd quartile	Max	Observ.
Unit linked products								
Policy fee	0.101	0.215	0.000	0.000	0.000	0.050	1.000	295,164
Loading costs	0.604	1.222	0.000	0.000	0.000	0.075	4.000	295,164
Annual management charge	2.001	0.473	0.100	1.657	1.950	2.320	3.150	295,164
OICR ongoing charges	1.028	0.567	0.050	0.670	0.930	1.226	3.670	295,164
Surrender charges[2]	0.162	0.548	0.000	0.000	0.000	0.000	4.000	295,164
Initial bonus[3]	0.792	1.522	0.000	0.000	0.000	0.000	6.000	295,164
Death bonus[4]	3.203	4.670	0.000	0.500	2.000	3.000	35.000	295,164
Coverage[5]	0.798	0.763	0.000	0.214	0.300	1.000	2.500	295,164
Mutual funds								
Service entry fee	0.093	0.197	0.000	0.002	0.012	0.120	0.850	279,504
Entry charge[6]	3.305	1.870	0.000	2.500	3.500	5.000	9.000	279,504
Exit charge[6]	0.062	0.406	0.000	0.000	0.000	0.000	3.000	279,504
OICR ongoing charges	1.671	0.657	0.000	1.350	1.710	2.020	5.000	279,504

Source: own elaborations based on individual policy prospectuses and on Morningstar Direct.

Note: (1) Summary statistics for the conditions actually accessible in the market, removing the financial case *in which the actuarial components are not considered. For the overall sample used in the analysis see Table A.1 (2) Zeros for the great part of the sample as several tariffs have not such a penalty and even when they have it, the long holding period (5, 10 20 years) make it not applicable. In order not to omit observation we record this data as zero. (3) Initial bonus is present only in very few products. (4) Death bonus is present for every product; for higher ages (in our sample, 70 years old) some contracts may set the bonus to zero. (5) Data are in tenth of percentage point. Some products set coverage charges at 0 when the age of the underwriter is high. (6) Depending on each intermediary, either entry charges or exit charges are applied. In the simulation we assume that the highest of the two is applied.*

Table 2 reports some descriptive statistics for each type of fees used in the analysis. The fees are calculated for each investment option (tariff-fund combination) and for a given value of holding period, age of the investor/underwriter and investment amount. From the table we see that unit-linked policies on average have entry charges lower than mutual funds[15]. Policies' surrender charges are often null as for long holding periods they are set to zero. *Ongoing charges* for funds sold through policies are on average lower than those applied for retail funds, as institutional (or premium) funds' share classes (i.e. those acquired by unit linked policies) have typically lower charges than retail ones. However, on an ongoing basis, policies apply also annual management charges (2.0 percent on average) that are not applied by retail funds.

[15] Since exit charges are applied alternatively to entry charges, we assumed that the highest of the two applies.

4. Methodology

4.1 Measure of costs: Reduction in yield

In order to measure the cost of an insurance policy and a mutual fund we use the Reduction in Yield (RIY), a synthetic measure of all fees and charges of a financial investment. Specifically, the RIY is defined as the difference between the yield of a hypothetical investment gross of fees and the yield of the same investment net of all fees and charges.

The cost differential between a unit-linked policy and a mutual fund is therefore given by:

$$\boldsymbol{Differential_{j,i,T} = Policy\_RIY_{j,i,T} - Fund\_RIY_{i,T}} ,$$

$$Fund\_RIY_{i,T} = Rend_{i,T} - G_{i,T} ,$$

$$Policy\_RIY_{j,i,T} = Rend_{i,T} - R_{j,i,T} ,$$

where, for a given year T, $Rend_{i,T}$ is the gross yield (without any charge and fee) of an investment in a specific mutual fund *i*, $G_{i,T}$ is the yield net of all fees and charges of an investment in the same fund *i*, and $R_{j,i,T}$ is the yield net of all fees and charges of an investment in a unit-linked policy *j* that invests in the same fund *i*. The details of the calculations are in Appendix *A.2 Reduction in Yield step by step*, where actuarial details are also explicated.

4.2 Monte Carlo simulation

In order to compare RIYs of policies and funds we simulate daily return, both gross and net of fees, by means of Monte Carlo simulation. We assume that the evolution of interest rates follows a process with Gaussian innovation. We simulate 100 yield paths with a mean of 4 per cent and a standard deviation of 10. We used 3 levels of premium (10,000, 100,000 and 500,000 euros), in order to control for the incidence of fixed costs and for the fact that policy discounts vary according to the amount invested. The holding period has been set to 5, 10 and 20 years, that are typical for investment in insurance products. We simulated the RIY for an investment both with and without the demographic component. To account for the impact of the death bonus, which is a decreasing function of age, we set the age of the underwriter to 40, 55 and 70 years.

Each simulated path is used to compare the RIYs of an investment in each policy-fund combination with that of an investment in the corresponding mutual fund. We then assess the distributions of the simulated cost differentials across funds, policies and companies (Section 5.1.).

4.3 Multivariate analysis

We use a multivariate analysis to decompose the cost differential into its main components and to assess how it depends on tariffs' and funds' characteristics (Sections

5.2. and 5.3. Breakdown of the cost).

In order to estimate the impact of the investment amount, the holding period, the age of the underwriter and the distribution channel, we use the following OLS regression model:

$$(1)\ y_{o,i,h,a} = \beta_0 + \beta_1 \times inv_{o,h,a} + \beta_2 \times holding\_period_{o,i,a} + \beta_3 \times age_{o,i,h} + \sum_{c=1}^{C-1} \mu_o^c + ETF_o + bank_o + \sum_{p=1}^{P-1} \lambda_o^p + \epsilon_{o,i,h,a}$$

The dependent variable $(y_{o,i,h,a})$ is the average[16] cost differential of the 100 realizations of the simulation between a policy and an investment fund for each tariff-fund combination (*o*) and a given value of the investment/premium (*i*), holding period (*h*) and age (*a*)

On the right-hand side of the model, *bank* and *ETF* are dummy variables identifying policies distributed through bank branches and policies invested in ETFs, while μ_o^c and λ_o^p are dummies respectively for fund categories (*c*)[17] and tariff fixed effects (*p*). Finally, $inv_{o,h,a}$, $holding\_period_{o,i,a}$ and $age_{o,i,h}$ are categorical variables for the different predefined values of the amount invested, the holding period and the investor's age[18].

In order to estimate the impact of each type of fee, we use the following model:

$$(2)\ y_{o,i,h,a} = \theta_0 + \sum_{m=1}^{M} \theta_m \times policy\_charge_{m,\mathrm{o,i,h,a}} + \sum_{f=1}^{F} \theta_f \times fund\_charge_{f,\mathrm{o,i,h,a}} + \beta_1 \times inv_{o,h,a} + \beta_2 \times holding\_period_{o,i,a} + \beta_3 \times age_{o,i,h} + \sum_{p=1}^{P-1} \lambda_p + \epsilon_{o,i,h,a}$$

In this model we include two set of regressors: $policy\_charge_{m,\mathrm{o,i,h,a}}$[19], which is the level of the fees for a given policy fee category (*p*) and $fund\_charge_{f,\mathrm{o,i,h,a}}$ [20], which is the level of fee for a given fund fee category (*f*). The other regressors ($inv_{o,h,a}$, $holding\_period_{o,i,a}$ and $age_{o,i,h}$ and λ_p) are defined as in equation (1).

5. Results

In this section, we first describe the simulated distributions of the cost differentials across funds, policies and companies; we then discuss the results of the multivariate analysis.

5.1. Simulated distributions of the cost differential

The average simulated cost differential varies greatly across insurers (Figure 3, panel a). In the "financial case" (i.e. when we do not consider the actuarial component of the insurance contract and set to zero both the coverage fee and the death bonus), the average cost differential varies from a minimum of 0,5 per cent to a maximum of almost 2 per cent. For each company, those with the lowest average differential

[16] $y_{oiha} = \overline{Differential}_{oiha} = \frac{1}{100}\sum_{s=1}^{100}(Policy\_RIY_{oiha}^{s} - Fund\_RIY_{oiha}^{s})$

[17] Using the Morningstar global category, we get: allocation, alternative, commodities, convertibles, fixed income, equity, commodity, and miscellaneous. We also add the category *portfolio* in order to account for those that use combination of external funds

[18] *inv* is set to 1, 2 and 3 when the investment amount is respectively equal to 10.000, 100.000 and 500.000 (3). Age: financial case (0), 40 (1), 55, (2), 70 (3). Holding period: 5 (1), 10 (2), 20 (3).

[19] Namely: Policy fee, Loading costs, Ongoing OICR policy, Surrender charge, Coverage charge, Bonus claim, Initial bonus.

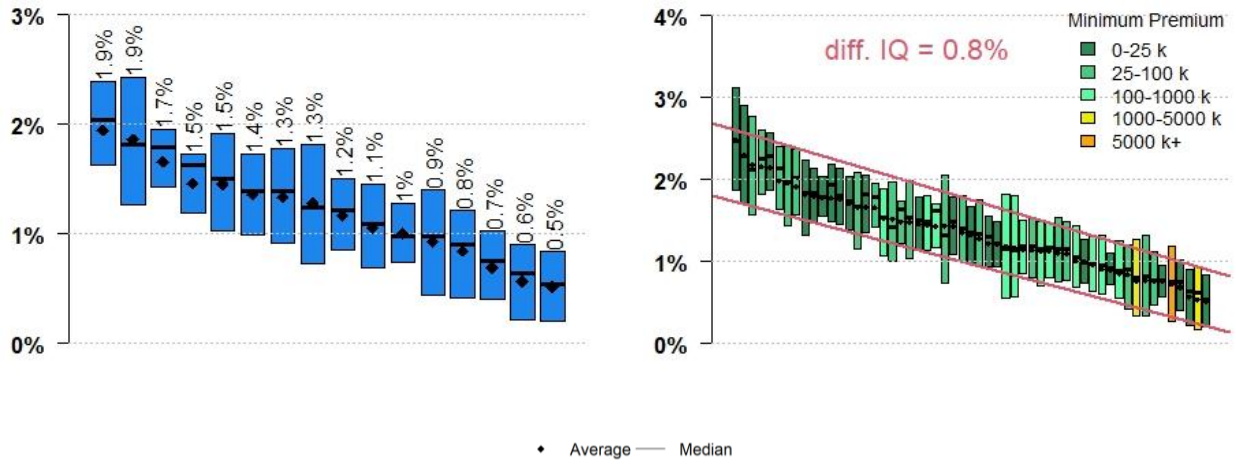
[20] Namely: Service entry fee, Entry charge fund, Ongoing OICR fund, Ongoing fees policy, Exit charge fund.

are mostly mutual insurance companies as they set on average lower *annual management charges*. The cost differentials of domestic companies are not significantly different from those of foreign companies operating under the Freedom to Provide Services regime.

There is high heterogeneity also across tariffs (Figure 3, panel b). The average cost differential ranges from a minimum of 0.5 per cent to a maximum of 2.5 per cent. Within each tariff, the share of investment options (tariff-fund combinations) with a positive differential is at least 87 per cent (for most tariffs there is none to two combinations with non-positive differential). The interquartile range is also low, with a sample average of around 0.8 per cent.

Figure 3: Distributions of the cost differential by undertaking and by tariff
(percentage)

(a) by undertaking **(b) by tariff**



Note: For each company (panel a) and for each tariff (panel b), the chart shows the average, the median and the interquartile range of the simulated cost differentials.

Figure 4 shows the distribution of the cost differential across all investment options when the policy does not include a life insurance component (financial case) and when the policy includes a life insurance component (actuarial case at three different ages). As in figure 3, the cost differential is almost always positive. It tends to be higher in the actuarial case, reflecting the extra cost of the insurance coverage which is only partially compensated by the death bonus. In the actuarial case, the cost differential tends to increase with the age of the investor/underwriter, especially for longer holding periods (panel b and c), since the coverage charge is a fixed percentage while the death bonus declines with age. In particular, in panel c, the average differential is highest (1.8 per cent) for a 20-years contract underwritten by a 70-year old investor.

Figure 5 shows that in the financial case the cost differential, as shown in Figure 4, increases with the holding period (on the x-axis of each panel), as ongoing charges are on average higher for policies than for funds[21]. Instead, in these bivariate figures, the cost differential varies only slightly with the investment amount (across panels) and is compensated by longer holding periods.

[21] The difference is mostly due to the fact that on top of "ongoing fund's charges" unit linked policies also apply "annual management charges".

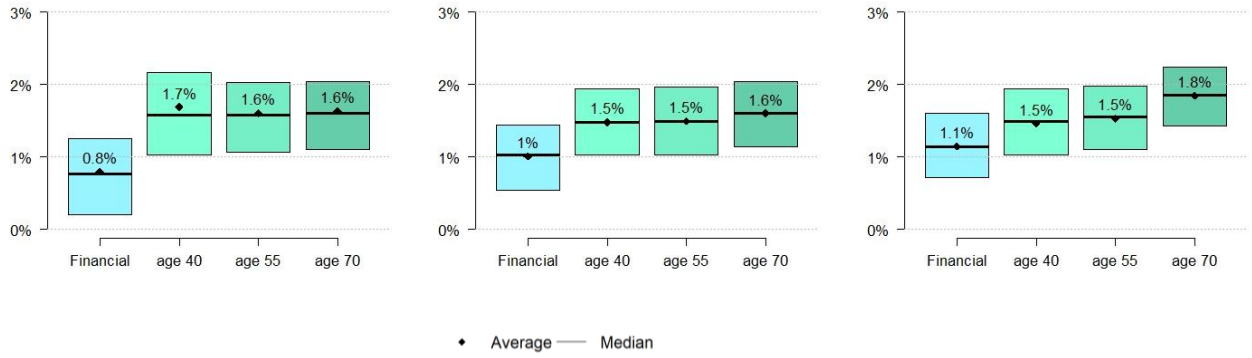
Figure 4: Distributions of the cost differential across tariffs and funds, by investor's age and holding period: financial case (without the life insurance component) versus the actuarial case (with the life insurance component)

(percentage)

(a) 5 years of contract; 10,000 investment

(b) 10 years of contract; 10,000 investment

(c) 20 years of contract; 10,000 investment



Note: The charts show the mean, the median and the interquartile range of the simulated distribution of cost differentials across tariffs and funds for a given value of investor's age and a given value of the amount invested. "Financial" indicates the simulation without the actuarial component of the insurance policy.

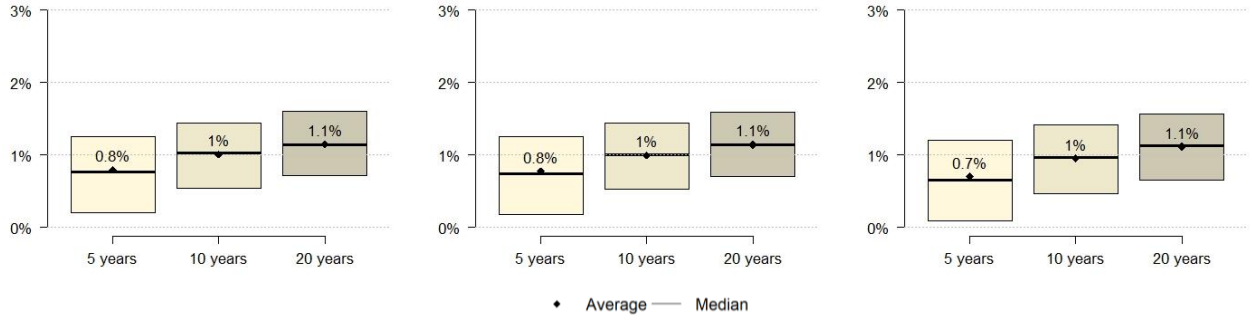
Figure 5: Distributions of the cost differential across tariffs and funds, by holding period and value of the investment ("financial case")

(percentages)

(a) investment 10,000

(b) investment 100,000

(c) investment 500,000



Note: The charts show the mean, the median and the interquartile range of the simulated distribution of cost differentials between policy tariffs and funds for a given value of the holding period and a given value of the amount invested. Simulations do not include the actuarial component of the life insurance ("financial case").

5.2. Determinants of the cost differential

We estimated model (1) presented in section 4.3 across all tariffs-funds combinations and for each predefined value of investment amount, age and holding period, both with and without tariff fixed effects. Results are shown in table 3. Results are slightly different than those seen with the analysis above, because of the multivariate context, in particular regarding the level of investment. As a robustness check we also estimated the model applying tariffs' investment constraints, that is excluding an observation whenever the corresponding investment amount was below the minimum investment (above the maximum) allowed by the tariff[22, 23].

Considering the specification with tariff investment constraints and including tariff fixed effects (Table 3, column 4), we find that the cost differential decreases by 6 basis points on average when *Investment* increases by one level[24] and it increases by 20 and 6 basis points on average, respectively, when *Age* and *Holding period* rise by one level[25]. The negative impact of *Investment* on the cost differential is mainly due to the discounts offered by unit linked contracts to higher levels of investments[26].

The positive impact of *Age* is explained by the cost of the actuarial component of unit linked policies, and the decrease of the death bonus in age. Finally, the positive effect of *Holding period* is due to the fact that ongoing charges are on average greater for policies than for mutual funds and the incidence of this recurrent cost component increases with the holding period. The effects of *Investment*, *Age* and *Holding period* are statistically significant and their sign is coherent across all model specifications.

Table 3: Determinants of the cost differential: impact of investment, age and holding period

	(1)	(2)	(3)	(4)
Investment	-0.0360***	-0.0412***	-0.0360***	-0.0650***
	(0.0016)	(0.0031)	(0.0013)	(0.0025)
Age	0.2060***	0.2043***	0.2084***	0.2081***
	(0.0011)	(0.0015)	(0.0009)	(0.0011)
Holding period	0.0440***	0.0576***	0.0440***	0.0576***
	(0.0016)	(0.0020)	(0.0013)	(0.0016)
Constant	1.0882***	1.1268***	N/a	N/a
	(0.0052)	(0.0092)		
Lowest fixed effect	N/a	N/a	0.2164***	0.2310***
			(0.0082)	(0.0109)
R-square	0.08	0.09	0.39	0.44
N	362,681	204,390	362,681	204,390
Tariff constraint	NO	YES	NO	YES
Tariff FE	NO	NO	YES	YES

Notes: (1) standard errors, in parentheses; (2) Level of significance: (***) 0.01; (**) 0.05; (*) 0.1

We then estimate three augmented versions of model 1 to evaluate the contribution of funds' characteristics (investment category, ETF and distribution channel). Results are shown in table 4. The

[22] All contracts in our sample allow for values of age considered in the simulation.

[23] This is not the default option as, for instance, in the Key Information Document (KID) companies calculate the RIY for a premium of 10,000 euros regardless of the minimum investment required to invest in it.

[24] From 10,000 to 100,000 euro or from 100,000 to 500,000 euro.

[25] For age, from 40 to 55 years or from 55 to 70 years; for holding period, from 5 to 10 years or from 10 to 20 years.

[26] The negative impact of *Investment* is higher in the model with tariff investment constraints. By applying the constraints, we drop from the estimation sample the observations with a premium above the threshold set by the tariff, which are on average more expensive than those that have not such a constraint.

cost differential is highest for money market funds (the reference category in the model; columns 1 and 2), as for low risk funds' categories the cost of the retail funds' share classes is generally lower than for other funds' categories (see Table A.3 for more details). The cost differential is on average between 11 and 15 basis points lower (column 2) for balanced, equity or fixed income funds than for money market funds. Products investing in predefined funds' portfolios have a slightly lower differential than that of those investing in the balanced, equity and fixed income categories.

Table 4: Determinants of the cost differential: funds' characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
Investment	-0.0362***	-0.0423***	-0.0360***	-0.0648***	-0.0362***	-0.0462***
	(0.0016)	(0.0031)	(0.0003)	(0.0029)	(0.0016)	(0.0032)
Age	0.2060***	0.2043***	0.2092***	0.2082***	0.1995***	0.1995***
	(0.0011)	(0.0015)	(0.0006)	(0.0013)	(0.0011)	(0.0015)
Holding period	0.0435***	0.0575***	0.0440***	0.0576***	0.0456***	0.0599***
	(0.0016)	(0.0021)	(0.0089)	(0.0019)	(0.0016)	(0.0021)
Balanced[3]	-0.2044***	-0.1140***				
	(0.0125)	(0.0143)				
Alternative	-0.2989***	-0.1785***				
	(0.0152)	(0.0180)				
Commodities	-0.6268***	-0.3577***				
	(0.0280)	(0.0330)				
Convertibles	-0.3080***	-0.2179***				
	(0.0154)	(0.0184)				
Equity	-0.2448***	-0.1529***				
	(0.0123)	(0.0140)				
Fixed income	-0.1904***	-0.1227***				
	(0.0123)	(0.0139)				
Miscellaneous	0.3165***	0.3534***				
	(0.0301)	(0.0367)				
Portfolio[4]	-0.1815***	-0.1866***				
	(0.0159)	(0.0195)				
Advisor			0.5640***	0.6367***		
			(0.0238)	(0.0033)		
ETF					0.3864***	0.2903***
					(0.0042)	(0.0046)
Constant	1.3094***	1.2669***	0.9051***	0.9732***	1.0774***	1.1290***
	(0.0132)	(0.0165)	(0.0233)	(0.0085)	(0.0052)	(0.0094)
R-square	0.09	0.09	0.19	0.24	0.09	0.10
N	362,681	204,390	362,681	204,390	362,681	204,390
Tariff constraint	NO	YES	NO	YES	NO	YES
Tariff FE	NO	NO	NO	NO	NO	NO

Notes: (1) standard errors, in parentheses; (2) Level of significance: (***) 0.01; (**) 0.05; (*) 0.1; (3) Allocation in the global Morningstar category, we used balanced *as more widely used. (4) This category refers to the investment options with a predefined fixed portfolio of funds, to which cannot be assigned any specific Morningstar global category.*

Funds included in the predefined portfolios are usually cheaper since they are typically offered by management companies that belong to the same financial group of the insurer as they can have an easier access to institutional classes. The distribution of unit linked policies has a large impact on costs: the cost differential is 64 basis points higher if it is sold by advisors rather than banks (column 4).

Finally, ETFs (listed index funds that we do not differentiate by class of investment) have on average a cost differential 38 basis points higher than non-ETF funds, given that for ETFs' retail classes have significantly lower costs than other funds.

5.3. Breakdown of the cost differential

This section analyses the components of the simulated cost differential between unit-linked policies and mutual funds using results from equation 2 presented in section 4.3 Multivariate analysis. The breakdown is shown in Table 5 while the regression results are displayed in Table A.4. Columns refer to the same specifications used in Table 3. The regressions control for investment amount, holding period, age and tariffs fixed effects.

The overall cost differential, evaluated at the mean values of all cost components, ranges between 0.62 and 0.75 percentage points depending on model specification. When controlling for tariffs fixed effects (columns 3 and 4) the differential reduces but remains sizable. Ongoing charges explain by far the biggest part of the differential, with a positive impact ranging from 0.65 to 0.95 percentage points. As showed in Table A.5, which includes all costs subcategories, they are the result of two components: *annual management fee*, which is a remuneration for the insurance company management services[27]; ongoing charges of funds, which remunerate the fund's asset management company and are on average lower for policies than for retail funds. Initial charges reduce the cost differential by around 10 basis points as they are generally higher for retail funds than for policies. Finally, the contribution of exit charges is negligible.

Table 5: Breakdown of the simulated average cost differential[1]
(percentage points)

Cost component	(1)	(2)	(3)	(4)
Initial charge	-0.1238	-0.0873	-0.0795	-0.0168
Ongoing charges	0.9036	0.9462	0.6449	0.6643
Exit charges	0.0098	0.0151	0.0054	0.0106
Other charges	-0.0445	-0.0603	0.0487	0.0460
differential due to charges	**0.7451**	**0.8137**	**0.6194**	**0.7041**
Constant	0.2667	0.2630	N/a	N/a
Fixed effect with lowest value	N/a	N/a	0.0021	-0.0774
Fixed effect with highest value	N/a	N/a	1.0853	1.1992
controls at minimum[2]	-0.1083	-0.2079	-0.0762	-0.1467
controls at maximum[3]	0.5653	0.5737	0.5962	0.6444
min differential	**0.9035**	**0.8688**	**0.5453**	**0.4800**
max differential	**1.5771**	**1.6504**	**2.3010**	**2.5477**

Note:(1) Table A.5 in the appendix give details on the individual fees (2) Premium is set to level 3, holding period to 1, age to 0. (3) Premium is set to 1, holding period to 3 and age to 3.

[27] It does not imply neither from the companies nor from the distributors an active management of the allocation across the funds available. These services are sometimes sold within contracts only if the underwriter explicitly chooses them, paying an additional fee.

6. Robustness checks

6.1 Controlling for rebates *and switching costs*

Our base simulation exercise did not consider *rebates*[28] (since we do not have this information at the contract level[29]) and switching costs (i.e. costs for changing the allocation of the portfolio). In order to control for the robustness of our results to *rebates* and switching costs we use the model presented in section 4.4, with no tariff investment constraints and no tariff fixed effects (as in table 5, column 1)[30].

We hypothesize that *rebates* equal to 40 per cent of the funds' *ongoing charges* and are applied on all unit-linked investment options[31]. Concerning switching costs, we hypothesize that investors rebalance their portfolio 5 times during the holding period and that the corresponding additional costs are paid only when they invest directly in mutual funds and not when they underwrite a unit linked policy as a certain number of switch can be executed for free[32]. Under these upper bound hypotheses the simulated cost differential decreases significantly but it remains positive and sizable. In particular, *rebates* lower *ongoing costs* from 0.90 to 0.58 per cent and the overall simulated cost differential from 0.75 to 0.41 per cent (table 6, column 2). At the same time, switching costs increase the differential of funds' initial charges (*service entry fee* plus *entry charge*) from 0.12 to 0.74 percentage points and hence reduce the cost differential from 0.75 to 0.14 per cent (table 6, column 3).

Table 6: Impact of *rebates* and switching costs on the simulated cost differential[1]

Feature	Mean	Rebates	5 switches
Initial charge	-0.1238	-0.1238	-0.7427
Ongoing charges	0.9036	0.5835	0.9036
Exit charges	0.0098	0.0098	0.0172
Other charges	-0.0445	-0.0445	-0.0497
differential	**0.7451**	**0.4136**	**0.1409**
Constant	0.2706	0.2706	0.2706
controls at minimum[1]	-0.1083	-0.1083	-0.1083
controls at maximum[2]	0.5653	0.5653	0.5653
min differential	**0.9035**	**0.5720**	**0.2993**
max differential	**1.5771**	**1.2456**	**0.9729**

Note: (1) Based on a regression model without tariff investment constraints and tariff fixed effects. (1) Premium is set to level 3, holding period to 1, age to 0. (2) Premium is set to 1, holding period to 3 and age to 3.

[28] Sometimes, the asset management company pays back to the insurance company a certain percentage of the fund's ongoing fees (rebates), which the law compels insurers to return to the underwriter. This is done through a discount in the *annual management fee*.

[29] Rebates are agreed between the insurer and the fund's management company on a case by case level and applied to the *funds' ongoing charges*. The corresponding amount is then repaid by the insurer to the underwriter in the form of a reduction in the *annual management fee*. In addition, they can change even on a monthly basis.

[30] The specifications corresponding columns 2, 3 and 4 of Table 5 are in Table A.7, A.8, A.9.

[31] On the basis of typical contracts, the 40 per cent discount assumed in the exercise can be considered as an upper bound value; moreover, the exercise applies *rebates* to all tariffs and funds, although they are applied on a case by case basis.

[32] This hypothesis should allow us to obtain an upper bound estimate of the impact of switching costs on the simulated cost differential as it is quite a strict hypothesis that all the costs of exiting and entering (e.g. *entry service fee* and *entry charge*) a fund are applied in each switch of mutual funds which is quite implausible. In addition, five portfolio switches represent a moderate rebalancing rate for retail investors. Unit linked contracts typically allow the investor to make from 3 to 5 switches per year for free and apply e a charge for additional switches.

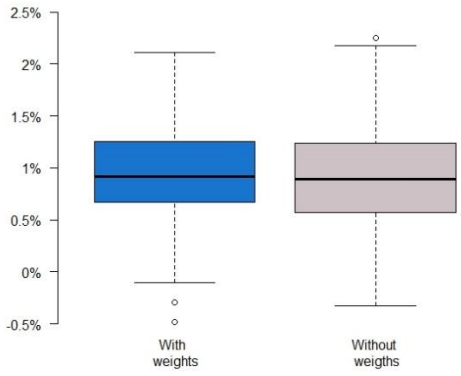
6.2 Volume weighted differential

The analysis performed so far considered for each policy the distribution of cost differentials across all funds offered by a tariff. We could not provide a synthetic measure of the cost differential based on the funds actually chosen by the underwriter as we do not have contract-level information on the actual amounts invested in each fund. In this paragraph, however, for each policy we compute an average cost differential weighted by the share of each fund in the company overall unit linked portfolio, using data from insurers' supervisory reports[33]. We then compare this measure with an unweighted version, that is, a simple average using uniform weights across all funds included in a product prospectus. Compared to the unweighted benchmark, in the weighted formula funds may have lower (even a zero) or higher weights. This exercise allows us to assess how the aggregate actual average cost differential incurred by company customers compares to the cost differential distributions we discussed in section 5.

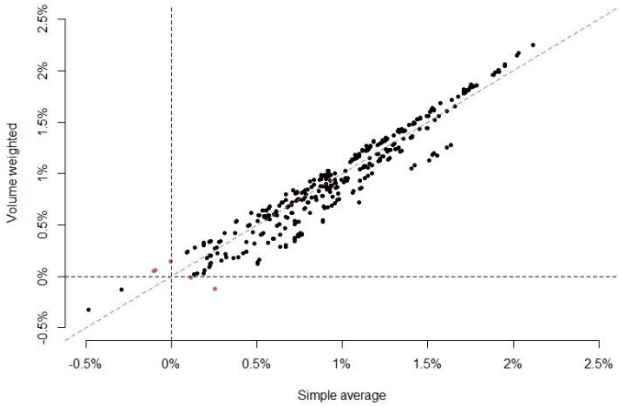
Panel *a* of Figure 6, shows that the two measures of the cost differential (weighted and unweighted) have approximately the same distribution across policies: the difference in the average value is 0.03 per cent and the median is basically the same. Panel *b* shows that the two measures have a different sign only in 5 cases (red dots, 1.3 per cent of occurrences). The differences between the weighted and the unweighted averages lie close and around the 45-degrees line of the first quadrant (which identifies policies with the same weighted and unweighted differential), showing that there is no clear bias. We can thus conclude that using the actual holding by undertaking does not have a material impact on the estimation of the cost differential between unit linked policies and investments funds.

Figure 6: Volume-weighted vs unweighted cost differential across policies
(percentage points)

a) distribution of the differential by policy



b) comparison of weighted and unweighted averages by observation[1]



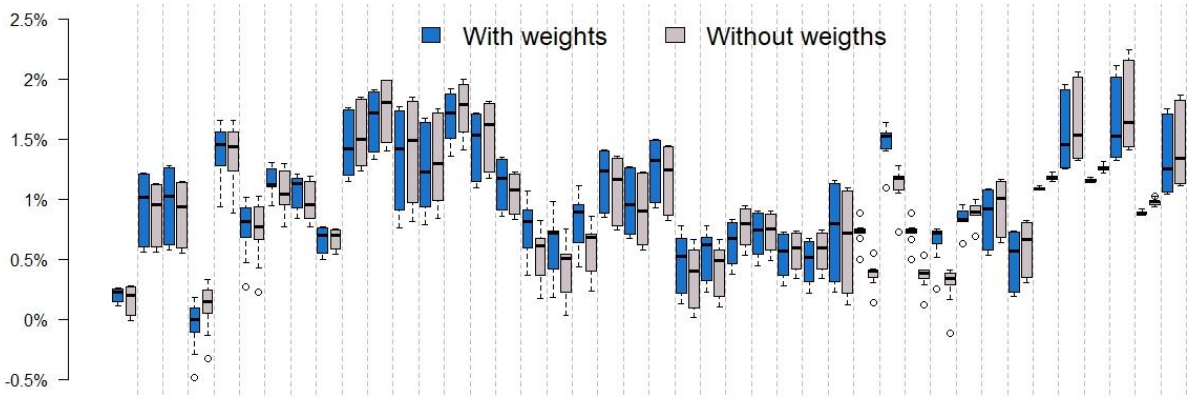
Source: weights are based on insurers' supervisory reports on investments related to unit-linked policies; data are available only for Italian undertakings.

Note: (1) The analysis is performed only on the financial case as it is the occurrence that could be susceptible of a change in the sign of the differential.

Figure 7 shows how the distribution across products of the two measures varies by company. In particular, we observe that the weighted average cost differentials are close to the unweighted ones without any clear pattern or bias.

[33] This analysis is performed only for Italian undertakings as data for foreign companies are not available.

Figure 7: **Distribution of the volume weighted and the unweighted cost differential across policies, by company**
(percentage points)



Source: weights are based on insurers' supervisory reports on investments related to unit-linked policies; data are available only for Italian undertakings.

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Annexes

A.1 Costs

Unit-linked contracts

- **Policy fee:** fee paid by the underwriter for compensating administrative costs associated with the issuance of the policy. The fee is subtracted upfront from the investment amount.
- **Loading costs:** percentage of the premium paid to cover distribution and other residual administrative costs. Sometimes it includes the death benefit coverage costs.
- **Annual management charges:** remuneration of the insurance company for the maintenance of the funds' list and for the eventual extraordinary liquidation of the funds. Often it includes the death benefit coverage costs.
- **Ongoing fund's charges:** remuneration of the fund's management company. Insurance companies have access to premium or institutional funds' classes with lower fees than those applied on retail mutual funds.
- **Death benefit coverage costs:** insurance premium paid for remunerating the bonus provided in case of death of the underwriter. It may be included among loading costs, annual management charges or as additional recurring costs.
- **Surrender charge:** fee paid for liquidating the investment. It decreases with the holding period of the policy.
- **Coverage fee:** either charged up-front or ongoing, it is needed to cover the actuarial costs of the *death bonus* and remunerate that service.
- **Initial bonus:** bonus given as increase in the quotes underwritten
- **Death bonus:** increase in the quotes at the death of the insured person, it is the compulsory insurance content of the unit-linked contract.

Mutual funds

- **Service entry/exit fee**: remuneration of third parties for acquiring or liquidating the position.
- **Entry charge:** remuneration of the distributor who can apply a percentage (from 0 to 100 per cent) of the value stated in the Key investor information document (KIID); the percentage is agreed on by the management company and the distributor. It is applied alternatively to the exit charge.
- **Exit charge:** remuneration of the distributor who can apply a percentage (from 0 to 100 per cent) of the value stated in the Key investor information document (KIID); the percentage is agreed on by the management company and the distributor. It is applied alternatively to the entry charge. In the simulation we assume that the distributor applies it only when it is greater than entry charge.
- **Ongoing fund's charges:** remuneration of the fund's management company paid by the investor in retail mutual funds. It is a comprehensive measure of ongoing costs, including management fee, transaction costs and all other recurring fees.

A.2 Reduction in Yield step by step

Let be $Yield_T$ the gross yield (without any charge) in year T, G_T the yield considering all fees and charges of the investment in the fund, and R_T the yield considering all fees and charges of the investment in the same fund but supplied through the policy, then the two RIYs are:

$$\boldsymbol{Policy\_RIY_T = Yield_T - R_T} \quad \text{and} \quad \boldsymbol{Fund\_RIY_T = Yield_T - G_T}$$

Let M_T and F_T be the values of insurance and mutual funds respectively after the costs that insured/investor should pay[34] according to the respective contracts, but before the surrender charge and exit cost. So at fixed time T , the net yield R_T and G_T are defined as:

$$\boldsymbol{R_T = \left(\frac{M_T*(1-surrender\ charge)}{Initial\ investment}\right)^{\frac{1}{T}} - 1} \quad \textbf{for policy insurance}$$

$$\boldsymbol{G_T = \left(\frac{F_T*(1-exit\ charge)}{Initial\ investment}\right)^{\frac{1}{T}} - 1} \quad \textbf{for mutual fund}$$

The policy yield depends on the time T, moment of the death of the underwriter, bonus ρ_x, depending on age x of the insured, triggered by the event and for a generic time k, we calculate it as follows:

$$\boldsymbol{R_k = \left(\frac{M_k * (1 + \rho_{x+k})}{Initial\ investment}\right)^{\frac{1}{k}} - 1}$$

For policies we have also the probability of deceasing or surviving is integrated as follows: Since the time k is not known at beginning of the contract, we calculate a RIY that is weighted probability

$$\boldsymbol{Policy\_RIY_T} = \sum_{k=0}^{T-1} {}_k\boldsymbol{q_x}\,(Yield_k - \boldsymbol{R_k}) + {}_T\boldsymbol{p_x}(Yield_T - \boldsymbol{R_T})$$

$$\boldsymbol{Fund\_RIY_T} = \sum_{k=0}^{T-1} {}_k\boldsymbol{q_x}\,(Yield_k - \boldsymbol{G_k}) + {}_T\boldsymbol{p_x}(Yield_T - \boldsymbol{G_T})$$

Where ${}_kq_x$ is the probability to death between age $x + k$ and $x + k + 1$, for an insurers of age x at time 0, while ${}_Tp_x$ is the survivor probability at age $x + T$; obviously $\sum_{k=0}^{T-1} {}_kq_x + {}_Tp_x = 1$. For our analysis we use the mortality table *sim2002* published by ISTAT. For mutual funds we work under the assumption that heirs close the positions when the investor has died, paying the exit cost if present.

[34] Cfr. Section 1 or Annex A.1 Costs

A.3 Figures and Tables

Table A.1: Fees and bonuses: descriptive statistics with the financial case
(in percentage points; observations in units)

	Mean	Std. Dev	Min	1st quartile	Median	3rd quartile	Max	Observ.
Unit linked products								
Policy fee	0.101	0.215	0.000	0.000	0.000	0.050	1.000	393,552
Loading costs	0.604	1.222	0.000	0.000	0.000	0.075	4.000	393,552
Annual management charge	2.001	0.473	0.100	1.657	1.950	2.320	3.150	393,552
OICR ongoing charges	1.028	0.567	0.050	0.670	0.930	1.226	3.670	393,552
Surrender charges[1]	0.162	0.548	0.000	0.000	0.000	0.000	4.000	393,552
Initial bonus[2]	0.792	1.522	0.000	0.000	0.000	0.000	6.000	393,552
Death bonus[3]	3.703	5.325	0.000	1.000	2.500	5.000	35.000	393,552
Coverage[4]	0.598	0.746	0.000	0.000	0.227	1.000	2.500	393,552
Mutual funds								
Service entry fee	0.093	0.197	0.000	0.002	0.012	0.120	0.850	372,672
Entry charge[5]	3.305	1.870	0.000	2.500	3.500	5.000	9.000	372,672
Exit charge[5]	0.062	0.406	0.000	0.000	0.000	0.000	3.000	372,672
OICR ongoing charges	1.671	0.657	0.000	1.350	1.710	2.020	5.000	372,672

Source: own elaborations based on individual policy prospectuses and on Morningstar Direct.
Note: (1) Zeros for the great part of the sample as several tariffs have not such a penalty and even when they have it, the long holding period (5, 10 20 years) make it not applicable. In order not to omit observation we record this data as zero. (2) Initial bonus is present only in very few products. (3) Death bonus is present for every product; for higher ages (in our sample, 70 years old) some contracts may set the bonus to zero. We set the death bonus at 0 when we do not consider the insurance coverage ("financial case"). (4) Data are in tenth of percentage point. Some products set coverage charges at 0 when the age of the underwriter is high; we set them at 0 when we do not consider the insurance coverage (the "financial" case). (5) Depending on each intermediary, either entry charges or exit charges are applied. In the simulation we assume that the highest of the two is applied.

Table A.2: asset classes by global Morningstar category
(in percentage points; observations in units)

Global category	Number of underlying investment options	percentage
Balanced[1]	1577	14.52
Alternative	219	2.02
Commodities	26	0.24
Convertibles	154	1.42
Equity	4946	45.53
Fixed Income	3562	32.79
Miscellaneous	3	0.03
Money Market	117	1.08
Portfolio[2]	113	1.04
Total	10717	100

Note: (1) Allocation in the global Morningstar category, we used balanced *as more widely used. (2) Not in Morningstar global category, but reflecting the products that supply external funds in fixed combinations.*

Table A.3: Ongoing charges by category of funds

(percentage point)

Morningstar global fund category	Annual management fee	Ongoing charges of funds sold by policies (a)	Ongoing charges of retail funds (b)	Difference of funds' ongoing charges (a)-(b)
Allocation[1]	2.03	1.23	1.86	-0.63
Alternative	2.10	1.23	2.00	-0.77
Commodities	1.82	1.00	1.79	-0.79
Convertibles	1.91	1.08	1.69	-0.61
Equity	2.15	1.19	1.92	-0.73
Fixed Income	1.84	0.75	1.25	-0.50
Miscellaneous	2.47	0.67	1.20	-0 .53
Money Market	1.57	0.21	0.31	-0.10
Portfolio[2]	2.08	0.74	1.70	-0.96
Total	2.02	1.03	1.67	-0.64

Note: (1) Allocation in the global Morningstar category, we used balanced *as more widely used. (2) Not in Morningstar global category, but reflecting the products that supply external funds in fixed combinations.*

Table A.4: Regressions used to evaluate the impact of the different types of cost on the simulated cost differential[1]

	(1)	(2)	(3)	(4)
Policy fee	0.1566***	0.5433***	0.1135***	0.4084***
	(0.0040)	(0.0371)	(0.0042)	(0.0470)
Service entry fee	-0.5589***	-0.5783***	-0.3418***	-0.3006***
	(0.0062)	(0.0067)	(0.0058)	(0.0058)
Loading costs	0.0406***	0.0355***	0.0611***	0.1010
	(0.0007)	(0.0009)	(0.0024)	(0.0030)
Entry charge fund	-0.0340***	-0.0333***	-0.0291***	-0.0276***
	(0.0005)	(0.0006)	(0.0005)	(0.0005)
Ongoing OICR fund	-0.9905***	-0.9882***	-0.9511***	-0.9396***
	(0.0017)	(0.0020)	(0.0016)	(0.0019)
Ongoing OICR policy	0.9199***	0.9562***	0.8920***	0.9337***
	(0.0018)	(0.0023)	(0.0020)	(0.0024)
Ongoing fees policy	0.8061***	0.8068***	0.6582***	0.6369***
	(0.0022)	(0.0029)	(0.0044)	(0.0049)
Surrender charge	0.2778***	0.3368***	0.2092***	0.2036***
	(0.0012)	(0.0017)	(0.0018)	(0.0024)
Exit charge fund	0.0040***	-0.0011***	0.0104***	0.0092***
	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Coverage charge[3]	0.0438***	0.0678***	0.0240***	0.0475***
	(0.0013)	(0.0015)	(0.0013)	(0.0015)
Bonus claim	-0.0025	-0.0059***	0.0081*	0.0097*
	(0.0019)	(0.0022)	(0.0018)	(0.0020)
Initial bonus	-0.0749***	-0.0710***	0.0128***	0.0150***
	(0.0005)	(0.0006)	(0.0016)	(0.0017)
Holding period	0.0741***	0.0996***	0.0657***	0.0891***
	(0.0011)	(0.0013)	(0.0010)	(0.0011)
Age	0.1346***	0.1258***	0.1488***	0.1519***
	(0.0007)	(0.0009)	(0.0007)	(0.0008)
Investment	-0.0608***	-0.1025***	-0.0473***	-0.0786***
	(0.0013)	(0.0021)	(0.0013)	(0.0021)
Constant	0.2667***	0.2630***	0.0021	-0.0774***
	(0.0072)	(0.0094)	(0.0115)	(0.0140)
R-square	0.6806	0.7309	0.7331	0.7958
N	367,167	207,168	367,167	207,168
Tariff constraint	NO	YES	NO	YES
Tariff FE	NO	NO	YES	YES

Notes: (1) coefficients should be interpreted as how much of the costs is translated to the differential, for example 4 per cent of Loading costs are translated to the differential (2) standard errors, in parenthesis; (3) p-value are calculated as percentage of simulations with a coefficient of opposite sign to the one displayed in the table out of 100 simulations Level of significance: (***) 0.01; (**) 0.05; (*) 0.1; (3) data in thousandths, not in percentages as the other coefficients

Table A.5: Breakdown of the simulated cost differential[1]

(percentage points)

Cost component	(1)	(2)	(3)	(4)
policy fee	0.0158	0.0549	0.0115	0.0413
service entry fee	-0.0518	-0.0536	-0.0317	-0.0279
loading costs	0.0245	0.0215	0.0369	0.0611
entry charge funds	-0.1124	-0.1101	-0.0962	-0.0912
Initial charge	-0.1238	-0.0873	-0.0795	-0.0168
ongoing funds' charges (policy)	0.9457	0.9830	0.9170	0.9599
ongoing funds' charges (retail fund)	-1.6549	-1.6511	-1.5891	-1.5699
annual management fee (policy)	1.6129	1.6143	1.3169	1.2743
Ongoing charges	0.9036	0.9462	0.6449	0.6643
surrender policy	0.0071	0.0110	0.0039	0.0077
exit charge[2]	0.0027	0.0042	0.0015	0.0029
Exit charges	0.0098	0.0151	0.0054	0.0106
coverage charge	0.0166	0.0202	0.0125	0.0122
death bonus	0.0148	-0.0041	0.0385	0.0341
initial bonus	-0.0594	-0.0563	0.0101	0.0119
Other charges	-0.0445	-0.0603	0.0487	0.0460
differential due to charges	**0.7451**	**0.8137**	**0.6194**	**0.7041**
constant	0.2667	0.2630	N/a	N/a
fixed effect with lowest value	N/a	N/a	0.0021	-0.0774
fixed effect with highest value	N/a	N/a	1.0853	1.1992
controls at minimum[2]	-0.1083	-0.2079	-0.0762	-0.1467
controls at maximum[3]	0.5653	0.5737	0.5962	0.6444
min differential	**0.9035**	**0.8688**	**0.5453**	**0.4800**
max differential	**1.5771**	**1.6504**	**2.3010**	**2.5477**

Note: (1) Policies' charges have a positive coefficient because they increase the cost differential, while mutual funds' charges have a negative coefficient because they decrease the differential (2) It is remarkable, however, that funds' exit charges have a positive coefficient rather than a negative one. The impact of exit charges for those funds where we applied them (when greater than entry charges) is lower than the one of entry charges on other funds, as a consequence the differential is higher for those applying exit charges and therefore the sign is positive rather than negative (3) premium is at level 3, holding period at 1, age at 0. (3) premium is at level 1, holding period at 3 and age at 3.

Table A.6: ***Impact of*** **rebates** ***and switching costs on the simulated cost differential (first model)***

Feature	Mean	ETF	Money Market	Equity	Rebates	5 switch
specification	(1)	(1)	(1)	(1)	(1)	(1)
Policy fee	0.0158	0.0203	0.0158	0.0158	0.0158	0.0158
Service entry fee	-0.0518	-0.0499	-0.0518	-0.0499	-0.0499	-0.2495
Loading costs	0.0245	0.0036	0.0245	0.0234	0.0234	0.0245
Entry charge funds	-0.1124	0.0000	-0.1124	-0.0355	-0.1149	-0.5324
Initial charge	-0.1238	-0.0260	-0.1238	-0.0461	-0.1256	-0.7416
Ongoing policy OICR	0.9457	0.2234	0.9457	0.1903	1.0950	0.9457
Ongoing fund OICR	-1.6549	-0.2354	-1.6549	-0.3088	-1.9057	-1.6561
Annual management fee	1.6129	1.6757	1.2814	1.2640	1.7355	1.6254
Ongoing charges	0.9036	1.6636	0.5722	1.1455	0.9249	0.9150
surrender policy	0.0071	0.0057	0.0071	0.0057	0.0057	0.0071
exit charge	0.0027	0.0000	0.0027	0.0000	0.0029	0.0101
Exit charges	0.0098	0.0057	0.0098	0.0057	0.0086	0.0172
Coverage charge	0.0166	0.0166	0.0166	0.0166	0.0166	0.0166
Death bonus	0.0148	0.0095	0.0148	0.0096	0.0096	0.0096
Initial bonus	-0.0594	-0.0441	-0.0594	-0.0594	-0.0594	-0.0594
Other charges	-0.0445	-0.0346	-0.0445	-0.0497	-0.0497	-0.0497
differential	**0.7451**	**1.6087**	**0.4136**	**1.0552**	**0.7581**	**0.1409**
Constant	0.2667	0.2667	0.2667	0.2667	0.2667	0.2667
controls at minimum[1]	-0.1083	-0.1083	-0.1083	-0.1083	-0.1083	-0.1083
controls at maximum[2]	0.5653	0.5653	0.5653	0.5653	0.5653	0.5653
min differential	**0.9035**	**1.7671**	**0.5720**	**1.2136**	**0.9165**	**0.2993**
max differential	**1.5771**	**2.4407**	**1.2456**	**1.8872**	**1.5901**	**0.9729**

Note: (1) premium is at level 3, holding period at 1, age at 0. (2) premium is at level 1, holding period at 3 and age at 3.

Table A.7: Impact of *rebates* and switching costs on the simulated cost differential (second model)

Feature	Mean	ETF	Money Market	Equity	Rebates	5 switch
specification	(2)	(2)	(2)	(2)	(2)	(2)
Policy fee	0.0549	0.0703	0.0549	0.0549	0.0549	0.0549
Service entry fee	-0.0536	-0.0516	-0.0516	-0.0516	-0.0536	-0.2582
Loading costs	0.0215	0.0032	0.0205	0.0205	0.0215	0.0215
Entry charge funds	-0.1101	0.0000	-0.0347	-0.1125	-0.1101	-0.5214
Initial charge	-0.0873	0.0218	-0.0110	-0.0888	-0.0873	-0.7033
Ongoing policy OICR	0.9830	0.2322	0.1978	1.1382	0.9830	0.9830
Ongoing fund OICR	-1.6511	-0.2348	-0.3081	-1.9013	-1.6511	-1.6522
Annual management fee	1.6143	1.6771	1.2651	1.7370	1.2825	1.6268
Ongoing charges	0.9462	1.6744	1.1548	0.9740	0.6144	0.9576
surrender policy	0.0110	0.0088	0.0088	0.0088	0.0110	0.0110
exit charge	0.0042	0.0000	0.0000	0.0045	0.0042	0.0157
Exit charges	0.0151	0.0088	0.0088	0.0133	0.0151	0.0266
Coverage charge	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202
Death bonus	-0.0041	-0.0026	-0.0026	-0.0026	-0.0041	-0.0026
Initial bonus	-0.0563	-0.0418	-0.0563	-0.0563	-0.0563	-0.0563
Other charges	-0.0603	-0.0444	-0.0589	-0.0589	-0.0603	-0.0589
differential	**0.8137**	**1.6606**	**1.0936**	**0.8396**	**0.4819**	**0.2220**
Constant	0.2630	0.2630	0.2630	0.2630	0.2630	0.2630
Fixed effect with highest value	N/a	N/a	N/a	N/a	N/a	N/a
controls at minimum[1]	-0.2079	-0.2079	-0.2079	-0.2079	-0.2079	-0.2079
controls at maximum[2]	0.5737	0.5737	0.5737	0.5737	0.5737	0.5737
min differential	**0.8688**	**1.7157**	**1.1487**	**0.8947**	**0.5370**	**0.2771**
max differential	**1.6504**	**2.4973**	**1.9303**	**1.6763**	**1.3186**	**1.0587**

Note: (1) premium is at level 3, holding period at 1, age at 0. (2) premium is at level 1, holding period at 3 and age at 3.

Table A.8: Impact of *rebates* and switching costs on the simulated cost differential (third model)

Feature specification	Mean (3)	ETF (3)	Money Market (3)	Equity (3)	Rebates (3)	5 switch (3)
Policy fee	0.0115	0.0147	0.0115	0.0115	0.0115	0.0115
Service entry fee	-0.0305	-0.0305	-0.0305	-0.0305	-0.0305	-0.1526
Loading costs	0.0352	0.0055	0.0352	0.0352	0.0352	0.0352
Entry charge funds	-0.0911	0.0000	-0.0911	-0.0303	-0.0983	-0.4557
Initial charge	-0.0750	-0.0104	-0.0750	-0.0142	-0.0822	-0.5616
Ongoing policy OICR	0.9170	0.2166	0.9170	0.1845	1.0618	0.9170
Ongoing fund OICR	-1.5902	-0.2260	-1.5902	-0.2965	-1.8299	-1.5902
Annual management fee	1.3272	1.3682	1.0565	1.0321	1.4171	1.3272
Ongoing charges	0.6540	1.3588	0.3833	0.9201	0.6490	0.6540
surrender policy	0.0039	0.0031	0.0039	0.0031	0.0031	0.0039
exit charge	0.0014	0.0000	0.0014	0.0000	0.0016	0.0055
Exit charges	0.0053	0.0031	0.0053	0.0031	0.0047	0.0094
Coverage charge	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Death bonus	0.0250	0.0247	0.0250	0.0250	0.0250	0.0250
Initial bonus	0.0101	0.0075	0.0101	0.0101	0.0101	0.0101
Other charges	0.0351	0.0322	0.0351	0.0351	0.0351	0.0351
differential	**0.6194**	**1.3838**	**0.3487**	**0.9441**	**0.6067**	**0.1369**
Fixed effect with lowest value	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
Fixed effect with highest value	0.9759	0.9759	0.9759	0.9759	0.9759	0.9759
controls at minimum[1]	-0.0762	-0.0762	-0.0762	-0.0762	-0.0762	-0.0762
controls at maximum[2]	0.5962	0.5962	0.5962	0.5962	0.5962	0.5962
min differential	**0.5453**	**1.3097**	**0.2747**	**0.8700**	**0.5326**	**0.0646**
max differential	**1.2177**	**1.9821**	**0.9471**	**1.5424**	**1.2050**	**0.7370**

Note: (1) premium is at level 3, holding period at 1, age at 0. (2) premium is at level 1, holding period at 3 and age at 3.

Table A.9: Impact of *rebates* and switching costs on the simulated cost differential (fourth model)

Feature specification	Mean (4)	ETF (4)	Money Market (4)	Equity (4)	Rebates (4)	5 switch (4)
Policy fee	0.0413	0.0528	0.0413	0.0413	0.0413	0.0413
Service entry fee	-0.0279	-0.0268	-0.0279	-0.0268	-0.0268	-0.1342
Loading costs	0.0611	0.0091	0.0611	0.0582	0.0582	0.0611
Entry charge funds	-0.0912	0.0000	-0.0912	-0.0288	-0.0932	-0.4322
Initial charge	-0.0168	0.0350	-0.0168	0.0438	-0.0206	-0.4641
Ongoing policy OICR	0.9599	0.2267	0.9599	0.1931	1.1115	0.9599
Ongoing fund OICR	-1.5699	-0.2233	-1.5699	-0.2930	-1.8078	-1.5710
Annual management fee	1.2743	1.3239	1.0124	0.9987	1.3712	1.2842
Ongoing charges	0.6643	1.3274	0.4024	0.8989	0.6749	0.6731
surrender policy	0.0077	0.0061	0.0077	0.0061	0.0061	0.0077
exit charge	0.0029	0.0000	0.0029	0.0000	0.0032	0.0110
Exit charges	0.0106	0.0061	0.0106	0.0061	0.0093	0.0187
Coverage charge	0.0122	0.0122	0.0122	0.0122	0.0122	0.0122
Death bonus	0.0341	0.0219	0.0341	0.0221	0.0221	0.0221
Initial bonus	0.0119	0.0088	0.0119	0.0119	0.0119	0.0119
Other charges	0.0460	0.0307	0.0460	0.0340	0.0340	0.0340
differential	**0.7041**	**1.3992**	**0.4422**	**0.9828**	**0.6976**	**0.2617**
Constant[1]	-0.0774	-0.0774	-0.0774	-0.0774	-0.0774	-0.0774
Fixed effect with highest value	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
controls at minimum[1]	-0.1467	-0.1467	-0.1467	-0.1467	-0.1467	-0.1467
controls at maximum[2]	0.6444	0.6444	0.6444	0.6444	0.6444	0.6444
min differential	**0.4800**	**1.1751**	**0.2181**	**0.7587**	**0.4735**	**0.0376**
max differential	**1.2711**	**1.9662**	**1.0092**	**1.5498**	**1.2646**	**0.8287**

Note: (1) premium is at level 3, holding period at 1, age at 0. (2) premium is at level 1, holding period at 3 and age at 3.