STUDY ON COMPETITION POLICY IN THE PORTUGUESE INSURANCE SECTOR: ECONOMETRIC MEASUREMENT OF UNILATERAL EFFECTS IN THE CAIXA/BCP MERGER CASE

FINAL VERSION

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Note: This is a NON-CONFIDENTIAL version of the original Study. All the confidential information was replaced by the symbol '[CONFIDENTIAL]'. In these cases, additional information was sometimes added, in *italic* and within square brackets, to help the understanding of the text.

CONTENT

ACKNOWLEDGMENT

We thank Adriana Azevedo Hernandez Perez for her efficient and valuable assistantship.

SUMMARY

This study is aimed at providing a measure of unilateral effects of the proposed acquisition of BCP by CAIXA on the Portuguese Insurance Market by means of an econometric model. In other words, it provides a measure of the impact of this notified merger on the insurance price and the consumer surplus. The preservation of competition on insurance markets makes insurance premia closer to the actuarial values of the risk transfers, therefore improving the insurability of individual risks and their diversification through mutualisation. Insurability is favourable to economic growth by disentangling investment decisions from risk aversion. The aim of this work is to determine whether the planned merger could jeopardise those collective benefits.

The econometric model describing the functioning of the Portuguese non-life insurance markets is based on several facts which are drawn from a descriptive analysis. First, for most segments of the market, mainly those concerning the individual consumer, it is observed that market shares are correlated among different lines of insurance. Consequently, what really matters is the strategy of each insurance firm taken as whole. Second, with respect to potential antitrust concerns, what matters is the decision of Portuguese consumers to choose among insurers based on their average commercial offering; that insurers are applying second order price discrimination should affect the analysis marginally. Third, differentiation in this market is significant; in particular the risk level, as measured by the ratio of the number of claims to the number of policies, varies among insurance firms. Fourth, after having experienced a vague of mergers before 2000, the Portuguese insurance industry experiences a more stable situation.

The model is built to account for these facts. It leans on the recent literature on the econometrics of differentiated-products market. It comprises a logit model to represent the consumer choice and to explain market shares measured in terms of the number of policies, a pricing equation bearing on the average premium and describing the conduct of firms in a Bertrand-Nash competition, and a cost function that serves to obtain a measure of marginal costs from the observation of total claims and administrative costs. The model is estimated on an annual data set over the period 2000-2003 using the nonlinear three stages least squares

method implemented by means of a SAS procedure. The number of policies for each firm includes all insurance contracts on personal accidents and passengers, fire and other damage to property, motor vehicle liability and general liability, because these insurance segments represent 90 percent of the market and because data associated with these segments are reliable. Thirteen insurance groups are represented in the data set on the period of estimation. The model involves not more than 20 parameters.

The most noticeable results are the following. [CONFIDENTIAL] [*Several firms have a high level*] of attractiveness. It is believed that this results show the combined effect of reputation or aggressiveness of firms and/or loyalty of customers. Second, own price elasticities are high, with an overall level of 3.6%. Cross-price elasticities are also high, with an overall level of 0.3%. These numbers suggest that the market is competitive and that possibilities of substitution among firms are high. Third, when ranking marginal costs by increasing order, [CONFIDENTIAL] arrives the second, while [CONFIDENTIAL] is among the last firms together with [CONFIDENTIAL] and [CONFIDENTIAL]. Note that the estimated marginal costs double between the lowest and highest values. Fourth, the cost function exhibits increasing returns to scale. There is not much savings on cost due to an increase in the number of contracts administered by a single firm. Indeed the average cost is roughly flat as an increase of one percent in the number of policies (which corresponds to 7750 policies on average) only decreases average cost by 0.001 percent. However there is a non negligible network effect. Indeed a one percent change in the number of offices involves a 0.2 percent decrease in marginal cost.

The model serves as a tool to simulate the merger. If all customers of CAIXA and BCP stay with their insurers after the merger, then one predicts a very high price if competitors do not react. It is not a sustainable situation. One reasonably expects that some customers of CAIXA and BCP make a move or even definitively move to other insurance companies that might change their pricing strategy. Hence it is required to simulate the new Bertrand-Nash equilibrium after merger, as if all customers re-compute the optimal choice of insurance. It turns out the average premium of [CONFIDENTIAL]'s policies would increase by [CONFIDENTIAL]. Neither of these price rises is significantly different from zero.

These results favour an approval of the merger. However, in the very short run, the relatively high market share of the entity CAIXA/BCP raises legitimate concerns. Indeed, it

takes time before customers are able to adapt their decisions even if the transaction costs incurred when changing from an insurer to another are not high. In order to facilitate the convergence of the industry to a new equilibrium, several actions could be applied. First, transparency of the merger should be enforced. In particular CAIXA's and BCP's customers should be informed of the operation and the business model chosen by the stakeholders. Second, given that [CONFIDENTIAL] is cost-efficient, forcing [CONFIDENTIAL] to divest some of the [CONFIDENTIAL]'s offices in local areas, in particular where competitors are weakly represented, would involve costs, which would be compensated by the increased degree of potential competition. This type of remedies requires further investigation and additional data.

In the short run, this situation calls for an involvement of the regulator of this industry which is able to monitor and to enforce the transparency of the operation. In a longer term, the possibility of an investigation for abuse of dominant position if needed constitutes the Sword of Damocles above the merging entity.

1. OBJECTIVES

The study addresses four questions concerning

- the definition of relevant markets, in particular the segmentation proposed by Portuguese Competition Authority into
    - Employers' liability
    - Health
    - Personal accidents and passengers
    - Fire and other damage to property
    - Motor vehicle liability
    - Transport liability
    - General liability
    - Others
- the conduct on the Portuguese market of insurance,
- the measure of potential effects on prices due to the notified merger,
- the evaluation of cost efficiencies related to the notified merger, using data made available by the Portuguese Competition Authority.

To achieve these objectives, our report provides a descriptive analysis of the data that serves as a basis for the specification of a structural model of the Portuguese Insurance Market. This model is used to simulate the effects of the notified merger and, in particular to provide a measure of unilateral effects.

2. DESCRIPTIVE ANALYSIS

Annual panel data are available for the period 1990-2003. They concern all insurance companies present on the market and all segments of the market as listed above. For each year, each firm, each segment, data bear on the following variables: total amount of claims, administrative costs, total amount of premia, and number of policies. The number of missing data is relatively small. In addition for some segments (employers' liability, fire and other

damage to property, motor vehicle liability, and general liability) the number of accidents is available.[1]

A descriptive analysis allows us to exhibit five important facts that are useful to understand the working of the insurance market.

2.1. Correlation among insurance segments and their relative weights

Graphs 1-6 display the market shares of the main Portuguese Insurance groups computed in terms of number of policies for the whole market and for different segments of market over the period 2000-2003. The merger clearly concerns the first two groups representing each [CONFIDENTIAL] more than 20 percent of the whole market. It would provide to the combined entity a much larger market share than the other groups present on the market [CONFIDENTIAL]. Note that the market share of the combined entity is drawn in all graphs under the category "[CONFIDENTIAL]".[2] By comparing Graphs 1 and 2, note also that the segment of transport insurance has almost no effect on the market shares on the overall position of groups.

These graphs mainly show that the market shares of each group in the different segments are similar. We do not observe a group having a strong position in one segment and having no activity in another segment. Even the ranking among groups is identical from one segment to another. There is clearly a strong correlation between the market shares in each segment and the overall market shares. It is confirmed by Graph 7, where the market shares of groups in the fire and motor insurance segments are displayed together with their overall market shares.

Finally, Graph 8 shows that the shares of different insurance market segments are stable over time and four segments – Personal and Passenger, Fire, Motor, General Liability – together represent almost 80 percent of the total number of policies. Given that the demand of

[1] [CONFIDENTIAL] To be more precise, the relevant company data obtained from the Portuguese Competition Authority covers most of the 1990-2003 period. It includes information on the number of offices and on each of the eight market segments - Health, Personal Accidents and Passengers, Employers' liability, Fire and other damage to property, Motor vehicle liability, Transport liability, General liability and Others (Creditor/loan, consequential loss and domestic mortgage indemnity) - for premium, claims incurred, administrative and acquisition costs in thousand euros and number of policies. The number of claims is available only for Employer's liability, Fire, Motor and General liability. The GDP series is in billions of euros.

[2] In all graphs, health insurances have been excluded because of the unreliability of data concerning this segment.

insurance by business customers is more complex to estimate, letting aside the other segments – in particular Employer's liability – should not involve a large distortion in the statistical results. For this reason, the econometric model below bears on the total number of policies for these four types of insurance. This solution avoids treating the question of policies for business groups. The analysis will therefore be made as if insurers offer an "umbrella policy" covering these four insurance lines at the same time. The economic theory of insurance provides some arguments for why providing this bundling of contracts is optimal for policyholders. Without asymmetric information, an umbrella policy is an optimal risk-sharing arrangement (See Arrow, 1971, Gollier and Schlesinger, 1995.). Under asymmetric information, bundling risks can alleviate the adverse selection problem when the various individual risks are correlated.

2.2. Correlation between number of policies and amount of premia

A standard problem in the measurement of market shares in insurance is related to the definition of the unit of service. Two methods can be used that are based respectively on the number of policies sold, or on the aggregate premium. None of them is completely satisfactory. However, Graph 9 shows that there is a strong correlation of market shares of insurance groups whether they are computed with respect to the number of policies or with respect to the total amounts of premia collected. Graph 10 also shows that the distribution among segments is not modified when this distribution is based on the amounts of premia instead of the numbers of policies as in Graph 8.

Together with the facts described in paragraph 2.1, it appears clearly that, what really matters is the strategy of each insurance firm taken as a whole. With respect to potential antitrust concerns, what matters is the decision of Portuguese consumers to choose among insurers based on their global commercial offering, averaged across the different lines of insurance; that insurers are applying second order price discrimination should not affect the analysis. In other words, what matters is the decision to enter in a relationship with an insurer based on the average price of its bundle of insurance contracts, i.e., the premium of its virtual "umbrella policy".

2.3. Average prices are not rising and margins are fair

Graph 11 exhibits the temporal pattern of average premia for some insurance groups and for the insurance industry as a whole. [CONFIDENTIAL] That the industry average premium has a slight negative trend on this period could be interpreted as a sign of competition in the industry. Note finally that the temporal pattern of the average premium for each firm is relatively unstable, which is also a sign of a very active market.

A change in the aggregate premium collected can originate from a reduction of the insured risks rather than from more effective competition between insurers.[3] Therefore, it is better to examine commercial margins. Graph 12 depicts the temporal pattern of average commercial margins for the same insurance groups and for the industry. The commercial margin is computed as the ratio of total premia to total costs, i.e., the sum of total claims, administrative and acquisition costs. Note that [CONFIDENTIAL] is about to break even, in the sense that its average premium paid by its customers just covers the cost of their accidents. This ratio is an indicator of profitability of the sector. This profitability does take into account two important components of the balance sheet of insurance companies. First, selling insurance generates administrative and acquisition costs (including selection costs, monitoring costs and auditing costs) that are usually estimated to equal between 20% and 30% of the insurance premium in the non-life sector. Second, because of the inversion of the production cycle in this sector, insurers can invest insurance premia on financial markets before paying indemnities to policyholders who incurred a loss. This activity yields a return that must be taken into account to measure the overall efficiency of insurance companies. In the absence of information about the return of the financial reserves of the various insurance companies, it is not easy to infer whether the evolution of the technical results observed on Graph 12 comes from increased competition or from other factors, as changes on anticipated returns of insurance reserves.

This ratio is also a good indicator of the insurability of risks in the economy. When it is close to unity, insurance premia are actuarially fair. This induces risk-averse households to purchase full insurance. This complete transfer of individual risks to insurers is efficient from the viewpoint of risk diversification. Insurance companies and mutuals wash away

[3] These forces – competition strength and level of risks insured – fuel the so-called “underwriting cycle” in the insurance market.

uncorrelated individual risks either by mutualisation or by the transfer to financial markets. A loss ratio around unity is also useful for the growth of the economy, because the efficient risk transfer that it yields allows for disentangling investment decisions from risk aversion, both at the individual level and at the level of firms. Graph 12 reveals that this objective is fulfilled by Portuguese insurance markets.

2.4. Insurance firms are differentiated in terms of risk level

What we observe on prices indicates that firms attempt to diversify their commercial strategies. There is an objective reason for this behavior. On Graph 13, it is noticeable that the firms are differentiated in terms of their average risk level, measured by the frequency of accidents, as measured itself by the ratio of the number of claims divided by the number of policies. [CONFIDENTIAL]. It is fair to say that the reason for the relatively low risk level [*for some firms*] should be related to the combined effects of their seniority and their large presence on the Portuguese insurance market.

2.5. The structure of the Portuguese insurance sector is stable since 2000

Finally Table 1a shows that, after having experienced a wave of mergers and consolidation before and during 1999, the industry remains relatively stable both in terms of average market share and number of active firms. The stability of the industry structure since 2000 invites us to fit the model only on the data covering the period 2000 – 2003.

Table 1b allows for a comparison of the structure of the Portuguese insurance sector to the insurance sectors of other European countries. The combined market share of the first 5 non-life insurance companies in Portugal had 70% of the market in 2002, up from 54.7% in 1992. The proposed merger would have no immediate effect on this measure of market concentration. However, based on this concentration index, it should be noticed that the Portuguese non-life market is more concentrated than in other national insurance sectors in Europe.

3. EMPIRICAL ANALYSIS

An econometric model of the Portuguese insurance market is specified and estimated on the basis of available data and facts just derived in the preceding section. This model is a particular case of a wider class of models that are used in econometrics of differentiated products market to evaluate the impact of mergers.

3.1. *Specification of the econometric model*

The model comprises three main ingredients: a demand model to describe the choice of insurance by individual consumers, a cost model to approximate how claims are affected by the activity level of firms, and a pricing behavior that describes the conduct of firms in a Bertrand-Nash competition.

3.1.1. Demand

The theory of insurance demand has been developed by Mossin (1968). Its main results is that full insurance is optimal only if insurance premia are actuarially fair. Because insurers must cover their administrative costs, insurance premia entail a positive loading factor. This induces households to optimally retain some of their risks. This can be done either by some coinsurance clauses (deductibles, caps on indemnities, …), or by leaving some of their risks uninsured. Under some weak assumptions on preferences, the insurance demand is decreasing in the premium rate, i.e., in the insurance price. Moreover, the demand for insurance is decreasing with wealth. Because of the cost incurred by switching insurer, it may be optimal for policyholders to stay with an inefficient insurer, as long as the inefficiency index does not exceed some small threshold. These switching costs may have a positive effect on the efficiency of insurance markets. Indeed, they imply some degree of loyalty of the policyholders to their insurer, which is beneficial for long-term risk-sharing. These switching costs imply also that the demand addressed to each individual company is not completely elastic, and that competition is imperfect. An important goal of this study is to examine these cross-price elasticities of insurance demand.

These ingredients are introduced in our econometric model in the following way. The preference structure of a representative Portuguese consumer is represented by means of a logit model. (See Werden, Froeb and Tardiff, 1996, or Motta, 2004.) Here the consumer chooses between I different insurance groups. There is an additional choice, called the *outside*

option, which is referred by index 0 in the sequel. This choice consists in buying insurance from a set of very small firms representing less than 3 percent of the market all together or in buying no insurance at all. So there are *I+1* choices (See Figure 1.). Each choice, indexed by *i*, is described by a utility index which itself depends on three components: the price, p_i, a quality index, δ_i, and a random term u_i. First, the price is measured by the average premium. The sensitivity of the quality index to prices is driven by a parameter, that we call the *marginal utility of income*, denoted by α. This parameter is supposed to be function of gross domestic product (GDP) to account for the increase in wealth from one year to the other. Second, the quality index depends on a set of factors, x_i, namely: the accessibility to the insurer (measured by the number of offices[4]), the reputation of this insurer (measured by its risk level observed by the consumer one period in advance) and by a fixed effect which, among many possible effects, measures the loyalty of consumers to their insurer. Third, the random component combines all variables that are not observable by the analyst and play a role in the consumer choices.

In this context, the choice probabilities are measured in terms of market shares. Indeed the market share of a product is the observed value of the probability that a representative consumer chooses this particular product. The market share of the insurance firm *i*, s_i is obtained as the ratio of the number of policies held by the insurance firm *i*, namely y_i, over the market size, *Y*, that is to say:

$$s_i = \frac{y_i}{Y} = \frac{y_i}{\sum_{i=0}^{I} y_i} . \qquad (1)$$

The number of policies associated with the outside alternative, y_0, is approximated by the number of policies hold by the set of small firms. It can be enlarged arbitrarily if one believes that the market size is larger and should take into account all potential customers having no coverage.

Mathematically, by using the logit model, one can write the logarithm of the market share s_i for insurance firm *i* as:

[4] The number of offices is not necessarily the best proxy for accessibility. The number of agents or brokers was not available for all insurance companies on a systematic basis.

$$\ln(s_i) - \ln(s_0) = \delta_i - \alpha p_i + u_i, \quad (2)$$

where s_0 is the market share of the outside alternative. Moreover, we specify that

$$\alpha = \alpha_0 + \alpha_1 GDP, \quad (3)$$

and

$$\delta_i = \beta x_i, \quad (4)$$

where α_0, α_1 and the βs are parameters to be estimated. For the sake of completeness, we apply the usual normalization that the mean utility of the outside alternative, $i = 0$, is zero.

3.1.2. Cost

The insurance activity entails many sources of costs linked to the fight of adverse selection and moral hazard. Because individual risks are heterogeneous, it is essential for insurers to establish an efficient marketing mechanism to select the individual risks that they will accept to insure. The complexity of evaluating these risks on the basis of their observable characteristics may explain the large acquisition costs in the non-life insurance sector. Different companies have developed different marketing strategies, either with independent brokers, with local branches or offices, with *bancassurance*, or using new information technologies (internet, call centers). In addition to these acquisition and selection costs, the existence of an ex-ante moral hazard problem in insurance requires that insurers monitor the efforts of the policyholders to prevent risks to occur, generating monitoring costs (See Arrow, 1971.). Finally, because insured losses may be difficult to observe, there is an ex-post moral hazard problem (insurance fraud). This implies that insurers must invest in sophisticated technologies to audit claims. Selection costs, monitoring costs and auditing costs are estimated to be as large as 20 to 30 percent of the insurance premium paid by the policyholder.

In this type of model, it is usual to assume constant marginal costs, i.e., the cost of selling one more policy is assumed to be independent of the size of the company. Here we propose to approximate marginal costs by means of a cost function. First, the assumption of constant marginal costs is unrealistic given what we just explain. Second this assumption

involves the estimation of one parameter – the marginal cost – for each firm. This is not ideal when the number of degrees of freedom remains limited as here. Third, estimating a cost function allows us to internalize the question of potential efficiency gains due to a merger within the equilibrium model of the industry.

We assume that, over the estimation period (2000-2003), most input factors are fixed and are function of the number of offices that corresponds to the size of the network of the insurance company. If C_i is the total cost of insurance firm *i* as measured by the sum of total claims and administration costs, if k_i is the number of offices held by this firm, then we assume that

$$C_i = \gamma_0 + \gamma_1 y_i + \gamma_2 y_i k_i + w_i , \tag{5}$$

where w_i is a random term representing measurement errors and γ_0, γ_1, and γ_2 are parameters to be estimated. This simple linear model for the cost provides an excellent fit and permits to approximate the marginal cost, c_i, as

$$c_i = \gamma_1 + \gamma_2 k_i + \omega_i , \tag{6}$$

where ω_i is a random term representing unobserved shocks to marginal costs.

3.1.3. Pricing

Firms adopt a Nash behavior: They choose the prices of their products to maximize profits, given the prices set by the other firms. In maximizing its profit π_i defined as

$$\pi_i = p_i y_i - C_i , \tag{7}$$

each firm trades off two effects when considering an increase in price by one unit: (i) it increases profits proportional to the current sales level of the firm, (ii) it reduces sales, which lowers profits proportional to the current markup. When the demand is specified as above, this trade-off is summarized by the pricing equation:

$$\frac{p_i - c_i}{p_i} = \frac{1}{\alpha p_i (1 - s_i)}. \quad (8)$$

This equation states that the price-cost margin (i.e., the Lerner index) of firm *i* must be set to the willingness-to-pay of consumers, i.e., to inverse of the own price elasticity that is here equal to $\alpha p_i (1 - s_i)$.

Equations (2)-(5)-(8) constitute the econometric model to be estimated.

3.2. Estimation

The model, which contains 20 parameters, is estimated by means of nonlinear three-stage least squares implemented with the procedure MODEL of the SAS software. It is fitted on a data set covering the period 2000-2003 for reasons explained in paragraph 2.5. As we use the risk level lagged once in the list of exogenous variables, we use the year 1999 for defining the initial conditions. The procedure requires the use of instrumental variables. The set of instruments we have selected contains all exogenous variables as well as the market share and the price lagged once.

Estimation results are gathered in Table 2. Most parameters are significant. The relatively high level of the first-stage coefficient of determination for the parameters of interest α_0 and α_1 indicates that they are relatively well identified by our set of instruments. Note that the effect of the number of offices is not significant on the quality index but it is strongly significant on the marginal cost. That the estimate for the parameter associated with the lagged risk level and the estimated value for the marginal utility of income (parameter α) have the expected sign should be viewed as the signal of an economically meaningful model.

3.3. Discussion

Table 3a gathers estimates for different characteristics of insurance firms. First the own and cross price elasticities are relatively high. These numbers suggest that the market is competitive and that insurance firms are perceived as substitutes by their customers. Second, the cost function of insurance firms exhibits increasing returns to scale. However the average cost function is much flatter than the marginal cost function. Note that the estimated marginal

costs range from 0.11 to 0.23, that is to say, almost double among firms, while the range of average costs spread over the interval between 0.16 and 0.26. A one percent increase in the number of policies (which corresponds to 7750 policies on average) decreases the average cost by only 0.001 percent. However a one percent increase in the number of offices involves a 0.2 percent change in the marginal cost. This result shows that, although economies of scale are not negligible, economies of density due to a network effect are much wider.

Table 3a also shows that [CONFIDENTIAL] has the second lowest marginal costs among insurance companies and both [CONFIDENTIAL] and [CONFIDENTIAL] have relatively high quality index, indicating a high level of loyalty and trust of their customers.

Table 3b compares the estimated markups of some firms to their ratios of premia to claims. These ratios could be considered as accounting markups. Note that the econometric model underestimates the markups, although the differences are relatively small for the largest companies.

4. MERGER ANALYSIS

The model serves as a tool to simulate the notified merger between CAIXA and BCP. If all customers of CAIXA and BCP stay with their insurers after the merger, then one can predict a very high price if competitors do not react. It is not a sustainable situation. One reasonably expects that some customers of CAIXA and BCP make a move or even definitively move to other insurance companies that might change their pricing strategy following the merger. Hence it is required to simulate the new Bertrand-Nash equilibrium after merger, as if all customers re-compute their optimal choice of insurance. It turns out the average premium of [CONFIDENTIAL]'s policies would increase by [CONFIDENTIAL]. Table 4a provides the results of the simulated equilibrium after merger. Using a bootstrap method, we show that neither of these price rises is significantly different from zero because the bootstrapped confidence interval always contains zero.

This simulation assumes efficiency gains in the sense that CAIXA is acquiring all offices of BCP and maintains its marginal cost. If not, as if there were no merger specific efficiency gains, the price increases are much higher but the new entity cannot hold its market

share (See Table 4b.). If our estimates of the cost function are correct, this case should be discarded because it corresponds to a case of efficiency offence.[5]

Consider again the results with efficiency gains in Table 4a. Note that each firm increases its price after merger by a non negligible percent. It is the sign that, at the present time, the Portuguese insurance industry is far from the equilibrium. One should expect more consolidations and/or more adjustment in terms of pricing and marketing strategies. Meanwhile the relatively high market share of the entity CAIXA/BCP raises legitimate concerns. Indeed, it takes time before customers are able to adapt their decisions even if the transaction costs incurred when changing from an insurer to another are not so high. In order to facilitate the convergence of the industry to a new equilibrium, several actions could be applied. First, transparency of the merger should be enforced. In particular CAIXA's and BCP's customers should be informed of the operation and the business model chosen by the stakeholders. Second, given that [CONFIDENTIAL] is cost-efficient, forcing [CONFIDENTIAL] to sale some of the [CONFIDENTIAL]'s offices in local areas, in particular where competitors are weakly represented, would involve costs which would be compensated by the increased degree of potential competition. This type of remedies requires further investigation and additional data.

In the short run, this situation calls for an involvement of the regulator of this industry which is able to monitor and to enforce the transparency of the operation. In a longer term, the possibility of an investigation for abuse of dominant position if needed constitutes the Sword of Damocles above the merging entity.

[5] In other words, we do not include merger specific efficiency gains. The efficiency gains are just the normal gains due to the cost structure we have estimated for this industry.

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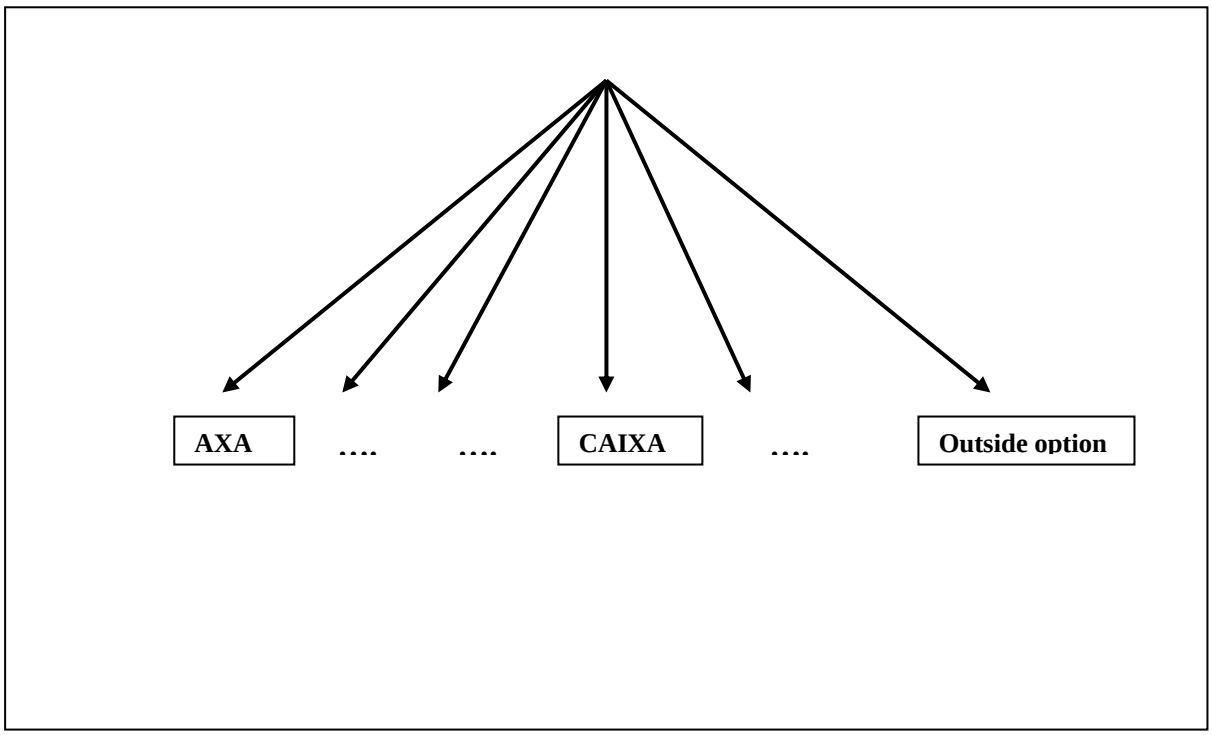
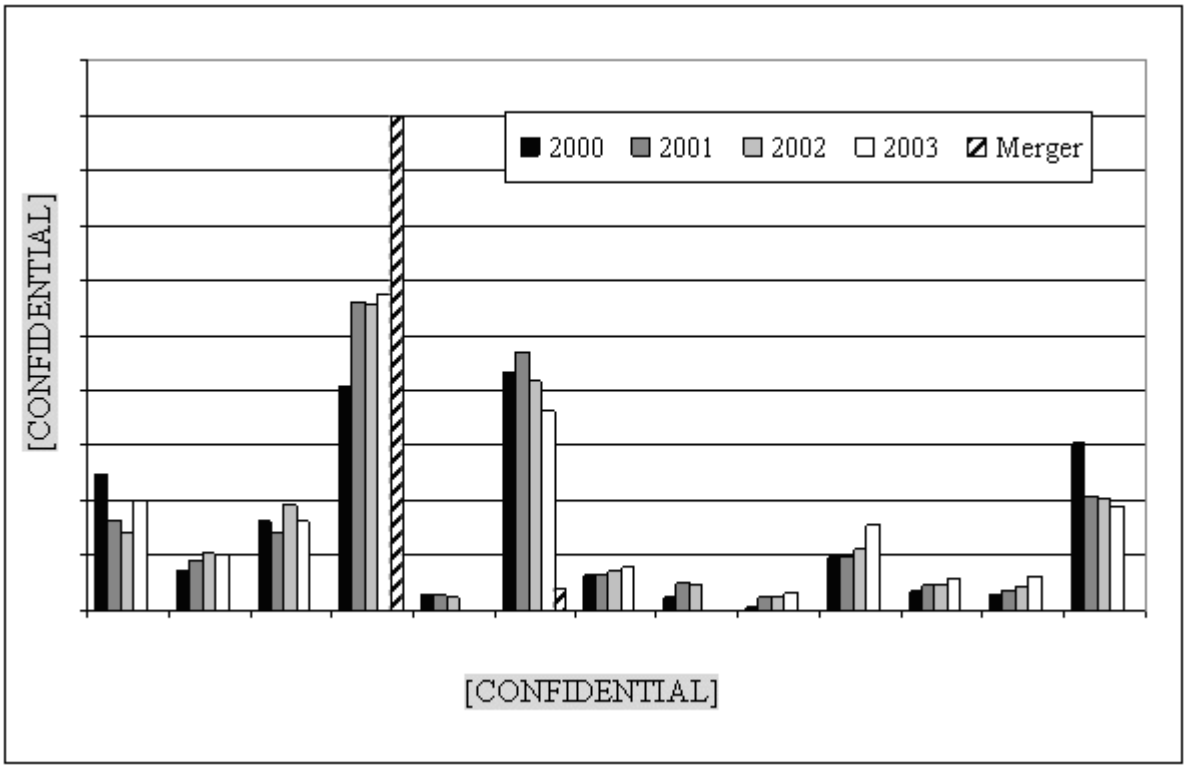
FIGURE

Figure 1: Consumer choice

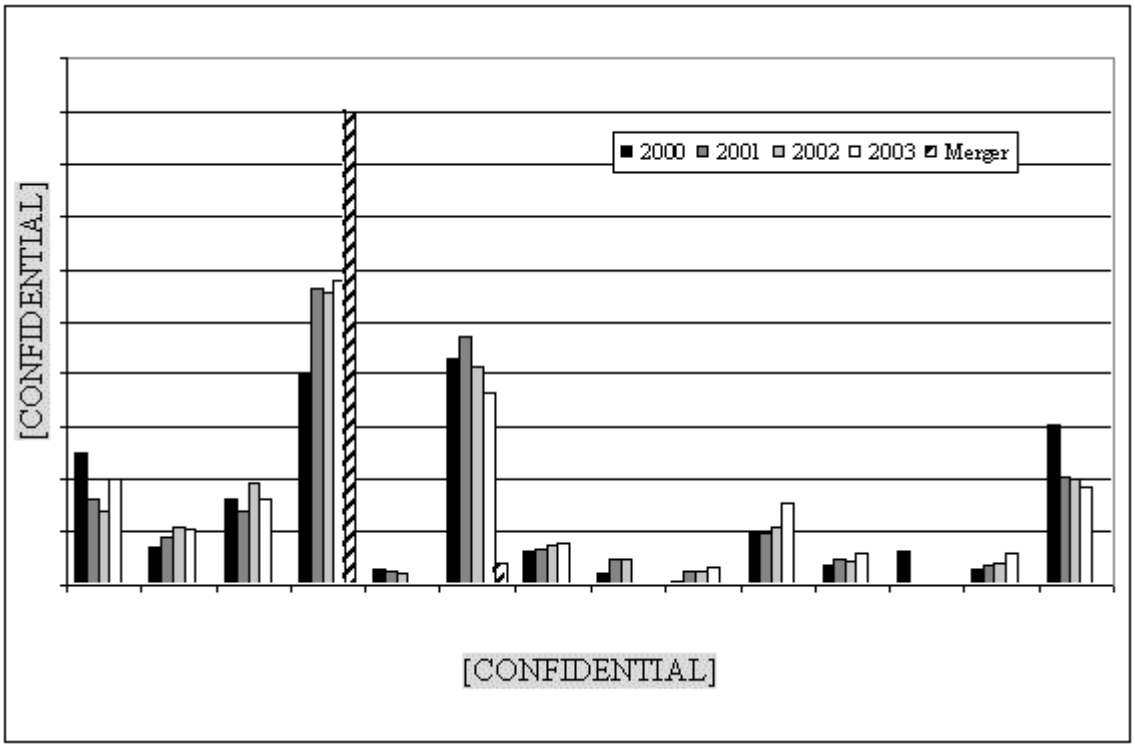


GRAPHS

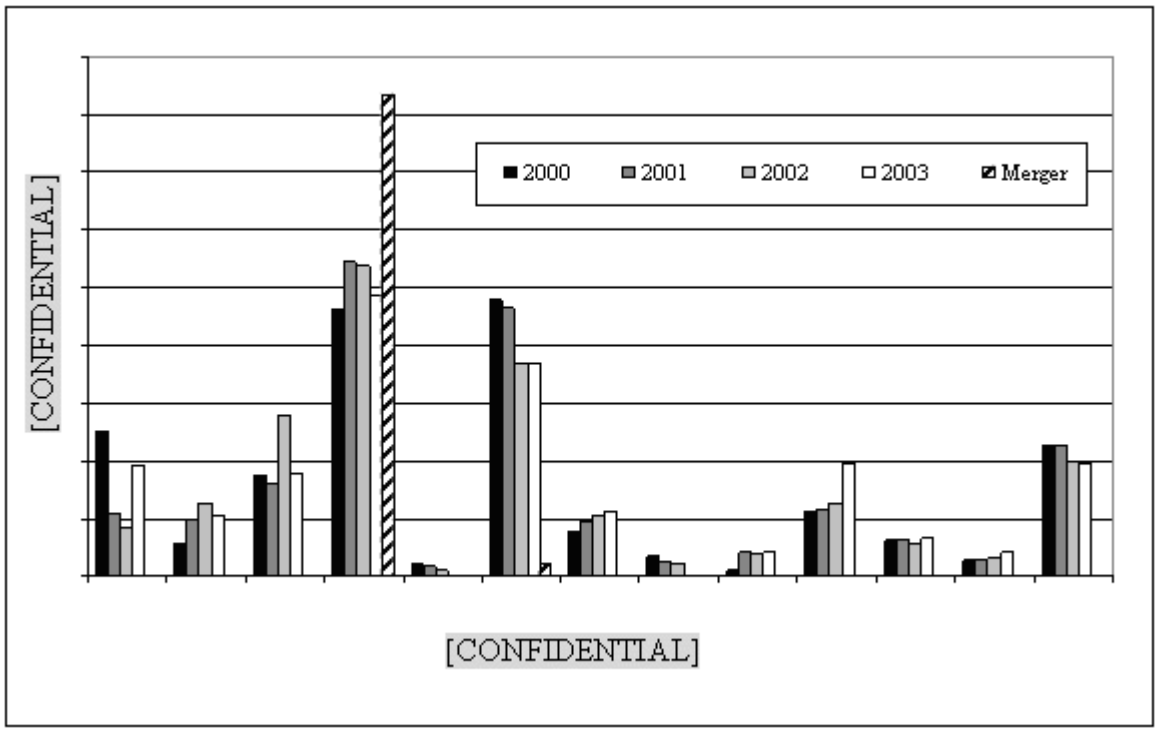
Graph 1: Market Shares of Non-life Insurance Groups (Health excluded)



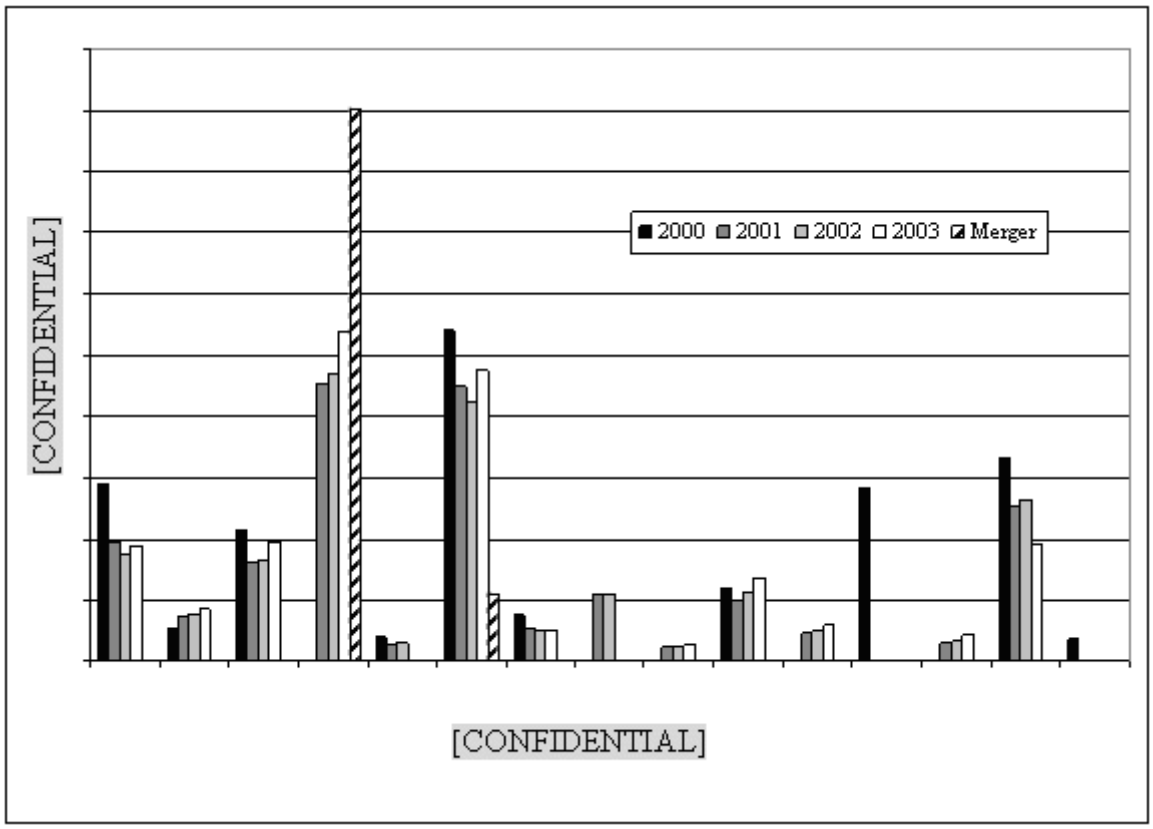
Graph 2: Market Shares of Non-life Insurance Groups (Transport and Health excluded)



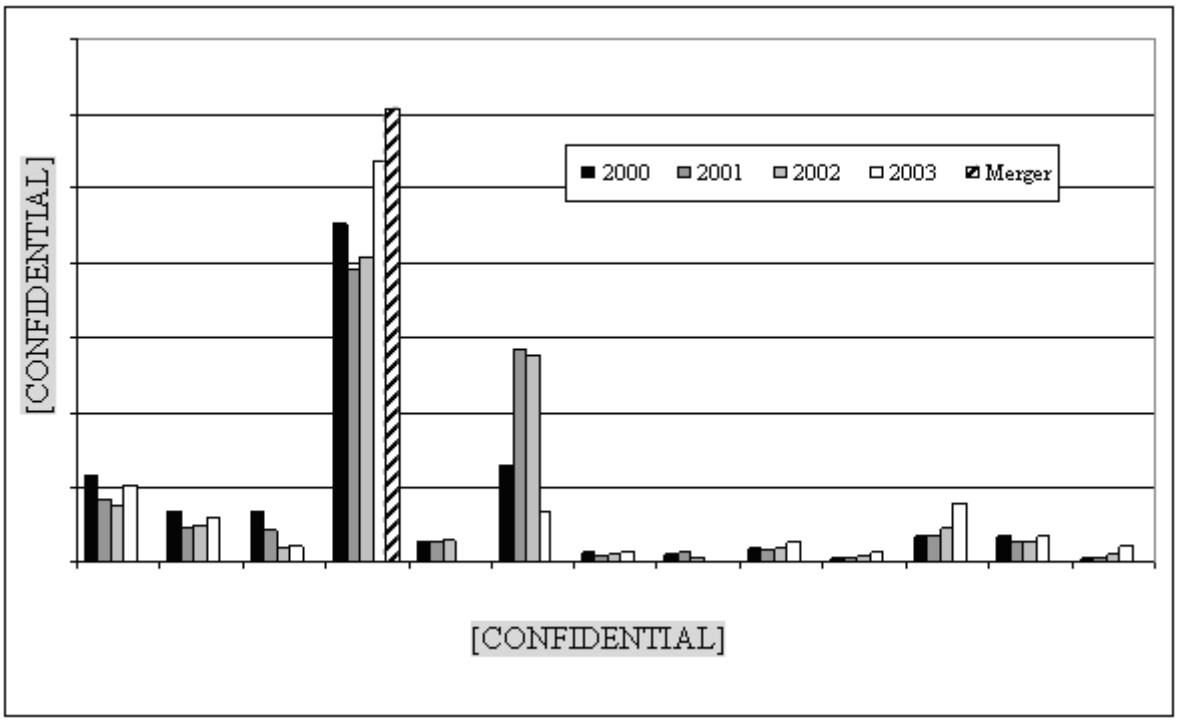
Graph 3: Market Shares in the Motor Insurance Segment



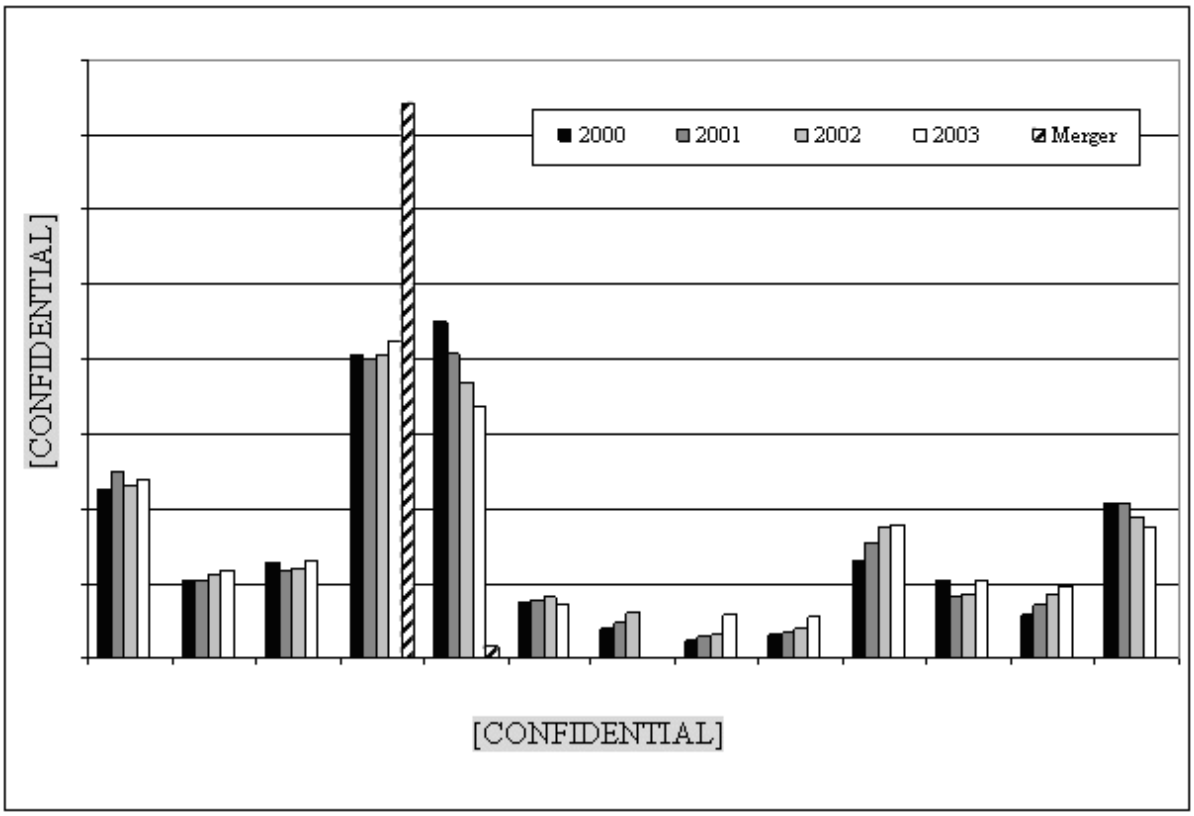
Graph 4: Market Shares in the Fire Insurance Segment



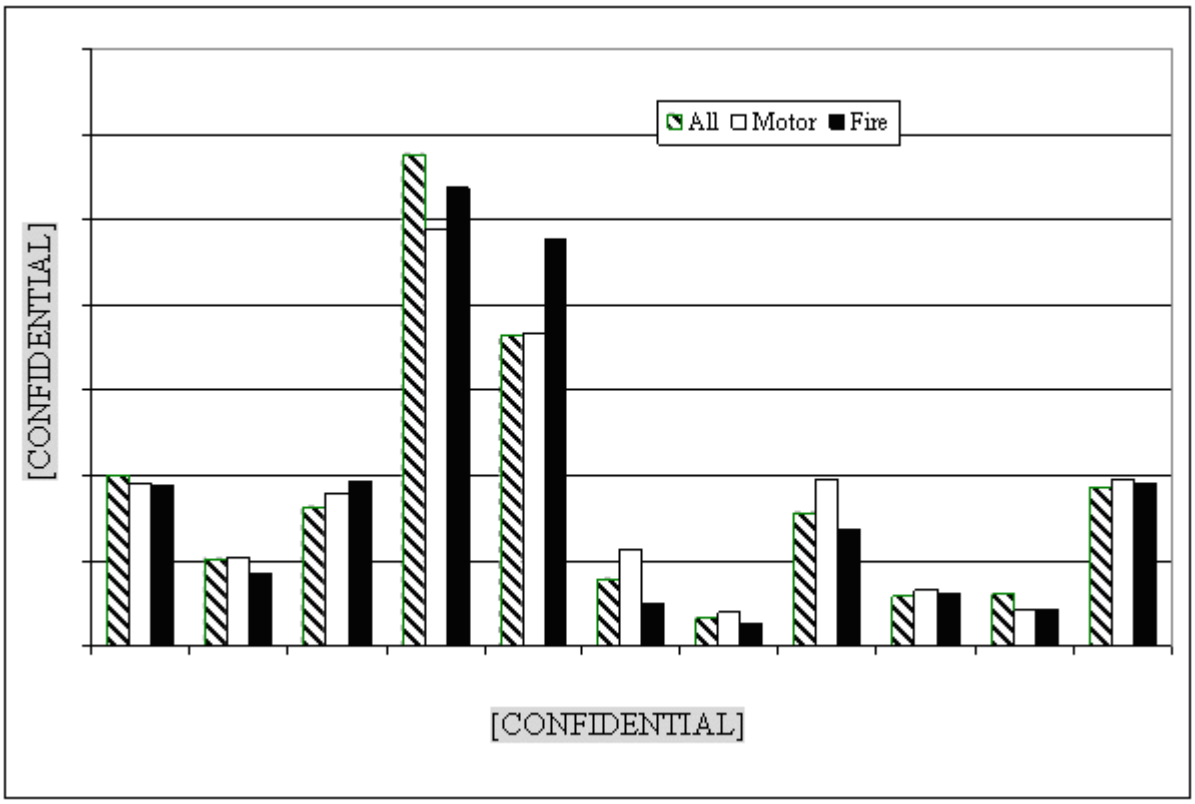
Graph 5: Market Shares in the Personal and Passenger Insurance Segment



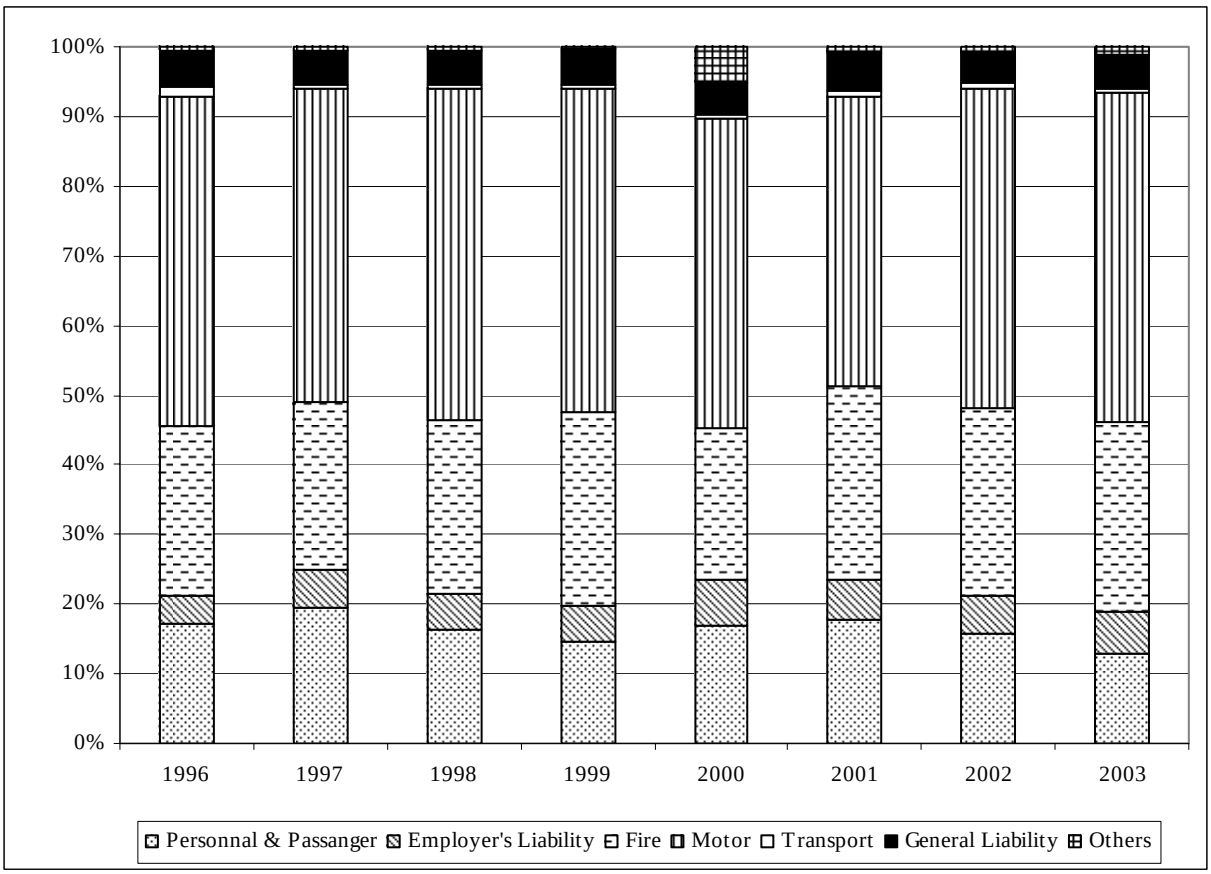
Graph 6: Market Shares in the Employer's Liability Insurance Segment



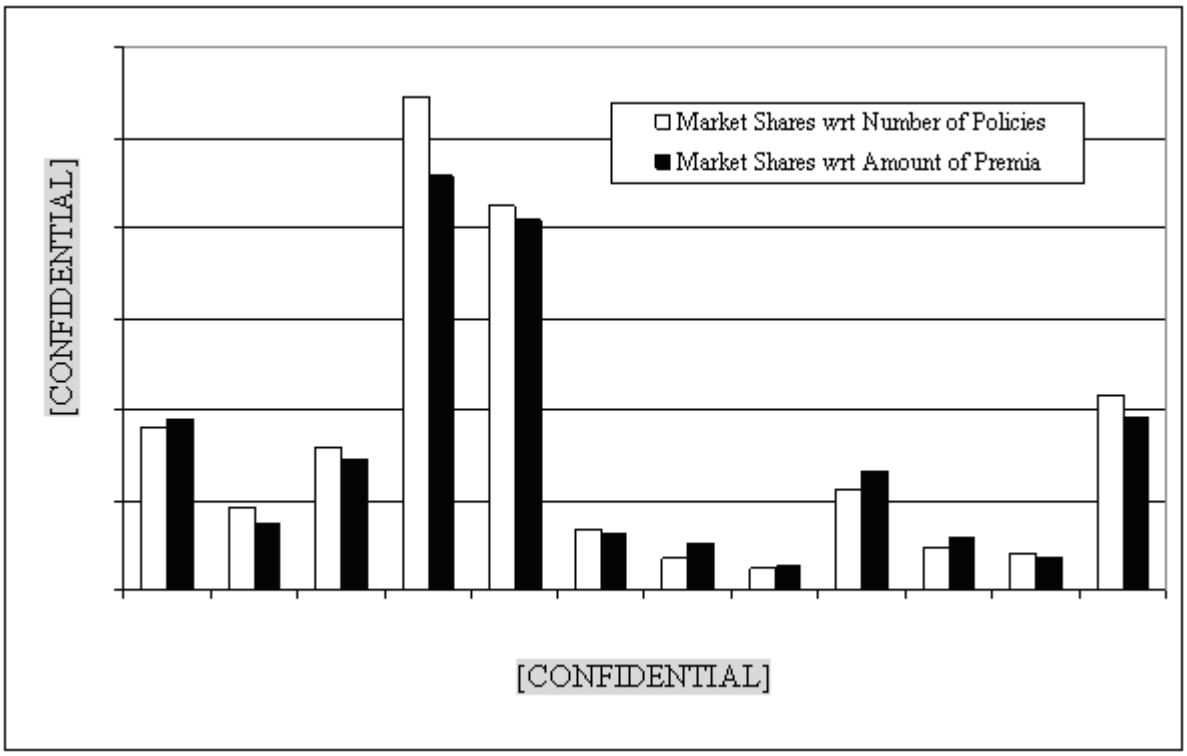
Graph 7: Market Shares: Motor and Fire Insurance Segments vs Overall Insurance Market



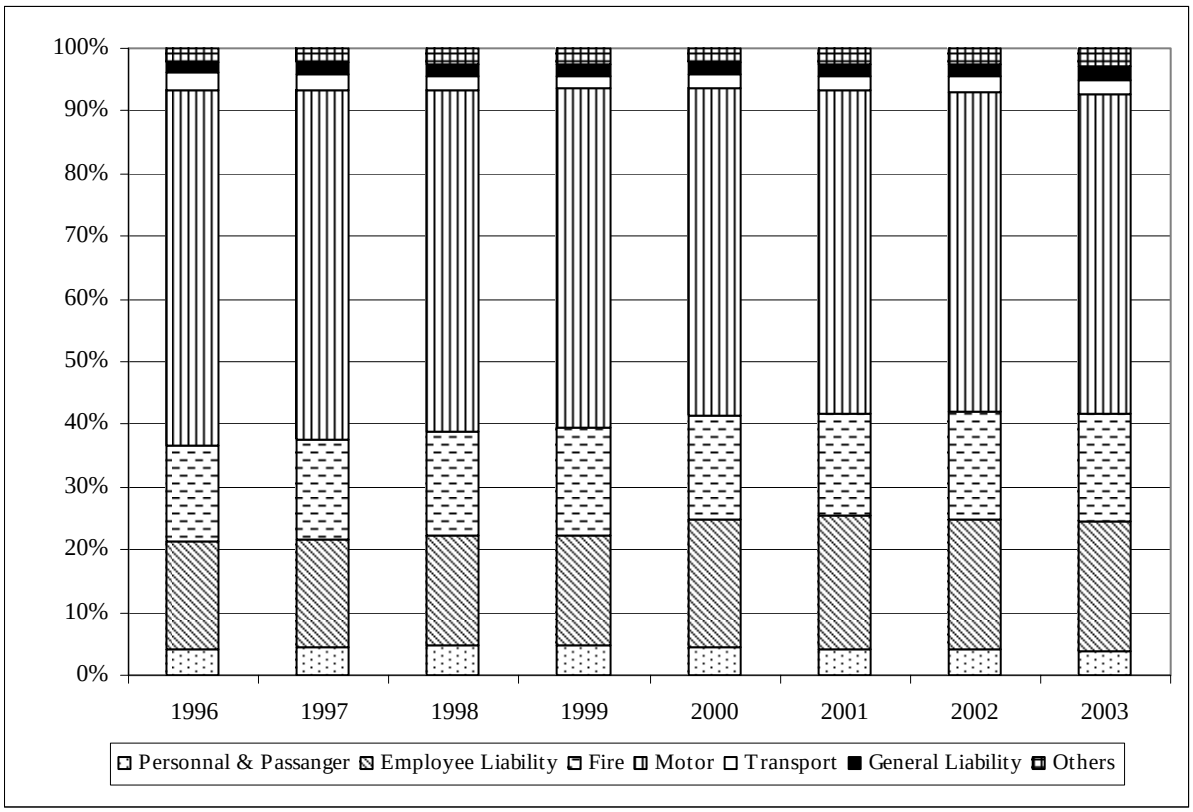
Graph 8: Distribution of Insurance Segments (wrt number of policies)



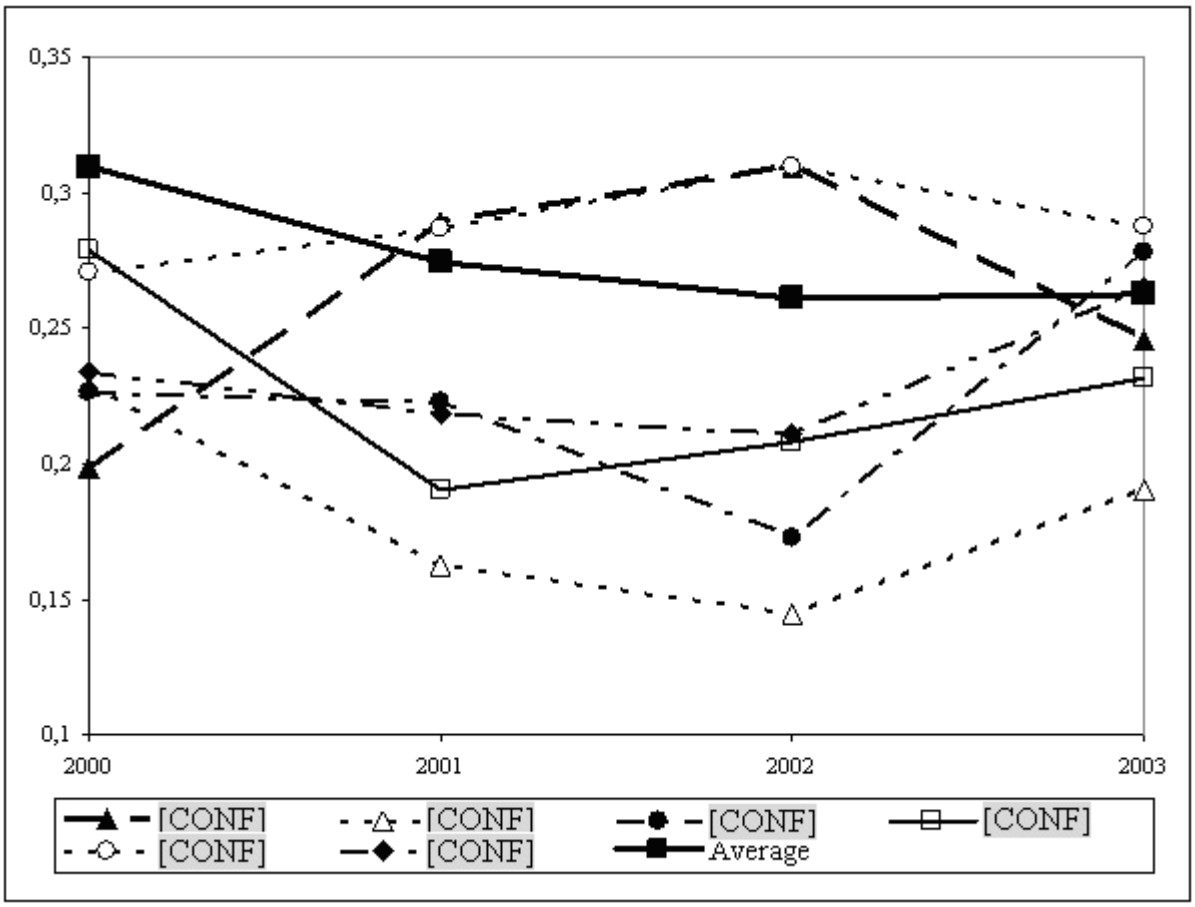
Graph 9: Market Shares in terms of number policies versus total amount of premia



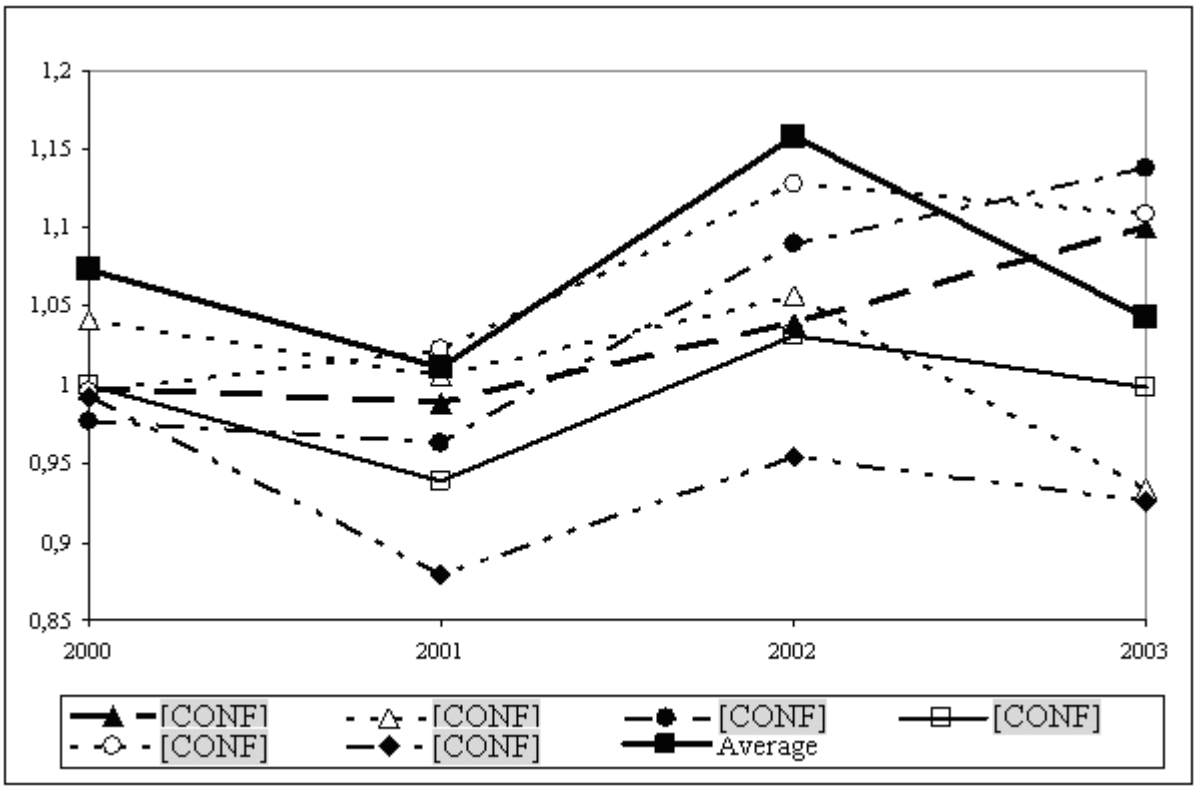
Graph 10: Distribution of Insurance Segments (wrt amount of premia)



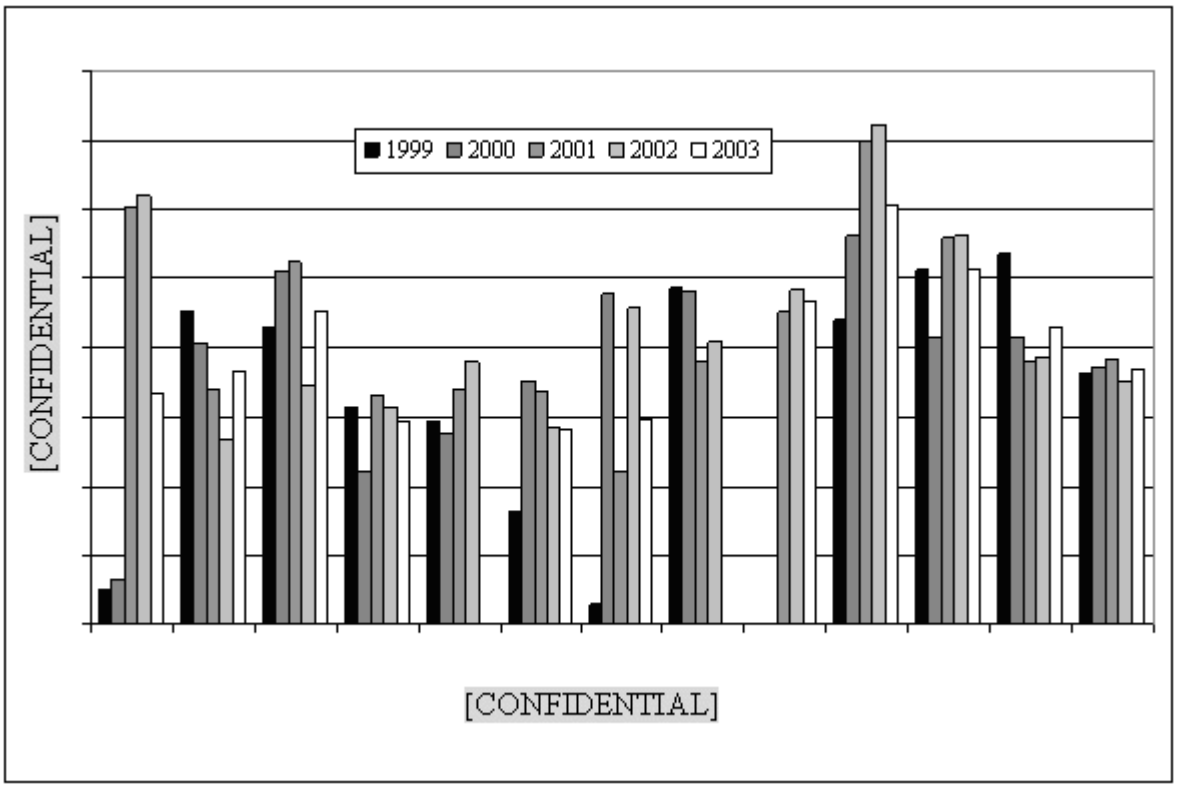
Graph 11: Average Insurance Premium (Personal, Motor, Fire, General Liability)



Graph 12: Average Commercial Margin (Personal, Motor, Fire, General Liability)



Graph 13: Annual Claim Frequency per Firm



TABLES

Table 1a: Statistics on the industry structure

	All firms			Firms having a market share higher than 1%	
	Maximum	Mean	# firms	Mean	# firms
1996	15%	4%	27	4%	15
1997	16%	4%	25	4%	16
1998	14%	4%	28	4%	16
1999	15%	4%	27	4%	16
2000	26%	5%	22	5%	12
2001	28%	5%	21	5%	13
2002	27%	5%	20	5%	14
2003	28%	6%	18	6%	12

Table 1b: Non-life insurance market concentrations in the European Community

Euro million

(Source CEA)	Non-life premium on national market		First 5			First 10			First 15		
Country	1992	2002	1992	2002	Change	1992	2002	Change	1992	2002	Change
AT Austria	5,171	6,999	54.5%	55.1%	0.6%	75.3%	77.0%	1.7%	86.3%	87.5%	1.2%
BE Belgium	5,785	7,875	34.9%	59.1%	24.2%	46.1%	77.7%	31.6%	56.1%	88.3%	32.2%
CH Switzerland	7,043	12,657	61.0%	56.3%	-4.7%	79.4%	78.1%	-1.3%	88.9%	86.6%	-2.3%
CY Cyprus	89	226	34.5%	45.7%	11.2%	52.9%	66.6%	13.7%	68.7%	72.6%	3.9%
CZ Czech Republic	441	1,799	100.0%	80.4%	-19.6%		92.1%			95.3%	
DE Germany	52,484	76,282	23.5%	28.3%	4.8%	36.2%	38.3%	2.1%	46.4%	47.8%	1.4%
DK Denmark	2,843	4,935	60.3%	68.5%	8.2%	77.5%	86.6%	9.1%	84.8%	94.3%	9.5%
EE Estonia		110		91.6%			100.0%				
ES Spain	12,167	21,596	13.8%	37.1%	23.3%	29.3%	54.0%	24.7%	38.6%	66.5%	27.9%
FI Finland	1,729	2,567	82.7%	91.5%	8.8%	93.2%	98.2%	5.0%	98.9%	99.8%	0.9%
FR France	30,749	46,502	40.7%	55.5%	14.8%	59.5%	73.5%	14.0%	73.2%	84.4%	11.2%
GB United Kingdom	36,230	70,164	28.6%	49.9%	21.3%	43.0%	69.0%	26.0%	50.6%	77.0%	26.4%
GR Greece	544	1,585	39.3%	45.9%	6.6%	50.9%	60.7%	9.8%	59.1%	71.0%	11.9%
HR Croatia		591		84.2%			95.0%			99.3%	
HU Hungary	465	1,239	94.8%	86.7%	-8.1%	100.0%	96.0%	-4.0%	100.0%	99.7%	-0.3%
IE Ireland	1,467	3,955	47.4%	71.1%	23.7%	75.5%	96.3%	20.8%	89.4%	99.9%	10.5%
IS Iceland	163	272	88.2%	99.5%	11.3%	100.0%	100.0%	0.0%			
IT Italy	18,982	32,415	33.8%	65.8%	32.0%	50.9%	85.3%	34.4%	60.1%	92.1%	32.0%
LI Lichtenstein											
LT Lithuania		184									
LU Luxembourg	496	962									
LV Latvia		164		75.6%			97.1%			100.0%	
MT Malta	42	109		73.5%			92.8%			99.6%	
NL The Netherlands	10,010	20,087	40.4%	42.8%	2.4%	61.3%	59.5%	-1.8%	71.6%	69.0%	-2.6%
NO Norway	2,807	4,082	81.5%			95.3%			97.7%		
PL Poland	814	3,911	94.7%	82.0%	-12.7%	98.7%	92.0%	-6.7%	99.7%	95.2%	-4.5%
PT Portugal	1,752	3,852	54.7%	70.0%	15.3%	76.6%	89.0%	12.4%	86.1%	97.2%	11.1%
SE Sweden	3,788	5,213	89.0%	87.9%	-1.1%	87.3%	95.7%	8.4%	99.0%	98.5%	-0.5%
SI Slovenia	203	960	99.6%	94.3%	-5.3%	100.0%	94.3%	-5.7%	100.0%	100.0%	0.0%
SK Slovakia	125	495	100.0%	87.3%	-12.7%	100.0%	95.7%	-4.3%		99.0%	
TR Turkey	631	1,757	45.0%	44.6%	-0.4%	67.0%	69.2%	2.2%	79.0%	81.2%	2.2%
CEA	**197,020**	**333,544**	**35.4%**	**49.2%**	**13.8%**	**50.7%**	**65.4%**	**14.7%**	**60.5%**	**74.3%**	**13.8%**
in which EU (15)	184,197	304,988	33.0%	47.8%	14.9%	48.3%	64.0%	15.7%	58.3%	73.0%	14.7%
in which Euro (12)	141,336	224,677	32.0%	45.8%	13.8%	48.0%	61.2%	13.2%	58.7%	70.7%	12.0%
EEA	194,210	321,999	34.7%	48.2%	13.5%	50.1%	64.6%	14.5%	60.0%	73.6%	13.5%
Others	2,810	11,545	82.9%	77.1%	-5.9%	90.6%	89.1%	-1.5%	94.1%	94.0%	-0.1%

(Source: CEA)

Table 2: Estimation results[6]

	Variable name	Parameter	Parameter estimate	t-Value	1st Stage R^2
Cost Equation	Constant	γ_0	-4,2047	-0.02	1.00
	Number of policies	γ_1	0,0064	16.14	0.95
	Nb policies * Nb offices	γ_2	0,0000	-2.34	0.97
Demand Equation	Constant	β_0	0,1610	5.87	1.00
	Number of offices	β_1	-0,0001	-0.77	1.00
	Risk level lagged	β_2	-0,0694	-1.18	1.00
	Firm specific effect for				
		β_{31}	0,0076	1.08	1.00
		β_{32}	-0,0449	-5.48	1.00
		β_{33}	-0,0058	-0.90	1.00
		β_{34}	0,0178	2.41	1.00
		β_{35}	-0,0638	-8.16	1.00
	[CONFIDENTIAL]	β_{36}	0,0176	2.69	1.00
		β_{37}	-0,0418	-5.04	1.00
		β_{38}	-0,0466	-5.86	1.00
		β_{39}	-0,0472	-5.79	1.00
		β_{310}	0,0043	0.62	1.00
		β_{311}	-0,0227	-3.30	1.00
		β_{312}	-0,0629	-6.96	1.00
	Marginal utility of income				
	Constant	α_0	1,0000	5.33	0.66
	GDP	α_1	-0,0045	-5.12	0.74

[6] For confidentiality reasons, the parameter estimates have been normalized by the constant α_0.

Table 3a: Estimated characteristics of insurance groups

Firm	Own price elasticity	Cross-price elasticity	Marginal cost	Average cost	Return to scale	Quality index
ACOREANA	[CONFIDENTIAL]					
ALLIANZ						
AXA						
BCP						
BES						
CAIXA						
ESIA						
EUROPEIA						
GLOBAL						
LUSITANIA						
MAPFRE						
REAL						
ZURICH						

Table 3b: Estimated versus observed markups

Firm	Estimated Mark-up	Accounting Mark-up
ACOREANA	[CONFIDENTIAL]	[CONFIDENTIAL]
ALLIANZ		
AXA		
BCP		
BES		
CAIXA		
ESIA		
EUROPEIA		
GLOBAL		
LUSITANIA		
MAPFRE		
REAL		
ZURICH		

Table 4a: Simulated effects of the notified merger (with efficiency gains)

	Quality Index	Marginal Cost	Pre-merger Price	Post-merger Price	Change in price	Pre-merger Market Share	Post-merger Market Share	Pre-merger margin	Post-merger margin
ACOREANA	[CONFIDENTIAL]								
ALLIANZ									
AXA									
BCP									
BES									
CAIXA									
EUROPEIA									
GLOBAL									
MAPFRE									
REAL									
ZURICH									

Table 4b: Simulated effects of the notified merger (without efficiency gains)

	Quality Index	Marginal Cost	Pre-merger Price	Post-merger Price	Change in price	Pre-merger Market Share	Post-merger Market Share	Pre-merger margin	Post-merger margin
ACOREANA	[CONFIDENTIAL]								
ALLIANZ									
AXA									
BCP									
BES									
CAIXA									
EUROPEIA									
GLOBAL									
MAPFRE									
REAL									
ZURICH									