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## **Policyholder and insurance policy features as determinants of life insurance lapse – evidence from Croatia<sup>1</sup>**

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**Abstract:** According to theoretical and empirical literature, life insurance lapse is determined by macroeconomic and insurer-specific factors, demographic and economic features of the policyholder as well as specific characteristics of the life insurance policy. Existing empirical literature on determinants of life insurance options is dominantly focused on developed insurance markets. The aim of this paper is to investigate the drivers of lapse in Croatia using survey data. The research encompasses both policyholder and life insurance contract features. The results of the research show that the number of children, income level, and the financial status of policyholder as well as the duration of the life insurance policies influence policyholders' decisions to lapse life insurance.

**Keywords:** life insurance, lapse, Croatia.

**JEL codes:** G22, C42.

### **Introduction**

Taking into consideration the specific characteristics of an emerging insurance market and the fact that existing literature on factors influencing life insurance options is focused on developed insurance markets, this paper analyses policyholder and insurance policy features as determinants of using of life insurance options in Croatia. The analysis shows that the most important influential factor is change in the financial status of the policyholder. Additionally, income level, number of children and duration of the life insurance policy also have the importance. Life insurance options mitigate the liquidity constraints of a life in-

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insurance policy for the policyholder. On the other hand, with the lapse of a life insurance policy, the policyholder could suffer financial loss as well as loss of insurance coverage. However there are various options that could be embedded in a life insurance policy. Precisely, according to the broad definition of life insurance lapse, it refers to “all legal or contractual policyholder options which can significantly change the value of future cash-flows. This includes options to fully or partly terminate, decrease, restrict or suspend the insurance cover as well as options which allow the full or partial establishment, renewal, increase, extension or resumption of insurance cover” [CEIOPS 2010: 155]. Besides the policyholders, life insurance lapse influences the life insurance companies as well. The options impose risk for life insurers in terms of “loss or change in liabilities due to a change in the expected exercise rate of policyholder options” [CEIOPS 2010: 155], affecting liquidity, profitability as well as the solvency of life insurers. Thus it is important to analyse which factors determine policyholders’ decisions to use life insurance options.

The existing empirical studies are mainly focused on macroeconomic and insurance-company level factors of life insurance lapse and less on policyholder and insurance policy features. The key reason is the limited availability of data. The main sources of data on life insurance lapse are life insurance associations and their surveys, national supervisory authorities and insurance companies [Elling and Kohanski 2013]. The current empirical research on life insurance lapse is focused on developed countries [Renshaw and Haberman 1986; Kagraoka 2005; Milhaud, Loisel, and Maume-Deschamps 2010; Eling and Kiesenbauer 2013; Canadian Institute of Actuaries 2014]. Although the literature on factors influencing life insurance demand in emerging countries has been increasing [most recently studies are: Elango and Jones 2011; Śliwiński, Michalski, and Roszkiewicz 2013; Dragos 2014], according to our best knowledge, besides two papers on the general characteristics on life insurance lapse in India [Kumar 2009; Surana and Gaur 2013], there is no study of policyholder and insurance contract factors influencing the exercise of life insurance options in emerging life insurance markets. Since the emerging markets have specific insurance market features as well as economic, demographic and social characteristics, it is valuable to investigate if the determinants of the use of life insurance options in developed insurance markets could be confirmed in emerging markets as well. Consequently the main purpose of this paper is to examine the determinants of life insurance options in Croatia. The main indicators of the life insurance market development in Croatia (penetration of 0.8% of GDP and density of \$104 per capita [Swiss Re 2014]) indicate a low level of development. The market was growing very fast, at double-digit premium growth rate, until 2009. However since then it has been declining [Croatian 2014]. There are no official statistics on life insurance lapse in Croatia. However according to the data of the insurance companies’ representatives, life insurance lapse started to increase with the financial and economic crisis. In 2009 the

number of lapsed policies was 20 to 30 percent higher in comparison to previous year [Banka 2010].

This empirical research is based on the survey data collected through questionnaires addressed to a sample of 113 respondents, applying Chi-square, the Mann-Whitney U test, as well as a t-test, depending on the characteristics of variables and logistic regression.

The results of the research show that amongst the demographic features of policyholders, an important determinant of using life insurance options is the number of children. Influential economic factors are the income level and financial status of policyholders whilst amongst life insurance characteristics, the duration of the policy has significance.

The paper will contribute to the literature of life insurance options, analysing the determinants of lapse in a less developed life insurance market and it is the first paper that investigates life insurance options in Croatia. Additionally and differently from the existing empirical studies, this research is based on survey data.

The rest of the paper is structured as follows. Section 2 discusses the effects and determinants of the exercise of life insurance options. The review of empirical literature is given in Section 3. Data and methodology follows in Section 4. The results are presented in Section 5, whilst Section 6 concludes.

## **1. Theoretical considerations on the effects and determinants of life insurance lapse**

As an embedded option, lapse has implications on many aspects of life insurers' business, from liquidity and management of underwriting risk to profitability and solvency. In order to provide cash flow to policyholders who request lapse, the insurers have to sell the assets. In cases of unfavourable market conditions the assets can be liquidated at low value, which could produce loss for the insurers. An additional effect on the profitability of life insurers results from a more conservative investment strategy that might be used in order to ensure an adequate level of liquidity, which will reduce the return [Elling and Kiesenbauer 2013]. The insurers will not receive the cash flow from lapsed life insurance policies and that additionally affects their liquidity and profitability. According to the results of the research of long-term insurance lapse of Pinquet, Guillén, and Ayuso [2011], policyholders who lapsed policies have better health histories in comparison to those who did not cancel the contracts. The lapse could affect the underwriting risk of insurer. With lapse the structure of the policyholders becomes unfavourable for insurers since those who have a worse health record will have a higher share in the portfolio of insured risks. Thus the problem of adverse selection could occur. Additionally, refer-

ring to EIOPA and CEA (Insurance Europe) Eling and Kohanski [2013], they emphasize the effect of lapse on solvency. Selling assets at lower value reduces the net value of the insurance companies.

Although, according to the theoretical and empirical literature on life insurance lapse (for comprehensive review of the literature, see Eling and Kohanski [2013]), macroeconomic and insurance-specific factors could determine lapse [Dar and Dodds 1989; Outreville 1990; Kuo, Tsai, and Chen 2000; Kim 2005a; 2005b; Cox and Lin 2006; Kiesenbauer 2012] this paper is focused on the policyholder and features of the life insurance contract encompassing demographic characteristics and the health status of policyholders, the economic characteristics of policyholders as well as specific features of life insurance policies.

Demographic factors include age, gender and number of children of the policyholder. The age could have both direct and indirect influence on lapse. The younger individuals are usually new policyholders. Since lapse in the early years of a policy results in higher loss, the policyholders abstain from exercising policy options. Supposing that those who are older contracted the life insurance much earlier, they have less to lose with the lapse. Consequently, they take more options.

The indirect effect of age on lapse results from differences in income during the life cycle. Because at the beginning of working life and fixed-term work contracts, young people often have a less stable income and they are not able to pay insurance premium regularly. In contrast, older individuals have a more constant income stream which is the result of work experience and a long-term job with the same employer. Consequently they use lapse less in comparison to younger individuals.

Gender affects risk aversion and consequently could be a determinant of life insurance lapse. Due to social and economic factors females are usually more risk averse in comparison to males. They usually demand life insurance if they are sure of their ability of pay insurance premium. Therefore women use lapse less than men.

Considering the number of children, families with a higher number of children usually have less income at their disposal. In times of financial problems they will cut the burden of life insurance premiums and take the opportunity of lapsing more often in comparison to families with a lesser number of children.

Amongst other factors related to policyholder characteristics, their health condition could determine life insurance lapse. Health condition influences health care expenditure and in case of bad health the policyholder will be forced to lapse a life insurance policy. This factor could gain in importance in the situation of an aging population, increasing medical treatment expenditure and the reducing coverage of publicly financed health care.

When taking into consideration the income level, policyholders with lower and an unstable level of income are more exposed to financial troubles which

make them unable to pay an insurance premium, in comparison to those with a higher and stable income. The financial burden could be result of being fired, problems with loan repayment or other liquidity problems. Thus a change in the financial status of the policyholder could result in opting for lapse (emergency fund hypothesis) as a way of alleviating financial problems.

Since annuity insurance provides periodically an amount of money during the specific period or for whole life, which makes this type of insurance important source of liquidity in the case of the bad financial status of policyholder, it is expected that policyholders of annuity insurance will exercise lapse less in comparison with policyholders of other types of life insurance policies.

Amongst distribution channels, agents usually cause higher lapses. Motivation for high intermediate commission leads agents to sell life insurance using an aggressive selling strategy and malpractice to individuals who often do not have adequate knowledge of life insurance. The agents do not take into account the individual's needs but their own benefits. Since the commission for the first year is much higher in comparison to renewal commission, the agents are more focused on acquiring a new policyholder rather than then taking care of existing one [Surana and Gaur 2013]. This could results in lapses of life insurance policies.

A longer duration of policy implies a higher probability of liquidity problems of the policyholder which could affect his/her ability to pay insurance premium and then opting for lapse. Thus the policy duration could be an influential factor in life insurance lapse.

Features of a life insurance policy related to the frequency of premium payment, insurance premium size and the value of the policy are additional potential factors that could influence life insurance lapse. A higher frequency of premium payment could cause an increase in lapse. A more frequent payment of insurance premium, such as monthly payment may impose financial difficulties for the policyholder in comparison with a yearly payment. The same is true for the amount of insurance premium. A higher insurance premium could cause financial troubles for policyholders making them to opt for lapse more often than in the case of a lower life insurance premium. As the value of the life insurance policy increases the policyholder could lose a greater amount of money in the case of lapse. Thus it is to be expected that the value of the insurance policy and lapse rate are negatively correlated.

## **2. Review of empirical studies**

The first empirical study of the influence of policyholder and contract features on life insurance lapse is made on a sample of the life insurance contracts of seven life insurers in the United Kingdom in 1976. Applying logistic regres-

sion and binomial model, Renshaw and Haberman [1986] find that the policyholder age, duration of the contract, type of life insurance policy and insurance companies influence lapse.

Kagraoka [2005] researches lapse of annuity contracts of a single insurance company in Japan in the period 1993 to 2001. The author uses the Poisson model and a negative binomial model. The results confirm the importance of change in unemployment rates and the time elapsed from the contract date.

The lapse and surrender of life insurance contracts of the large Italian bancassurance company from 1991 to 2007 with a Poisson modelling approach is analysed by Cerchiara, Edwards, and Gambini [2009]. According to the results the use of life insurance options is determined by the contract duration and type, the age of policyholder and the calendar year of exposure.

Milhaud, Loisel, and Maume-Deschamps [2010] analyse endowment policies of a single insurance company in Spain. The study covers the period 1999 to 2007 and it is based on the classification and regression tree (CART) and logistic regression models. The policyholder and life insurance contracts characteristics investigated are policyholder age, contract duration, type of life insurance, sum insured, risk premium and saving premium. The results show a statistical significance of contract duration and profit benefit option.

The determinants of lapse in German insurance market are investigated by Eling and Kiesenbauer [2011] covering endowment, annuity and term life insurance policies of a single insurance company in the period between 2000 and 2010. The authors apply Poisson, binominal and negative binominal models. The research shows that product type and policy duration are contract features important for lapse. Amongst the policyholder characteristics that influence the exercise of life insurance options, age and gender are significant.

Canadian Institute of Actuaries [2014] analyses lapse for fully-guaranteed individual renewable and convertible 10-year term insurance policies. The analysis is based on data of ten companies in the period 2005–2010 and on percentage calculation and comparison. The analysis is done according to both the number of policies and their face value. The research encompasses the following factors: age, gender, amount, policy duration, smoking status, mortality rating, preferred underwriting classification, joint/single, policy structure (stand-alone or rider), payment frequency, mode of payment (pre-authorized or other) and province. For some of the analysed factors there is a variation of the lapse rates amongst the number and value of the policies.<sup>4</sup>

The empirical research of policyholder and life insurance contract characteristics is limited to the studies reviewed above. All the studies are based on a sample of insurance companies, mostly on a single company and all of

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<sup>4</sup> Because of the many factors that are analysed in this study, as well as the differences in the results amongst the number and amount of policies, we do not present detailed results.



the studies refer to developed life insurance markets. This paper applies a different methodology and it encompasses a less well-developed life insurance market.

### **3. Data and methodology**

The analysis is based on the survey data collected through questionnaires on a sample of 113 respondents in Croatia. The sample was formed randomly. We used an indirect approach to the respondents. Specifically we used a web questionnaire. The information on the questionnaire was sent by e-mail to many randomly selected e-mail addresses. The questionnaire was anonymous.

The sample consisted of both individuals who used life insurance options and those who did not. All participants are separated in two groups, depending on their usage of the options. There are 45 respondents who exercised life insurance options whilst the number of those who did not lapse is 68. The respondents that used life insurance options were placed in the first group. Their questionnaire consisted of 19 questions referring to the influence of demographic and economic factors as well as policy features on life insurance options. The first part of the questionnaire was related to questions on policyholder age, gender, number of children, health status, income level and change in his/her financial status. The second section was focused on questions about life insurance options and policy features, such as policy type, distribution channel, duration of contract, frequency of premium payment, premium amount and sum insured.

The second group of respondents are policyholders who didn't use life insurance options. Their questionnaire had 13 questions about policyholder characteristics and policy features. Respondents were also asked to answer questions about the change in their health and financial situation from the time of buying a life insurance policy.

The first analysis of the survey data is based on statistical tests. Depending on the variable characteristics, Chi-square, Mann-Whitney U test, as well as t-test are used. The Mann-Whitney U test is used to analyze ordinal scaled variables, whilst the t-test is applied in analysing quantitative variables that are not ordinally scaled. Chi-square is used to analyze whether distributions of categorical variables differ from one another.

In order to check all factors that could influence the life insurance options, the data are additionally analysed using binary logistic regression and the backward: Wald method. To identify key determinants of life insurance options a dichotomous variable is computed, indicating whether the life insurance option is used or not. That is, life insurance options = 1, if life insurance option is used; 0, if life insurance options is not used. On the basis of Pearson's Chi-square statistic, the predictors are determined as to whether they are associated with life insurance options.

## 4. Results

The first set of analysed factors referred to the demographic characteristics of policyholders. The relationship between the age and life insurance options is presented in Table 1.

**Table 1. Relationship between age and life insurance options**

Count		Life insurance options		Total
		Yes	No	
Age	18–30	4	7	11
	31–40	10	33	43
	41–50	21	17	38
	51–60	9	10	19
	61–70	1	1	2
Total		45	68	113

**Table 2. Results of the Mann-Whitney U test for variable age**

	Age
Mann-Whitney U	1167.000
Wilcoxon W	3513.000
Z	-2.243
Asymp. Sig. (2-tailed)	0.025

In the questionnaire the question considering the age variable was formulated in a way that we proposed 5 classes and the respondent had to choose in which class he/she belongs. The largest number of respondents (43) belongs to the age group 31–40. The smallest number of respondents (2) is in the age group 61 and older. The most numerous users of life insurance options are individuals in the age group 41–50 years whilst the number of those who use and do not use life insurance options in the age group 51–60 is almost the same. In order to determine the link between age and life insurance options, the Mann-Whitney U test was conducted and the results obtained are presented in Table 2. An empirical significance of 0.025 indicates that there is a correlation between age and life insurance options. The result is in the accordance with the result of the empirical study of life insurance options in Italy done by Cerchiara, Edwards, and Gambini [2009] as well as the study of Eling and Kiesenbauer [2013] based on the German insurance market.

**Table 3. Cross-tabulation for gender**

		Life insurance options		Total
		Yes	No	
Gender	Male	21	28	49
	Female	24	40	64
Total		45	68	113

**Table 4. Chi-Square test for gender**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.332	1	0.564
Continuity Correction <sup>b</sup>	0.146	1	0.702
Likelihood Ratio	0.332	1	0.565
Fisher's Exact Test			
Linear-by-Linear Association	0.329	1	0.566
N of Valid Cases	113		

The nexus between gender and life insurance lapse is presented in Table 3. The database consisted of 56.64% male and 43.36% female respondents. Approximately 60% of female respondents stated that they did not use life insurance options. An almost equal number of men and women use life insurance options. The correlation between gender and the usage of options is presented in Table 4. The empirical significance is 0.564. Thus the results of the Chi-Square test indicate that there is no correlation between gender and life insurance options.

The question considering the number of children in the questionnaire was set in such a way that we proposed 4 categories: without children, 1, 2, and 3

**Table 5. Cross-tabulation for the number of children**

		Life insurance options		Total
		Yes	No	
Number of children	0	7	24	31
	1	8	10	18
	2	24	28	52
	3 or more	6	6	12
Total		45	68	113

**Table 6. Results of Mann-Whitney U test for variable number of children**

	Number of children
Mann-Whitney U	1202.000
Wilcoxon W	3548.000
Z	-2.055
Asymp. Sig. (2-tailed)	0.040

or more children. Table 5 shows the relationship between number of children and life insurance options. The largest number of the respondents in this survey has 2 children. Only 7 out of 31 individuals with no children used life insurance options. An equal number of respondents with 3 or more children used/did not use life insurance options. Considering those who used lapse, 33.33% of them have no children or have 1 child, whilst 66.67% are those who have 2 children. The results of Mann-Whitney U test of link between number of children and life insurance options are shown in Table 6. The result shows that the number of children is a significant determinant of life insurance lapse. This

**Table 7. Cross-tabulation for health status**

		Life insurance options		Total
		Yes	No	
Health status	Significant changes	3	2	5
	Without changes	42	66	108
Total		45	68	113

**Table 8. Chi-Square test for health status**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.889	1	0.346
Continuity Correction <sup>b</sup>	0.226	1	0.634
Likelihood Ratio	0.865	1	0.352
Fisher's Exact Test			
Linear-by-Linear Association	0.881	1	0.348
N of Valid Cases	113		

confirms that individuals with more children use more life insurance options which is in accordance to theoretical considerations.

Health status is the next factor whose influence on life insurance lapse is analyzed with the results presented in Table 7. Variable health status was tested in a way that respondents who did not use options had to state whether their health status has changed significantly. For respondents who have used options, the question was adapted in such a way that they were asked whether their health status had changed significantly by the time of using the options. There are 108 respondents who didn't have any significant changes in health status. Only 5 respondents claimed that they had changes in health status and the number is almost equal for those who used and those who did not exercise life insurance options. The results of the Chi-Square test are shown in Table 8, indicating that there is no relationship between health status and life insurance options.

In the questionnaire income was divided into 7 categories: without income; to 3,000 kn; 3001–5000 kn; 5001–7000 kn; 7001–10000 kn; 10001–12000 kn; more than 12 000 kn. The link between the life insurance options and income level is presented in Table 9. The majority of most respondents have an income

**Table 9. Cross-tabulation for income level**

Count		Life insurance options		Total
		Yes	No	
Income level (HRK)	no income	3	2	5
	to 3000	7	0	7
	3001–5000	22	2	24
	5001–7000	10	15	25
	7001–10000	2	29	31
	10001–12000	1	5	6
	more than 12000	0	15	15
Total		45	68	113

**Table 10. Mann-Whitney U test for income level**

	Income level
Mann-Whitney U	1266.500
Wilcoxon W	3612.500
Z	-1.583
Asymp. Sig. (2-tailed)	0.014

of 7001–10000 HRK and the smallest number of respondents has no income. The respondents who use options mostly belong to the lower income groups. When considering 45 respondents who used options, 22 of them have monthly incomes of 3001–5000 HRK. There is almost no user of life insurance options in the higher income group. This is consistent with the hypothesis that individuals belonging to higher level income groups are more able to pay premium regularly and less forced to exercise options in comparison with those who have lower income. Based on the results of the Mann-Whitney U test shown in Table 10 there is a significant relationship between income level and life insurance options.

**Table 11. Cross-tabulation for change of financial status**

		Life insurance options		Total
		Yes	No	
Change of financial status	Yes	28	4	32
	No	17	64	81
Total		45	68	113

**Table 12. Chi-Square test for change of financial status**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.826	1	0.001
Continuity Correction <sup>b</sup>	12.238	1	0.002
Likelihood Ratio	13.729	1	0.001
Fisher's Exact Test			
Linear-by-Linear Association	13.703	1	0.001
N of Valid Cases	113		

The question related to the change in the financial situation was set in such a way that the respondents were asked if they had any problems with liquidity. The question was adapted for those respondents who have used options who then had to state if they had any problems with liquidity at the time of using the options. Table 12 shows the results of the Chi-Square test for the change of financial status. The empirical significance is 0.001 confirming that there is a statistically significant correlation between life insurance options and change of financial status. Analyzing the respondents who used life insurance options, 62.22% of them experienced changes in their financial situation from the time

**Table 13. Cross-tabulation for policy type**

		Life insurance options		Total
		Yes	No	
Policy type	Term insurance	8	11	19
	Endowment assurance	35	54	89
	Annuity insurance	2	3	5
Total		45	68	113

**Table 14. Chi-Square test for policy type**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.051	2	0.975
Likelihood Ratio	0.050	2	0.975
Linear-by-Linear Association	0.034	1	0.855
N of Valid Cases	113		

they bought life insurance. Amongst those who did not use options even 94.11% of them did not experience any change of their financial condition.

In respect of the type of policy the respondents own they were asked to choose amongst term insurance, endowment insurance or annuity insurance. The majority of respondents (89) have an endowment assurance policy, which is the most popular type of life insurance in Croatia (its share of total life insurance premiums is 75% [Croatian Insurance Bureau 2014]). Those who have a term insurance policy are 17.5% of the total number of respondents. Only 5 respondents have annuity insurance policy. The correlation between the policy type and life insurance options is presented in Table 14. The empirical significance of 0.975 indicates that policy type does not have an influence on life insurance options.

For the variable of distribution channel the respondents were asked through which channels they had bought their life insurance policy, broker, agent or bancassurance. The data on the relationship between the distribution channel and life insurance options is presented in Table 15. The largest number of respondents (94) purchased life insurance through an agent. The smallest number of respondents (7) used a broker. The number of respondents who bought life insurance policy through bancassurance and who used life insurance options is twice the number of those who used the same distribution channel and

**Table 15. Cross-tabulation for the distribution channel**

		Life insurance options		Total
		Yes	No	
Distri- bution channel	Broker	3	4	7
	Agent	34	60	94
	Bancassurance	8	4	12
Total		45	68	113

**Table 16. Chi-Square test for the distribution channel**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.159	2	0.125
Likelihood Ratio	4.074	2	0.130
Linear-by-Linear Association	1.994	1	0.158
N of Valid Cases	113		

did not exercise life insurance options. Table 16 presents the results of the Chi-Square test for variable distribution channels. Based on the result the variable distribution channel is not statistically significant.

The next question the respondents were asked was related to the frequency of premium payment (monthly, quarterly, half-yearly annually). The largest number of respondents (48) pays monthly premium, whilst the smallest number of respondents (11) pays their life insurance premium half-yearly. Table 18 presents the results of the Chi-Square test for frequency of payment. The value of empirical significance is 0.389 and it shows that frequency of payment is not statistically significant linked to life insurance lapse.

**Table 17. Cross-tabulation for frequency of premium payment**

		Life insurance options		Total
		Yes	No	
Frequency of pay- ment	monthly	19	29	48
	quarterly	3	11	14
	half-yearly	4	7	11
	yearly	19	21	40
Total		45	68	113



**Table 18. Chi-Square test for frequency of premium payment**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.016	3	0.389
Likelihood Ratio	3.173	3	0.366
Linear-by-Linear Association	0.705	1	0.401
N of Valid Cases	113		

**Table 19. Group statistics for insurance value**

Life insurance options	Mean	N	Std. Deviation	Median	Minimum	Maximum
Yes	118414.91	45	101976.363	87126.00	7600	456000
No	101255.92	68	72269.925	87400.00	4500	311600
Total	108089.14	113	85328.884	87126.00	4500	456000

**Table 20. Test statistics for insurance value**

		F	Sig.	T	df	Sig. (2-tailed)
Insurance value	Equal variances assumed	1.513	0.222	1.403	101	0.164

**Table 21. Group statistics for premium amount**

Life insurance options	Mean	N	Std. Deviation	Median	Minimum	Maximum
Yes	4030.67	45	4507.706	3000.00	120	17741
No	2881.19	68	3425.947	1862.00	100	18000
Total	3338.94	113	3914.512	2158.00	100	18000

**Table 22. Test statistics for premium amount**

		F	Sig.	T	df	Sig. (2-tailed)
Premium amount	Equal variances assumed	2.563	0.112	1.537	111	0.127

In the questionnaire respondents were asked to provide information on the value of their life insurance. The relationship between the insurance value and life insurance options is presented in Table 19. The average insurance value for respondents who used life insurance options is 118,414.91 kn whilst the average insurance value for respondents who didn't use life insurance options is 101,255.92 kn. Thus the respondents who use life insurance options have a policy of higher value. However, according to the test, there is no correlation between the insurance value and life insurance options.

Additionally the respondents were asked about the amount of their premiums. The average premium for respondents who used life insurance options

**Table 23. Cross-tabulation for the duration of contract**

Number		Life insurance options		Total
		Yes	No	
Duration of the contract	2	0	1	1
	3	0	2	2
	4	0	2	2
	5	0	4	4
	7	1	2	3
	8	0	6	6
	10	1	6	7
	11	0	2	2
	12	0	2	2
	15	1	20	21
	16	0	1	1
	17	1	2	3
	19	0	1	1
	20	14	7	21
	21	1	2	3
	23	2	0	2
	24	2	0	2
	25	12	3	15
	30	7	4	11
	32	2	0	2
40	1	1	2	
Total		45	68	113

is 4,030.67 kn, and the average premium amount for respondents who did not use life insurance options is 2,881.19 kn. Therefore respondents who used life insurance options paid a higher premium than respondents who did not use life insurance options. Table 22 presents the results of the t-test to analyse the link between premium amount and life insurance options. The empirical significance is 0.127. Thus it can be concluded that there is no statistically significant difference in premium amount between those who used and those who didn't use life insurance options.

The final question in the questionnaire was related to the contract duration. According to the data in Table 23, 31.11% of respondents who used the options of life insurance had a life insurance policy of 20 years duration, whilst the number of those respondents with shorter contracts who used options is insignificant. The results of the t-test referring to the link between the duration of the contract and life insurance options are shown in Table 24. Since the empirical significance is 0.029, the duration of the contract has an influence on life insurance options. A longer duration of the insurance contract may increase the probability that the owners of life insurance policies will experience financial difficulties and consequently use more life insurance options. The result is in accordance with the theoretical assumption. The same results are obtained by Cerciara et al. [2009], Milhaud et al. [2010] and Eling and Kiesenbauer [2011].

In table 25 original variables are crossed with predictions. In 62.2% of cases respondents who used life insurance options the predictions correspond to the actual situation. In 82.4% of cases respondents who did not use life insurance options, the predictions correspond to the actual situation.

**Table 24. Test statistics for the duration of the contract**

		F	Sig.	T	df	Sig. (2-tailed)
Duration of the contract	Equal variances assumed	4.179	0.043	-2.211	111	0.029

**Table 25. Classification table**

Observed		Predicted		
		Life insurance options		Percentage Correct
		Yes	No	
Life insurance options	yes	28	17	62,2
	no	12	56	82,4
Overall Percentage				74,3

**Table 26. Results of logistic regression**

	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>Sig.</b>	<b>Exp(B)</b>
Number of children	-0.373	0.224	2.764	1	0.096	0.689
Income level	-0.304	0.150	4.088	1	0.043	0.738
Change of financial status	1.642	0.494	11.055	1	0.001	5.167
Duration of the contract	0.059	0.029	4.077	1	0.043	1.060
Constant	-1.240	1.149	1.166	1	0.280	0.289

According to the result of the logistic regression the most influential factor of life insurance options is a change in financial status. Financial difficulties related to loss of job, problems with repayment of loans, etc., lead to problem of liquidity for policyholders when, the payment of insurance premiums becomes a burden forcing them to use life insurance options. The number of children is a significant determinant of life insurance lapse. Families with a greater number of children usually have less disposable income and using life insurance options is a way of reducing the burden of life insurance premiums. The income level is confirmed as an important factor of life insurance options. Individuals in higher income groups are more able to pay insurance premiums regularly and are less obliged to exercise an option in comparison with those who have a lower income. The duration of the contract also has an influence on life insurance options. A longer duration of the insurance contract may increase the probability that the policyholders will experience financial difficulties and consequently use more life insurance options.

The results of the logistic regression analysis almost confirm the results of the test. A comparison of the results of the multivariate regression analysis and the results of the tests, show that there is only a variable of policyholder age, having a significant influence on life insurance options according to the analysis which is not of significance when checking all factors.

In summary, amongst the characteristics of the policyholders analysed as well as the features of life insurance contracts, the number of children, income level, financial status and duration of the life insurance policy are confirmed as statistically significant factors of life insurance lapse. Although the research is limited by the size of the sample due to the unavailability of data, the research is the first analysis of the drivers of life insurance options in Croatia and the attempt to emphasize the importance of the management of embedded options in a life insurance contract as well as the importance of making data on life insurance options publicly available. This is an important prerequisite for further research.

## Conclusions

This research provides an understanding of the key lapse determinants in Croatian life insurance markets. Based on survey data of 113 respondents the analysis shows that amongst the demographic features of policyholders an important determinant of using life insurance options is the number of children. Influential economic factors are the income level and financial status of policyholders whilst amongst the characteristics of life insurance the duration of the policy has significance.

The results of the research have implications for both insurance companies and regulators. Since insurance options affect the liquidity and profitability of the life insurer it is important for decision makers at insurance companies to manage the risk of the options, taking into consideration the factors influencing lapse. Since life insurance options are an important risk for insurance companies which affects solvency, regulators should consider the determinants of life insurance lapse in the context of risk models.

Additionally, in order to reduce the problem of information asymmetry between policyholders and insurance companies, policyholders should be provided with adequate information of the detrimental consequences of lapse at the moment of purchasing insurance. This would be helped by a greater understanding of insurance policy features amongst potential policyholders.

For further research it is important to have publicly available data at industry and company level that would be provided by the supervisory authority or insurers' association. The data would provide a basis for the analysis of the macroeconomic and company-specific drivers of insurance options.

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