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Contemporary Aspects of Insurance Industry Economics

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Abstract

The article aims at research on contemporary aspects of insurance industry economics, taking into account the situation related to the GDP and insurance premium growth as well as the problem of the insurance fraud and providing the examples from Denmark. This would be the first article on the subject, the next one, on the sociology of the insurance fraud, will be submitted to the later issue of this journal. The article has 4 interrelated parts focusing around the relation of insurance premiums growth and GDP growth, reflecting upon the economic growth of the countries, around the business cycle of the Danish insurance industry, as well as the impact of fraud on the economy. These empirical parts are supplemented by the theory of fraud and methodological notes, related to calculations.

Keywords: insurance, fraud, business cycle.

Introduction

Insurance is a part of financial services. Although its primary function is to provide for the safety-net of society in order to reduce the risk of functioning in the market economy (financial, physical, social, environmental, health-related risk), this is also a branch of economy, seeking to keep itself alive by getting revenue and profit.

Insurance is important to development of the global economy, since it creates almost 7% of the world GDP, and with higher penetration of financial services in the emerging and developing economies, this share will only go up.

However, the impact of insurance upon the real economy would be higher, if not the never-ending problem of insurance fraud, which has intensified during the recent financial and economic crisis. Therefore, *the research problem* of this article relates to impact of insurance fraud, particularly at crisis time, upon economies of countries in general, and insurance companies in particular. The puzzle is whether the insurance fraud is pro- or counter-cyclical to the economic cycles of the countries as well as whether these tendencies are similar in different countries of Europe.

The article is based on the materials from a wider report done by the authors for the Danish association of insurance and pension companies in April-June 2011. Thus, it contains some examples from Danish insurance industry. The article aims at presentation of the contemporary aspects of insurance industry economics, taking fraud into account, and is made up of two interrelated parts, i.e. the economy of insurance and the insurance fraud, by seeking to answer the following research questions:

1. What is the contemporary economic situation of insurance sector worldwide and in Europe?
2. How does the tendency of GDP growth interrelate with the growth of insurance premiums? What could be the consequences of this interrelation for the companies, consumers, and policy makers?
3. What is the essence of insurance fraud? What is the cyclicality of fraud, and how does it interrelate with the business cycle?
4. What is impact of insurance fraud upon economy of the countries? What methods could be used to identify this impact?

The article uses a few data sets, along with research methods to answer these questions. *First of all,* the secondary information from the European insurance and reinsurance federation (CEA), from Eurostat and from Danish association of insurance and pension companies (Forsikring & Pension) on economic situation in European insurance market, including Denmark. *Secondly,* secondary information and research findings from different researchers and research centres, which have been recently conducting research related to consumer fraud. *Thirdly*, original correlation analysis of GDP and insurance premiums growth in European countries, based on data from the CEA. *Fourthly*, original analysis of interrelation between the business cycle in Denmark and the insurance claims (analysis of growth rates of insurance premiums, GDP and claims ratio in Denmark). *Fifthly*, original estimates of fraud volume (spread) in Denmark.

Different aspects of insurance industry economics have been researched already for a number of

years by a number of authors. This article does not aim at very deep and exhaustive literature review, but rather at the applied research with empirical excises, the results of which can be used for practical decisions as well as for further theoretical conclusions. A brief literature review of the earlier research related to insurance fraud is done in the course of the article.

1. Brief overview of insurance sector

Insurance is one of the fastest-growing economy segments in the world. Within the decade (2000-2009), the total worldwide premiums grew almost twice, slightly slow-downed just by the recent economic crisis (Table 1).

Table 1

Worldwide premiums, in 2000–2009 (bn $)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Europe	786	767	847	1 036	1 206	1 335	1 489	1 763	1 704	1 611
Asia	647	595	629	685	739	765	779	812	935	989
North America	906	949	1 054	1 117	1 179	1 188	1 262	1 339	1 344	1 239
Other	106	104	102	120	140	158	181	212	238	227
Total	**2 445**	**2 416**	**2 632**	**2 958**	**3 264**	**3 446**	**3 711**	**4 126**	**4 220**	**4 066**

Source: CEA, 2010

According to Swiss Re (Swiss Re, 2010), worldwide premiums amounted to $4 066bn (€2 915bn) in 2009, with 3.6% nominal decrease compared with 2.3% growth in 2008 and 11.2% growth in 2007. This is only the second time in the last decade that worldwide premiums decreased in nominal terms. The first decline, observed in 2001 after the crisis, related to dotcom bubble, was only 1.2%.

Looking at individual regions, it is clear that premiums decreased in all regions of the world, except Asia. However, there is clear imbalance regarding the value of insurance premiums and the weight of the region, taking the population into account. Between 2002 and 2007 the European share in the global market rose from 32% to 43% as premiums in Europe grew faster than total worldwide premium income. However, with the decline in European premiums in 2008 and 2009, Europe's market share decreased to 40%. At the same time, share of Europe's population constitutes only 13%, taking Russia into account. The similar share, 40% of world insurance, goes to USA and Japan, while the share of population in these markets constitutes only about 7% of the global population. On the other hand, emerging markets accounted for over 85% of the world's population but generated only around 10% of premiums. Their markets are, however, growing at a quicker pace.

The European insurance market has been experiencing steady growth in 2001-2007. Of course, the financial-economic crisis affected the sector, however, it survived the hard times much better than the sector of banking. There were no bankruptcies of insurance companies, what tells of clever risk management and sufficient capital of the companies. Statistical data taken from CEA (CEA, 2010) indicate that the European insurance industry recovered and grew by 2.9% in 2009 compared to 2008. A year earlier, in comparison, total premiums dropped by more than 6% at constant exchange rates (Table 2). The growth of European insurance market in 2009 was driven by the sector of life insurance, which accounts for more than 60% of all premiums. With 30% of non-life premiums, motor insurance is the largest European non-life business line, followed by health and property, with market shares of 25% and 20% respectively.

Table 2

Total European gross written premiums, in 2001–2009 (€m)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	09/08
AT Austria	12 470	12 615	13 128	13 974	15 295	15 589	15 874	16 214	16 420	1.3%
BE Belgium	20 571	22 304	25 774	28 417	33 832	29 489	31 193	29 279	28 386	-3.0%
BG Bulgaria	228	319	342	428	555	643	772	915	850	-7.1%
CH Switzerland	33 603	36 151	33 907	32 816	32 658	31 352	30 132	33 666	35 138	-0.7%
CY Cyprus	454	485	527	550	589	637	695	742	787	6.0%
CZ Czech Republic	2 010	2 548	2 837	3 332	3 709	4 099	4 525	5 274	5 218	4.8%
DE Germany	135 093	141 008	147 729	152 166	157 984	161 945	162 923	164 523	171 330	4.1%

DK Denmark	12 271	13 426	15 038	15 890	16 988	18 702	19 570	20 811	19 902	-4.5%
EE Estonia	114	139	168	203	254	284	434	372	367	-1.3%
ES Spain	41 015	48 061	40 630	45 418	48 779	52 836	54 297	60 086	60 374	0.5%
FI Finland	11 819	12 247	12 641	13 191	14 297	14 942	15 047	15 800	16 182	2.4%
FR France	128 059	131 998	142 028	158 226	175 884	197 092	195 732	183 194	200 057	9.2%
GR Greece	2 642	2 895	3 235	3 624	3 923	4 371	4 736	4 789	5 002	4.4%
HR Croatia	682	753	801	884	993	1 118	1 235	1 341	1 282	-2.8%
HU Hungary	1 635	2 036	2 206	2 380	2 767	3 142	3 701	3 542	2 944	-7.4%
IE Ireland	10 518	11 208	11 884	11 998	13 580	16 150	18 204	13 431	12 099	-9.9%
IS Iceland	269	294	294	281	344	350	403	280	251	7.6%
IT Italy	76 254	87 708	96 993	101 038	109 780	106 502	99 095	92 019	117 866	28.1%
LI Liechtenstein	n.a.	n.a	n.a.	1 490	2 713	4 311	4 203	3 769	5 947	50.1%
LT Lithuania	133	224	242	269	313	425	606	590	432	-26.8%
LU Luxembourg	783	916	891	964	1 100	1 138	1 222	1 899	1 935	1.9%
LV Latvia	175	179	195	197	219	291	438	476	315	-33.5%
MT Malta	163	183	208	237	258	286	352	275	288	4.9%
NL Netherlands	42 335	43 995	46 782	48 816	48 245	73 386	74 920	76 559	76 395	-0.2%
NO Norway	7 872	9 172	9 498	10 381	11 968	11 945	12 965	12 705	11 824	-1.2%
PL Poland	6 095	6 006	5 646	6 091	7 717	9 631	11 580	16 830	11 824	-13.4%
PT Portugal	7 989	8 414	9 445	10 472	13 444	13 123	13 751	15 329	14 559	-5.0%
RO Romania	n.a.	434	514	614	890	1 276	2 018	2 443	1 814	-14.4%
SE Sweden	17 751	16 964	19 264	19 096	22 384	23 079	24 887	24 706	23 244	3.9%
SI Slovenia	1 055	1 185	1 275	1 457	1 547	1 726	1 894	2 019	2 073	2.7%
SK Slovakia	736	850	1 008	1 198	1 309	1 439	1 714	2 031	2 026	-0.2%
TR Turkey	2 273	2 527	2 938	3 725	4 739	5 340	6 119	6 179	5 677	4.3%
UK United Kingdom	228 691	255 226	236 746	246 212	266 587	294 269	366 572	247 022	203 809	-7.7%

Source: CEA, 2010

2. Correlation analysis of GDP and insurance premiums

Although while looking at statistical data on insurance premiums and comparing them with GDP growth, both in dynamics and by countries, it seems clear that insurance premiums increase along with GDP growth, it is still worth to look more closely at the relationship between the variables.

Having the aim to investigate the relationship between GDP growth and growth of insurance premiums (life and non-life) we did a correlation analysis, calculating the Pearson's correlation coefficients for 33 European countries, members of the CEA, for 9 years (2001-2009). This has allowed following, inter alia, the relationship of the variables in the years of pre-crisis and crisis (2007-2009). Data has been taken from CEA.

2.1. The method

Correlation analysis is one of the most widely used tools of statistical analysis, measuring the degree of dependencies, normally between 2 quantitative variables.

The most familiar measure of dependence between two quantities is the Pearson's product-moment correlation coefficient, or Pearson's correlation. It is obtained by dividing the covariance of the two variables by the product of their standard deviations. The population correlation coefficient $\acute{n}_{X,Y}$ between two random variables X and Y with expected values $\acute{g}_X$ and $\acute{g}_Y$ and standard deviations $\acute{o}_X$ and $\acute{o}_Y$ is defined as (Kedaitis, 2009):

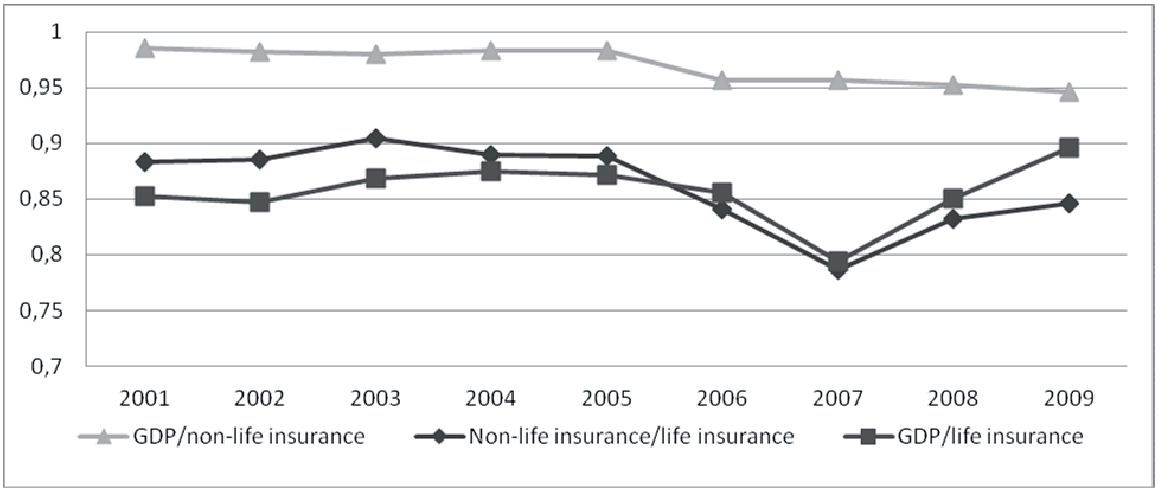
$$\rho_{X,Y} = \operatorname{corr}(X,Y) = \frac{\operatorname{cov}(X,Y)}{\sigma_X \sigma_Y} = \frac{E[(X-\mu_X)(Y-\mu_Y)]}{\sigma_X \sigma_Y},$$

where E is the expected value operator, *cov* means covariance, and *corr* is a widely used alternative notation for Pearson's correlation.

The Pearson's correlation is defined only if both of the standard deviations are finite and both of them are non-zero. It is a corollary of the Cauchy–Schwarz inequality that the correlation cannot exceed 1 in absolute value. The Pearson's correlation is +1 in the case of a perfect positive (increasing) linear relationship (correlation), −1 in the case of a perfect decreasing (negative) linear relationship (anticorrelation), and some value between −1 and 1 in all other cases, indicating the degree of linear dependence between the variables. As it approaches zero there is less of a relationship (closer to uncorrelated). The closer the coefficient is to either −1 or 1, the stronger the correlation between the variables.

2.2. The results

The calculated correlation coefficients show the tight relationship between the value of GDP and the value of written premiums in the given years in 33 countries, members of CEA. The correlation is stronger for non-life insurance, reaching 0.94-0.98, and weaker (but still very high) for life insurance, reaching 0.73-0.90 in different years. The relationship between life and non-life insurance reflects that of GDP and life insurance, what means that it is driven by the tendencies of life insurance market (Figure 1).



Source: own calculations

Fig. 1. Pearson's correlation coefficients for 33 countries of CEA, 2001-2009

What conclusion could be drawn from these calculations? The first one, related to non-life insurance, is that while entering the non-life insurance market, the consumers are affected by the general macroeconomic tendencies, i.e. they increase the amounts of insurance in good times, and decrease in bad times, however, the fluctuations of non-life insurance growth rates are still flatter compared to those of GDP. The premiums of non-life insurance in 33 countries of CEA increased by 0.2% in 2008/2007, but decreased by 2% in 2009/2008, and the GDP for the same years has been increasing by 2%, and decreasing by 6%, respectively. The Figure 1 also demonstrates the somewhat weaker correlation between GDP and premiums of non-life insurance starting with year 2006. It follows that the sector of non-life insurance could act as a stabilizer of economy in the countries where it is well developed, since the consumers used to keep with non-life insurance even in the downturn of the economy.

Secondly, what could be drawn from the correlation of GDP and life insurance premiums? This is a slightly different picture, and, although the correlation is positive, the scale of fluctuations is higher. The overall correlation is high, around 0.88-0.9 in good times of 2001-2005. It got weaker in 2006 and especially in 2007, by has been regaining slowly since 2008. However, the weaker relationship does not mean the weaker premiums of life insurance. Indeed, in 2007, compared to 2006, life insurance premiums in CEA countries rose by more than 10%, then sharply decreased by 16% in 2008/2007, and increased by 1% in 2009/2008. But still, neither the level of 2007, nor of 2006 has been reached yet. On the other hand, the growth/decrease rates of GDP have been flatter in 2007-2009. This means that customers in life insurance markets used to overreact to the general economic situation, especially in situation of financial or economic crisis. The overreaction could be explained by a few reasons. In year 2007, the economists were warning the world about economy being at the beginning of a global financial crisis, and it really was underway already. The consumers reacted to this by increasing the spending on life insurance, since they believed the financial funds could be a safe place for investing the surplus. Besides, in 2007, the sector of finan-

cial services was still accelerating by spreading promises of high returns on investments. However, the situation in 2008 got worse, a number of people lost their jobs, thus, they started to save on life insurance, by decreasing or terminating their investments. In 2009, despite that situation got even worse, people kept with the slight investments in life insurance, since they trusted insurance sector more than banks, as being the safety-net of the situation.

This means that in case of economic instability, consumers see life insurance as a powerful financial instrument, not just insurance that could help them to keep-up with the situation; thus, they manipulate this instrument, by distorting the tendency of the relationship with GDP. Hopefully, it will be like this in the future, thus, the critical segment in managing the business of insurance in face of macroeconomic instability are the consumers of life insurance. It is important to manage this segment, especially their financial expectation, as they could worsen the finances of insurance companies in just a single year, or reward them, again in just a single year.

The results of the correlation, described above, bring us to important conclusions regarding policy implication for insurance. The sectors of non-life insurance and life insurance are quite different regarding consumer behaviour in times of economic instability. The sector of non-life insurance could be regarded as some stabilizer of the situation or at least not promising bad surprises, but the sector of life insurance could act as a destabilizer in some years. Taking into account that premiums of life insurance prevail over non-life insurance, the situation requires that insurance companies have a risk management system for the consumers of life insurance in place, by analyzing them continuously.

And, although the insurance companies in Europe used to complain about the increasing regulation of the sector, especially for the EU member states, this could be the right policy. Here, we may remember the establishment of the European Insurance and Occupational Pensions Authority (EIOPA) on 1 of January 2011 and the so-called Solvency II project, which is under way for the EU countries (European Commission, 2011). This is a set of legislative proposals aiming at strengthening of the financial position of insurance undertakings and taking into account current developments in insurance, risk management, finance techniques, international financial reporting and prudential standards. It is a follow-up of Solvency I, and going to be in force by the end of 2012.

However, again, the above described tendencies are drawn from the aggregated data of 33 European countries, and it does not mean that they are valid for all individual countries. There is a difference between insurance sector and behaviours of consumers in the EU-15 countries and in the rest of Europe. We will see it later in this article, when we get to the analysis of Danish insurance market.

3. Brief theoretical foundations of insurance fraud

3.1. Definition of fraud

Insurance fraud is a deliberate falsification of information by a claimant in order to obtain a financial advantage or gain. Insurance fraud ranges from overstating the value of damaged or lost items or not declaring information that is known and relevant to a claim, to the activities of highly organized criminals coordinating large and complex false claims.

Insurance is a contractual relationship in which an insurer party agrees with an insurance taker party or a policyholder on payment of a premium, to make monetary provision on behalf of an insured party to cover, after a formal claim has been filed by a claimant party, the loss of an insurable interest due to one or more future, well-defined, but uncertain events. At any time, all parties transacting in the context of this contract are legally required to act with the utmost good faith toward one another, which obliges them to reciprocally disclose all material information known to them. A lack of good faith does not, however, as such, imply fraud. In legal terms, though its exact specification may vary across legal systems, fraudulent activity on behalf of any of the transacting parties generally requires the presence of at least the following elements: (1) material misrepresentation in the form of concealment, falsification or lie, (2) intent to deceive, and (3) aim of gaining an unauthorized benefit (Viaene, Dedene, 2004).

Insurance fraud can be:

- Insider versus outsider,
- Soft versus hard.

Internal fraud is committed by insiders of insurance industry, such as insurers, agents, brokers, managers and other insurer employees or representatives. This covers, for example, selling insurance without a proper license, embezzlement of insurance funds and obstruction of regulatory body investigations. External fraud is fraudulent activity on the part of outsiders of the insurance industry such as applicants, policyholders and claimants, sometimes perpetrated in collusion with insiders such as agents or brokers, or third-party service providers.

In this article, we do abstain from investigating the insider fraud, although it is becoming a serious problem to certain extent, especially when insider cooperates with outsider.

The label "soft" tends to be broadly associated with unwanted opportunistic behaviour of normally honest people. What behaviour exactly falls under this category is not always made explicit and depends on the stakeholder using the vocabulary, but it generally includes claimants seizing an opportunity to inflate the damages of an otherwise legitimate claim. The label "hard" tends to be associated with carefully premeditated and minutely executed scams to rip off insurance.

Fraud affects all types of insurance. The automobile or motor insurance branches are widely believed to be among those most affected by insurance fraud. All around the globe, approx. up to 10-15% of claims exhibit fraud indicators, however just up to 1% of fraud claims are uncovered (Holsheimer, 2005). This amount is too small for insurance companies to stay satisfied with their activities. Thus, more efforts are needed to detect fraud, especially in the post-crisis time, when everyone looks upon their finances.

Insurance companies were used to apply the single policy in combating fraud. However, according to recent research, the opportunistic (soft one) and the organized (hard one) may require different and complex polices to reduce the cases of fraud.

Because insurance claims fraud involves taking advantage of the insurer's contractual promise to pay a certain amount of losses in certain circumstances, it differs from other common situations of consumer dishonesty such as tax evasion, pilfering from an employer, or shoplifting. This unique contractual relationship has important implications for the character of claims fraud and the ways in which insurers and societies attempt to deal with it. Some have argued that insurance fraud is an example of a created crime, because it is determined by the terms of an insurance contract and the strength of their enforcement (Tennyson, 2008).

3.2. Roots of fraud

However, to understand the nature of fraud, we shall get even deeper, to the sociology of dishonest consumer behaviour. There are a few approaches to this.

One of the widely used ones is based on Danish sociologist J. Goul Andersen's empirical study of Danish morality, done in 1998, serving as a point of departure, where he described the importance of morality for breaking of legal rules and discussed if observing of law can be influenced by reinforcement of morality (Andersen, 1998).

From sociological point of view, insurance fraud could be explained by following one or more approaches, such as:

1. *Macro-morality.* Classical sociology predicts a growth of cynicism and egoism in modern societies, and modernization theory talks, similarly, of a moral decline, referring to increasing hedonism, narcissism, to dissolution of the moral basis of society, and to relativism. *Andersen* research is of particular interest here, since he explores potentially dishonest insurance customer behaviour as one among several comparable disputable behaviours. According to him, honest and dishonest insurance customer behaviour reflects how the sociocultural climate may have worsened or just changed and also reflects changes in the mix or balance of morality-free cognitive expectations and moral-normative expectations.

2. *Industry-specific*. Another approach to consumer dishonesty could be to look at what goes on inside the insurance industry and then to look at how this could influence what insurance customers think and do. The question is whether insurance industry gets the customers it deserves and *vice versa*; and whether the insurance customers and the insurance industry have interdependent moralities (Brinkmann, Lentz, 2006).

3. *Moral heterogeneity.* Furthermore, it could be one more, widely exploited sociological approach to consumer fraud, which could label moral heterogeneity or moral inequality approach. It tells of horizontal and vertical groupings of individuals in modem and post-modern societies, which could differ by their morality and values (Giddens, 2001).

In 2006, *Brinkmann* and *Lentz* made an attempt to test the moral heterogeneity approach, by completing the research among Norwegian and German insurance consumers to define their clusters by homogeneous insurance consumers groups, regarding the undertaken fraud issues. They determined the typology of insurance consumers, reflecting theirs morality, attitude and value set, i.e. consumer were divided into:

- Critics, having high tolerance for fraud,
- Conformists, fairly tolerant of insurance fraud,
- Realists, may feel that some behaviours are justified depending on the circumstances,
- Moralists, believing that fraud is unacceptable.

The research provided interesting insights based on acceptance of and possible reactions to insurance fraud, by finding the differences not only between the four groups of respondents, but also between the two countries. However, the results, if they are reliable, tell nothing good for insurance. First of all, although European countries are supposed to develop the European identity based on European-wide values, the consumer groups in Norway are too different compared to Germany, although the aggregate results

are almost the same, i.e. 69% of all consumers had fraud experience in Norway, and 63% – in Germany. Secondly, consumers of all 4 types used to commit fraud, even the moralists, which means that there might be another explanation for consumer fraud than just the heterogeneity of values and moral norms (Table 3).

Table 3

Fraud experience in consumer groups, in % of total in the group

Consumer groups/fraud experience	Norwegians		Germans	
	No, %	Yes, %	No, %	Yes, %
Critics	6	94	29	71
Conformists	38	62	33	67
Realists	55	65	55	46
Moralists	20	50	25	75
All	31	69	37	63

Source: Brinkmann and Lentz, 2005

4. Insurance fraud in Denmark

In Denmark, almost any adult of 18+ years is insured by an insurance company, some of them have several insurance agreements. According to the statistical data on household expenditures, in 2007 an average household in Denmark spent 15 399 DKK per year on insurance and other services[1], which comprised 5% of annual household expenditure (Statistical Yearbook, 2010). These expenditures are increased, since in 2001 they were equal to 9 707 DKK and 4.2% respectively. The prices of insurance services in 2009 increased by 47% compared to 2000. Average annual household expenditures in 2007 comprised 308 033 DKK.

Denmark is among the leading countries of Europe in respect of insurance market development. Insurance density in Denmark is one of the highest in Europe. The country took the 5-th place in 2009, among 33 countries of CEA, by insurance premiums per capita, which, in 2009, amounted to approx. €3500 per capita. Insurance premiums in Denmark make about 9% of GDP. The investments of insurance companies account for about 100% of GDP of Denmark.

In 2009, there were 187 insurance companies in Denmark. The number of insurers in this country slightly decreased, as in 2001 there were 252 of them. Denmark has over 16 000 people employed directly in insurance sector. The number of employees has been increasing steadily, starting from 13 834 in 2000.

However, the Danish insurance industry is not an exception with regard to the widely spread fraud of consumers. Without a detailed investigation it is hard to tell the precise impact upon the economy as well as what the underlying sociological reasons of it are, i.e. if this is the reflection of macro-morale of the society, if this is industry-specific, or if this is the reflection of heterogeneity of society. However, we will try.

4.1. Analysis of fraud cycle

Experts of economic crime, specializing in fraud detection and deterrence, find that the frequency of fraud is a cyclical phenomenon (Singleton, Singleton, 2010). Besides, new frauds lead to new or modified anti-fraud measures, which lead to innovations in fraudulent activities, which lead to updated anti-fraud measures, and so on. The fraud environment can be and often is viewed as a pendulum swinging from one extreme to the other with little time in between at the proper balancing point. This cycle is a natural result of human nature, business cycles, and the nature of legislation and regulation. The cycle can certainly be influenced and controlled to some extent, but it will probably never cease.

What is the nature of fraud cyclicality, i.e. is it exogenous or endogenous? Some research suggests that it is exogenous. It could be explained by the so-called *public's short memory,* resulting in cyclical patterns of fraud over time (Lui, 1986). According to *Lui,* when corruption becomes more prevalent in the economy, effectively auditing a corrupt official becomes more difficult, what leads to reinforcement and variations in government effectiveness to deter corruption. A related topic, the intertemporal variation in business ethics, was studied by *Noe* and *Rebello* in 1994. They modelled the dynamic interaction between business ethics and economic activities, generating cycles of ethical behaviour. Another approach, which we will use, interrelates certain types of frauds with the business cycle. However, the shortcoming of exogenous models of fraud cyclicality is that they focus on supply side of it. And what about the demand side, and what about the models suggesting that cycli-

[1] Here we assume that insurance expenditures could account for 90% of the group expenditures (insurance and other services), since the services like repair, traveling, etc. are included in different expenditure categories. Other services here could mean mostly other financial services.

cality of fraud is endogenous? According to research done by a group of scientists in 2011, the demand of fraud could be stimulated by the human factor, i.e. by reduced vigilance (Gong, Preston McAfee, Williams, 2011). When fraud is prevalent, vigilance pays. Increased vigilance reduces the return to fraud, thereby decreasing fraud. The reduction in fraud reduces the return to vigilance, thereby increasing fraud.

The researchers have also suggested that cyclicality of fraud could be reduced by two actions:

- Eliminate frauds on the demand side,
- Sustain frauds on the supply side.

Strategic interaction between the demand and supply forces of fraud causes the cyclical path to be robust to outside shocks, such as government intervention. Fundamentally, cyclicality is caused by market player's non-reinforcing responses to external shocks under stable dynamic systems. However, in general, we do still lack empirical evidence to state on the cyclicality of fraud and on the nature of it. Unlike business cycles, for which data are collected systematically, fraud cycles are more difficult to follow up due to their fundamentally illegal nature.

Since we will stick to the analysis of a business cycle, what is it? The term "business cycle" or "economic cycle" refers to economy-wide fluctuations in production or economic activity over several months or years. These fluctuations occur around a long-term growth trend, and typically involve shifts over time between periods of relatively rapid economic growth and periods of relative stagnation or decline.

Business cycles are usually measured by considering the growth rate of GDP. Despite being termed cycles, these fluctuations in economic activity do not follow a mechanical or predictable periodic pattern.

In the rest of this section, we will demonstrate how the business cycle of GDP interrelates with that of life and non-life insurance premiums in Denmark.

Table 4 below presents the growth rates of GDP, non-life insurance and life insurance over the years 2001-2009, measured as ratios, where above 1 means an increase compared to the previous year, and below 1 means a decrease compared to the previous year.

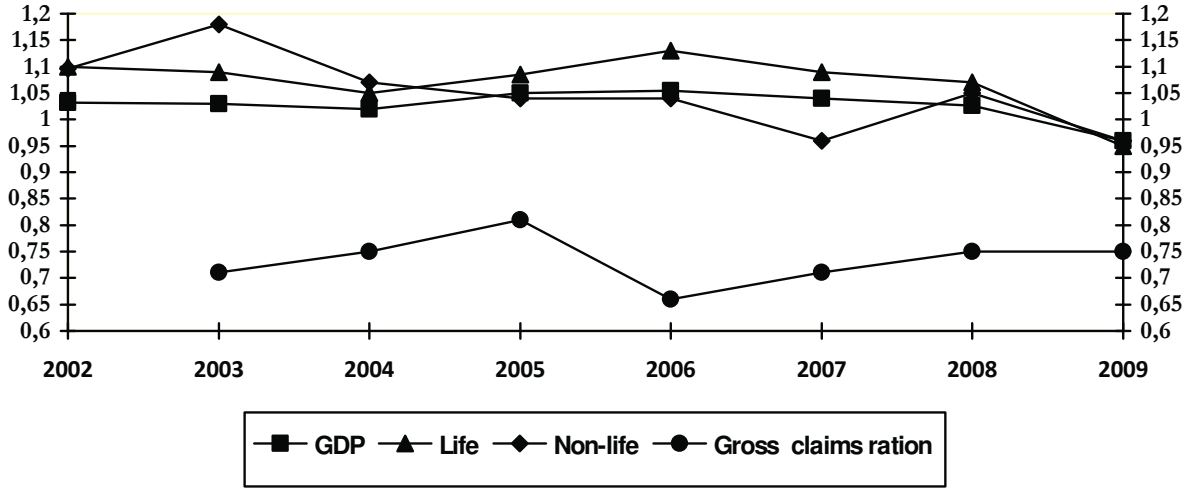
Table 4

Growth rates of GDP, non-life insurance and life insurance in Denmark, ratio

	2002/01	2003/02	2004/03	2005/04	2006/05	2007/06	2008/07	2009/08
GDP	1.032	1.03	1.02	1.05	1.055	1.04	1.026	0.96
Non-life	1.096	1.18	1.07	1.04	1.04	0.96	1.05	0.96
Life	1.1	1.09	1.05	1.085	1.13	1.09	1.07	0.95

Source: own calculations

Figure 2 below presents the data on growth rates from the Table 4 in a visual format as well as the gross claims ratio, measured as coefficient to 1, being the gross premiums of insurance companies.



Source: own calculations

Fig.2. Comparison of GDP and insurance premiums growth ratios with the tendencies of claims ratio, in Denmark, 2001-2009

What do we see here? The picture is quite mixed up. It seems that tendencies of GDP growth are related to those of life insurance, however, the growth rates of non-life insurance used to differ from those of GDP quite significantly. The same fits for gross claims ratio. Until year 2007, it was fluctuating following its own character, i.e. increasing and decreasing. However, in the last 2 years (2008-2009) the growth rates both of GDP and of gross premium were decreasing, and the claims ratio was increasing. This means that at least in the last 2 years of economic crisis the tendencies of insurance claims demonstrated being counter-cyclical to those of GDP and gross premiums. The premiums of life insurance are pro-cyclical to the GDP growth, similar to the premiums of non-life insurance in years of crisis.

This means that in time of economic instability, Danish insurance companies shall be cautious, by paying more attention to consumer retention and to detection of fraud. The counter-cyclical nature of claims could mean the counter-cyclical nature of fraud.

4.2. Influence of fraud on Danish economy

Since insurance fraud became an urgent issue for the *Forsikring & Pension*, we will try to make approximate estimates of its influence upon the Danish economy. However, again, this sort of estimates would require more precise data than those we have, especially not just on what the exact percentage of inflated or falsificated claims received by the Danish insurance companies is, but also on how much, compared to the actual value, these claims are inflated. We guess this hard data is not available, since on average through the world, insurance companies are able to recognize only 1% of all inflated or falsificated claims. It is also known that on average about 10-15% of claims that insurance consumers present worldwide have elements of fraud (Holsheimer, 2005). But again, we do not know how much these claims are inflated.

Taking this into account, i.e. that there are many missing variables, we will use the method of *top-down* estimates and use the data of the developed countries, which we have[2].

What we have are the hard data for 3 countries:

- *United Kingdom*. It is known from the Association of British Insurers (ABI) that opportunistic fraud carried out by individual customers alone costs over £800 million a year. In total, the ABI estimates that insurance fraud costs £1.6 billion annually. Other estimates are much higher, and according to the Financial Services Authority, insurance fraud as a whole costs the UK economy around £14–20 billion a year (KPMG, 2007).
- *the USA*. It is also known from the Coalition Against Insurance Fraud (indication to Arizona Insurance Council, and to National Insurance Crime Bureau) that insurance fraud costs Americans approximately $30 billion a year, although some articles indicate $80 billion a year (Azinsurance, 2011).
- *Germany.* The German Insurance Association estimates that insurance fraud costs Germany around 4bn euro every year (KPMG, 2007).

We will compare these economies, and the portion of indicated insurance fraud as percent of GDP. We took indicator of GDP, rather than population, since insurance penetration is related to amount of GDP rather than to the size of population. Then, using this data as the starting point, we will estimate fraud in Denmark. The considerations are presented in Table 5 below.

Table 5

Estimation of value of insurance fraud in Denmark, with GDP data for 2009

	GDP, 2009, m. $	Available insurance fraud estimates, m. $	Insurance fraud as % of GDP	Insurance fraud penetration
USA	14 119 000	30 000 (80 000)	0.2 - 0.5%	About 10-15% of all claims
UK	2 174 530	2 600	0.1%	About 10-15% of all claims
Germany	3 330 032	5 700	0.17%	About 10-15% of all claims
Denmark	309 596 (m. $) 1659705 (m. DKK)	0.309 – 0.618 (m.$) 1 607 – 3 213 (m. DKK)	0.1- 0.2%	About 10-15% of all claims

Source: own calculations, based on various sources

[2] We have used this method successfully, as advanced by the German experts from ASA institute, in estimating some of the data for calculation of economic accounts for agriculture, what was well assessed by the Eurostat

As we can see, insurance fraud has similar, although slightly different impact upon economies in the USA and in Europe. In the USA it amounts to about 0.2 – 0.5% of GDP, however in the United Kingdom – just to about 0.1% of GDP, and in Germany – to 0.17% of GDP. Again, these estimates are rather approximate, because only the GDP data are available as hard, i.e. reliable, however, we do not know well how the estimates for fraud in the USA, Germany and the UK were derived. Nevertheless, they could be logical, since the portions of GDP are more or less comparable.

We have assumed that fraud in Denmark could amount to between 0.1% of GDP (UK estimate) and 0.2% of GDP (the USA estimate). Knowing that GDP in Denmark was equal to 1 659 705 million DKK (309 596 million $) in 2009, we may predict that taking into account the same portion of inflated or falsified claims as in the USA and the UK (10-15%), as well as the equal amount of claims inflation or falsification, insurance fraud in Denmark could result in between 1 607 million DKK and 3 213 million DKK per year[3]. This is about the annual output of the entire fishing industry in Denmark (2 862 m. DKK in 2009). Furthermore, this amount results in huge damages for Danish insurance industry. Taking into account that claims paid by Danish insurance companies amounted to 38 627 million DKK in 2009, the damage due to fraud could constitute between 4% and 8% of claims value.

But, again, these are just very rough estimates. Moreover, we did not take into account the indirect expenses of fraud, i.e. the resources, which are used for prevention, detection and investigation, and which can impose a substantial economic cost on insurance companies, both directly and indirectly. We could assume that like in the UK case, the entire costs of insurance fraud for Danish economy could be by about 10 times higher than just the costs of inflated claims, i.e. could equal to about 16 070 – 32 130 million DKK, or to 1-2% of GDP. For comparison, in 2009, net profit of Danish insurance industry amounted to 10 178 million DKK.

The exercise of this section revealed the problems related to methodology of fraud estimations. We are afraid there is no officially approved methodology on the EU, world, or even the national level. This happened because of the hidden nature of fraud it is hard to obtain the data[4].

[3] Out of this value, 30-50% could be organized fraud, and the remaining – opportunistic fraud.

[4] The authors participated in the project to measure the black economy. Then they applied very complex methods, including the hard data based assessments, also the soft data methods, by asking, for example, the tax inspectors to tell, based on their experience, what share of revenues the manufacturing companies are used to hide. The method was well assessed by the Eurostat.

Nevertheless, more coordinated attempts shall be made to measure fraud. After all, we need to know the extent of the problem to effectively solve it. Without knowing the size and scope of the problem, how can we know how much and where to deploy the resources?

We may start, first of all, by deciding on the classification of cost of fraud. The research done in the UK suggests that fraud could be grouped as follows (Levi, Burrows, Fleming et al., 2007):

- Fraud losses (transfer costs): direct losses as a result of fraud,
- Costs of preventing fraud before the event (and other anticipatory costs),
- Costs of responding to fraud after the event: The costs in response to fraud include costs of the criminal justice system (including police, prosecutors, courts, prison service) and of civil remedies in response to fraud.

The costs of fraud may be estimated by bottom-up and/or top-down methods. The *bottom-up* approach seeks to evaluate the costs of fraud from the perspective of an insurance company. An example of the bottom-up method might be the use of administrative data. The *top-down* approach seeks to estimate the economic implications of fraud from a national perspective. This is the approach we used in our estimations in this section, i.e. based on nation-wide macroeconomic data.

For the *bottom-up* estimates the insurance companies shall take into account the costs we just indicated above, i.e. direct losses incurred by the companies, resource costs of fraud prevention, and investigative/legal costs of reactions to fraud. *Furthermore*, there will always be externalities to be taken into account. The rise in the price of a specific product as a result of a fraud-specific risk premium could reduce market demand to the extent of the price sensitivity of demand for the product, as well as result in loss of consumer surplus (welfare cost) to the consumer.

For estimation of fraud a variety of data sources could be used. These could be global surveys of insurance fraud, from which data for Denmark could be obtained; national level surveys as we have from *Forsikring & Pension*; national administrative data collection exercises compiled by *Forsikring & Pension*; data on fraud trends derived from the value of fraud cases heard in courts; fraud studies derived from samples of activity; media analysis; studies of fraud against individuals, based around the reported cases, etc. Nevertheless, use of these data shall be deliberate and approved by the experts, along with methodology of fraud estimation.

Conclusions

Based on the results of the article, we draw the following conclusions:

1. Insurance industry worldwide is well developed, accounting for about 7% of the world GDP. In 2009, insurance premiums worldwide accounted for 4 066 billion USD.

2. The European insurance market has been experiencing steady growth in 2001-2007, accounting for about 40% of world premiums. European insurance industry recovered and grew by 2.9% in 2009 compared to 2008, driven by life insurance sector that accounts for more than 60% of all premiums.

3. Denmark is among the leading countries of Europe in respect of insurance market development. Insurance density in Denmark is one of the highest in Europe. The country took the 5th place in 2009, among 33 countries of CEA, by insurance premiums/per capita, which, in 2009, amounted to approx. €3500 per capita. Insurance premiums in Denmark make about 9% of GDP. The investments of insurance companies account for about 100% of GDP of Denmark.

4. In 2009, there were 187 insurance companies in Denmark. The number of insurers in this country slightly decreased, as in 2001 there were 252 of them. Denmark has over 16 000 people employed directly in the insurance sector. The number of employees has been increasing steadily, starting from 13 834 in 2000.

5. Insurance development largely depends on the tendencies of GDP in the countries of CEA. The richer the country, the higher the premiums. The Pearson's correlation coefficients show the tight relationship between the value of GDP and the value of written premiums in the given years (2001-2009) for 33 countries, members of CEA. The correlation is stronger for non-life insurance, reaching 0.94-0.98, and weaker (but still very high) for life insurance, reaching 0.73 – 0.90 in different years.

6. According to the statistical data on household expenditures, in 2007 an average household in Denmark spent 15 399 DKK per year on insurance and other services, which comprised 5% of annual household expenditure.

7. In Denmark in 2001-2009 the tendencies of GDP growth were related to those of life insurance, however, the growth rates of non-life insurance used to differ from those of GDP quite significantly. The same fits for gross claims ratio. Until year 2007, it was fluctuating following its own character, i.e. increasing and decreasing. However, in the last 2 years (2008-2009) the growth rates both of GDP and of gross premium were decreasing, and the claims ratio was increasing. This means that at least in the last 2 years of economic crisis the tendencies of insurance claims demonstrated being counter-cyclical to those of GDP and gross premiums.

8. Fraud in Denmark may amount to between 0.1% and 0.2% of GDP. Knowing that GDP in Denmark was equal to 1 659 705 million DKK (309 596 million $) in 2009, we may predict that insurance fraud in Denmark could amount to between 1 607 million DKK and 3 213 million DKK per year. Taking into account that claims paid by Danish insurance companies amounted to 38 627 million DKK in 2009, the damage due to fraud could constitute between 4% and 8% of claims value.

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Dabartiniai draudimo ekonomikos aspektai

Santrauka

Draudimas – tai finansinių paslaugų dalis. Nors visų pirma jo funkcija yra teikti visuomenės saugos paslaugas, siekiant sumažinti finansinės, fizinės, socialinės ar su aplinka ir sveikata susijusios rizikos poveikį, tai irgi ekonomikos dalis, siekianti gauti pajamų ir pelno. Draudimas svarbus pasaulinės ekonomikos plėtrai, nes jis sukuria beveik 7 proc. bendrojo pasaulinio vidaus produkto (BVP). Tačiau draudimo poveikis realiai ekonomikai būtų didesnis, jei ne nuolat kylanti sukčiavimo draudime problema, ypač suintensyvėjusi per pastarąją finansų ir ekonomikos krizę.

Straipsnis paremtas autorių atlikto tyrimo Danijos draudimo ir pensijų įmonių asociacijos užsakymo pagrindu, kurio pirminis tikslas buvo ištirti sukčiavimo draudime problemą. Straipsnis turi dvi tarpusavyje susijusias dalis, kuriose nagrinėjama bendra draudimo sektoriaus padėtis pasaulyje ir Europoje, ypač draudimo pajamų ir BVP augimo ryšys, taip pat sukčiavimo draudime ciklišKumas Danijoje ir sukčiavimo masto poveikis Danijos ekonomikai.

Europos draudimo rinka 2000–2009 m., nepaisant krizės, nuosekliai augo. Ši rinka nežymiai susitraukė tik 2008 m., bet vis tiek užėmė apie 40 proc. pasaulio rinkos. Danija yra viena lyderiaujančių Europos šalių pagal draudimo sektoriaus išsivystymo lygį. 2009 m. šalis, pagal draudimo pajamas, tenkančias 1 gyventojui, užėmė 5 vietą tarp 33 Europos draudimo ir perdraudimo įmonių federacijos (CEA) šalių, kurios buvo lygios 3500 €. Danijos draudimo sektoriaus pajamos yra lygios apytiksliai 9 proc. šalies BVP, o draudimo įmonių investicijos – net 100 proc. Danijos BVP. 2009 m. Danijoje iš viso veikė 187 draudimo kompanijos, kuriose dirbo daugiau nei 16 000 žmonių. 2007 m. vidutinio Danijos ūkio išlaidos draudimui siekė apie 5 proc. metinių išlaidų ir buvo lygios 15 399 DKK per metus.

Iš pirmo žvilgsnio atrodo aišku, jog draudimo sektoriaus pajamos auga kartu su BVP, tačiau vis dėlto, siekiant įsitikinti šio ryšio tikrumu, atlikta BVP vertės ir draudimo pajamų vertės koreliacijos analizė pagal 33 CEA šalis 2000–2009 m. Pearsono koreliacijos koeficientas parodė glaudų teigiamą šių rodiklių ryšį. Koreliacija buvo stipresnė, matuojant jos ryšį tarp BVP ir negyvybės draudimo pajamų, siekdama 0,94–0,98, ir silpnesnė, bet pakankamai stipri tarp BVP ir gyvybės draudimo pajamų, siekdama 0,73–0,90 įvairiais metais. Detalesnė analizė rodo, jog nors negyvybės draudimo pajamos taip pat mažėja ekonomikos nuosmukio metu, bet jos mažėja daug lėčiau, todėl gali kurį laiką savotiškai amortizuoti BVP smukimą. Gyvybės draudimas ekonominės krizės metu svyruoja gana nenuspėjama kryptimi: iš pradžių smarkiai krenta, o po to išauga. Tačiau toks netolygumas gali kelti grėsmę draudimo įmonių gyvybingumui, nes vienu metu gyvybės draudimo įmokas nutraukus daugeliui žmonių, jos gali atsidurti ties bankroto riba.

Analizuojant Danijos ekonominį ciklą, galima teigti, jog 2001–2009 m. Danijos BVP augimo tendencijos buvo glaudžiai susietos su gyvybės draudimo pajamų augimo ciklu, tačiau negyvybės draudimo atveju buvo pastebėtas pajamų augimo tendencijų nuokrypis nuo BVP augimo tendencijos, kaip ir draudimo išmokų atveju. Iki 2007 m. draudimo išmokų kreivė svyravo labai netolygiai, pagal savo pačios tendenciją tai išaugdama, tai smukdama. Tačiau pastaraisiais metais, t. y. 2008–2009 m. tiek BVP, tiek draudimo pajamų augimo tempai mažėjo, o draudimo išmokų didėjo. Vadinasi, draudimo įmokos ir sukčiavimo atvejai draudime turi priešciklinį poveikį, didėdami ekonomikos nuosmukio metu.

Apytiksliais skaičiavimais nuostoliai dėl sukčiavimo draudime gali svyruoti nuo 0,1 ir 0,2 proc. Danijos BVP, t. y. užimti panašią dalį kaip ir kitose išsivysčiusiose šalyse, tokiose kaip JAV, Didžioji Britanija ir Vokietija. Žinant, jog Danijos BVP 2009 m. sudarė 1 659 705 mln. DKK, nuostolių dėl sukčiavimo suma gali būti lygi 1 607 mln. – 3 213 mln. DKK per metus. Kadangi 2009 m. draudimo išmokos Danijoje siekė 38 627 mln. DKK, nuostoliai dėl sukčiavimo gali siekti 4–8 proc. išmokų vertės.

Pagrindiniai žodžiai: draudimas, ekonomikos ciklas, sukčiavimas.

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