Józef Garczarczyk
Marek Mocek
Iwona Olejnik
Department of Marketing Research
Poznań University of Economics

Business Tendency Surveys in Diagnosing and Forecasting the Market of Insurance Services in Poland

Abstract

The paper presents a business tendency survey applied to diagnose and forecast a business tendency in the insurance market in Poland in 1993-2004.

Firstly a development of this market is discussed in relation to the Polish economy as a whole. Subsequently we concentrate on the main methodological assumptions and organizational aspects of the pioneer business surveys in Poland which have been conducted since 1993 by the Department of Marketing Research of the Poznań University of Economics. The research has been conducted quarterly and is dedicated to about 400-450 insurance units (from life and non-life companies), represented by their headquarters and randomly selected subsidiaries all over Poland.

The applied questionnaire is discussed with a great emphasis on its structure and the scope of its research usage. The research results are presented in the form of simple indicators of economic situations and one synthetic index – the Poznań Index of Insurance Business Conditions (PIKU). Finally, some selected results which have been obtained for the accuracy of diagnosis and forecasts made for the Polish insurance market in 1993-2004 are discussed. Moreover, the effectiveness of a business tendency survey is also mentioned.

Key Words: business tendency survey, insurance market in Poland, situation in insurance market, synthetic index - the Poznań Index of Insurance Business Conditions (PIKU), forecast accuracy

1. Preliminary remarks

One of the results of market economy growth in Poland involves sudden changes in the area of financial services. Also, significant changes in the financial services market result from privatisation processes, the opening of the economy to foreign investors, departure from the monopoly nature of the financial sector, as well as Poland's

accession to the European Union and related adjustments of Polish legal regulations to the rules effective in the EU. The most important and largest components of the financial market in Poland include the banking and insurance sectors, investment funds and, in several decades' time, the newly created sector of open pension funds. The financial market is relatively young and growing and thus rather unstable and it is still shaping its image. The rate of economic changes and their low stability in Poland, as well as the fact that the system of official statistical information cannot keep pace with those changes, makes it difficult to diagnose and forecast business conditions in the market by way of standard quantitative methods (e.g. statistical and econometric). Therefore, interest is growing in qualitative methods.

This paper presents business condition tendencies in one of the key areas of the financial market, i.e. the insurance market. The first section shows the profile of development and changes which have taken place in this sector, so dynamically developing almost since the very beginning of market economy in Poland. The next section presents the methodology and results of pioneering research into business conditions in the Polish insurance market, which has been carried out by way of the Business Tendency Survey method. In the last section an analysis has been made using the BTS method to check the consistency between forecasts and diagnostic assessments. The business surveys have been conducted since 1993 by the Department of Marketing Research of the Poznan University of Economics (DMRP).

2. The Insurance Sector in Poland in 1993-2003

2.1. The role of the insurance sector and its development in the economy

One can observe a growth in the insurance sector based on market conditions in Poland only from the time when centrally planned economy transformed into a market one, i.e. since 1990. It was then that the Act on Insurance Activity allowed for the Polish insurance market to be demonopolised and privatised. Apart form introducing new business rules in the market, the Act also established new institutions of the insurance market (the Insurance Guarantee Fund, and the Fund for the Protection of the Insured)

The key and synthetic measure of the significance of insurance for the state economy is the share of insurance premium in GDP (the so-called penetration index). The value of this index in Poland grew from 1.83% GDP in 1991 to 3.04% in 2003; however, it is still far lower than in highly developed countries in the world (it is 9.1% on average in the OECD countries, 8.7% in the EU, 10.86% in Japan, and 9.39% in

North America)[1]. The average level of share of gross written premium in GDP in the past twelve years equalled 2.5% in Poland, of which 0.9% was in life insurance and 1.6% in non-life insurance.

The insurance premium of Polish enterprises accounts for an average of 0.21% of the total world market (ranked 32nd), of which 0.08% is in life insurance and 0,26% in the non-life insurance market. However, the share of the Polish insurance market in the European one grew from 0.33% in 1994 to approximately 0.7% in 2002 (ranked 18th)[2]. The role of Poland in the insurance market of the Central and East European countries is very significant and growing systematically. It has been reflected by the growth from 18.3% to 30.1% in the past eight years.

Notwithstanding the fact of the Polish insurance sector being not as mature as that, for example, in the EU countries, USA or Japan, its development is also shown in the growth of expenditure for insurance per capita. In Poland, insurance expenditure grew almost five times nominally from USD 37 to USD 167 in 1991-2003. However, despite a clear growth of expenditure for insurance per capita in Poland, the role of insurance in the average Polish citizen's wallet is still very low, as, the average annual expenditure per capita in the European Union amounted to USD 1.981, USD 2.105 in the OECD countries, USD 3.499 in Japan and USD 1.283 in North America.

One internal manifestation of the growth of the Polish insurance market is a steadily growing number of insurance companies operating in Poland. The number has grown over three times since 1990 (from 24 to 78 insurance companies in 2003). A more dynamic growth concerned the group of life insurance companies (from 5 companies in 1991 to 37 in 2003), than the non-life insurance ones (from 19 in 1991 to 41 in 2003).

2.2. Insurance premium

A sign of a rapid growth in the insurance market in Poland was a high rate of change in insurance premium. In 2003, written insurance premium amounted to over USD 6.380m in the whole insurance sector, which means that the insurance premium grew over fourteen times in the analysed period, and over 2.5 times in real terms. The average growth rate of insurance premium equalled as much as 34.1% (10% in real terms) in that period, while the growth rate of life insurance premium was much higher than in non-life insurance throughout the period (although premiums written in

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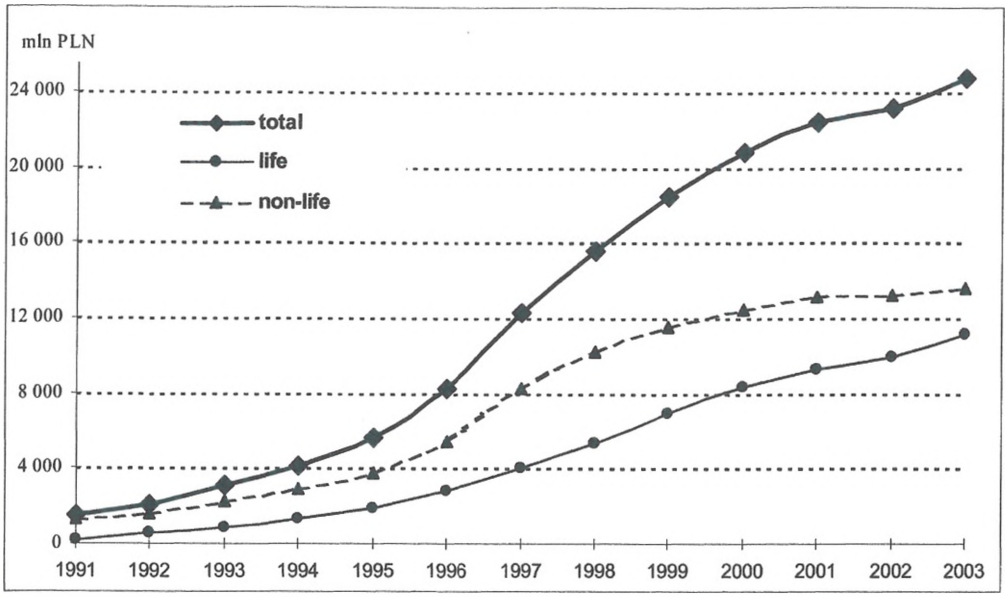
[1] Sigma, 2003, no. 8, p. 37.

[2] Sangowski, T. (2002), Polski rynek ubezpieczeń – stan i kierunki rozwoju, in: Ubezpieczenia w gospodarce rynkowej, Branta, Poznań, pp. 198; Sigma, op. cit. p. 31.

life insurance are lower than in non-life insurance). It is important to note that the growth rate of the insurance market in Poland declined visibly after 1997.

Figure 1. Gross written premium in Poland



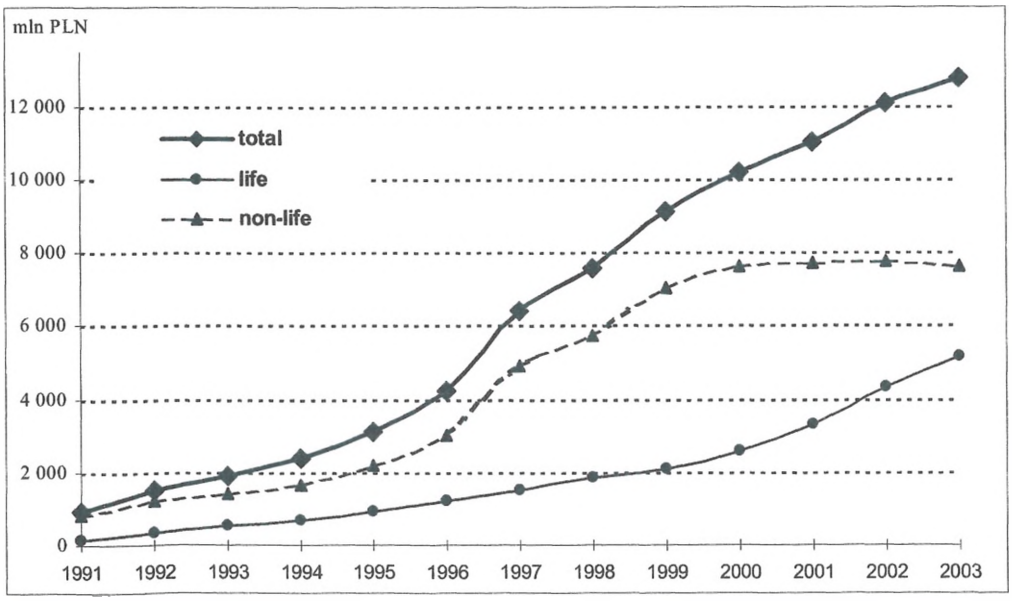
The past twelve years also saw a change in the structure of gross written premium. Namely, the share of life insurance in its total amount grew systematically (from 14% in 1991 to 45% in 2003), with a simultaneous decline of non-life insurance (a drop from 86% to 55%). The average annual growth of life insurance share in the portfolio of the sector equalled 2.5 percentage points, which exerted stabilising effect on the growth of the whole sector.

In the life insurance sector, life insurance made up the most significant group (48% in 2003), but the greatest dynamics was visible in the group of life insurance linked with an investment fund. However, in terms of the structure of gross written premium of life and non-life insurance companies, motor insurance enjoys a predominant share on a permanent basis (65.0% of the portfolio in 2003) and non-life insurance against Acts of God and property loss (nearly 20%). Instead, sickness and accident insurance policies, which are so popular in Western Europe, clearly play a lesser role in Poland (approx. 5%).

2.3. Insurance claims and benefits

The gross value of claims and benefits paid out by insurance companies amounted to nearly USD 3.300m (PLN 12.767m) which is indicative of the fact that the value has grown approximately 12 times nominally since the beginning of the development of the insurance sector based on market conditions. It is important to note that a lion's share (60%) of claims were paid on account of non-life insurance (nearly USD 2,200m in 2003).

Figure 2. Insurance claims and benefits in Poland



In 1991-2003 there was a steady decline in the net loss ratio for insurance activity in general. The index provides information on the proportion of earned premiums which insurance companies allocated for claims payments; it declined from 96.9% in 1991 to 57.4% in 2003.

3. The Methodology of Research Carried Out by the Business Tendency Survey (BTS) in the Insurance Market

Apart from research carried out in the banking sector[3], business tendency research in the insurance market in Poland is one of the research areas opened by the Department of Marketing Research, Poznań University of Economics, for the first time in Poland.

3.1. Organisation of the research and sample selection

Pioneering national business tendency research in the insurance market in Poland has been carried out quarterly on a continuous basis since the 2nd quarter of 1993. The research is run using the method of business tendency survey including 400-450 insurance companies representing both non-life and life insurance. The research is done in insurance company headquarters and their branches. In the selection of the sample the stratum method was applied and the strata were chosen according to three criteria:

1. type of insurance offered (life and non-life),
2. value of share capital and market share (large, medium, small),
3. region (Pomerania, the Centre, Wielkopolska, the South, the East).

The research is carried out by way of mail survey on a quarterly basis. Questionnaires are mailed about two weeks before the end of each quarter. In order to increase the response rate, a reminder letter is sent to those units which have not returned their questionnaires at the end of the quarter. Hence, the actual rate of response amounts to 40%-50%. It is a relatively favourable result, particularly in view of a quite unstable situation which is typical of an economic transformation period, a very high turnover rate of management staff, bankruptcy rate among insurance companies, as well as ownership transformations and mergers.

In an attempt to increase the response rate, managers participating in the research get access to the research results: a synthetic study is mailed to them following the end of the quarter and the results are also made available on the internet sites. Furthermore, selected participants in the panel are invited to science conferences devoted to financial market issues and organised regularly by the Department of Marketing Research.

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[3] For more information, see: Garczarczyk, J. and R. Matusewicz (2002), Economic Performance in the Polish Banking Sector. Accuracy Evaluation of the Results Obtained from the Business Tendency Survey, 26th CIRET Conference, Taipei.

Certain modifications are being planned in the research area and these concern, among other things, adjusting the research questionnaire to EU recommendations and using the internet to carry out the research on a parallel basis.

3.2. Questionnaire structure

The business tendency questionnaire used in the insurance market research is quite detailed and its two key sections can be distinguished.

The first section includes questions concerning general changes in the surveyed insurance unit with respect to the general financial situation, number of services rendered, number of clients served, number of insurance policies entered into, value of premiums revenue, number of losses, value of claims payments, number of clients cancelling further premium payments, and the loss rate.

The second, detailed section comprises questions concerning changes in particular products offered by insurance companies. These questions concern the number of insurance policies entered in, the value of premiums revenue, premium rate, the number of damages and value of claims. For the purposes of the research, insurance services were divided into the following groups and subgroups:

1. life insurance in general, including: group insurance, continued insurance, individual insurance, child provisions,
2. personal insurance, including personal casualty insurance, personal sickness insurance,
3. general property insurance, including: motor hull insurance, insurance against fire and other Acts of God, theft insurance, loss in transport insurance, apartment insurance,
4. third party liability insurance, including: compulsory farm insurance, motor TPL insurance, professional insurance,
5. financial insurance, including insurance of loans, receivables, hire purchase, leasing, customs and taxation debts.

A characteristic feature of the questionnaire is a five-point rating scale: significant decrease, slight decrease, no change, slight increase, significant increase (or significant decline, slight decline, no change, slight improvement, significant improvement), and in order to eliminate the impact of seasonality, ratings and forecasts are made by way of comparison with the same quarter in the previous year.

3.3. Result studying and presentation

The process of studying the collected data involves the setting of simple and composite business tendency indicators. Simple indicators concern individual categories and types of insurance service. Then, on the basis of the established simple indicators, composite indicators are set. A synthetic measure of business tendency in the insurance market is the Poznań Index of Insurance Business Conditions PIKU, being an arithmetical mean of 10 simple indicators, of which 5 are diagnostic and 5 forecasting ones.

$$\text{PIKU} = \frac{OWS + OPS + (-OWO) + (-OLR) + OSF + PPU + PLS + PNK + (-PWS) + PSF}{10}$$

Where:

OWS – balance of the number of services in the period i

OPS – balance of premiums revenue in the period i

OWO – balance of claims payments in the period i,

OLR – balance of clients cancelling in the period i

OSF – balance of financial situation in the period i,

PPU – balance of demand forecast in the period i+1

PLS – balance of new services forecast in the period i+1

PNK – balance of new clients forecast in the period i+1

PWS – balance of loss rate forecast in the period i+1

PSF – balance of financial situation forecast in the period i+1

The obtained results are analysed both in statistical and dynamic perspective and the comprehensive results are published quarterly in the form of bulletins: *Rynek usług ubezpieczeniowych. Koniunktura i przewidywania (The Market for Insurance Services: Business Tendencies and Predictions).*

4. Business tendency in the insurance market in Poland in the light of BTS research in 1993-2004

The research carried out by the method of business tendency survey (BTS) allows for a long-term analysis of business tendency fluctuations in the insurance market in Poland. The analysis has been made on the basis of simple business tendency indicators in such categories as:

1. number of clients served,
2. value of premiums revenue,
3. value of claims payments,

4. premium rate.

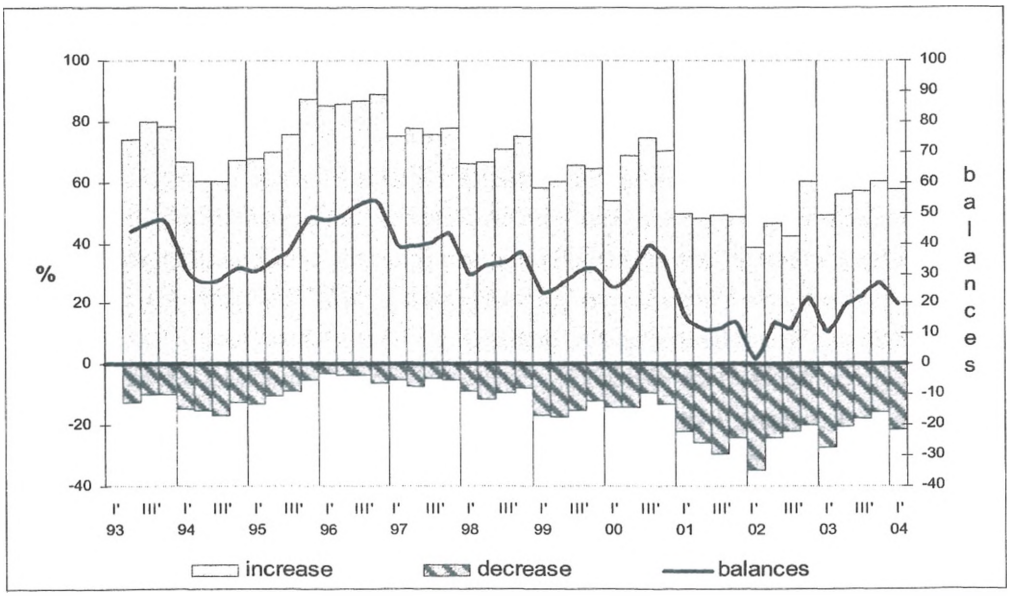
Furthermore, business tendency has been analysed using PIKU, the composite business tendency indicator for the insurance market.

It is important to note that the years 1993-2004 have seen clear evidence of business tendency fluctuations in the insurance market in Poland. Generally, two sub-periods can be distinguished: the period of an improving business tendency at the turn of 1996 and in early 1997 and a later period showing a decline in the insurance market growth rate which has lasted to date. At the same time, the market for life insurance enjoyed clearly better business tendency than the non-life insurance market.

4.1. The number of clients served

In the years 1993-2004, the number of clients served by insurance companies was affected by a relatively fluctuating growth rate. It was high until the end of 1996 (the balances of business tendency between +27 and +53); however, it began to decline steadily in the later period (a drop by 38 points).

Figure 3. The number of clients served (BTS)



A slight business tendency improvement was recorded only at the beginning of 2002, which has lasted to date (the balance increment by 20 points). As a result, the growth in the number of clients was clearly lower in early 2004 than at the beginning

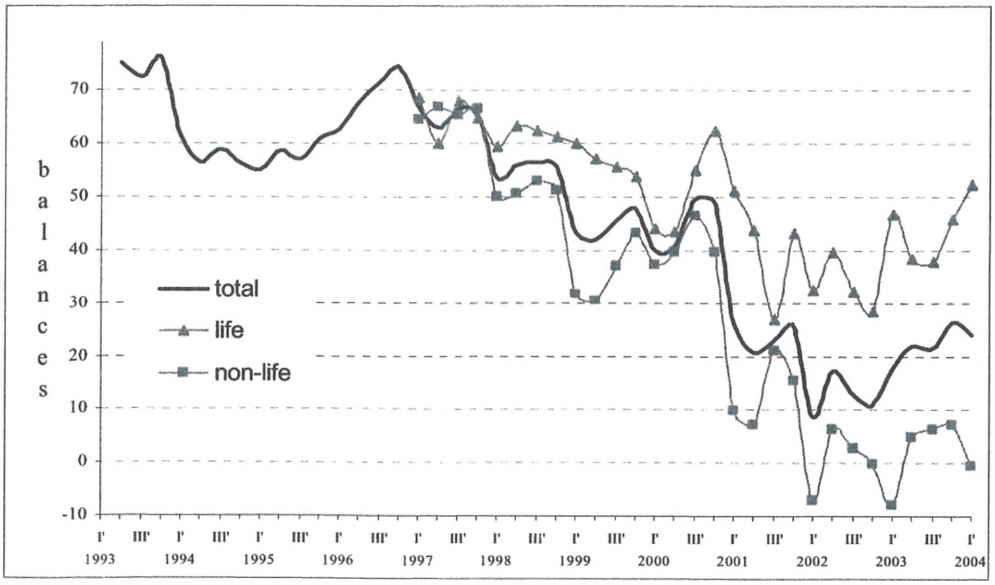
of 1993 (a decline by as much as 24 points). Hence, the amplitude of fluctuation in the whole reported period was large too and equalled as much as 51 points.

In the past 44 quarters, several development phases can be distinguished in the insurance market in terms of the number of clients served, which showed both progressive and regressive changes. Generally, six phases can be distinguished in the reported period: three of which showed an increasing growth rate in the number of clients served (a total of 24 quarters) and two phases with the growth rate declining (11 quarters in total); one stability phase was recorded, where the growth rate was low but growing steadily (the latest 8 quarters).

4.2. The value of premiums revenue

In the past 11 years the quarterly rate of change in premiums revenue in insurance companies was high yet declining, which also shows a relative decline in business tendency. As the amplitude of change in business tendency was high, the balances of business tendency remained in the range between +9 and +76.

Figure 4. The value of premiums revenue in Poland (BTS)



In the whole reported period, 4 development phases can be distinguished in terms of changes in premiums revenue, while the rate of change in the declining phases was definitely higher than that in the growth phases. In the first phase, a declining one (5 quarters long; balance decline by as much as 20 points), there was quite a long (10

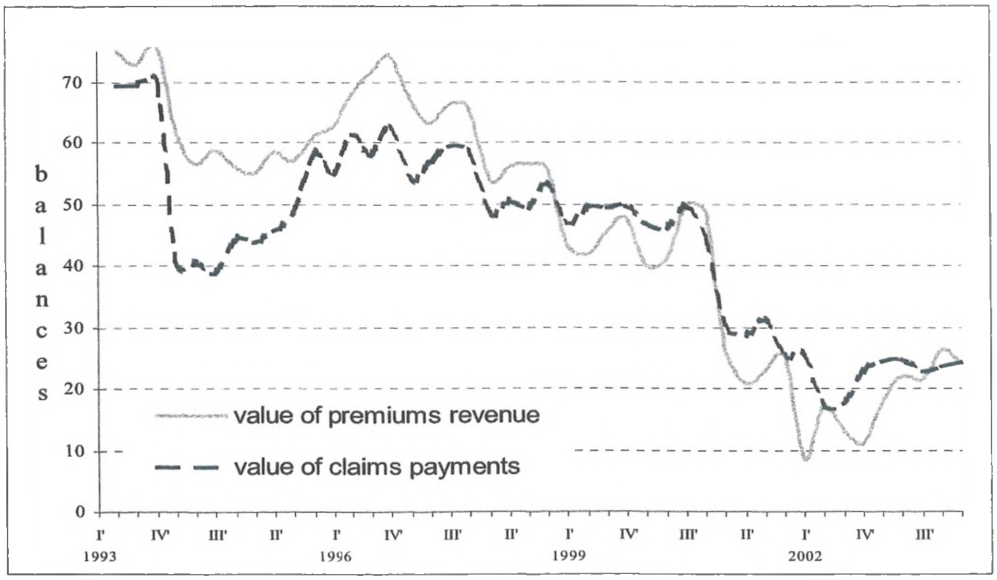
quarters) period of business tendency improvement in the insurance market in Poland, which showed a systematically increasing growth rate in premiums revenue (balance change by 19 points). However, in the next 21 quarters (as from the beginning of 1997) a strongly decreasing growth rate occurred in premiums revenue (balance decline by 70 points!). However, in the fourth phase (from the second quarter of 2002) a slight improvement in business tendency could be observed in this respect.

It should be noted that the growth rate in premiums revenue was much higher in the area of life insurance than in non-life insurance in the analysed period, and in the following quarters the gap grew systematically (gap between the balances up to 50 points). However, in both cases a declining rate of change in premiums revenue was recorded, which was a sign of decreasing business tendency in the insurance sector in Poland.

4.3. The value of claims payments

It is worth mentioning that the growth dynamics in claims payments was very high until 1997 (the balances of business tendency up to +70). Following that period, a clearly declining tendency occurred (balance decline by 38 points), which was arrested in the last 6 quarters. Although the rate of change in claims was lower than the increment of premiums revenue until 1999, claims payments began to grow faster than premiums revenue in the later period.

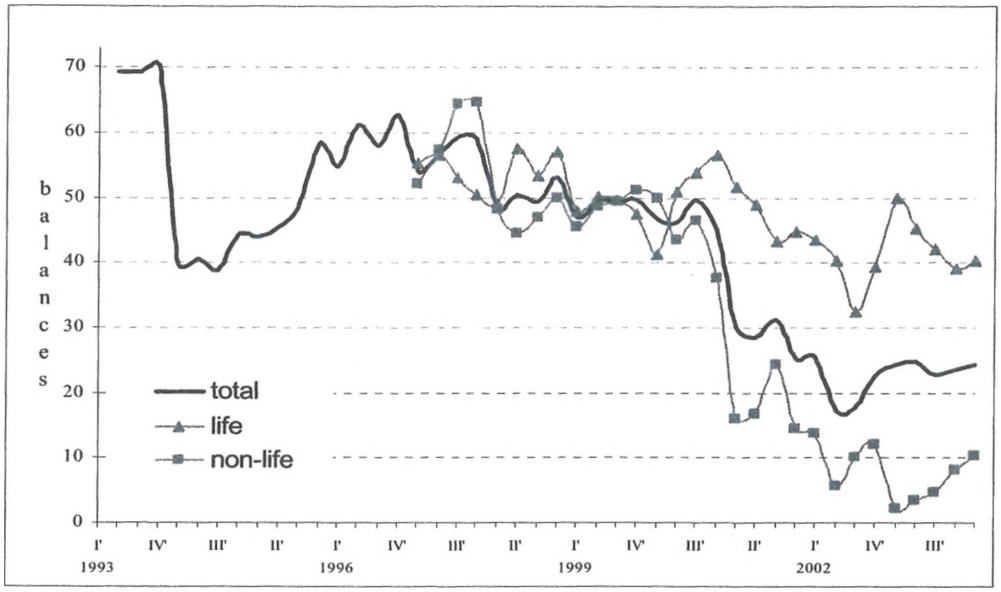
Figure 5. The value of premiums revenue and claims payments in Poland (BTS)



In 1993-2004, one can distinguish five phases in the area of growth rate changes affecting claims payments under insurance policies entered into in Poland. These were the following: one phase with a growing rate of change (13 quarters), two phases with a declining growth rate (9 quarters in total), and two stability phases (a total of 22 quarters) showing a slightly declining tendency.

It needs to be noted as well that not unlike in the case of premiums revenue the rate of change in claims payments under life insurance policies was higher than that under non-life insurance policies (by an average of 16 points throughout the whole period).

Figure 6. The value of claims payments in Poland (BTS)



Since early 1999, a systematic decline in the value of claims payments under non-life insurance can be observed (by as much as 50 points). Instead, the change in dynamics of claims under life insurance policies rode on a slightly varying, high but regressive level (balances between +58 and +45) in 1997-2001 and slowed down slightly as from 2002.

4.4. The premium rate

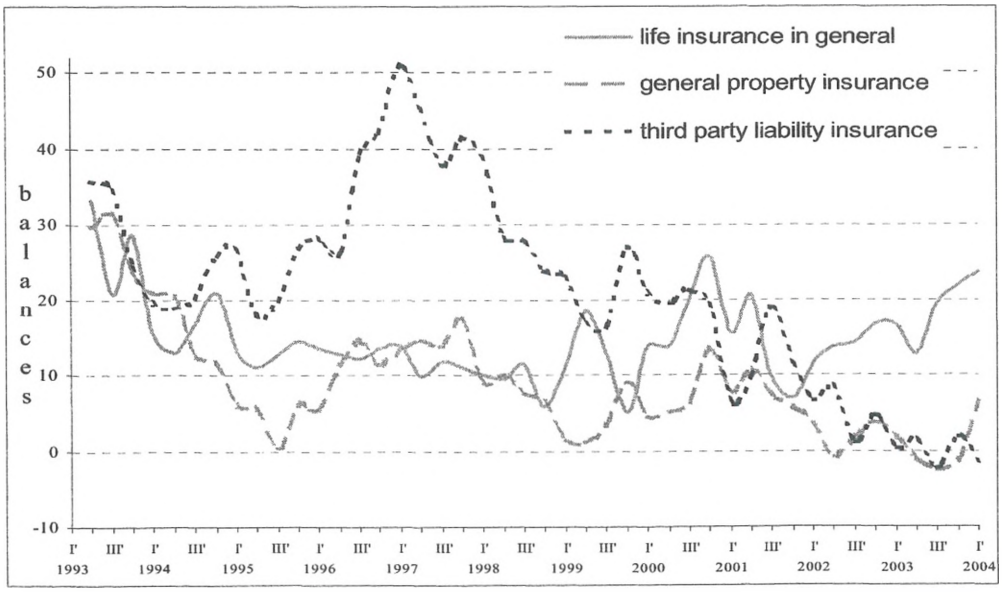
In 1993-2004, a moderate growth of the premium rate usually occurred (balances up to +35), while the growth rate was varying in time and dependent on insurance group.

Until the middle of 2000, the largest growth dynamics in the premium rate was observed in the group of TPL insurance, and it was mainly caused by motor TPL insurance. Only since the following quarter to date has the rate of life insurance premium been growing faster than that of TPL.

The rate of premium rate changes in individual insurance groups showed a different pattern of growth and decline phases as well as their duration. In the case of life insurance relatively slight and irregular fluctuations were recorded in business tendencies. Two phases can be distinguished: a phase with a declining rate of premium rate changes (up to 1999; a drop in the balance by 23 points), and a phase of a relative stability (24 quarters, the gap between business tendency balances was 15 points).

The lowest change dynamics of the premium rate, in relative terms, was recorded in the area of property insurance (balances were usually lower than +15), in the case of which two phases took place. First a declining phase occurred (10 quarters) followed by a stability phase (33 quarters long), with a minimum growth rate, which grew first and then declined.

Figure 7. The premium rate in Poland (BTS)



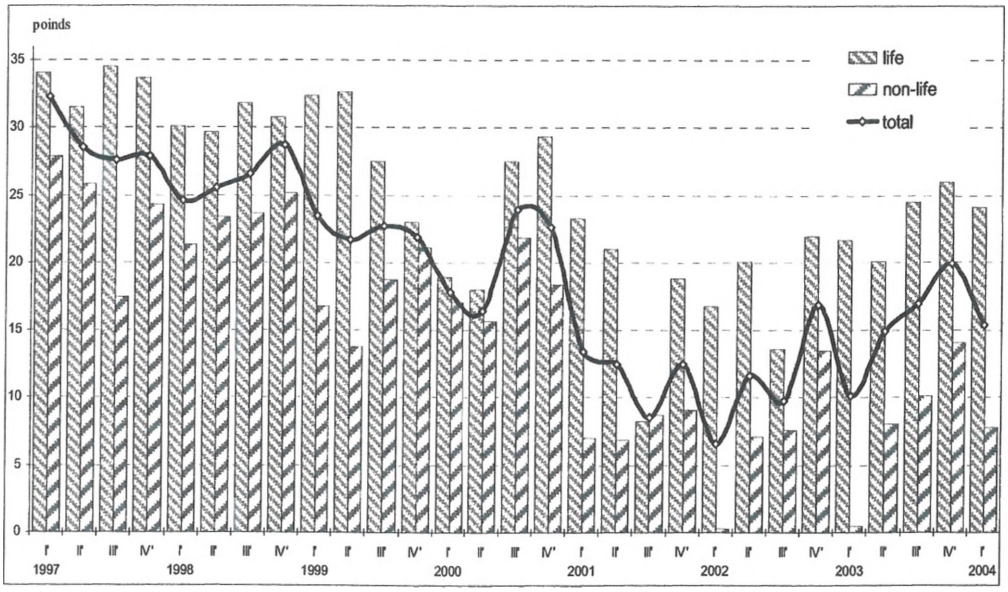
Still a different pattern was observed in premium rate changes in TPL insurance, where three phases can be distinguished. In the first phase, a very short one until the second quarter of 1995, a declining increment in the premium rate occurred (balance

decline by 18 points); in the next one, a growth phase (a total of 11 quarters), there was a significant increment of that value (by as much as 30 points), and a degressive trend has been observed in the last phase (balance decline by 52 points).

4.5. The synthetic index of business conditions in the insurance services market – PIKU

The synthetic assessment of the growth of the insurance market in Poland was carried out using the Poznań Index of Insurance Business Conditions PIKU. On the basis of its achieved values, it can be stated that the growth rate of the insurance market has been rather moderate (the PIKU ranging from +7 to +31 points) and varying in time over the past eleven years. Three stages can be distinguished: the first one, until year-end 1996, showed an increasing growth rate (PIKU increment by 14 points), the second stage showing a definite deterioration of business tendencies reflected by PIKU decline by as much as 31 points (from the beginning of 1997 to the end of the first quarter 2002), and the third one, from the second quarter 2002 to date, showing a slowly progressive growth rate in that market[4].

Figure 8. The Poznań Index of Insurance Business Conditions PIKU (BTS)



[4] For more information, see: Garczarczyk, J., R. Matusewicz and M. Mocek (2001),, Koniunktura na rynku bankowym i ubezpieczeniowym w Polsce, Akademia Ekonomiczna w Poznaniu, Poznań.

It needs to be noted that the deterioration of business tendency following the year 1996, reflected in a lower growth rate, was more evident in non-life insurance than in life insurance. In the years 1997 – 2004, business tendencies were clearly more favourable in the life insurance market (balances between +8 and +35) than in the non-life insurance market (balances between +1 and +28), with significant differences recorded since early 2001.

To recapitulate, an improvement of business tendency in the insurance market in Poland can be expected due to the following:

- Growing insurance awareness among the Polish people (being the result of, among other things, a reform of the pension protection system, and the health service crisis),
- Implementation of risk management standards in relation to the functioning within EU structures in the European market,
- Tax incentives (allowances).

On the other hand, threats to the development of business tendency improvement in the insurance market can ensue from:

- Lowering the nominal interest rates,
- Raising the reinsurance rates by reinsurers,
- Risk growth (catastrophe, terrorism),
- Continued long-term instability in the market.

5. Accuracy of the business tendency diagnoses and forecasts in the insurance market in Poland

In this part of the paper we have presented some selected results of analyses aimed at determining the extent to which the results of research made by way of the BTS method illustrate the actual pattern of changes, over time, in economic values concerning the situation in the insurance market in Poland.

The presented results of the research concern three economic values, which mainly determine business tendency patterns in the Polish insurance market. These are the following:

- value of premiums revenue,
- value of claims and benefits paid,
- loss ratio[5].

[5] The gross loss ratio is „the relationship between gross claims/benefits paid plus the change in provisions for unpaid claims/benefits over the gross premium earned". According to CSO

The patterns of the above variables were analysed in general and in terms of a cross-section of the life insurance and non-life insurance markets. The time range of the presented analyses covers the results of quarterly national research made by MRDP between the second quarter 1993 and the first quarter 2004 inclusive. Hence, the key empirical material used for the analysis is made up of 44-element time series of qualitative data in the form of business tendency balances[6].

The accuracy analysis of diagnoses was based on a comparison between the series of business tendency balances concerning ex post evaluations (BTS) and the series of properly prepared market statistics gathered by the Chief Statistical Office GUS (CSO). On the other hand, in order to analyse the degree of accuracy of forecasts resulting from the business tendency survey, the series of expired forecast balances are compared with relevant series of balances of ex post evaluations and with series of statistical data. The preparation of quantitative data obtained from GUS (CSO) for the purposes of the above analyses, mainly involved the transformation of absolute values concerning premiums revenue and paid claims into chain indexes of dynamics, by way of dividing their values in a given quarter by a relevant value recorded in the same quarter previous year.

In the research into the consistency of BTS results with statistics, the Pearson line correlation coefficient was applied as well as the direction quality indicator[7]. On the other hand, in the analysis of consistency between forecasts and ex post evaluations resulting from the business tendency survey, a set of Theilcoefficients and simple indicators of forecast errors (ME, RMSE) were used apart from the above tools[8].

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[6] Because of the insignificant changes in the range of the methodology of the Business Tendency Surveys which were carried out, in the case of the applied split between life insurance and property insurance, the data cover the period between the 1st quarter 1997 and the 1st quarter 2004 inclusive.

[7] Koniunktura gospodarcza w Polsce (1999), (red) Adamowicz, E., Prace i Materiały Instytutu Rozwoju Gospodarczego, SGH, Warszawa

[8] For more information, see: Zeliaś, A. (1997), Teoria prognozy, PWE, Warszawa; Cieślak, M. (1997), Prognozowanie gospodarcze, PWN, Warszawa

5.1. Consistency between the diagnosis balances (BTS) and market statistics data (CSO)

Generally speaking, the level of correlation coefficients between the balances of ex post evaluations and statistics is highly satisfactory (Table 1)[9]: there is a statistically significant and quite strong dependence in five out of six analysed variables[10]. Notably, the analysis of correlation taking into account leads and lags shows that, in the case of four of these values, ex post evaluations related to a given quarter are most closely correlated with market statistical data concerning the same period (the strongest correlation occurs between the series Bt and At). In consequence, the qualitative information resulting from the business tendency survey identifies, largely with a great deal of accuracy, current changes in the market values recorded in the statistical reports of the industry.

An analysis of the direction quality of changes in statistical data and ex post balance evaluations shows that quality assessments of the situation in premiums revenue are better than in the value of claims payments. Namely, the highest consistency is shown in assessments concerning premiums revenue in life insurance (the same change quality was observed in the qualitative indicator and the relevant business tendency balance, in almost 79% of the quarters); the assessments of premiums revenue in non-life insurance companies are only slightly less favourable (the indicator is lower by 7 points); however, consistency in claims payments in non-life insurance companies is relatively the lowest (the parallel series indicator – 50%).

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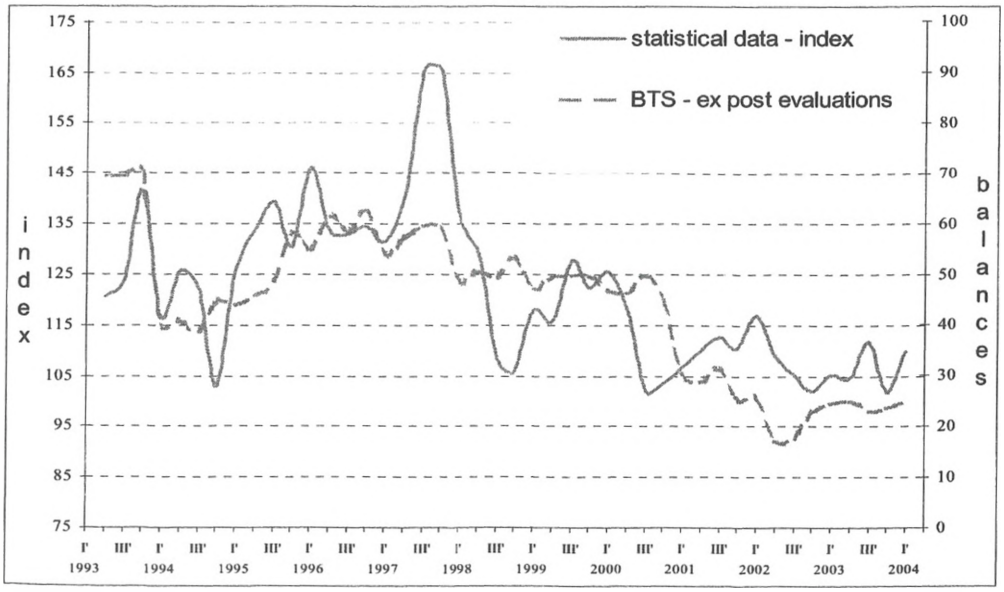
[9] Symbols used in the tables stand for the following: At – ex post evaluation of situation in the period t resulting from BTS (the balance in points); Pt – forecast of pattern development in the period t resulting from BTS (the balance in points); Bt – fixed base chain index of dynamics determining the level of a specific value in the period t against its level in the period t-4 (%); (At, Bt) - interpretations of a pair of symbols

[10] Correlation coefficient are significant for: $\alpha = 0.10$, $n = 29$, $r = 0.3124$ and $n = 44$, $r = 0.2515$; $\alpha = 0.05$, $n = 29$, $r = 0.3683$ and $n = 44$, $r = 0.2976$; $\alpha = 0.01$, $n = 29$, $r = 0.4716$ and $n = 44$, $r = 0.3848$

Table 1. Consistency between ex post evaluations of premiums revenue and claims payments (BTS), and business survey data (CSO)

Specification	Correlation coefficient		Directional accuracy ratio (in %)	
	Value of premiums revenue	Value of claims	Value of premiums revenue	Value of claims
Total				
Bt ; At-2	0.757	0.586	46.3	46.3
Bt ; At-1	0.790	0.630	40.5	52.4
Bt ; At	0.850	0.651	60.5	53.6
Bt ; At+1	0.853	0.615	64.3	47.6
Bt ; At+2	0.846	0.620	48.8	48.8
Life				
Bt ; At-2	0.796	0.127	65.4	34.6
Bt ; At-1	0.762	0.151	44.4	59.3
Bt ; At	0.856	-0.027	78.6	60.7
Bt ; At+1	0.800	-0.269	50.0	51.9
Bt ; At+2	0.797	-0.427	61.5	42.3
Non-life				
Bt ; At-2	0.662	0.606	38.5	53.8
Bt ; At-1	0.708	0.699	37.0	55.6
Bt ; At	0.819	0.751	71.4	50.0
Bt ; At+1	0.811	0.730	50.0	63.0
Bt ; At+2	0.770	0.684	38.5	65.4

Figure 9. The value of claims and benefits paid – diagnosis (CSO and BTS)



It should also be noted that whereas in the case of premiums revenue in both life and non-life insurance the highest direction consistency of quarterly changes clearly occurs for the parallel series (Bt, At), in the case of market-wide premiums revenue the highest consistency occurs in the series of diagnostic balances lagged by one quarter. That means that opinions concerning the turning point in the direction of the observed tendencies are more often lagging behind than concurrent with the results of statistical reporting. A different situation occurs in claims payments, where current consistency of directional changes is relatively the highest in the case of total value of payouts (the index is not very high, as it does not exceed 54%); however, directional changes can be observed in the area of payout amounts under non-life insurance in the case of a rather significant lag.

5.2. Assessment of consistency between forecast balances (BTS) and ex post evaluation balances (BTS)

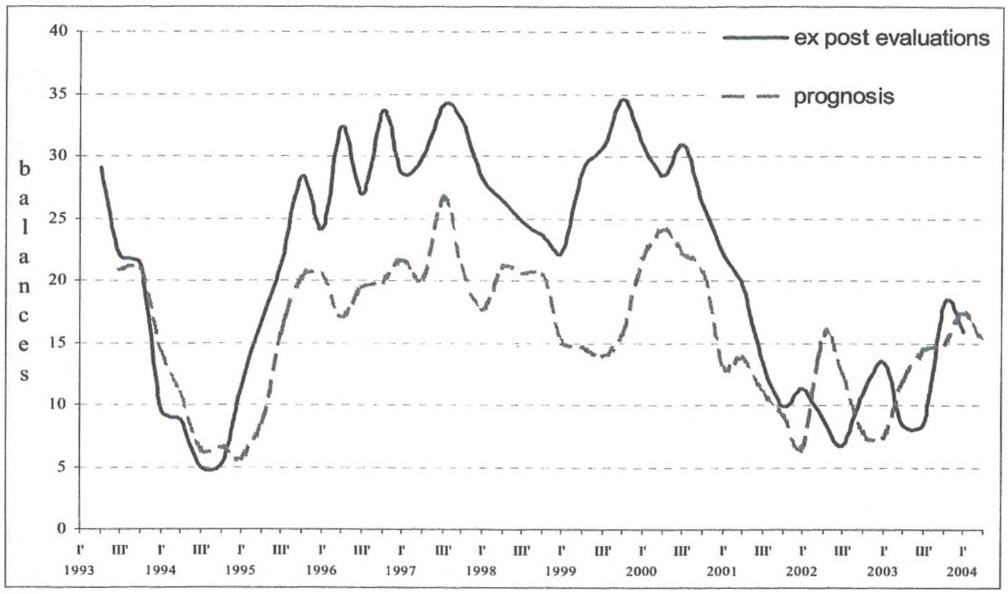
A survey of key ex post evaluation measures shows that, to a varying degree, all mean forecast errors share one common feature of being positive for each of the six analysed variables (Table 2). The implication is that on average, over the period in question, quarterly forecasts for each of the variables fell short of actual performance, as subsequently measured. Notably, forecasts were more underestimated for variables describing market-wide premiums revenues and revenues received within the life insurance segment than for variables describing premiums revenues in non-life insurance and the loss ratio. This is evidenced by much higher mean errors (greater by 1 or more), square errors, and ratios of understated to total forecasts (greater by an average of 12 points).

It should also be noted that whereas commonly underestimated premiums forecasts may suggest excessive and irrational conservatism on the part of forecasting managers (as could be concluded from more optimistic ex post evaluations), the fact that loss ratio forecasts are also understated suggests the opposite. Such forecasts show that the managers' opinions were generally overoptimistic as the loss ratio exceeded recent forecasts.

A good, although not uniformly good, correspondence between forecasts and ex post evaluations can be found in outcomes of surveys of the correlation between series of corresponding cycle balances (Table 2). The resulting correlation ratios show that for each of the variables at hand there is a statistically significant correspondence (at $\alpha = 0.05$) between forecasts and the subsequent measurements of the actual state. Note that the closest of the correlations was recorded for the two variables describing non-

life insurance (r > 0.850). The correlation for the total premiums revenue and total loss ratio was only slightly lower (0.750–0.850). The biggest discrepancies with ex post evaluations were observed in life insurance forecast and, in particular, forecasts of change in the loss ratio in the life insurance segment (r ≈ 0.400).

Figure 10. Loss ratio – diagnosis and prognosis (BTS)



Less differentiation, on the other hand, can be found in the accuracy with which the forecasts drawn up for each variable predicted turning points in short-term trends. What is even more noteworthy is that while the average accuracy of forecasts was only satisfactory, forecasts of life insurance premiums revenues turned out to be much more accurate. This can be seen in the directional accuracy ratio of nearly 78% (actual and predicted trend reversals were identical in more than 75% of the investigated quarters). Meanwhile, the accuracy achieved for the remaining variables ranged between 36% (total premiums) and 53% (total loss rate).

Equally interesting results came out of surveys of correlations that accounted for leads and lags between evaluations and forecasts. In the case of five of the surveyed trends, nearest future trends were closer to the actual measurements taken at the time such forecasts were formulated than to the measurements taken at the time such forecasts were intended to describe. This shows a substantial (and more than justifiable) influence of the current status on the forecasts of insurance managers. The

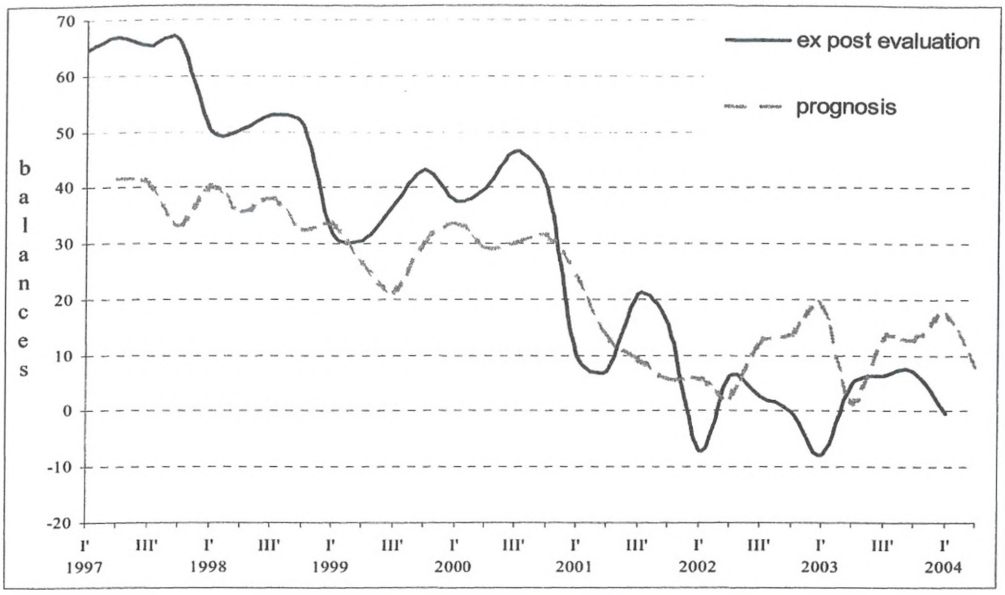
phenomenon is more likely to occur in life insurance loss ratio forecasts where the correlation exceeds the parallel series correlation by 0.125, and is less predominant in predictions of premiums revenues in life insurance.

Table 2. Accuracy of forecasts concerning premiums revenue and loss ratio as compared with ex post evaluations (BTS)

Specification	Value of premiums revenue OPS-PPS			Loss ratio OWS-PWS		
	Total	Life	Non life	Total	Life	Non life
ME – mean error	12.45	11.11	4.56	5.01	4.34	5.49
RMSE - root mean square error	17.28	16.05	14.91	7.86	8.29	9.85
Percentage of predictions:						
- underestimated ($A_t \geq P_t$)	83.7	85.7	64.3	79.1	71.4	75.0
- overestimated ($A_t < P_t$)	16.3	14.3	35.7	20.9	28.6	25.0
Directional accuracy ratio (%)	35.7	77.8	37.0	52.4	40.7	48.1
Correlation coefficient						
$r(A_t ; P_{t-4})$	0.736	0.619	0.729	0.189	-0.141	0.686
$r(A_t ; P_{t-3})$	0.821	0.644	0.838	0.365	0.195	0.760
$r(A_t ; P_{t-2})$	0.833	0.457	0.830	0.530	0.484	0.821
$r(A_t ; P_{t-1})$	0.826	0.428	0.848	0.669	0.316	0.864
$r(A_t ; P_t)$	0.812	0.570	0.863	0.771	0.398	0.895
$r(A_t ; P_{t+1})$	0.801	0.572	0.929	0.819	0.523	0.911
$r(A_t ; P_{t+2})$	0.732	0.420	0.842	0.732	0.289	0.847
$r(A_t ; P_{t+3})$	0.672	0.162	0.765	0.589	0.069	0.822
$r(A_t ; P_{t+4})$	0.546	-0.014	0.703	0.381	-0.151	0.773

One should also note that forecasts of total premiums revenues and premiums revenues in life insurance are most closely correlated where the lead relative to ex post evaluations is two to three quarters (the correlation ratios in such cases are greater by 0.020 to 0.080 than those for parallel series). In consequence, the predictions of both of the variables by insurance company managers become realised 2 to 3 quarters after the period which the forecasts were intended to describe. This feature of the forecasts can well be employed in formulating synthetic indicators of business tendencies in the insurance market ahead of time.

Figure 11. Value of premiums revenue (non-life insurance companies) – diagnosis and prognosis (BTS)



A general good accuracy of the surveyed forecasts is fully supported by the H. Theil inequality coefficient of forecast accuracy (relative to subsequent evaluations). The mean value of the coefficient for the six variables under investigation is not very high (0.1305) (Table 3). This implies that, by and large, the forecasts in question are moderately accurate (and fall within the 0.10–0.15 range). A considerably greater accuracy has been achieved in forecasting premiums in the life insurance segment (U^2>0.10). Relatively least accurate predictions were observed for both non-life insurance variables (where U^2 fell between 0.15 and 0.17).

On the other hand, an analysis of partial H.Theil coefficients shows that the main reason for forecast errors is the relatively low correspondence between the predicted direction of change and the ex post observation of such a direction (this reason contributed to an average of 43% of the registered errors). It is clear that the relatively low success rate in predicting turning points in short-term trends has the largest effect on errors in forecasting the performance of the life insurance market (accounting for 51% of the error in premium forecasts and as much as 73% of the error in loss ratio forecasts).

Figure 12. Loss ratio (life insurance companies) – diagnosis and prognosis (BTS)

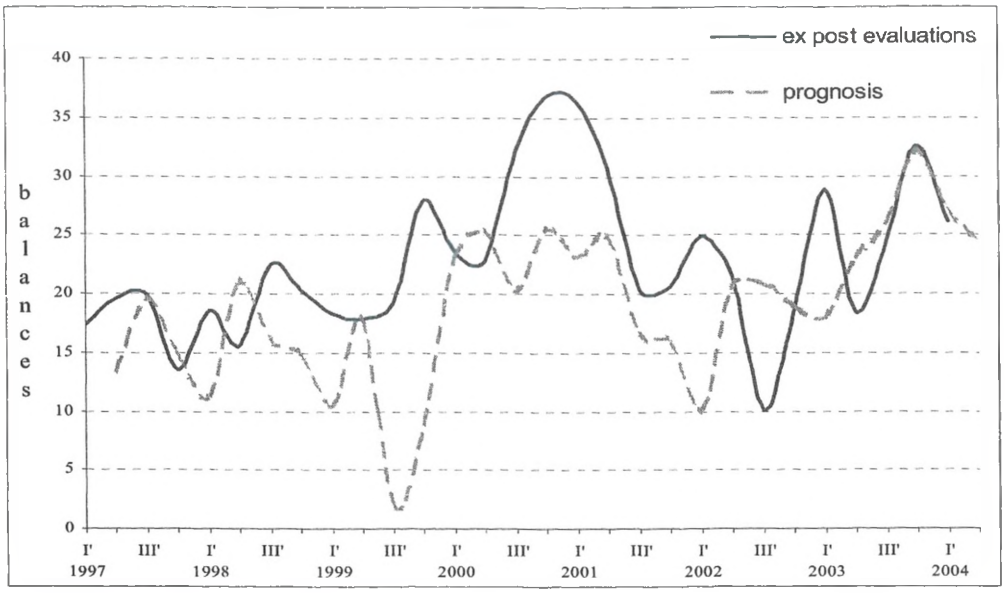


Table 3. H. Theil coefficient for premiums revenue and loss ratio forecasts compared with ex post evaluations (BTS)

Specification	Value of premiums revenue OPS-PPS			Loss ratio OWS-PWS		
	Total	Life	Non life	Total	Life	Non life
Theil's coefficient U^2	0.1186	0.0990	0.1697	0.1197	0.1209	0.1548
Theil's coefficient components						
U^2_M	0.519	0.480	0.094	0.407	0.274	0.310
U^2_S	0.183	0.009	0.554	0.225	0.001	0.385
U^2_C	0.298	0.511	0.352	0.368	0.725	0.305

The second most significant cause of prediction errors, accounting for an average of 35% of total error, is the inaccurate prediction of the average value of the forecast phenomena. Systematic errors were the largest in forecasts of market-wide premiums revenues (accounting for 52% of the error), life insurance forecasts (48% of the error), and in forecasts of the total loss ratio (41% of the error).

Generally speaking, the overall accuracy of the phenomena at hand was found to be least affected by inappropriate predictions of the extent of fluctuations in the analysed trends (the average contribution to error of such predictions was 22%). Note also that such inappropriate predictions are the primary cause of errors in forecasting the

performance of the non-life insurance market (accounting for 55% of the error in premium forecasts and 39% of the error in loss ratio forecasts).

5.3. Consistency between forecast balances (BTS) and market statistics (CSO)

The results of correlation analysis between quarterly forecasts of premiums revenue and properly prepared market statistics, considered to be ex post forecast realisations, are fully satisfactory. Although in the case of each of the three analysed variables, correlation of forecasts resulting from the business tendency survey method with the corresponding quantitative data is lower than in the case of ex post evaluations (coefficients lower by 0.05-0.30), the level of resulting coefficients clearly shows the existence of statistically significant correlations (at α=0.01), which are also relatively very strong (Table 4).

One the basis of a comparison between the obtained results, the highest rating needs to be given to managers' predictions of quarterly change trends in premiums revenue on a market-wide basis. Namely, in the case of premiums revenue the highest correlation was registered between the BTS forecast and statistical data (r=0.800). Another positive aspect is that the correlation for the parallel series is only slightly weaker than the highest correlation for the series of forecast lagged and shifted forward (the only higher coefficient, higher by 0.006, resulted from shifting the forecast series one quarter forward compared with the quantitative data).

However, a significantly lower correlation occurs in the case of forecasts and market statistics concerning non-life insurance premium and in life insurance (coefficients are lower by 0.15 and 0.21 respectively). Furthermore, a closer correlation was noted for these two variables at leads or lags of the forecasts as compared to data recorded by statistical reporting. Namely, life insurance premium forecasts formulated by managers are most closely correlated with quantitative data when they lead the latter by three quarters (correlation coefficient 0.10 higher than in parallel series). However, a reverse correlation occurs in non-life insurance premium, as the closest correlation occurs in forecasts at a three-quarter lag compared with statistical data (with the correlation coefficient being 0.09 higher than the one concerning parallel series).

Figure 13. Value of premiums revenue – prognosis (CSO and BTS)

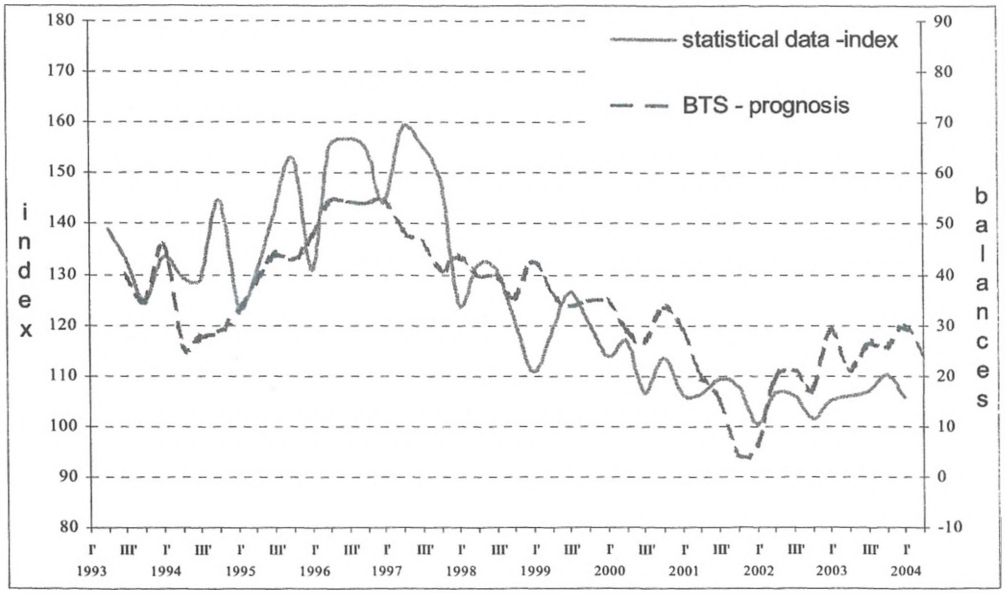


Table 4. Accuracy of forecasts concerning premiums revenue (BTS) compared with market statistical data (CSO)

Specification	Total	Life	Non life
Correlation coefficient			
$r(B_t ; P_{t-4})$	0.609	0.584	0.645
$r(B_t ; P_{t-3})$	0.732	0.695	0.636
$r(B_t ; P_{t-2})$	0.749	0.651	0.641
$r(B_t ; P_{t-1})$	0.806	0.579	0.671
$r(B_t ; P_t)$	0.800	0.592	0.654
$r(B_t ; P_{t+1})$	0.772	0.522	0.733
$r(B_t ; P_{t+2})$	0.790	0.459	0.743
$r(B_t ; P_{t+3})$	0.780	0.379	0.744
$r(B_t ; P_{t+4})$	0.676	0.255	0.702
Directional accuracy ratio (in %)			
$B_t ; P_{t-2}$	50.0	64.0	50.0
$B_t ; P_{t-1}$	63.4	61.5	64.0
$B_t ; P_t$	47.6	70.4	38.5
$B_t ; P_{t+1}$	35.7	59.3	57.7
$B_t ; P_{t+2}$	56.1	57.7	61.5

Generally speaking, the results of the research into direction quality of the analysed forecasts and market statistics are less satisfactory when compared with correlations.

A good rating can definitely be given only to predictions concerning premiums revenue in life insurance (in over 70% of analysed quarters, the direction of qualitative changes of forecast indicators was consistent with the direction of quantitative statistical indicators). In this respect, relatively less favourable results are shown by forecasts concerning the general value of premiums revenue (consistent directional changes occurred in every second quarter at the maximum). Premium forecasts in non-life insurance turned out to be the most problematic in terms of accurate predictions of the turning points in short-term tendencies.

Summary

A sign of the growing significance of the insurance sector in the Polish economy is *inter alia,* an increasing share of insurance premium in GDP and a growth in insurance expenditures per capita. However, the Polish insurance market, currently experiencing a growth phase, is subject to an ongoing evolution linked to the growth of competition, fast changes in product offer and customer service; it is also facing a cost-reduction pressure. Therefore, business tendency diagnosis and forecast seems to be a complex process in such a market, and it requires the application and improvement of various methodologies, including business tendency survey. The results of the analysis presented in this paper show a high level of usefulness of BTS in diagnosing and forecasting business tendencies in the Polish insurance market.

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