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INSURANCE AGAINST LONGEVITY RISK IN A PENSION SYSTEM THE CASE STUDY OF POLAND*

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K e y w o r d s: longevity risk, life expectancy, public and additional pension systems.

A b s t r a c t

Life expectancy has been rapidly increasing and remains uncertain in all OECD countries, including Poland. One of the many economic and social consequences of this process is the increase of the longevity risk in social security systems. This article focuses on the issues of managing longevity risk in the pension system in Poland, in particular – the construction of public and supplementary pension systems and its ability to adapt to the challenges associated with longevity risk. Particular attention has been paid to the analysis of public structures and supplementary pension schemes in the phase of payment of benefits (decumulation).

The research work, of which the results are presented in the article, is based on literature studies, comparative analysis, statistical analysis; as well as descriptive and explanatory methods. Also, a model of the two stages of pension risk created by T. Szumlicz has been used.

The author argues that both the public pension systems as well as the supplementary pension schemes in Poland do not secure adequate protection against the risk of longevity. While in the public retirement system, the aggregate longevity risk exists, and the participants of additional pension systems are exposed to individual longevity risk. The limitation of these risks requires significant structural changes both in the public and in the additional pension schemes in Poland.

UBEZPIECZENIE OD RYZYKA DŁUGOWIECZNOŚCI W SYSTEMIE EMERYTALNYM NA PRZYKŁADZIE POLSKI

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S ł o w a k l u c z o w e: ryzyko długowieczności (ryzyko dłuższej niż oczekiwano długości życia), dalsza oczekiwana długość życia, publiczny i dodatkowe systemy emerytalne.

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Abstrakt

Średnia długość życia gwałtownie wzrasta, lecz tempo wzrostu pozostaje niepewne we wszystkich krajach OECD, w tym w Polsce. Jednym z wielu gospodarczych i społecznych skutków tego procesu jest wzrost ryzyka długowieczności w systemach zabezpieczenia społecznego. W artykule skupiono się na kwestiach zarządzania ryzykiem długowieczności w systemie emerytalnym w Polsce, w szczególności na wpływie konstrukcji publicznych i dodatkowych systemów emerytalnych na zarządzanie ryzykiem długowieczności.

W badaniach, których rezultaty przedstawiono w artykule, zastosowano metodę literaturową, metodę badań porównawczych, a także metody opisu i wyjaśniania. Wykorzystano też model dwóch faz ryzyka emerytalnego opracowany przez T. Szumlicza.

Na podstawnie przeprowadzonych analiz stwierdzono, że zarówno konstrukcja publicznego systemu emerytalnego, jak i dodatkowych programów emerytalnych w Polsce nie zapewnia odpowiedniej ochrony przed ryzykiem długowieczności. Podczas gdy w publicznym systemie emerytalnym istnieje łączne ryzyko długowieczności (ryzyko błędnego oszacowania dalszej długości życia dla danej kohorty demograficznej osób osiągających ustawowy wiek emerytalny), uczestnicy dodatkowych systemów emerytalnych są narażeni na indywidualne ryzyko długowieczności. Ograniczenie tego ryzyka wymaga znacznych zmian strukturalnych, zarówno w publicznych, jak i w dodatkowych systemach emerytalnych w Polsce.

Introduction: longevity risk in a pension system – a model approach

Continued progress in living conditions and health standards has increased the average life expectancy in all OECD countries, including Poland (see Tab. 1). Life expectancy at birth now exceeds 79 years on average across the OECD. The 25 years between 1983 and 2008 saw an average rise in life expectancy of about six years (*Society at a Glance* 2011). Taking into consideration the longer perspective, ANATOLIN (2007, p. 3) states that „the length of time that people are expected to live in most OECD countries has increased by 25 to 30 years in the last century". The Max Planck Institute for Demographic Research (MPDR) reports on the remarkably stable increase in life expectancy since 1840. A summary aggregate statistic (defined as the highest life expectancy of all countries in a given year) has been increasing steadily every decade by about 2.5 years for women and 2.2 years for men (VAUPEL 2011, 2002, ZELENKO 2014, p. 36).

Table 1

Life expectancy in Poland and OECD countries

Life expectancy at birth* in 2008 or latest year		Rise of life expectancy between 1983 and 2008	
OECD (average)	Poland	OECD (average)	Poland
79.3	75.6	6.0	4.5

* Life expectancy is defined as the average number of years that a person could be expected to live if he or she experienced the age-specific mortality rates prevalent in a given country in a particular year. It does not include the effect of any future decline in age-specific mortality rates.
Source: OECD Publishing, Paris (www.oecd.org/health/healthdata), and OECD Income Distribution and Poverty Database (www.oecd.org/els/social/inequality), access: 15.10.2015.

The increase of life expectancy in Poland is even more impressive when we take into consideration a longer period. For example, an expected period of life for men born in 1950 was 56.1 years and for women 61.7. The life expectancy for men born in 2014 is already 73.1 years and for women 81.1 years (see Fig. 1).

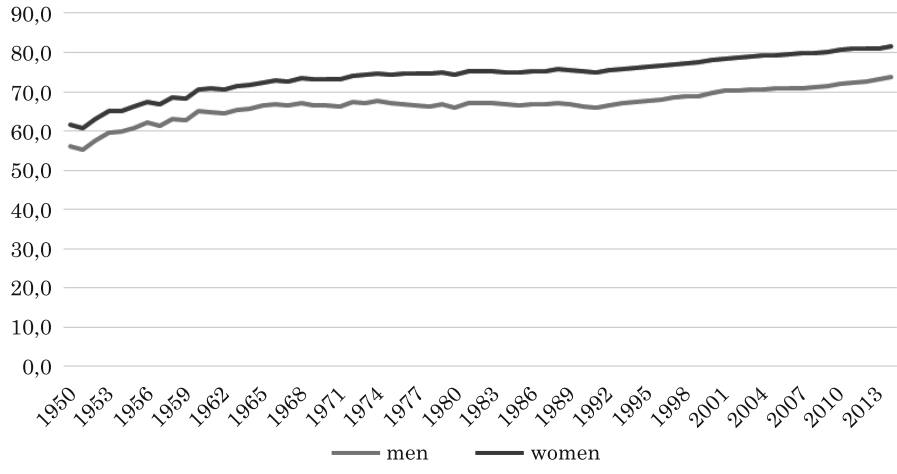
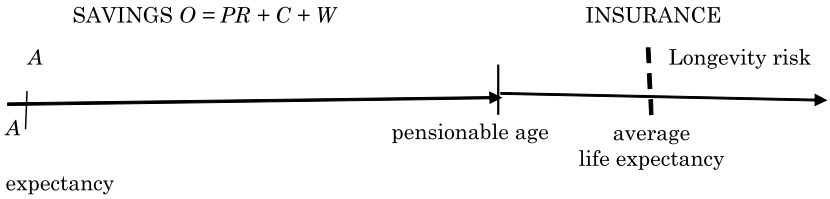


Fig. 1. Life expectancy by sex in Poland in urban and rural areas from 1950–2013
Source: *Life Expectancy*. 2015.

A basis for further consideration is the proper definition of longevity risk, which is not the same as the demographic risk related to the aging of the population. However, improvements in the mortality rate and life expectancy are uncertain and the outcomes of future life expectancy pose many kinds of threats to social security systems as well as for individuals. In each demographic cohort there are people living longer than expected. From the point of view of pension economics, this basically positive phenomenon is connected also with certain risks (ANATOLIN 2007, p. 3), such as the risk of outliving one's pension savings – the **individual longevity risk**. Inaccurate estimation of life expectancy can undermine the sustainability of a pension scheme (the risk addressed to the pension provider – public or private) or negatively influence the wealth of pension benefits (risk addressed to pensioners). This kind of risk is called the **aggregate longevity risk** (the trend risk). It consists of the fact that in a given cohort, the average life expectancy will be longer than expected and predicted in statistical forecasts. In other words, it is the risk of incorrect estimates of future trends in the mortality rate. Together, both specific and aggregate longevity risks form the **total longevity risk** (BLAKE, BORROWS 2001, p. 340, BLAKE 2006, REJDA 2001, PITACCO, DENUIT, HABERMAN, OLIVIERI 2009).

The risk of longevity, which refers to the phase of paying out pension benefits (pension capital decumulation) affects both public pension systems as well as the supplementary pension schemes (occupational or individual pension schemes). The degree of vulnerability of a pension system to longevity risk depends on its structure, especially on the methods of calculating benefits (pension formula), and the pension benefit method of payment. In order to manage longevity risk, it is particularly important to properly define the risks of old age covered by pension security. In Polish literature this is aptly illustrated by a model of pension risk by Tadeusz Szumlicz (see Fig. 2).



A – adoption of occupational activity
O – total retirement savings
$PR + C + W$ – the possible forms of retirement savings (pension rights + pension capital + wealth)

Fig. 2. Two stages of pension risk – a model by Tadeusz Szumlicz
Source: own study based on SZUMLICZ (2005, p. 242).

Using this model approach for the risk of old age, the longevity risk can be placed in an individual's third cycle of life. Considering unitary and individual terms (microeconomic level), the risk of old age in the first phase (accumulation) lies in the fact that a person does not gather sufficient retirement savings, and in the second phase (from the age of retirement until the end of the average life expectancy) that the accumulated savings provide too little income. In the third phase, for people living longer than expected, in addition to the risk of low income (e.g. low level of pension benefits offered by the public pension system) there still exists the risk of partial or total exhaustion of additional accumulated resources (e.g. in an individual or occupational pension plan, in other forms of savings, etc.); namely the implementation of individual longevity risk (see Fig. 2).

The design of the Polish pension system

Since the comprehensive and systemic reform introduced in 1999, the Polish pension system for employees and the self-employed has consisted of three pillars (see Tab. 2). The first pillar refers to a mandatory notional defined

contribution account (NDC) scheme (JAROCIŃSKA et al. 2014, p. 21–22). The total pension contribution rate amounts to 19.52% of gross wages (pillar 1 + pillar 2). The contributions (premiums) are financed equally by both employer and employee. 16.60% of pension contributions are transferred to pillar 1 (being written down on the individual accounts and sub-accounts of those insured) and 2.92% goes to open pension funds (pillar 2), if the insured person is a member of an OFE (Open Pension Fund). If not, the entire 19.52% is transferred to the first pillar (RUTECKA 2014, p. 130).

Table 2

The architecture (design) of the three pillar Polish pension system

Pillar 1	Pillar 2	Pillar 3
Mandatory	Mandatory/Voluntary*	Voluntary
PAYG	Funded	Funded
Basic pension benefit	Basic pension benefit	Additional/Complementary Pension benefit
Notional Defined Contribution (NDC)	Defined Contribution (DC)	Defined Contribution (DC)
Managed by public institution: Social Insurance Institution (ZUS)	Privately managed: Open pension funds (OFEs) managed by Pension Fund Societies (PFSs)	Privately managed: Individual and group (occupational) pension savings managed by different financial institutions

* Open Pension Funds (OFEs) were introduced in 1999 and have been obligatory since 1999. As of 1 April, 2014 they are voluntary. The role of the second pillar has been marginalized.
Source: own elaboration.

The notional interest rate is defined as 100 percent of the growth of the real covered wage bill, and no less than the price of inflation. The second pillar is a voluntary funded defined contribution (FDC) scheme. Contributions paid into the second pillar are indexed with the rate of return on pension fund investments.

One of its main objectives in the economic dimension was the division of risk between the financial market and the labor market by introducing a three-pillar structure, and in particular the second capital funded pillar and private pension funds (called „OFE") operating within it (GÓRA 2003).

After retirement (in the decumulation phase of a pension system), pension benefits are indexed annually by inflation with at least 20 percent of the real average wage growth.

The pension formula is to a large extent similar to the first and the second pillar. Benefits are equal to the accumulated capital from contributions (plus indexation) divided by life expectancy obtained from the observed unisex period mortality tables. Mortality tables are recalculated by the Polish Central Statistical Office (GUS) every year.

The third pillar consists of voluntary, additional private pension plans:

– the occupational pension schemes („pracownicze program emerytalne", PPE),

– individual retirement accounts („indywidualne konta emerytalne", IKE)

– and individual retirement saving accounts („indywidualne konta zabezpieczenia emerytalnego", IKZE).

Tax incentives for additional pension savings are rather poor. The occupational pension schemes (PPE) cover only 2.3% of the labor force in Poland. Both forms of individual pension schemes are: IKE – 5.2% and IKZE 3.2% of the working age population, respectively (RUTECKA et al. 2014, p. 6).

Two recent reforms (introduced from 2011 to 2014) will have a further impact on pension income in Poland. The first reform has shifted a part of the contributions from the mandatory FDC to the NDC system since 2011, but assumes that the benefit formula will be very similar. If the rates of return in the FDC and NDC systems during the accumulation phase differ, this may influence future pension incomes. The second reform will have a more important impact: the retirement age has been raised gradually to 67 for both men and women as of 2013. Men will reach the new retirement age by 2020, and women by 2040[1].

The new legislation that came into force in February 2014 made the second pillar voluntary, i.e. an insured person can pay the entire old-age pension contribution (19.2%) to the first pillar only. The decision can be reversed every two years (JAROCIŃSKA et al. 2014, pp. 21–22).

Longevity risk in the Polish pension system

While the first pillar (PAYG) is in the accumulation (savings) phase, the pension system is more sensitive to the risk of demographics which increases with the aging of the population, and the funded pillar is subject to different (demographically non-correlated) kinds of risk (including investment risk). However, the diversification of pension risk in the Polish pension system was not to be applied only to the phase of its consumption (decumulation), which carries the risk of longevity. Both PAYG and the funded pillar are not immune to aggregate longevity risk in the pay-out phase of the pension system.

According to the initial assumptions of the pension reform of 1999, the payment of benefits from capital accumulated in the second pillar of the

[1] The new Polish president Andrzej Duda promised in his election campaign in 2015 to restore the previously existing statutory retirement age (65 for men and 60 for women). Making this change under the rule of the Law and Justice party in 2016 is quite likely. It would be another significant change in the rules of the pension reforms introduced in Poland.

pension system was to be dealt with by pension institutes (created especially for this purpose), which would not only pay benefits under the second pillar but also multiply the accumulated capital and invest it in low risk financial instruments. However, such pension institutes never came into existence. For the last 15 years, the pension reform has not been completed, because there has been no legislation regarding the payment of pensions from the second pillar. Only recently has the legislation been enacted (Ustawa z 6 grudnia 2013 r. o zmianie...) that will finally regulate this important issue. The payment of the total pension funds accumulated in the first and second pillar will be provided by the Social Insurance Institution (ZUS). A lifetime pension (annuity) remains the only available product.

In order to justify the recent changes in the public pension system, former government experts explicitly informed the public that only the state is able to take on demographic risks, including longevity risk, by stating that „the only entity able to deal with the demographic risk is the state. Thus, the issue of payment of benefits accumulated in private pension funds should also be linked to the interests of public finances" (MLSP, 2013, p. 5). However, the examples of insurance companies that pay annuities and have already developed a method of spreading risk within the insurance community, demonstrates that the state monopoly with regards to the payment of pensions, although still present in most countries, does not need to be the only acceptable solution.

Merging pension payments from the first and the second pillar in one state institution (ZUS) does not eliminate the aggregate longevity risk. We can analyze it using an example based on real data.

Example no. 1

A 53 year old participant of a public pension system in Poland, who started work in 1982 and paid pension contributions at 1.5% of an average salary, received in 2013 information from the Social Insurance Institution (ZUS) about the pension rights registered on his individual retirement account (the 1st pillar) through the end of 2012:

Valorized initial capital[2]	525,014 PLN
Valorized pension contributions	178,172 PLN
Contributions cataloged on a subaccount[3]	18,095 PLN

[2] Capital pension rights transferred from the old pension system, which was in force in Poland until 1999.

[3] The subaccount was created after the reduction of pension contributions transferred to OFE in 2011. Generally it can be treated as a part of the first pillar (PAYG), but its valorization method is a bit more generous.

Total pension rights (based on paid contributions in the 1st PAYG pillar of the public pension scheme) are 721,281 PLN

The same participant of the pension scheme gathered 93,556 PLN on his second individual pension account (2nd pillar) in an open pension fund (OFE) – since the introduction of pension reform from the 1st January 1999 until December 31st, 2012.

So his pension capital (pension rights registered in the 1st PAYG pillar and pension savings invested in the capital market and registered in a form of units of the given OFE pension) is found to equal the following:
721,281 PLN + 93,556 PLN = 814,837 PLN

Pension formula:
Total pension capital / expected time of future life in months (for a given demographic cohort)

A hypothetical amount of pension paid at the age of 67 out of the 1st PAYG pillar:
721,281 PLN / 195.7 months of expected life for this demographic cohort[4] = 3,685.6 PLN.

A hypothetical amount of pension paid at the age of 67 out of the 2nd funded pillar (OFE):
Total pension savings/ expected amount of future life in months (for a given demographic cohort)
93,556 PLN /195.7 months of expected life for this demographic cohort = 478 PLN

A hypothetical total amount of the old-age pension paid at the age of 67 out of the 1st PAYG and the 2nd funded pillar:
3,685.6 PLN + 478 PLN = 4,163.6 PLN, that is **approx. 4,164 PLN**

If the chosen cohort of participants of pension systems lived longer than expected on average, for example 220 months instead of 195.7, the Social Insurance Institution (ZUS) would be obliged to pay 4,164 PLN pension benefits 24 month longer. **It would cost an additional 99,936 PLN** (for one participant of this cohort in the public pension scheme). This is an example of the materialization of the aggregate longevity risk.

[4] Own calculation based on *Life Expeetancy*..., 2012, p. 80.

This calculation is based on the following assumptions:

1. The statutory retirement age in Poland will be extended for this cohort of male participants of the pension scheme until the age of 67. Otherwise, of course, the pension capital (accumulated in the 1st and second pillar) would be lower, as well as the capital of hypothetical pensions. It would reduce the aggregate longevity risk (for ZUS) and at the same time cause increased individual aggregate risk for participants (lower old-age pensions from the public pension scheme must be complemented with additional, voluntary pension savings) if this additional pension savings were not sufficient. If that were the case, the individual longevity risk – the risk of outliving individual, personal pension savings – would materialize.
2. For the analyzed cohort, no more contributions to the public compulsory pension system would be paid until the statutory retirement age.

At the level of social security in the current Polish pension system, the individual longevity risk – assuming ownership of a reasonably long period of contribution – does not exist. Pensions are paid by the state until death – in the form of a life annuity. The elimination of individual longevity in the public (base) pension system does not eliminate the aggregate longevity risk, which must be covered by the Social Insurance Institution and by the State which is responsible for paying pension benefits out of the obligatory public pension scheme. As a consequence of rising living standards and advances in medicine, in conjunction with a declining birth rate and increasing migration (in the case of Poland, after joining the EU about 1.5 mln Polish citizens have migrated to other EU Member States to find better jobs and living conditions), the increasing life expectancy in Poland is a very serious challenge for the public pension system financed (after the reduction of the funded part of the system since 2011) mainly by the PAYG method. From the point of view of ZUS (and public finances) the risk of incorrect estimates of the life expectancy trend (the aggregate longevity risk) lies in the fact that the given demographic cohort would live longer than the forecast provided annually by the Central Statistical Office (GUS). Since the pension reform in 1999, the amount of pension benefit in Poland has been calculated by dividing the accumulated pension capital (pension obligations) by the expected number of months of life for the given demographic cohort. The 1999 introduction of the defined contribution formula does not provide automatic financial stability and does not protect against the risk of longevity. If a certain demographic cohort lives longer than predicted, the aggregate longevity risk must be covered by the Social Insurance Institution (ZUS).

To a large extent, longevity risk affecting the people in a given year of beneficiaries (the demographic cohort) reduces the risk of a shorter than

expected life span of other retirees receiving pensions. It is known that in every age group there are people living shorter than the average life expectancy, as well as those living longer than expected. It is difficult to assume that these two groups will always balance one another. Nevertheless, the risk of longevity cannot be completely eliminated, and the State (directly or indirectly) must take responsibility for the elderly, for whom the benefits of the public pension system are often the main or the sole source of income. Not even a single part of the longevity risk in the public pension system in Poland is offset by any financial instrument (such as longevity SWAPS or longevity bonds). The Polish capital market does not offer such longevity hedging. Very few insurance companies operating in Poland offer insurance with life annuity payments, and none of them are ready to take the risk from the public pension system (for example in the form of a longevity SWAP).

The subject of the aggregate longevity risk is neither broadly discussed in the Polish scientific literature nor in the praxis of the public pension provider (the Social Insurance Institution). On the contrary, the most serious political discussions concern the restoration of the statutory retirement age (65 for men and 60 for women) in force as of 2014, and so the withdrawal of the recently introduced reform would provide a gradual equalization of the retirement age for men and women to 67 years. Of course, the shortening of the statutory retirement age only increases the aggregate longevity risk and the general risk for public finance in Poland.

As for the additional voluntary pension systems functioning under the third voluntary pillar, there are no products offered in the form of a retirement annuity, neither in the system of group savings for additional pension in the workplace (occupational pension systems – PPE, available since 1999), nor in individual systems (individual retirement accounts – IKE, operating since 2004, or individual retirement savings accounts – IKZE, since 2011 onwards). Legal regulations on occupational pension plans (Ustawa z 20 kwietnia 2004 r. o indywidualnych... art. 42), IKE and IKZE (Ustawa z 20 kwietnia 2004 r. o indywidualnych... art. 34), provide that the payment of money may take place at once or in installments after a retiree reaches the age of 60 (occupational pension plans or individual retirement accounts) or 65 years (in individual accounts of retirement security). Any payment of installments will last until the depletion of savings that has accumulated in occupational pension plans, IRA or in individual accounts of retirement security, and will not be in the form of benefits payable for life. There is a quite realistic scenario, where a person saving for retirement will receive an additional one-time payment at the age of 60 or 65 years of age, and by living unusually long, this person will deplete their additional funds. Therefore, in the last phase of life his or her standard of

living (based solely on funding from the public pension system) will be significantly lower. Such a structure of payments from the third pillar of the pension system in Poland does not protect against longevity risk.

Conclusions and recommendations

The public pension system in Poland is sensitive to longevity risk and this exposure is likely to increase in the near future (in 10–20 years time) as well as in the longer foreseeable horizon (until 2050). The reduction of the funded pillar in the public pension scheme since 2011 and a retreat to the pension system prior to 1999 is based almost exclusively on the PAYG financing method. This has caused a significant increase in longevity risk and an increase in the risks of damage to the long-term sustainability of the pension system. The anticipated withdrawal from the extension and equalization of the statutory retirement age for men and women in the public pension system in Poland would increase the aggregate longevity risk and the systemic risk of the entire pension system in Poland – in both the short and the long term.

The purpose of the payment of benefits should be to ensure an optimal standard of living for beneficiaries continuing through the duration of their life. The right solution to this problem requires the development of an algorithm and parameters to determine the optimal value of benefits. Actuarial risk is associated with the adoption of poorly estimated parameters (e.g. longer life expectancy in terms of months for a given demographic age group as the basis for the calculation of benefits in the new pension system). When pension payments are realized directly from the accumulated capital, a pensioner begins to bear the risk. Above the minimum guaranteed by the state, the level of benefits is determined by the amount of capital held and by a legally defined algorithm for determining the scope of the provision. The adoption of the algorithm, which in the sphere of assumptions departs from reality, can provide two kinds of results.

The too slow decumulation of capital in the population reduces the beneficiaries' level of consumption and causes the transfer of non-consumed pension capital to the next generation. On the other hand, a too high payout level may conclude with prematurely depleted capital and result in the realization of longevity risk. The problem then is a decline in living standards of pensioners and a burden for the state, due to minimal guaranteed pension payments.

Therefore, the necessary missing link in the pension system is to create an institution of national actuary, which will be properly prepared for the precise forecasting of demographic trends and the appropriate calculation of base pension benefits on the basis of further life expectancy. This will enable the more effective management of both demographic and longevity risks.

Additional pension systems (occupational pension systems – PPE, individual retirement accounts – IKE, individual retirement saving accounts – IKZE) do not protect the savers against longevity risk as they do not offer life annuities. In many countries, a widely used solution is to buy an annuity at the starting point of the withdrawal of accumulated additional pension capital. However, in Poland life insurance with perpetuity payments is very poorly developed, and its availability is limited. As there are no additional systems in Poland with defined benefits, such as the occupational pension systems in Western Europe or the U.S., aggregate longevity risk does not affect those employers who offer pension schemes.

The general conclusion that can be drawn from the analysis of the public and supplementary pension schemes in Poland is that: **both the public pension system, as well as any supplementary pension schemes in Poland, do not secure adequate protection against the risk of longevity**. While in the public (the base) retirement system the aggregate longevity risk exists, the participants of additional pension systems are exposed to individual longevity risk.

The limitation of these risks requires significant structural changes both in the public and in the additional pension schemes in Poland. Changes in the public pension system (including the introduction of the institution of the state actuary, the possible use of derivatives allowing for the transfer of part of longevity risk to private institutions such as life insurance companies) should minimize the aggregate longevity risk. The introduction of compulsory conversion of savings accumulated in additional pension systems into a stream of annuity payments should reduce the individual risk for participant longevity in such systems.

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INSTRUMENTS OF ADDITIONAL PENSION PROVISIONS IN LIMITING THE RISK OF LOW PENSION BENEFITS FOR FARMERS

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K e y w o r d s: supplementary pension scheme, farmers' pensions, the third pillar, instruments of supplementary retirement provision.

A b s t r a c t

This paper considers the issue of additional retirement security for farmers. On the basis of theoretical considerations and empirical data analysis, the hypothesis is that in the face of a low level of farmers' pensions, insured persons who would like to guarantee themselves a satisfactory replacement rate must use supplementary retirement security instruments. Studies conducted to test the main objective of the research, which was based on an analysis of current incomes, the level of retirement insurance premiums and pensions for different sized homesteads, confirmed the assumptions expressed in the main hypothesis. As an addition to the main objective of the research, the potential forms of supplementary retirement security and their characteristics were presented.

INSTRUMENTY DODATKOWEGO ZABEZPIECZENIA EMERYTALNEGO W OGRANICZANIU RYZYKA NISKICH ŚWIADCZEŃ EMERYTALNYCH ROLNIKÓW

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S ł o w a k l u c z o w e: dodatkowy system emerytalny, emerytury rolnicze, III filar, instrumenty dodatkowego zabezpieczenia emerytalnego.

A b s t r a k t

W opracowaniu podjęto problematykę dodatkowego zabezpieczenia emerytalnego rolników. W świetle rozważań teoretyczno-poznawczych oraz danych empirycznych falsyfikacji poddano hipotezę badawczą stanowiącą, że w obliczu niskiego poziomu emerytur rolniczych lepiej usytuowani rolnicy, chcąc zagwarantować sobie zadowalający dochód po osiągnięciu wieku emerytalnego, powinni

podjąć działania polegające na wykorzystaniu instrumentów dobrowolnego zabezpieczenia emerytalnego. Badania przeprowadzone w celu weryfikacji tak sformułowanej hipotezy badawczej opierały się na analizie wielkości dochodów, skali obciążenia składką na ubezpieczenie emerytalno-rentowe oraz poziomie świadczeń emerytalnych w gospodarstwach rolnych różnej wielkości. Spostrzeżenia sformułowane na podstawie przeprowadzonych analiz pozwoliły wnioskować o braku podstaw do odrzucenia postawionej hipotezy. W tej sytuacji oczywistym dopełnieniem przeprowadzonych badań była identyfikacja oraz charakterystyka form dodatkowego zabezpieczenia emerytalnego.

Introduction

A continuous public debate on the functioning of the pension scheme for farmers has been going on over the last dozen or so years. The issues that raise particular concern are both the principles of paying insurance contributions for pension insurance for farmers as well as the principles of determining the amount of pension benefits for this social group. The enthusiasts of changing the principles underlying the payment of insurance contributions for the pension scheme indicate the fact that the financial position of farmers is improving, and today a large part of them could pay the contributions on terms similar to the common (employee) pension system. On the other hand, the farmers themselves raise the issue of very low pension benefits they receive from the Polish Agricultural Social Insurance Fund (KRUS). Bearing in mind the fact that possible systemic changes in the farmers' social insurance are complicated, and thus distant in time, the author undertook a research problem that may be formulated by asking the following questions: *Are the farmers' pension benefits shaped at a level adequate to their income and are the benefits satisfactory for farmers? If not, how may the farmers themselves ensure a decent amount of their future pension benefits?* The defined problem led to the creation of a research hypothesis stating that farmers in a better financial position, in the face of a low level of agricultural pensions, wishing to guarantee a satisfactory income after reaching the retirement age should undertake actions consisting in the use of instruments of voluntary pension provisions. The research hypotheses formulated in such a manner provide the main objectives of the study, which are the verification of the need for additional pension provisions for farmers and the indication of the potential forms (instruments) of this type of provision.

The structure of the article reflects the adopted research objectives. Firstly, the economic potential of agricultural farms in Poland was examined and the farmers' pension insurance system was characterized, placing particular emphasis on the amount of paid contributions as well as the amount of pension benefits. Then, in order to verify the need for additional pension provisions of the examined social group, a synthesis of conclusions resulting from these

analyses were attempted. The final portion of the article indicates and briefly characterizes the methods for additional pension provisions that may be used by farmers.

Income of agricultural farms in Poland

Poland has approx. 1.42 million individual agricultural farms that vary in terms of their size[1] (see Tab. 1) (Rocznik... 2015, p. 113). The agrarian structure of Polish agriculture is dominated by farms with a total area under 5 ha (53.7% of all agricultural farms). On the other hand, there are only 135,000 farms with an area greater than 20 ha (9.4% of all agricultural farms). Taking into account the area of agricultural farms in the context of their economic situation, it is worth noting that, according to data from the Central Statistical Office of Poland (GUS), the average value of global production from 1 ha of arable land on individual farms in 2013 amounted to PLN 7,203 (an increase of 411 as compared to 2012), of which approx. PLN 2,898 (in 2012 – PLN 2,460) is gross added value (Rocznik... 2015, p. 174).

Table 1

Number of farms conducting agricultural activities

Area [ha]	< 1	1–1.99	2–4.99	5–9.99	10–14.99	15–19.99	20–49.99	> 50	In total
Number (thousand)	34	278	455	315	141	70	103	32	1429
Percentage [%]	2.4	19.4	31.9	22.1	9.9	4.9	7.2	2.2	100

Source: prepared by the author on the basis of (Rocznik... 2015, p. 113).

The average monthly disposable income in an agricultural farm is PLN 5,043.97 and is more than 38% higher than the average disposable income calculated for all households in Poland (see Table 2). The statistics also demonstrate the fact that the disposable income per one agricultural farm is approx. 18% higher than the income generated by households of employees and 2% lower than the income of households earning their living from self-employment (*Budżety*... 2015, p. 100). The average income for agricultural farms per one person on the farm is PLN 1,050.85, which corresponds to 78% of the income for households of employees and 64% of the income for households of self-employed people[2].

[1] Additionally, it should be emphasized that in GUS statistics the notion of individual agricultural farms is not identical with the notion of individual agricultural farms conducting agricultural activities.

[2] An average agricultural farm has 3.93 self-employed people, while the average number of people in households in total is equal to 2.73 (*Budżety*... 2015, p. 78).

Table 2

Average monthly disposable income in households

Specification	Disposable income per 1 household [PLN]	Disposable income per 1 person in the household [PLN]
Households of employees	4,289.01	1,349.12
Households of farmers	5,043.97	1,050.85
Households of self-employed people	5,164.13	1,631.64
Households of pensioners	2,531.99	1,382.32
Households in total	3,647.03	1,340.44

Source: prepared by the author on the basis of (Rocznik... 2015, p. 250) as well as (*Budżety*..., 2015, p. 100).

It is also worth noting that the highest pace of growth in income in recent years was recorded in the case of individual farms in agriculture (see Table 3).

Table 3

Dynamics of nominal gross disposable income in the households sector

Specification	2011	2012	2013	
	previous year = 100		2010 = 100	
Households of employees	105.1	104.2	102.7	112.5
Households of farmers	107.6	104.0	105.0	117.5
Households of self-employed people	105.1	104.2	102.7	114.2
Households of pensioners	103.6	104.4	103.6	112.1
Households in total	105.2	104.5	102.9	113.1

Source: prepared by the author on the basis of (Rocznik... 2015, p. 241).

More detailed information on the structure of income in Polish agricultural farms is provided in the studies of the Polish Institute of Agricultural and Food Economics – National Research Institute, conducted as part of the European FADN system (*Farm Accountancy Data Network*)[3]. Selected characteristics of Polish agricultural farms estimated on the basis of FADN research are presented in Table 4.

[3] See: *System*... (2014). In FADN, agricultural farms are classified with regard to the economic volume criterion into one of six categories. The category „very small" includes agricultural farms for which the amount of the so-called Standard Production ranges from EUR 2,000 to EUR 8,000 (additionally, it is worth noting that defining the lower limit of an agricultural farm size in the lowest category results in the omission of the smallest farms in the research). „Small" farms are characterized by the amount of production from EUR 8,000 to EUR 25,000 „average small" – from EUR 25,000 to EUR 50,000, „average large" – from EUR 50,000 to EUR 100,000, „large" from EUR 100,000 to EUR 500,000, and „very large" – above EUR 500,000.

Table 4

Selected characteristics of Polish farms in 2013 according to FADN

Farm's economic category according to the ES6 classification	Average farm area [ha]	Number of farms [pcs]	Value of production per 1 farm [PLN]	Income from a family farm [PLN]	Income from a family farm per person working full-time from the farmer's family [PLN]
Very small	8.91	305 881	39,312.49	13,886.44	10,118.48
Low	16.32	326 060	88,463.58	35,855.27	21,932.66
Average, small	32.67	72 660	225,193.02	89,789.55	49,408.44
Average, large	56.61	21 600	457,520.65	176,567.89	91,286.33
Large	138.65	10 391	1,292,916.62	398,144.24	177,502.91
Very large	928.99	1 451	8,860,832.27	1,183,829.31	349,776.65

Source: prepared by the author on the basis of (*System*... 2014).

For comparison with the data presented in the table above, it is worth mentioning the average value of annual net disposable income of households of employees – PLN 60,046.14 as well as of households of self-employed people – PLN 60,722.28 (Rocznik... 2015, p. 250). We may thus conclude that households from the „average, small" category and larger ones, namely approx. 14.4% of farms covered by FADN research, are in a better financial situation than average households of employees and entrepreneurs[4]. It is also worth noting that, despite the fact that the average income per person working full-time from a farmer's family in very small and small farms did not exceed PLN 22,000 in one year, it did reach a level that may be identified as satisfactory for larger households assuming the average annual remuneration in the national economy as the point of reference amounting to PLN 45,401.52 in 2014.

Contribution to the pension insurance of farmers

The pension insurance system for farmers[5] is a defined benefit system in which the total value of contributions paid during the term of insurance is hardly related to the amount of the received pension benefits. The basis for

[4] However, taking into account the remark formulated in the previous annotation, this means that the actual percentage of farms with such a good economic situation is smaller than the entire population of agricultural farms in Poland.

[5] Two types of insurance may be distinguished in the system of social security for farmers: pension insurance as well as accident, disease and maternity insurance. Therefore, when analyzing the functioning of the system of social insurance for farmers, the reference is usually made to pension insurance in total.

determining the amount of the contribution for the farmers' pension insurance is the basic pension which is the equivalent of the monthly amount of the lowest pension determined in the Act dated December 17, 1998 on pensions and disability pensions from the Polish Social Security Fund[6]. The basic contribution for pension insurance is 10% of the basic pension per month per each person covered by the insurance. A farmer whose farm has an area larger than 50 ha is also obliged to pay an additional contribution that is dependent on the size of the occupied arable land[7]. The amount of the contribution for the farmers' pension insurance in the years 2005–2014 is presented in Table 5.

Table 5

Quarterly amount of contribution for farmers' pension insurance*

Year	Amount of contribution	Year	Amount of contribution
2005	168.80	2010	213.00 – 1,230.00
2006	179.00	2011	219.00 – 1,269.00
2007	179.00	2012	240.00 – 1,392.00
2008	191.00	2013	249.00 – 1,446.00
2009	203.00	2014	252.00 – 1,467.00

* A uniform contribution for the pension insurance for farmers was valid until the 4th quarter of 2009. The minimum and the maximum value of contribution for this insurance is presented for the years 2010–2014.
Source: prepared by the author on the basis of (*KRUS w liczbach* 2014).

At this point, it is worth noting that the amount of the contribution for the farmers' pension insurance raises numerous controversies and is the cause of lively discussions among people in both government and academic circles. One of the issues raised most often is the irrelevance of the amount of the contribution and the economic potential of agricultural farms. Analyzing the principles of determining the amount of the contributions for the pension insurance for farmers, we may note that the adopted criterion for differentiating the contributions is disproportionate to the actual income of agricultural farms. The area of land, despite the fact that it is measured in conversion hectares, does not reflect the actual economic potential of these farms (e.g. small farms may conduct specialized highly-profitable production). Further-

[6] Journal of Laws 1998, No 162, item 1,118 as amended. Since March 2015 the basic pension amounts to PLN 880.45.

[7] The amount of the additional contribution for agricultural farms with a total area of arable land from 50 ha to 100 ha is 12% of the basic pension, for farms with an area of arable land from 100 ha to 150 ha – 24%, for farms with an area of arable land from 150 ha to 300 ha – 36%, and for farms with an area of arable land above 300 ha – 48%. In addition, a person subject to social insurance for farmers who at the same time conducts non-agricultural activities is obliged to pay the additional contribution for pension insurance amounting to 20% of the basic pension.

more, yields of various amounts may be obtained from a similar acreage which is affected by the farmer's knowledge and skills as well as the farm's technical equipment[8].

The discussions concerning the form of the pension system for farmers as well as the range of instruments for additional pension provisions for farmers often include the issue of limited financial possibilities of this professional group. However, it is worth noting that all farmers who own farms with a total area up to 50 ha (nearly 98% of all agricultural farms (Rocznik... 2015, p. 113)) pay social insurance contributions in the amount of PLN 130 per month (including PLN 88 for pension insurance). At the same time, entrepreneurs that run self-employment companies are obliged to pay a contribution that is more than 5 times higher, amounting to PLN 754.67 (including PLN 653.98 for pension insurance)[9]. Theoretically, it should be easier for farmers to finance expenses related to additional pension provisions. However, we cannot forget that nearly 76% of agricultural farms have an area under 10 ha (Rocznik... 2015, p. 113). Bearing in mind the fact that the average gross value added from 1 ha of arable land estimated by GUS is approx. PLN 2,898, it should be assessed that the income of these farms may prove too small for additional savings to be possible at all (Rocznik... 2015, p. 145).

Amount of agricultural pensions

The agricultural pension consists of two parts: the contributed portion and the supplemental portion[10]. The pension's contributed portion is equal to the

[8] Additionally, it is worth noting that one possible solution to the described problem could be the introduction of accounting at agricultural farms and making the amount of contribution dependent on their actual income. Alternatively, it would also be possible to differentiate the contribution depending on the economic potential of agricultural farms measured with the use of ESU (European size unit). Currently, the perspective of introducing one of these solutions is still in the distant future.

[9] Data for 2015. The value of the total contribution also includes the contribution for disease insurance amounting to PLN 58.2. The stated value of the contribution for self-employed people is the minimum amount of the social insurance contribution, along with the voluntary disease insurance for self-employed people conducting activities for a period longer than 24 months.

[10] The right to the agricultural pension is granted to the insured person (a farmer, a spouse, a household member) if they reached the retirement age provided for in the Act as well as was subject to pension insurance for at least 25 years. Alternatively, the right to the agricultural pension is also granted to women who are 55 years old and men who are 60 years old, provided that they were subject to pension insurance for at least 30 years. Additionally, the Act also provides for the possibility to receive a partial pension provided that the person receiving the partial pension was subject to pension insurance for 35 years and reached 62 years of age (women) or was subject to pension insurance for 40 years and reached 65 years of age (men). See Act dated December 20, 1990 on social insurance for farmers, Journal of Laws 1991, No 7, item 24 as amended. More information on the functioning of the social insurance system for farmers and on agricultural pensions is available from: *Finanse* (2013, p. 411–430) and *Ubezpieczenia gospodarcze i społeczne* (2009, p. 420–437).

product of the number of years of being subject to pension insurance and 1% of the basic pension. The pension's supplemental part is 95% of the basic pension, and if the number of years of being subject to pension insurance is greater than 20, the supplemental part is decreased by 0.5% of the basic pension for each additional year above 20 years, but not more than up to 85% of the basic pension. It was also adopted that the total amount of the agricultural pension cannot be lower than the basic pension, which in practice means that the minimum agricultural pension is determined at this level. It should also be noted that when a pensioner still conducts agricultural activities the pension's supplemental portion is partially or completely suspended, and when the farmer selects earlier pension, the supplemental part is decreased by 5% of the basic pension for each year separating the entitled from the retirement age.

Table 6 compares the average amount of pension benefits paid by KRUS in the years 2004–2014. In addition, for comparison, the table also includes information on the amount of the basic pension (minimum pension from FUS), the average amount of pension received by the insured in the employee system as well as the average monthly remuneration in the economy. The analysis of presented data leads to the statement that the average pension paid by KRUS in 2014 was nearly twice as low as the average pension from the Polish Social Insurance Institution (ZUS). What is more, its value was only approx. 27% of the average remuneration in the economy at that time. When comparing the average amounts of pension benefits presented in Table 6 with the average amount of income in various types of households contained in Table 2, we may note that the diversity of the level of pensions of employees and people conducting business activities as well as farmers is much greater than it could be assumed from the level of their income.

On the basis of the remarks above, it may be concluded that the reason for the diversity in the amount of pensions in the common and in the agricultural pension system are differences in the structure and functioning of these systems. Without denying the statement formulated in the previous sentence, we should however note that this issue is much more complex. In particular, we should bear in mind the fact that:

– the average amount of agricultural pensions is affected by the low benefits of people insured as household members which were covered by insurance from 1983 and the contributions for which until 1990 were paid in the lowest amount;

– the low value of the pension benefit may result from the partial or complete suspension of the payment of the pension's supplementing part when the farmer did not stop their agricultural activities;

– the structure of the farmers' social security system enables a relatively easy achievement of the right to benefits at the level of the basic pension;

Table 6

Amount of pension benefits from KRUS

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Average pension benefit from KRUS [PLN]	785.18	793.75	841.03	852.2	675.78	796.2	839.72	873.19	941.7	999.46	1,027.31
Basic pension [PLN]	526.58	562.58	597.46	597.46	636.29	675.1	706.29	728.18	799.18	831.15	880.45
Average pension from ZUS [PLN]	1,288.59	1,305.75	1,360.52	1,396.88	1,523.05	1,651.21	1,755.19	1,844.66	1,938.09	1,954.2	1,970.39
Relation of average pension benefit from KRUS to average pension from ZUS [%]	60.93	60.79	61.82	61.01	44.37	48.22	47.84	47.34	48.59	51.14	52.14
Average remuneration in the economy [PLN]	2,289.57	2,380.29	2,477.23	2,691.03	2,943.88	3,102.96	3,224.98	3,399.52	3,521.67	3,650.06	3,783.46
Relation of average pension benefit from KRUS to average remuneration in the economy [%]	34.29	33.35	33.95	31.67	22.96	25.66	26.04	25.69	26.74	27.38	27.15

Source: prepared by the author on the basis of data from Kwartalne informacje statystyczne KRUS z lat 2004-2014 (*Przeciętne*... 2015, *Emerytury*... 2013, *Emerytury*... 2014).

– the formula for determining the amount of pension benefits practically makes their amount independent of the farmers' income, thus preventing the wealthier farmers from obtaining benefits at a level adequate to their earnings.

Instruments of additional pension provisions for farmers

The analysis of income earned by farmers, the amount of pension insurance contributions paid by them, as well as the amount of pension benefits for this group leads to the statement that the pension insurance system for farmers in its present shape does not meet the function of allocation of income in life to the desired extent. There is a relatively numerous group of farmers who would not only be interested in higher pension benefits but would also be willing to incur additional related costs. Taking into account the limited possibilities of conducting a fundamental reform of the farmers' pension insurance system, it seems that the most adequate solution for farmers interested in increasing their income after the end of their professional activities is to use the methods of additional (voluntary) pension provisions.

Basically, the concept of additional pension provisions for farmers is based on assumptions similar to the so-called 3rd pillar of the employees' pension system. According to the assumptions of the reform of the employees' pension system in 1999, the 3rd pillar consists of the voluntary savings of a citizen with their future pension in mind. From this perspective, the 3rd pillar may be seen in two ways (*System ubezpieczeń społecznych* 2014, p. 59, 60). From a narrow point of view, this pillar is based only on forms of gathering savings with the future pension in mind promoted by the state. From a wider point of view, the 3rd pillar is formed by any savings and investments of the insured made in order to collect funds, bearing in mind their use after the cessation of professional activities.

Instruments of additional pension provisions promoted by the state include employee pension schemes (PPE), individual pension accounts (IKE) as well as individual pension security accounts (IKZE). The feature distinguishing these forms of savings is a system of discounts and tax exemptions aimed at encouraging the citizens to gather savings for their future pensions (see Table 7). Without analyzing the detailed principles of the functioning of the designated instruments, we should note that only IKE and IKZE, being individualized forms of saving for the future pension, apply in the case of farmers. Individual farmers, being the subject matter of research, do not work on the basis of an employment agreement and cannot save within PPE which, by definition, are created by employers for employees.

Table 7

Tax incentives in IKE and IKZE

	IKE	IKZE
Taxation	Payment is subject to taxation with personal income tax on general terms. Paycheck is exempted from personal income tax.	Payment is exempted from personal income tax. Paycheck is subject to taxation with flat-rate personal income tax amounting to 10% of income.
Capital gains tax	Gains from investing are not subject to taxation with capital gains tax.	
Inheritance	Funds are inherited and are exempted from the tax on inheritances and donations.	
	Payment for successors without income tax.	Successors are obliged to pay income tax amounting to 10% of revenue.

Source: prepared by the author.

Both IKE and IKZE are kept on the basis of an agreement concluded by the saver with a financial institution (e.g.: a bank, an investment fund, a voluntary pension fund, an insurance company or a foreign financial institution). What is important, the only financial benefit for farmers related to having IKE or IKZE is the exemption from the capital gains tax. Individual farmers do not pay income tax and thus do not have a basis for a deduction from the tax basis for payments made to IKZE, and the lack of taxation of payments from IKE is not a significant incentive from their point of view. This may be the reason why only 1.6% of farmers had savings in IKE, while the analogical percentage value for all households was approx. 7% (*Diagnoza*... 2011, quoted after: WALCZAK 2012, p. 34).

The analysis of the instruments of voluntary pension provisions for farmers, according to the presented concept of the wider point of view, leads to the distinguishing of the two following groups:

– financial instruments offered by external entities (mainly financial institutions) used to invest and multiply generated financial surpluses;

– mechanisms that are based on investing earned financial surpluses in own property to be used after the end of professional activities.

The first indicated group includes, in particular, various types of investments made within the capital market, gathering funds as part of life insurance with an insurance capital fund or pension insurance, saving on a bank deposit (e.g. as part of the so-called systematic savings schemes) as well as investments in real estate or works of art. What is important, these methods are not in any way particularly dedicated to farmers, and their possible use depends on the knowledge concerning these assets as well as the availability of financial funds. These instruments are the object of interest of a number of publications in the field of finance and will not be discussed here in more detail.

The mechanisms that have been classified into the second group include equity release services and annuity agreements. In addition, especially with regards to farmers, we should also indicate the significant importance of direct investment in own property (farm).

Equity release services are financial products aimed at releasing the capital accumulated in real estate. These products are dedicated for the elderly (55-67 years) who are interested in obtaining an additional source of income in exchange for the transfer of property rights to their real estate. The obligations of a financial institution resulting from equity release agreements may have the form of a single payment or monthly payments to the owner who retains the right to live on the real estate being the object of the concluded agreement until the end of their lives. Equity release services may have the form of reversed mortgage or an annuity pension. The main difference between a reversed mortgage and an annuity pension is the moment of the transfer of property rights to the real estate to the bank or another financial institution. In the case of a reversed mortgage, the transfer of the property rights takes place after the death of the real estate's owner, and in the case of the annuity pension – directly after the agreement is concluded. Further differences between these two products are the consequence of a different determination of the moment of the transfer of the real estate's property right[11]. It is estimated that due to the common lack of the farmers' pension foresight, equity release services in the future may be one of the few effective methods to increase the income of this social group after the end of their professional activities. It is also worth noting that the use of this type of instrument may be additionally stimulated by the migration of young people from rural areas to cities that results in the lack of generation substitutability in agricultural farms.

The annuity agreement imposes an obligation on the purchaser of the transferred real estate to support the seller (annuitant) for their life who should be accepted as a household member and have food, clothes, a place to live, lighting and fuel, as well as medical assistance[12]. The annuity agreement may also provide for an obligation for the purchaser to fulfil other benefits, including cash benefits (e.g. pension), for the benefit of the annuitant. From the point of view of pension provisions for farmers, annuity agreements are usually a formalized form of a special type of generational agreement where adult children naturally take over their parents' farms and take on the burden

[11] These are, e.g. regulations with regard to the obligation to cover the costs of maintaining real estate, a possible obligation of settlement with heirs for the financial institution taking over the real estate. See Cycoń 2014, p. 108.

[12] Art. 908 of the Act dated April 23, 1964 – Polish Civil Code, Journal of Laws 1964, No 16, item 93 as amended.

of their support. It is worth noting that annuity agreements initially constituted the only form of protection available for the inhabitants of rural areas during their old age. Currently, they serve as supplementations in pension provisions for farmers. However with regard to the use of this form of pension provision by farmers, there is a basic question as to whether when parents working on a farm (being the subject of the annuity agreement) were not able to earn a surplus allowing them to finance the pension, will children taking over the farm be able to support themselves and their parents at the same time, invest in the development of the farm and finance their future pensions?

A method of pension provisions for farmers similar in nature to the annuity agreement are the so-called direct investments in own farms[13]. As opposed to annuity agreements, they require a farmer's intentional action during their professional activities. Generally speaking, direct investments in own agricultural farms come down to purchasing new real estate (land), expanding and modernizing owned buildings and utility rooms as well as purchasing elements of equipment and technical devices. The primary objective of this type of investment is the growth in the economic value of the owned farm by increasing the owned acreage and the number of livestock as well as by increasing the efficiency of work. Assuming the existence of family bonds that make children at one point take over the farm management, investments made in the development of the farm are, in fact, investment in workplaces for these children. If we assume that parents who stopped their professional activities will create a common household with their children, investments in own agricultural farms may substantially contribute to improving their standard of living after their retirement. As D. Walczak correctly pointed out, investments in own farms may prove one of the best and the least risky forms of pension provisions for farmers (WALCZAK 2012, p. 43).

Summary

When formulating conclusions from the conducted research, we should firstly note that the economic potential of agricultural farms in Poland is diverse. As compared to the entire working population, the vast majority of agricultural farms earn a low income. However, there are more than a few agricultural farms (over 100,000) where the economic situation is at a level similar to or better than the average Polish household. The analysis of the structure and functioning of the agricultural social security system makes it possible to state that people working in agriculture are a social group that are

[13] More on this subject in: WALCZAK (2012, p. 33).

especially exposed to the risk of receiving low pension benefits in the future which are inadequate with respect to earned income. With regards to the research hypothesis formulated in the introduction, we should thus state that there are no grounds to reject it. In other words, this means that farmers in a better financial position, wishing to guarantee a satisfactory income after reaching the retirement age, should use the methods of voluntary pension provisions. The detailed analysis of these types of methods leads to the conclusion that instruments of additional savings for the future pension promoted by the state are unavailable for farmers (PPE) or hardly attractive for them (IKE and IKZE). On the other hand, alternative forms of savings with the pension in mind, excepting for strictly financial instruments which were not the object of this research, include particularly interesting services, such as equity release types and investments in own farms.

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MEDICATION INSURANCE POLICY – A NEW INSURANCE PRODUCT IN THE POLISH HEALTH CARE SYSTEM

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K e y w o r d s: medication insurance, healthcare system, health expenditure.

A b s t r a c t

In the Polish healthcare system, medications (including compounded preparations) are wholly or partially paid for from public funds. Subsidising medications which are either central or incidental to treatment (e.g., when patients are unable to work because of an illness) means that medication costs make up a large percentage of total health expenditure and are a drain on the patients' purse. Medication insurance (or drug coverage) policies are a relatively new product and are featured in business insurance portfolios of only a handful of insurance companies offering coverage for medication costs. This article sets out to discuss and analyze available medication coverage policies.

POLISY LEKOWE – PRODUKT UBEZPIECZEŃ GOSPODARCZYCH OBSZARU OCHRONY ZDROWIA W POLSCE

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S ł o w a k l u c z o w e: polisy lekowe, system ochrony zdrowia, wydatki na ochronę zdrowia.

A b s t r a k t

W systemie ochrony zdrowia w Polsce leki (w tym recepturowe) znajdują się w katalogu świadczeń gwarantowanych w całości lub w części finansowanych ze środków publicznych. Konieczność dofinansowania leków, których przyjmowanie może być podstawą bądź uzupełnieniem procesu leczenia (np. w sytuacji niezdolności do pracy wywołanej chorobą), skutkuje wysokim odsetkiem w łącznych wydatkach na ochronę zdrowia oraz uszczupleniem środków finansowych pozostających w dyspozycji pacjenta. Polisy lekowe (in. ubezpieczenia lekowe) są stosunkowo nowym produktem w ubezpieczeniach gospodarczych nielicznych zakładów ubezpieczeniowych oferujących pokrycie kosztów zakupu leków. Celem artykułu jest omówienie oraz analiza dostępnej oferty polis lekowych.

Introduction

Insurers in Poland sell a variety of insurance products, including several types of business insurance, offering medical benefits similar to those available under public health insurance. Drug insurance is one such product, the other examples being supplemental health insurance or hospital coverage.

Medication is a guaranteed benefit in the Polish public healthcare system and topics such as access to drugs, what drugs are reimbursable or how patients pay for drugs are regulated by law. The need to pay for drugs as part of treatment regimens means that costs for medications make up a large percentage of total health expenditure and are a drain on whatever funds the patients have. Patients who struggle financially may even forgo buying drugs entirely. All of this means that the drug expenditure may need to be managed through drug insurance.

Drug insurance (or drug coverage) policies are a relatively new product featured in business insurance portfolios of only a handful of insurance companies offering coverage for drug costs. This type of insurance is voluntary and prospective policyholders should base their buying decisions on an analysis of their needs and the choice of available insurance products.

This article sets out to discuss and analyze the available drug coverage policies.

Medication as a guaranteed benefit in the Polish healthcare system

In Poland, healthcare and its organisational and financial underpinnings are regulated by the Healthcare Benefits (Public Funding) Act of 27 August 2004 (Journal of Laws of 2004, No. 122, item 696, as amended; „the Act"). The Act specifies which healthcare benefits are guaranteed, i.e. which of them are funded publically, and whether they are funded in whole or in part. In addition to the so-called health benefits[1] and ancillary benefits[2], guaran-

[1] Health benefit: any action aimed to prevent disease or maintain, regain, restore or improve health, and any other medical action resulting from treatment or from other laws regulating provisions of health benefits (point 40).

[2] Ancillary benefit: accommodation and nutrition, adequate for the patient's state of health, provided in a hospital or in some other healthcare institution engaged in such curative activities as provision of in-patient or 24-hour health care, transportation services and ambulance services, and also accommodation provided outside a healthcare institution if the need to provide it is determined by specific conditions of a guaranteed benefit (point 38).

teed benefits also include medical benefits in kind which are used to support treatment processes. These are drugs, medical devices, orthopaedic appliances, and ancillaries.

In the Act, drugs (medicines) and medical devices are defined as follows:

– Drug: a medicinal product as defined in the Pharmaceutical Law Act of 6 September 2001 (Journal of Laws of 2008, No. 45, item 271);

– Compounded drug: a medicinal product prepared in a pharmacy based on a doctor's prescription;

– Medical devices: medical devices, devices used for in vitro diagnosis, accessories for medical devices and devices used for in vitro diagnosis, and active implantable devices.

Other than these, guaranteed benefits also include foodstuffs for particular nutritional uses. These benefits are available by prescription and benefit recipients (i.e. anyone covered by health insurance under the social security scheme) can obtain them from pharmacies.

These benefits (including drugs) are reimbursable, which means that all or some of the costs to purchase drugs, foodstuffs for particular nutritional uses and medical devices are paid for by the National Health Fund (NFZ). The rules, conditions and procedures involved in issuing administrative decisions on whether or not drugs, foodstuffs for particular nutritional use and medical devices will be reimbursable are set out in the Reimbursement (Drugs, Foods for Particular Nutritional Use, and Medical Devices) Act of 12 May 2011 (Journal of Laws No. 122, item 696, as amended).

The Reimbursement Act has established separate reimbursement categories for:

– drugs, foodstuffs for particular nutritional use and medical devices subject to prescription;

– drugs, foodstuffs for particular nutritional use, and medical devices used under specific drug schemes;

– drugs used in chemotherapy;

– drugs and foodstuffs for particular nutritional use which are provided as guaranteed benefits other than those specified above.

The reimbursement system covers drugs, foodstuffs for particular nutritional use and medical devices which are subject to prescription and provided to benefit recipients:

– free of charge (B),

– for a lump-sum payment (R),

– for a co-payment at 30% or 50%,

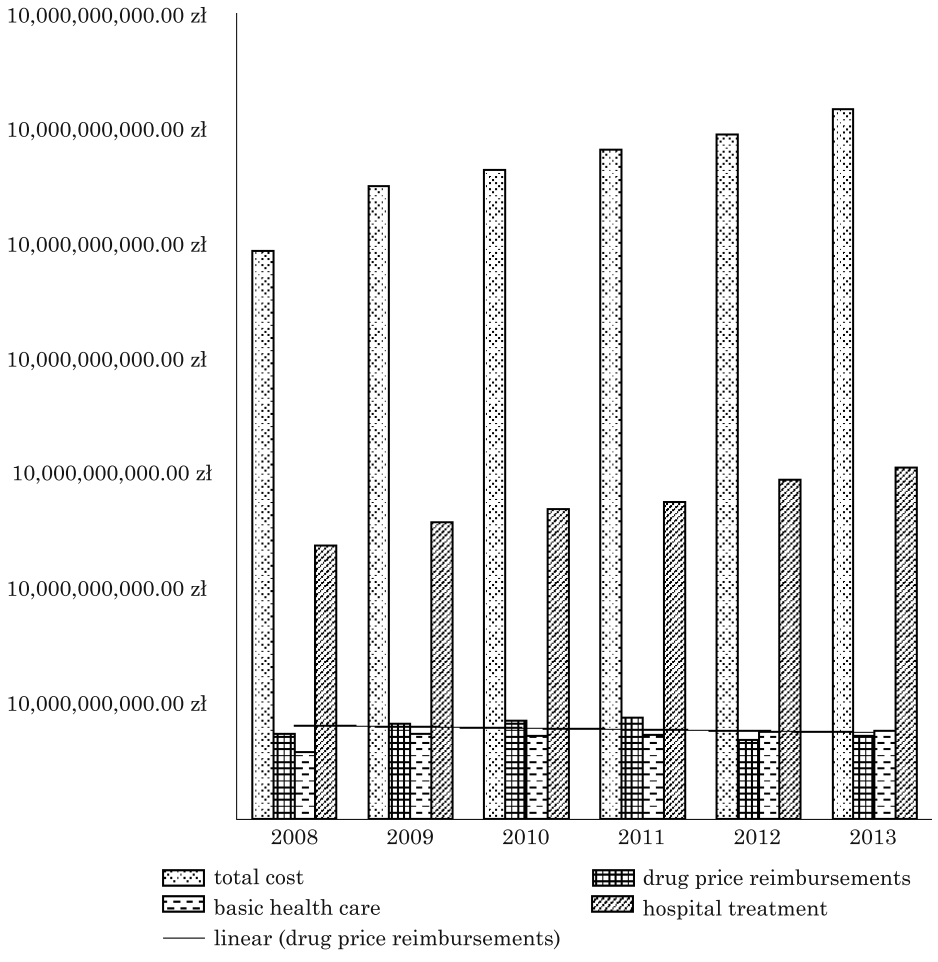

Fig. 1. Healthcare expenditure: total cost, hospital treatment, basic health care, and drug reimbursements for 2008-2013

Source: NFZ aggregate financial statements for 1 Jan 2009 – 31 Dec 2009; NFZ aggregate financial statements for 1 Jan 2011 – 31 Dec 2011 (p. 32); NFZ aggregate financial statements for 1 Jan 2013 – 31 Dec 2013 (p. 36).

up to the funding (reimbursement) limit, with the difference between the NFZ funding limit and the retail price[3] to be covered by a patient Article 2.26; Journal of Laws of 2011, No. 122, item 696.

[3] Retail price is the regulated price of a drug, a foodstuff for particular nutritional use or a medical device (i.e. their selling price as determined in an administrative reimbursement decision, including VAT) to which the following are then added: a regulated wholesale mark-up (at 5% of regulated selling price) and a regulated retail mark-up (calculated differently on the wholesale price as per statutory algorithms) (Article 7.1–7.4; Journal of Laws of 2011, No. 122, item 696).

Therefore under the existing law, benefit recipients (patients) who buy prescription drugs in a pharmacy pay for the difference between the funding limit for a drug and its retail price.

Drug reimbursements are a major healthcare expenditure item for NFZ, second only to hospital treatment and basic healthcare costs. Between 2008–2013, the average reimbursement figure was PLN 7,838,468,422.03, or 14% of total healthcare expenditure on average (*Łączne sprawozdanie finansowe...* 2010, 2012, 2014). Drug reimbursement levels for 2008–2013 are shown in Figure 1.

Private spending for medicines

Due to their high use, drugs and pharmaceutical products are a significant cost item for the general public in Poland, despite reimbursements from the National Health Fund. For the most part, drug and pharmaceutical product purchases are treatment-related. Increasingly, however, they are also triggered by pharmaceutical marketing campaigns. These are primarily focused on drugs and dietary supplements which are available over the counter and are used for individual treatment, often without supervision from a physician.

Annual spending on drugs (prescription and reimbursable medicines) is approx. PLN 25 billion, around PLN 9.6 billion of which is spent on medicines which do not need to be prescribed by doctors (SUDAK 2014). The figure makes up a substantial percentage of the total pharmaceutical expenditure among the general public. Available figures show differing per-group drug consumption rates and expenditure levels based on socio-economic status.

According to data from the Central Statistics Office (GUS), drugs or dietary supplements are used by over 50 per cent of people in every age group (except 3–6 year-olds). Those who use them most often, however, are old-age or disabled pensioners (93.3%; by source of livelihood); in terms of age, the most frequent users are people aged 60–69 (90%) and 70 or more (96.9%) (Fig. 2) (*Łączne sprawozdanie finansowe...* 2014, p. 109, 110.

This high consumption of pharmaceuticals translates into a high level of drug expenditure in households. According to a 2013 study by GUS, the per-person expenditure for drugs and pharmaceutical products was PLN 36, or 66.7% of average monthly healthcare expenses (*Łączne sprawozdanie finansowe...* 2014, p. 57). The findings of the 2009–2013 Social Diagnosis study (*Diagnoza społeczna*) show that an average of 92% of all households purchase drugs and medical products, the average amount being PLN 357.40 (figures are for one quarter in each surveyed year) (Fig. 3) (CZAPIŃSKI, PANEK 2009, 2013).

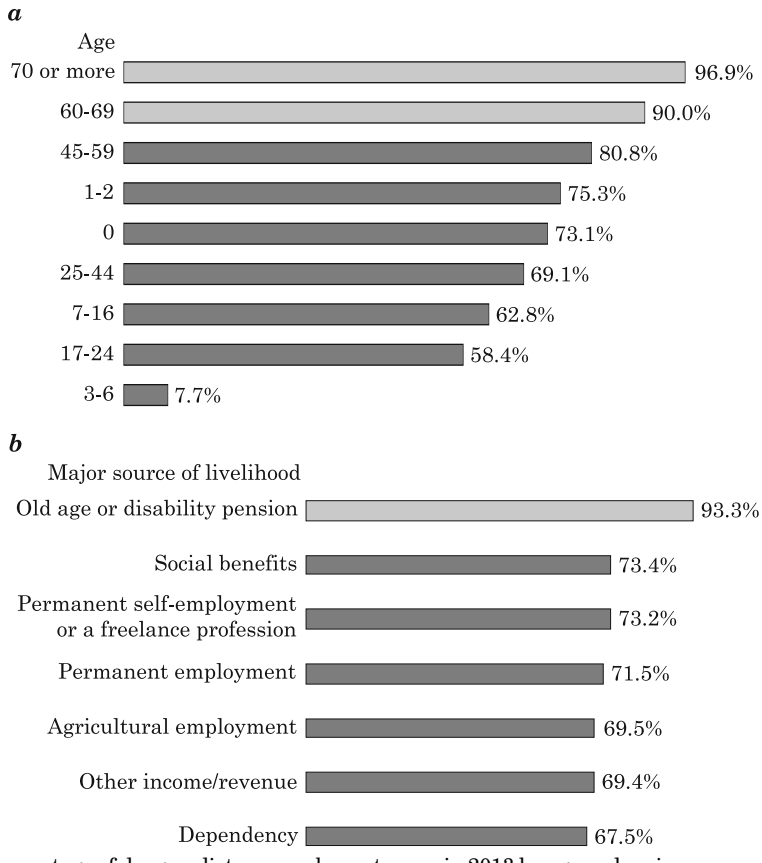

Fig. 2. Percentage of drug or dietary supplement users in 2013 by age and major source of livelihood: *a* – age, *b* – major source of livelihood

Source: Żyra (2014, p. 109, 110).

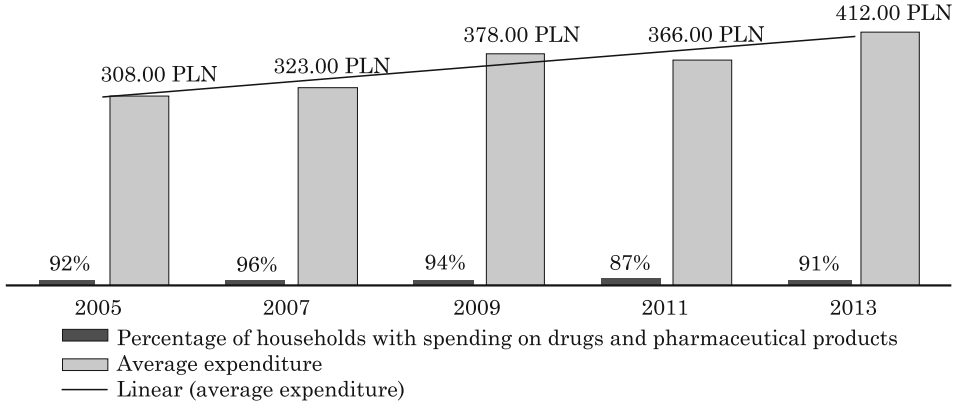

Fig. 3. Percentage of households with quarterly spending on drugs and pharmaceutical products, and the amounts of such expenditures from 2005–2013 (entire samples)

Source: Compiled from Czapiński, Panek (2009, p. 114, 2013, p. 114).

The higher usage of medicines amongst old-age and disabled pensioners translates into their higher health spending, with per-household health expenditure for old-age and disabled pensioners accounting for 8.3% and 7.6% of total household budgets, respectively (*Łączne sprawozdanie finansowe...* 2015, p. 162). Between 2009–2013, quarterly drug and pharmaceutical product spending in old-age and disabled pensioner households was PLN 414.20 and 376.60, respectively (Figure 4) (CZAPIŃSKI, PANEK 2006, 2007, 2009, 2013).

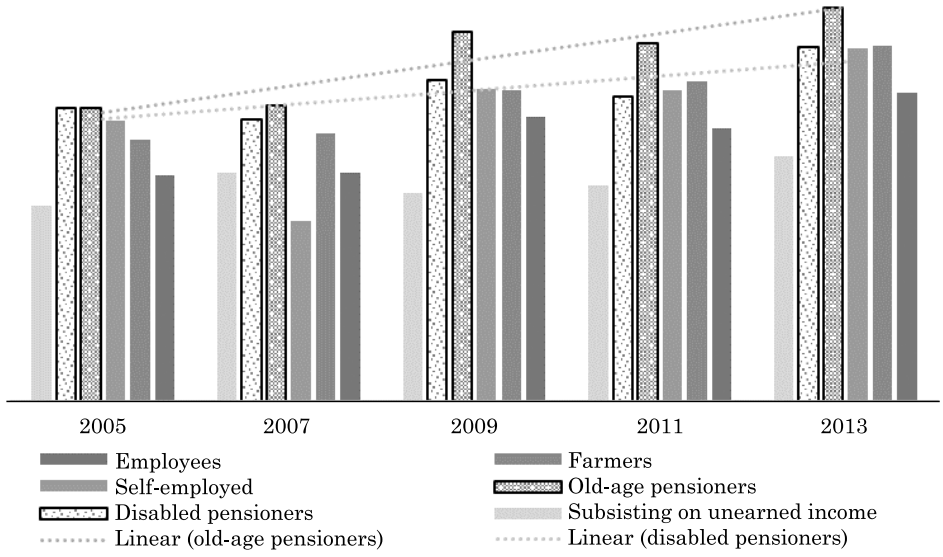

Fig. 4. Household spending on drugs and pharmaceutical products per socio-economic group (whole samples) in 2005, 2007, 2009, 2011 and 2013 (data for 3 months)
Source: CZAPIŃSKI, PANEK (2006, p. 194, 2007, p. 103, 2009, p. 113, 2013, p. 115).

Higher co-payments, at 40% on average (ŁANDA 2015), and low incomes mean that some households forgo purchasing drugs altogether, even when drugs are needed or a cheaper alternative is offered. Households which do this most often are those of disabled pensioners (39.8%), people subsisting on unearned income (45.1%), and old-age pensioners (21.0%). (CZAPIŃSKI, PANEK 2013, p. 111, 113).

Medication coverage products offered by insurers: an analysis

One could assume that a contributing factor to insurance companies devising and offering medication coverage plans (including drug insurance policies) was the new reimbursement system introduced by NFZ, in that it

brought regulated prices for medicines. That and the fact that patients must pay for the cost of medications out of their pockets, in whole or in part, all translate into high drug-related expenditure levels.

Medication insurance is related to and supplements what is available via the public system. The link between the two (especially with regard to drug reimbursement) is that the former only applies to „*prescription drugs available from pharmacies*". Even though drug coverage is currently available from a handful of insurers only, the products offered are quite different[4].

The insurance benefit in the first form of available medication coverage is the percentage of co-payment[5] for prescription drugs (or drug alternatives) included in the list of drugs covered by the insurer. Since the benefit is available for prescription medications, the insurer will finance part of a drug payment covered by the patient. The benefit may be realised in an affiliated pharmacy which accepts the insured's medication card or in any other pharmacy. Where the benefit is realised in an affiliated pharmacy, the following are needed: a medical prescription and what is called a medication (or insurance) card which a policyholder receives when executing his or her insurance contract. Otherwise, the insured will be reimbursed for the cost a drug based on a medical prescription and a proof of drug purchase (such reimbursement to the extent of the insurer's co-payment percentage). The level of medication co-payment by the insurer is limited to the sum insured, as specified in the contract. This type of coverage is offered as group or individual insurance under a separate insurance contract or as an addition to life insurance. In group insurance, the contractual parties are the insurer (insurance company), the policyholder (employer) and the insured (employee). In this type of insurance, the insurer and the policyholder agree on a co-payment percentage, a sum insured and a minimum number of employees which must take out insurance. In individual insurance, the contractual parties are the insurer (insurance company) and the insured. The insurance premium will depend on the sum insured, medications covered, a co-payment percentage, and (for group insurance) a proportion of all employees to those who take out the insurance. The insurance premium may be paid entirely by the policyholder or by the insured, or partly by both the policyholder and the insured. Insurance is available to anyone aged 69 or less; however, the liability of the insurance company ends in the calendar year in which the insured turns 70. If agreed to by the insurer, coverage may be extended to the insured's life partner or child (in group insurance, an agreement will also be needed from the policyholder (employer)). In such a case, the terms of insurance applicable to

[4] Information on drug insurance is derived from publically available source documents on insurers' websites.

[5] A specific percentage of the insurer's share in payment for a drug.

the insured will also apply to others who are co-insured (sum insured, insurance premium, percentage co-payment) (MAKOWIECKI 2012, ROSIK 20120.

The insurance benefit in the second form of available medication coverage is a percentage or amount of retail price (subject to limits specified for each drug pack covered by the selected insurance option). Additionally, the calculation of the insured's benefit depends on whether or not a drug is reimbursable. For reimbursable medications, the cost to be refunded to the insured is the difference between the drug's retail price and the reimbursement limit as determined by the Health Minister and is applicable on the day the prescription is processed. For non-reimbursable drugs, the refund is a percentage of the retail price as specified for any given medication. As with the first form of coverage, here too, the insured uses his or her medication card to buy medication in an affiliated or unaffiliated pharmacy. The insured may be a person aged 75 or less, and the contract of insurance may extend to the insured's partner or children. Insurance is taken out based on an application which sets out the applicant's personal particulars, the option selected, the terms of insurance, and information on the applicant's health and lifestyle. Two options are available (I & II), each providing for a different range of covered medications. Option II also provides for a four-month waiting period in which the insured is not eligible for any cash benefit with respect to the costs incurred in the purchase of prescription medications. The waiting period is not applicable to renewed coverage. The premium depends on the insured's risk assessment which includes such factors as the insured's health, lifestyle or occupation. The product comes with the insurer's liability exclusions, which set out circumstances in which the policyholder will not be refunded the cost of medications. These relate to drug purchases in connection with health treatment resulting from the introduction and existence of any state of emergency, martial law, war or acts of war, or from the consumption of alcohol, narcotic drugs or addictive substances. The exclusion also covers purchases of medications in connection with health treatment where the symptoms had been present or treated before the insurance contract was made, and such symptoms were either not reported or they were reported falsely. A further liability exclusion is that the insurer will not provide any refunds for medications that are not on the list of medications covered by the insurer.

When compared, both forms of medication coverage offer sharing in the insured's medication costs as their insurance benefit. The difference is in how they define sharing. The first product specifies it as a percentage of price for all covered medications; the second one offers a percentage of price or a specific amount for each drug pack covered by insurance. These different mechanisms for calculating the insurer's share of costs mean that the two

offers are not comparable as they define their key parameters (co-payment share and limits) differently.

It seems that whether an offer is attractive to the client (the insured) will depend on a number of insurance parameters, such as:

– the sum insured: this is the insurer's co-payment limit and the higher it is, the more benefit the insured will receive (in group insurance, this parameter is agreed without the involvement of the insured and the co-insured);

– the co-payment percentage or amount: this is the portion of a drug price the insurer will pay for. From the client's point of view, it should be as high as possible (here too, this parameter is agreed without the involvement of the insured and co-insured in group insurance);

– the insurance premium: this is because it reflects the insured's liability for the coverage he or she will be receiving. From the client's point of view, the premium should be at the lowest acceptable level. In individual insurance, however, the premium will be variously affected by the insured's risk assessment (most often, this means that an increase should be expected), the sum insured, and the percentage or amount of the insurer's co-payment for the cost of medicine.

The element that diminishes the attractiveness of insurance products are their liability exclusions, especially those with a policy that no refunds are offered for medications bought to treat symptoms that occurred or were treated before the insurance contract is made.

Concluding remarks

Medication is a guaranteed benefit in the Polish public healthcare system. As such, medications are wholly or partially paid for from public funds. Despite the reimbursement system, Poles continue to incur significant expenditure on prescription medications (KALBARCZYK 2015).

Drug coverage which the insurers offer as a way to cover some medication expenses is an interesting option, especially after key (economic) data have been obtained from the insurer concerned, such as the sum insured, the insurer's co-payment level, and the insurance premium that reflects the personal circumstances of the insured (such as his or her age, health, or occupation). If all the required circumstances are in place (employment), the client may choose either a group or an individual plan.

It should be noted that the availability of medication coverage is restricted in that it is subject to age limits: the prospective insured must not be older than 69–75 years of age. Data show that the highest medication use and medication expenditure is among people aged 60–69 or 70 and older, and among those

subsisting on old-age or disabled pensions. Therefore, the target group that could benefit the most from drug insurance is excluded from coverage. Furthermore, given that insurers base their premium calculation on individual risk assessments, an assumption must be made that the premium will be beyond the means of those socio-economic groups.

The insurance premium is another limitation. Data on medication spending levels, low income among numerous social groups and the fact that some patients forgo medication for cost reasons might indicate a lack of financial wherewithal to pay the insurer for the coverage provided. It seems, however, that this limitation could be overcome if a stipulation is provided (as present in one of the group insurance offers) that premiums can be paid by the policyholder (i.e. the employer).

The development of medication insurance policies will provide patients with an opportunity to cut down on their medication costs. As with other types of insurance, whether or not a suitable policy is chosen will depend on the knowledge and understanding of the insured's needs and on the terms of the insurer's offer. It is difficult to assess whether (and for whom) taking out medication insurance is economically reasonable (where such factors as the need for medication, income level, or drug spending level are taken into account) unless key (financial) parameters of coverage are known. It seems that further analyses of medication insurance offers could be a step towards achieving that goal.

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THE USEFULNESS OF READABILITY FORMULAS IN THE INSURANCE INDUSTRY

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K e y w o r d s: text readability, simplification, readability formulas, insurance.

A b s t r a c t

The aim of this paper is to characterize the most important methods which are used to determine the level of text readability. The author presents practical examples of the usage of chosen methods by foreign insurance companies. The final section of the study is completed with general conclusions relating to the application of the given solutions to the Polish insurance market.

„There is nothing wrong with the formulas except they are not used enough" (William DuBay)

ZASTOSOWANIE MIERNIKÓW PRZYSTĘPNOŚCI TEKSTU W BRANŻY UBEZPIECZENIOWEJ

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S ł o w a k l u c z o w e: czytelność i przystępność tekstu, symplifikacja, wskaźniki przystępności, sektor ubezpieczeń.

A b s t r a k t

W artykule scharakteryzowano najważniejsze metody do badań nad stopniem przystępności dowolnego tekstu, ze szczególnym uwzględnieniem ubezpieczeniowych wzorców umownych. Autorka prezentuje przykłady zastosowań wybranych metod przez zagraniczne zakłady ubezpieczeń, które mogłyby zostać z powodzeniem wykorzystane przez polski sektor ubezpieczeniowy.

Introduction

An enormous amount of information from a variety of sources, processed and provided daily, makes one realize that readability is a significant part of our life. It is also a subject of research by many companies and organizations in order to hit the target group of people with their messages. The problem is usually the same – limitations. There is a limited number of space, and a limit to the amount of characters which often leads to a difficult-to-understand text instead of an easy-to-read one. With regards to this, such materials are filled with incomprehensible terminology, frequently containing long sentences or exotic syntactic constructions, which do not demonstrate a customer-oriented approach. Therefore, a broad area for formulas measuring readability is available.

The readability formulas and existing methods used to measure readability have become more popular. In recent years, the problem of text readability has attracted considerable attention. It is not surprising that nowadays, in the era of information technology and the computer age, all formulas are computerized and are acting mainly as online calculators, which show the readability level of every kind of text that is pasted into it. Due to this fact, the readability of various types of documents and agreements can be probed thoroughly; in particular, different trade agreements which consumers deal with all the time. They are written in a very complex way so that their understanding by an average, non-expert audience is practically impossible. It also applies to insurance contracts where readability leaves a lot to be desired. However, readability formulae should in that case be regarded as a cure-all and a rough indicator of insurance policy quality, according to the *KISS* principle („keep it short and simple").

General considerations on readability

Reading comprehension is appropriate to any situation and it is verified at every life stage. The understanding of written texts is a specific human ability, which has awakened the interest of representatives of many disciplines in the social and behavioral sciences for a long time. Statistics on readability and competencies of adults are alarming. The human population is having problems with basic reading skills from understanding the given text as a whole, through difficulties with understanding the meaning of sentences, and up to minor lapses in vocabulary. Furthermore, the problem isgrowing. A rich source of data on adults' proficiency, for example in literacy, is provided by a survey „Programme for the International Assessment of Adult Competencies"

(PIAAC) sponsored by the OECD. Literacy in this context means the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts. PIAAC assessed the level and distribution of adult skills across selected countries, focusing on the cognitive and workplace skills needed for successful participation in the economy and society of the 21st century.

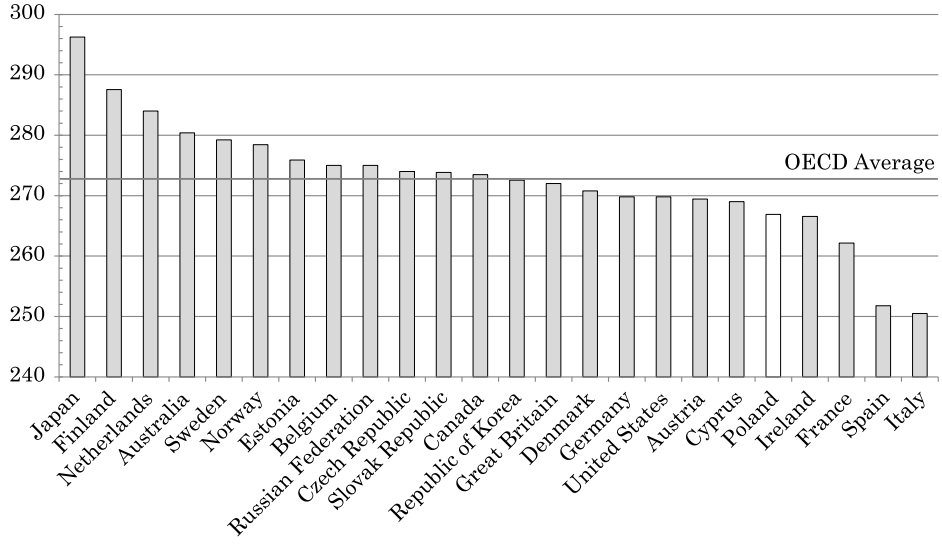

Fig. 1. The average literacy score among adults aged 16–65 years in selected countries
Source: self-study based on: OECD, *Programme for the International Assessment of Adult Competencies* (PIAAC), 2012 (data retrieved from http://piaacdataexplorer.oecd.org).

The graph presents how literacy skills are distributed across a population of 24 countries that participated in the Survey of Adult Skills (PIAAC).The highest country-average literacy level of 296 points was scored by Japan. Countries occupying the Scandinavian Peninsula are at the top of this ranking as well. According to the column graph, the average score for Poland seems to be a bit on the weak side and remains substantially below the OECD average (267 points against 273). The results put Poland together with Ireland on one of the last places among the analyzed countries, which cannot be treated as a positive effect when it comes to reading comprehension.

To summarize the above studies on readability, the difference between two similar concepts: readability and understandability should be emphasized. Readability can be defined in numerous ways: for instance, as a „quality of writing (print or handwriting) that can be easily read". The term readability

does not equal understandability, which means „capable of being understood". In general, there are three ways the term readability (this paper focuses exactly on readability) is used in research (LARSSON 2006, p. 8):

1. To indicate legibility of the printed material as well as its layout or typography.
2. To indicate ease of reading due to the interest-value or the pleasantness of writing.
3. To indicate ease of comprehension due to the style of writing.

Apparently, the third definition of readability is the most suitable for the purposes of this article. On the basis of analyzing the structure of sentences, words and phrases; many readability formulas (tests) were created, which are methods for measuring and determining the difficulty of a given text.

Existing methods for measuring readability

It seems obvious that measuring the readability of a piece of writing can lead to its simplification. For this reason, different metrics which differ in their range of evaluated features and complexity of formulas have been discovered. Evaluations of readability fall into two broader categories:

– quantitative measures,
– psycholinguistic methods (cloze tests).

The first group involves mathematical and statistical analysis of specific linguistic characteristics of the given text. To this group belong reading comprehension tests or analytical methods such as readability formulas. The second one, so-called cloze deletion tests, aim to determine the understanding of a text by letting readers fill in blanks that represent left-out words.

Over the past decades, many experts through their studies have compiled recommendations connected with readability and its measurement or techniques for effective writing documentation. There is a lot of readability research available, most of it was conducted between 1930 and 1960 and designed for American English. However, present-day readability tests are only adaptations of the original preexisting ones, in spite of the fact that they are tailored for almost every language in the world,

Readability tests are indicators which measure how easily a piece of writing can be read and understood by the man on the street. They give a quick, handy overview of whether or not a sentence is too long and/or so full of polysyllabic words that it is virtually unreadable to all but a particular sub-set of over-educated individuals. In short, all procedures which are used to measure readability are known as readability formulas.

Perhaps, the most common and the most publicized test for computing readability was the one credited to Rudolph Flesch in 1948. The popularity of his formula made Flesch a leading authority on readability (HEYDARI, RIAZI 2012, p. 177). This test has also been incorporated into software applications such as Microsoft Office Word, so that every user may easily check a word for its spelling and grammar, as well as its readability level. Flesch Reading Ease Readability Index (FLESCH 1949) is based on the average number of syllables per word and words per sentence. It rates texts on a 100-point scale – the higher the score, the easier it is to understand the text. Although quite simple at first sight, today this formula is still considered to be very efficient and this is most likely due to its easy application. This is why it continues to be one of the most widely used tests to measure text difficulty. On the other hand, we have The Gunning Fog Index Readability Formula (simply called FOG Index), from the name of the author- Robert Gunning, which also measures the readability of any piece of writing. The formula estimates the number of years of education that a reader hypothetically needs to understand the passage of a text. It is based on the percentage of hard words (normally those with three or more syllables). Nowadays the FOG Index is commonly used for running texts in health care, general insurance industries and for general publication as well (KOUAMÉ 2010, p. 137).Last, but not least is the Automated Readability Index (ARI), which is designed to evaluate the readability of text. Like the other two Indices previously mentioned, the ARI formula outputs a number which approximates the grade level needed to comprehend the given text. One aspect, which is particularly remarkable, is that ARI relies on a factor of characters per word instead of the usual syllables per word. As it turns out, such a solution is a faster one, because the number of characters may be counted more accurately than syllables by software applications.

The following (Table 1) is an outline of the chosen, well-known methods for measuring readability of a text.

It is fair to recognize that all readability formulas provide an indication of text readability that is based on the word and sentence lengths found in the text. The output of the statistics used here is an indication of the number of years of education that a person needs to be able to understand the text easily on the first reading (LARSSON 2006, p. 10). Most of them return a score where a higher result indicates a more difficult piece of writing, and has to be interpreted with a scale to get the exact difficulty. That is how the target audience of a given text which is being analyzed is set. Undoubtedly, it is a significant advantage of readability formulae. Obviously, they cannot measure or give an answer to a question of whether a piece of writing is suitable and easy-to-understand by an audience or a group of clients, or if it is understandable for them. However, readability tests can surely help by

Table 1

Main characteristics of the chosen readability formulae

	Formula	Output	Description
Flesch Kincaid Reading Ease (1948)	206.835 – 1.015 · asl – 84.6 · asw asl = average sentence length (the number of words divided by the number of sentences) asw = average number of syllables per word (the number of syllables divided by the number of words)	– 90–100 easily understandable by an average 5th grader – 80–90 easy – 70–80 fairly easy – 60–70 easily understood by 8th and 9th graders – 30–50 difficult – 0–30 best understood by university graduates	– higher score indicates more difficult text – the score between 60 and 70 is largely considered acceptable – most used and well--known formula (incorporated in Microsoft Office Word) – suitable for all kinds of texts
Gunning Fog Index (1952)	0.4 · (asl + phw) asl = average sentence length phw = percentage of hard words	FOG index = number of years of formal education needed to understand the text i.e. score of 8 = eighth grade student (13-14 years old)	– short sentences written in Plain English achieve a better score – „ideal" score is 7 or 8, anything above 12 is too hard for most people to read, widely used inhealth care and insurance. Ideal for business publication and journals
Automated Readability Index (ARI, 1967)	4.71 · chw + 0.5 · asl – 21.43 chw = characters per word asl = average sentence length	outputs a number that approximates the age needed to understand the text	– formula relies on a factor of characters per word – used in technical documents and manuals – produces a reason-ably accurate score in most European languages

Source: from ReadabilityFormulas.com, http://www.readabilityformulas.com (access: 17.07.2015).

forming rules for writers so that the text will be clear and understood by people with a given educational background. This may contribute to the retention of the readers or clients, and also increase their speed of reading. The fact is, many of the formulas can be easily adopted by software programs (they are mathematical equations) to make them easy-to-use. There are prepared tools available on websites, so the only work to be done is to copy-paste a text and the programs return a result very quickly using the preferred formula. Some readability calculators can also display complicated sentences (those with

many words and syllables) with suggestions of what might be done to improve its readability.

In spite of the success of the formulas for computing readability on the one hand, they were always at the centre of controversy on the other. It is obvious that the methods for measuring text readability are based on a limited number of independent variables – they cover only a fraction of all factors that actually contribute to the comprehensibility of a particular document. Even though there are some disadvantages of tests for computing readability, they can significantly improve text simplicity and, therefore, its readability. To enable the non-expert audience to understand most of the evaluation document, the author should take into account some techniques that might increase its readability. Shorter words, shorter sentences, words with fewer syllables, and words that are used more frequently are easier to read. Indeed, longer words and sentences are generally harder to understand and read due to the fact that they require more mental work by the reader. In any case, the clearer and simpler, the better for the reader or customer.

In conclusion, readability formulae are easy to learn, easy to use (mainly through their computerization) and an inexpensive way of testing document comprehension. They could be treated as a first step leading to any text simplification. What is more, using more than one formula could provide greater insight into a given piece of writing. Nowadays, more than 40 different methods used in readability testing can be identified. Some of them are better known and more popular than the others. Furthermore, there are also available readability measurement tools for languages such as: Chinese, Hindi, Hebrew or Vietnamese. Unquestionably, they have great utility.

Use of readability formulas in the insurance practice

Currently, readability indices can be applied to anything from textbooks to government documents and they are more popular than ever. Readability measures have been historically used primarily to place textbooks into grade level categories; but for over 50 years now, these formulas have been massively used in many languages and worldwide in (SCOTT 2015):

– education and publishing (from the abovementioned textbooks, to journals, to literature which tends to form the backbone of a good educational system),

– health care (testing clinical leaflets relevant to patients, doctors, pharmacists, researchers),

– military and governmental agencies (several important readability formulas were developed to measure the readability of enlistment applications and technical manuals),

– financial and accounting sector (measuring the readability of loan applications, insurance contracts, financial reports, tax forms).

The reason for this massive use is that a growing number of incomprehensible words in various kinds of documents have beenobserved which is against the plain English drafting. The concept of plain language is based on a clear, concise, direct, and exactly readable style of drafting documents in English. It rather means presenting clear and accurate information, not just using simple language or easy words.

In one form or another, plain language laws have existed for more than 40 years. In 1972, U.S. President Richard Nixon initiated plain language reforms by decreeing that the Federal Register should be written in 'layman's terms'. The First National Bank of Boston has implemented plain English into loan agreements, and in 1973 Citibank converted a promissory note to plain language (by cutting its length in half), which has been seen as a leader in improving customer relations. By mid-1986, twenty states had enacted legislation requiring plain English in insurance policies, and nearly thirty-nine states had considered some form of plain language legislation. Plain English laws for consumer contracts have been implemented in more than 35 states. New York was the first state to pass a law requiring that contracts governing consumer transactions should be written in plain English, as opposed to legalese. Beginning in the early 1980s, a number of states began to regulate the „readability" of insurance policies. Nowadays, about 30 states have enacted readability laws designed to simplify the language in insurance contracts (ASPREY 2010, p. 1–3).

The plain-language movement has also been joined by other countries outside the U.S. Proponents of plain language have been active in Australia, where a plain English car insurance policy was introduced by NRMA in 1976, and other plain language policies quickly came forward. The UK has also implemented standards for plain English for improving readability (DWYER 1993, p. 335). Other countries which have mandated plain language in all credit and financial agreements are: Canada, Sweden, Mexico, the Netherlands, South Africa and New Zealand.

The USA is the forerunner of the regulation for improving simplicity of the contractual language used in insurance practice. Most states have regulations that impose a plain language requirement on insurance policies or legal documents in general. Although these requirements differ slightly from state to state, the general terms are relatively common to all of them. The readability standards can be subdivided into three categories (FRIMAN 1995, p. 106, 107):

a) subjective tests,
b) objective tests,
c) formulas (Flesch test).

The first group of standards for determining readability can be found in some state's regulations, and frequently use terms such as „reasonable", „clear" and „common". The New York statute, for instance, requires that consumer contracts be written in a „clear and coherent" manner. It concludes that subjective tests allow for flexibility and interpretation dependent upon the particular parties involved. In that case especially „reasonableness" requires additional judicial interpretation. In contrast, the objective test relies on mechanical, precise formulas to determine reading ease. They are based on the nature and length of the words and sentences used in customer contracts. Specifically, the Connecticut statute requires such technical details as: „the average number of words per sentence (...) less than twenty-two" or „allows at least three-sixteenths of an inch of blank space between each paragraph and section". Definitely, a great benefit of the objective standards is their precision and clear guidelines for contract drafters. But on the other hand, they are quite naturally inflexible and full of technicalities which cause problems in their application. At the end of this article, the readability formulas are presented.

Most U.S. States and jurisdictions mandate that insurance policies and contract forms meet a readability test. The most popular index for gauging insurance language is the Flesch test. In many of the states shown in Figure 2 (marked green), the language used in auto, life, health and other insurance policies must pass the Flesch Reading Ease test. A number of state insurance Commissioners (responsible for the harmonization of the country's different laws and regulations with regards to the insurance industry, customer service and quality of insurance products) demand that policies issued in their state be „readable"; in practice, that means about Grade 8. The standard for the insurance industry is a Flesch score of 40 that is equivalent to a high-school graduate's reading level in insurance forms.

Historically, insurance policies have been written in very small type and contained much fine print where many of the important items from an insurance perspective can be found. The contracts have been drafted in language that challenges even the most experienced insurance professional. This refers to lawyers or judges, and also drafters of legal language, who are stumped by its meaning; even though they are engaged with insurance policy argot (ROSSMILLER 2008, p. 9).Most insurance companies have used this fine print to exaggerate the insurance contract length (over 20 pages) or layout; not to mention to add loopholes into the content of the agreement which should not be ignored.

An InsuranceQuotes.com poll (HAWKINS 2011) presents that 87% of drivers who currently have auto insurance said that they read at least part of their auto insurance policies. Thirty-six percent of surveyed drivers who had read their policy found them to be somewhat or very difficult to understand. It is

Fig. 2. States in the U.S. using readability formulas in the insurance sector
Source: own elaboration.

assumed that less than 5% of insurance company clients actually read their insurance policies, and with good reason. Of course, the easiest way is to read all product documentation before signing, but it is not as simple as that because much of the documentation is not written in a way that is accessible to clients. Consumers are often not familiar with insurance concepts, principles and laws, and the reason for this lies in the customer's insufficient education with regards to insurance. This can contribute to a lack of insurance vocabulary (terms) and, as is known, many insurance contracts (General Terms and Conditions or Tariffs) are long documents containing large amount of legalese and industrial terminology. In consequence, only „seasoned experts" can easily understand the specific details of each policy, such as: general provisions, amount of coverage, insurance premium to be paid, sum insured and guarantee sum or exclusion clauses. Usually the only time most of the Insured ever pull out their insurance policy is when they have a claim. Moreover, it often turns out that this it is a difficult-to-read document with a long list of items that are excluded and the particular accident is not covered by the insurance policy. Badly written customer-oriented documentation results in poor customer satisfaction and can lead to lawsuits. More clarity and simplification of insurance contracts will reduce customer service calls and appeals. When an insurance policy is given to a customer that is too difficult to understand, they

will be less informed. A readable insurance product/service specification saves money and time by avoiding unnecessary customer complaints. For Insurers, it should be crucial to provide its standard agreements in a simple and easy--to-read way; such asa concise, easy-to-read summary. Presenting the same information, but with simplified details, can convince the most uninterested customers to buy a policy. That is the main reason the insurance industry should use and implement readability standards.

As mentioned previously, plain English laws for consumer contracts have been enacted in most of the states in response to the urging by consumer groups. They have mainly incorporated the Flesch test into their legislation. For instance, the State of Massachusetts (Mass. Gen. Laws 2014) has incorporated the Flesch reading ease test, which forces insurance policies to have a minimum score of 50 (equivalent to a 10^{th} grade reading level). In Michigan, each insurance company needs to obtain prior approval of its policy from the Insurance Bureau before the company can offer that policy for sale. One of the requirements is that each policy must meet a „readability score for a form for which approval is required (...) shall not be less than 45". Moreover, state regulations do not refer only to readability. Oregon Law(ORS 2013) says that „consumer contract complies with plain language standards if it uses: words that convey meanings clearly and directly, the present tense and active voice whenever possible, margins adequate for ease in reading and frequent section headings". Another example is the Connecticut definition of readable language which states there must be a standard layout, font, and the policy must avoid „the use of unnecessarily long, complicated, or obscure words, sentences, paragraphs or constructions" (Conn. Gen. Stat. 2015). Some states go further than that: the North Carolina Department of Insurance says its agency runs a consumer hotline available to anyone in the state where they can get „free unbiased information" and the Texas Department of Insurance provides toll-free consumer help.

Many states are trying to improve consumer-friendly legislation so that the Insured understand easily and comfortably general terms and conditions. While most state statutes differ in the exact language used, penalties applied, and coverage; they all tend to employ either a subjective standard or an objective standard, or both. Foreign experts and regulators have taken note of the complexity of insurance policies, and they are working to create additional protections for insurance consumers. Nonetheless, the idea of readability, and more precisely readability formulas, has had an important effect on the insurance industry in simplifying their policies and determining the direction which other foreign countries (without any readability regulations) should follow.

Conclusions

There are numerous examples from other countries, mostly developed ones, where the readability formulas are working well in the insurance business (they even regulate the degree of insurance policy readability). However, it is true that such simple formulas providing readability statistics could be relatively widely used; but instead, are very often ignored. Although, as mentioned previously, today so many formulas exist for different languages, but none of them are used by the Polish insurance sector.

The main reason the insurance industry in Poland should use and implement readability formulae is that every policyholder must understand general terms and conditions, standard contractual clauses and their rights and obligations arising from the insurance contract. In 2013 the Polish Financial Supervision Authority (KNF 2013) recorded an increase in the number of complaints referred to it. Almost half of them (47%) were related to the insurance industry. Many complaints occur when Policyholders or the Insured do not clearly understand general terms and conditions of a given insurance product. The main concerns contained in the complaints regarding personal and non-life insurance include a focus on insurance compensation payment. When concluding an insurance contract, people are not often aware of all the conditions because they do not read them or only roughly analyze them. The result of this is improperly selected insurance coverage where certain insured events are excluded. As a consequence of making a claim, it may transpire that such a loss or damage is not covered by the insurance policy and the Insured Person is not entitled to receive any compensation. This is mainly the subject of the complaints by Polish consumers.

The readability of the polish insurance contract leaves a lot to be desired. Much of the product documentation is not written in a way that is accessible to clients. There are so many twists and turns in the language that it is even possible to read through the entire policy and not understand it. However, in the Polish legislation (Polish Civil Code 2015) there is a provision which is applicable to all contracts entered into with consumers and which states that „any provisions of general terms and conditions which are ambiguous shall be interpreted in favor of the consumer". The main criterion for choosing the insurance product should be readability and not just the price as often happens. Consumers should not buy an insurance product that they find confusing.

Poland ought to take advantage of this new opportunity and apply the given solutions to the insurance market. Looking at the experience of other countries with regards to insurance materials readability, the Polish insurance market should rely on readability formulae and concentrate on implementing

and putting into force the proposed measures as soon as possible. More importantly, text difficulty can be measured without language-specific adaptation, which means that such a solution could bring clear, measurable benefits for the Polish insurance industry.

* The paper achieves a score of 36 on the Flesch reading ease test.

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REGIONAL VARIATION OF POTENTIAL AND ACTUAL LABOR RESOURCES IN POLAND IN THE LIGHT OF FORECASTS THROUGH 2040

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K e y w o r d s: potential labor resources, actual labor resources, population ageing process, territorial diversity, Poland, voivodships, poviats.

A b s t r a c t

The article aims to analyze the territorial diversity of the subpopulation that corresponds to the potential labor resources in Poland, both as it appeared between 2000–2014 and in the light of forecasts produced by the Central Statistical Office. The analysis comprises the working age subpopulation in Poland, including the current change of the pension age threshold. In addition, the age structure of this subpopulation has been analyzed according to territorial and temporal aspects.

REGIONALNE ZRÓŻNICOWANIE POTENCJALNYCH I REALNYCH ZASOBÓW PRACY W POLSCE W ŚWIETLE PROGNOZ DO ROKU 2040

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S ł o w a k l u c z o w e: potencjalne zasoby pracy, realne zasoby pracy, starzenie się populacji, zróżnicowanie regionalne, Polska, województwa, powiaty.

A b s t r a k t

Celem artykułu jest analiza terytorialnego zróżnicowania subpopulacji tworzącej potencjalne zasoby pracy w Polsce w latach 2000–2014, a także w świetle prognoz Głównego Urzędu Statystycznego. Przeanalizowano subpopulację będącą w wieku produkcyjnym, z uwzględnieniem zmian w wieku emerytalnym, polegających na stopniowym wydłużaniu czasu aktywności zawodowej ludności. Dodatkowo badano strukturę wieku tej subpopulacji, zarówno w przekroju terytorialnym, jak i czasowym. Źródłem informacji stanowiących podstawę badania były publikacje Głównego Urzędu Statystycznego.

Introduction

The literature defines potential labor resources (potential labor force) as composed of a working age subpopulation. However, the working age is not identical everywhere: Europe and many countries (including Poland) are now reforming the state pension scheme, changing the retirement age thresholds, which is why labor resources are often considered in the context of biological age groups. Hence, potential labor resources are most frequently defined as people aged 15 to 64 years, while the individuals in these age brackets who are active in the labor market constitute actual labor resources.

The objective of this article has been to analyze the territorial diversity of the subpopulation that corresponds to the potential labor resources in Poland, both as it appears today and in the light of forecasts produced by the Central Statistical Office. The analysis comprises the working age subpopulation (divided according to economic age groups) in Poland, including the current change of the pension age threshold, which will be gradually raised[1]. In addition, the age structure of this subpopulation has been analyzed according to territorial and temporal aspects.

The data for the analyses originated from publications by the Central Statistical Office (GUS) in Poland regarding the age structure of the Polish population observed in 2000–2014 and estimated until 2040 (forecast).

Demographic characteristics of potential labor resources

The structure of the Polish population has been changing over the past few decades, and the most distinct change is the lowered percentage of the pre-working age subpopulation while the post-working age subpopulation has grown in number. These tendencies will persist over the following decades (cf. Fig. 1). The progressive changes in the shares of these two subpopulations generate both economic and social outcomes. A declining size of potential labor resources, observable in Poland since the early 2010s, is an example of the economic consequences.

[1] Until the year 2012, the working age subpopulation in Poland referred to the fraction of the population aged 18 to 59 (women) and 18–64 (men). Following the reform of the state pension scheme (Ustawa z 11 maja 2012 o zmianie...) the upper threshold of the working age (and therefore the lower threshold of the retirement age) has been gradually increased since 2013 and will continue to grow until it reaches 67 years of age. The changes in the subsequent years (*Prognoza ludności na lata 2014–2050*... 2014, p. 147): 2012 – men 65, women 60, 2013 – men 65.25, women 60.25, 2014 – men 65.5, women 60.5, 2015 – men 65.75, women 60.75, 2020 – men 67, women 62, 2025 – men 67, women 63.25, 2030 – men 67, women 64.5, 2035 – men 67, women 65.75, 2040 – men 67, women 67.

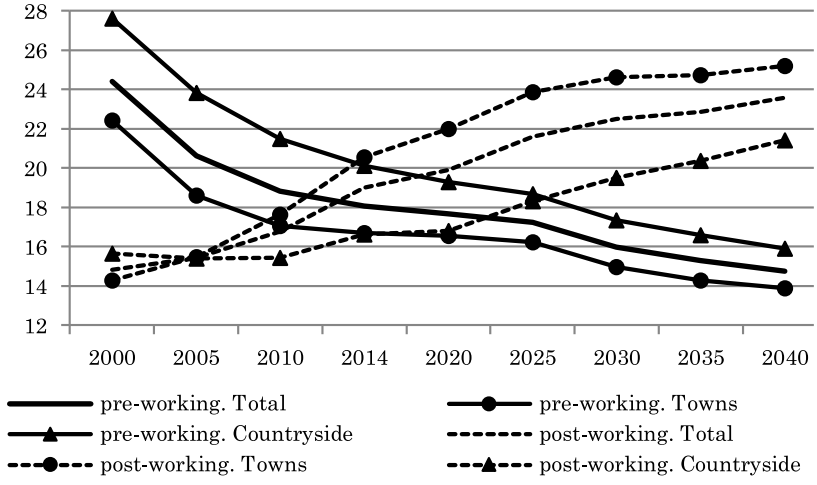

Fig. 1. Shares of pre- and post-working subpopulation in Poland in 2000–2040 [%]
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

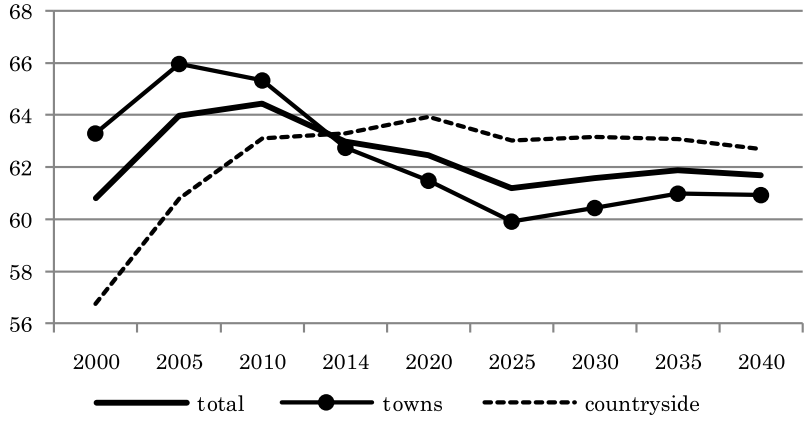

Fig. 2. Share of the working age subpopulation* in Poland in 2000–2040 [%]
* Including the gradual increase of the retirement age threshold.
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

The percentage of the post-working age urban residents tended to increase from the onset of the 20th century until 2007, after which it began to decline and, according to the GUS projections, it will continue to decrease until 2025. In the countryside, the percentage of the retirement age subpopulation is predicted to increase consistently from 2000 to 2020 (cf. Fig. 2).

In 2000–2014, the working age population increased by 3.6% in the whole of Poland, while decreasing by 0.9% in towns and rising by 11.5% in villages (cf. Fig. 3). In the next few years, this fraction is expected to decrease and its largest decline is predicted to occur in 2025, when the oldest representatives of the subpopulation (i.e. people born in the late 1950s) will have entered the pension age brackets (cf. Fig. 4). As compared to 2014, in 2025 the share of potential labor resources will have decreased by 2.8% countrywide (by 4.5% in towns and 0.5% in villages); in 2040, the decrease will reach 2% (2.9% in towns and 1% in the countryside).

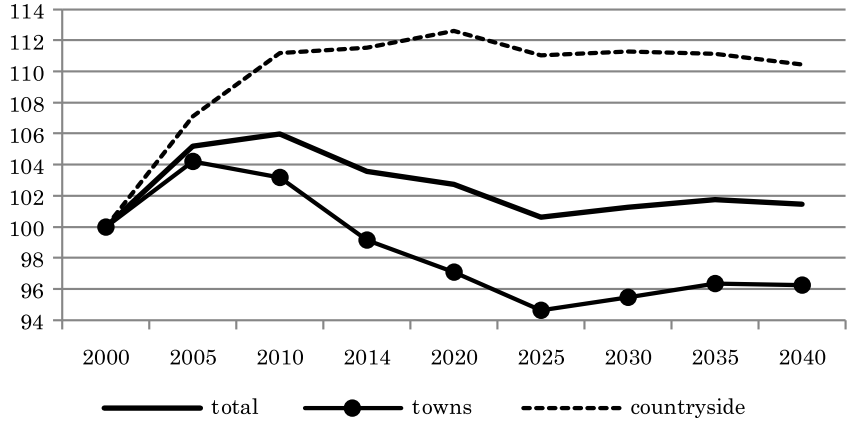

Fig. 3. Dynamics of the changing share of the working age subpopulation in Poland in 2000-2040 (2000=100)

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

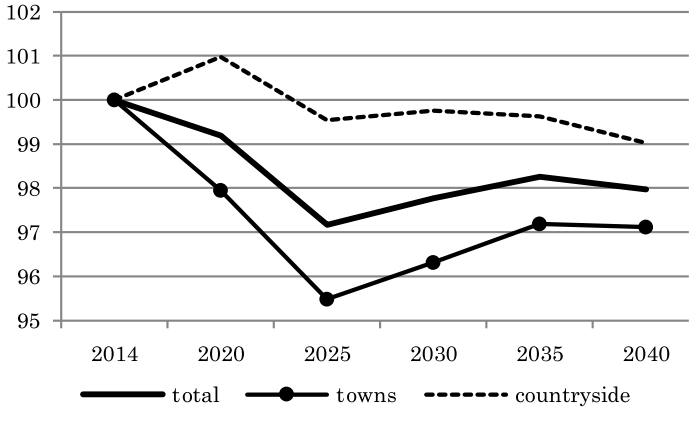

Fig. 4. Dynamics of the changing share of the working age subpopulation in Poland in 2014–2040 (2014=100)

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

In Poland, the working age population demonstrates territorial diversity, which manifests itself in the differences both between the provinces, i.e. Polish voivodships (cf. Tab. 1) and between smaller administrative units, called poviats (cf. figs 5–8). In 2014, the lowest fraction of potential labor resources could be found in central Poland (mostly the voivodships of łódzkie and mazowieckie) while the highest ones appeared in areas lying in the west and north of Poland (especially the voivodships of opolskie and warmińsko-mazurskie). In 2020, the smallest share of this fraction will most likely be recorded in the łódzkie voivodship while the highest one is predicted in the opolskie voivodship. In the following years, the smallest percentage of the working age subpopulation will be found on the peripheries of the Polish provinces (mainly in central and eastern Poland), and the population representing the potential labor resources will concentrate mostly around large cities.

More detailed considerations of the differentiation within the above subpopulation across the NTS4 units in 2014–2020 (cf. Figs 5–8) demonstrate that the lowest percentage of the potentially available working age population appeared in the town of Sopot and in the poviats hajnowski and bielski (59.8–60.1%), followed by the puławski poviat, as well as the towns of Kalisz, Łódź and Warszawa (60.5–60.8%); the highest percentages occurred in the poviats łęczyński, opolski, koszaliński, bełchatowski and policki (66.0–66.4%). In 2020, a relatively low share of potential labor resources (up to 60.9%) will most likely appear in cities and large towns (the lowest ones in Sopot, Jelenia Góra, Łódź and Warszawa, where the said percentage should range from 58.7 to 59.6%), as well as in the poviats hajnowski, pruszkowski and żyrardowski; whereas the highest percentage will be found in the poviats krapkowicki, dąbrowski, kolbuszowski, niżański and opolski (65.5–66.5%). In 2030, the smallest potential labor resources will most likely be recorded in the hajnowski poviat (56.8%), and in the following towns: Jelenia Góra, Sopot, Wałbrzych and Słupsk (57–58%). The highest shares will be seen in the poviats kolbuszowski, gdański, bydgoski and wrocławski (65.1–65.9%). Finally, in 2040 the least favorable situation in terms of potential labor resources will be found in the hajnowski poviat (where the percentage of the working age population is expected to equal 55.7%) and in such towns as Tranobrzeg, Włocławek, Jelenia Góra, Przemyśl and Chełm (57.3–58%). Meanwhile, the poviats poznański, policki, gdański and wrocławski will enjoy the best position (64.6–66.2%).

The changes, observed and presented in this article, regarding the shares of potential labor resources in the total population, are mainly a consequence of changes in the age structure (i.e. the progressive aging of the general population), although a significant role is also played by migrations (the majority of migrants are working age persons, inclined to search for professional opportunities). A large outflow of people is mostly noticed in the peripheries of voivodships, especially in the east of Poland. Since the mid-1990s, a depopu-

Table 1

Percentage of the working age subpopulation in Poland and in the Polish voivodships in 2000–2040 (in %)

Voivodship	Total					Towns					Countryside				
	2000	2014	2020	2030	2040	2000	2014	2020	2030	2040	2000	2014	2020	2030	2040
Poland	60.8	63.0	62.5	61.6	61.7	63.3	62.8	61.5	60.4	60.9	56.8	63.3	63.9	63.1	62.7
Dolnośląskie	62.2	63.5	62.3	61.4	62.1	63.6	62.8	61.2	60.1	61.1	58.6	65.0	64.8	64.0	63.9
Kujawsko-pomorskie	61.0	63.3	62.8	61.7	61.5	63.0	62.9	61.8	60.4	60.5	57.6	63.8	64.2	63.3	62.8
Lubelskie	58.4	62.4	62.5	61.4	61.1	63.1	63.1	61.8	60.0	59.8	54.3	61.9	63.0	62.6	62.1
Lubuskie	61.5	63.8	62.7	61.6	62.0	63.2	63.1	61.6	60.4	61.1	58.4	64.9	64.6	63.5	63.2
Łódzkie	61.0	61.9	61.3	60.7	61.0	63.5	61.9	60.4	59.5	60.2	56.4	62.1	62.8	62.4	62.2
Małopolskie	59.7	62.8	63.0	62.3	62.2	63.0	62.6	61.8	61.1	61.7	56.4	63.0	64.1	63.3	62.7
Mazowieckie	60.7	62.0	61.4	61.6	62.3	63.4	61.7	60.4	61.0	62.2	55.9	62.4	63.1	62.6	62.4
Opolskie	61.5	64.3	64.2	62.1	61.1	63.6	63.4	62.4	60.4	59.8	59.1	65.2	66.0	63.9	62.4
Podkarpackie	58.2	63.5	63.9	62.6	61.8	61.8	63.9	62.6	60.4	60.4	55.7	63.2	64.7	64.0	62.8
Podlaskie	58.0	63.4	63.6	61.6	60.6	61.6	64.8	63.9	61.0	60.3	52.9	61.2	63.0	62.5	61.1
Pomorskie	61.4	62.8	62.2	61.5	61.9	63.2	62.2	61.1	60.4	61.0	57.5	63.9	64.1	63.3	63.2
Śląskie	63.1	63.2	62.2	60.8	60.9	64.1	63.1	61.7	60.2	60.5	59.3	63.6	63.7	62.5	62.1
Świętokrzyskie	58.9	62.6	62.4	61.0	60.8	63.1	62.4	60.9	58.8	58.7	55.3	62.7	63.6	62.6	62.2
Warmińsko-mazurskie	60.2	64.2	63.6	61.7	61.4	62.4	63.9	62.7	60.5	60.5	57.0	64.7	64.9	63.4	62.7
Wielkopolskie	61.0	63.1	62.5	62.0	62.3	63.2	62.7	61.5	60.7	61.3	58.1	63.6	63.7	63.3	63.3
Zachodniopomorskie	62.2	63.8	62.7	61.4	61.7	63.9	63.2	61.7	60.3	60.8	58.3	65.2	64.9	63.6	63.4

Note: data for the years 2000 and 2014 are the actual ones while those for the years 2020, 2030 and 2040 are the ones projected by GUS
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

lation processes in Poland has also been recorded in non-rural areas, wherein urban residents migrate to the countryside, settling mostly in the vicinity of large towns and cities. This trend can be expected to continue in the following decades, which will probably lead to the territorial differentiation of potential labor resources as implicated in this paper (cf. Fig. 8).

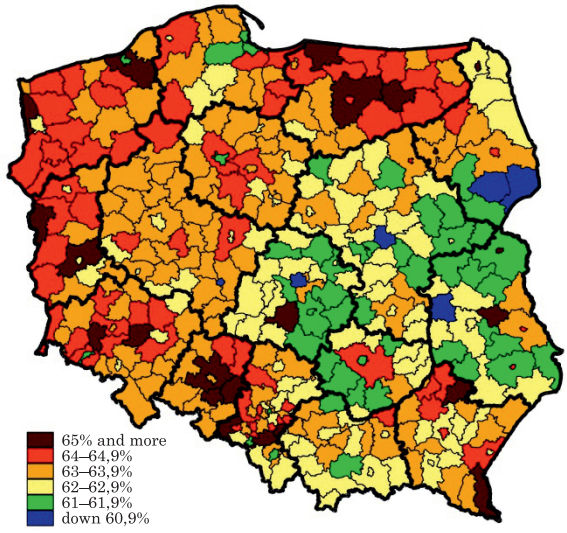

Fig. 5. Percentage of the working age subpopulation in poviats in 2014
Source: GUS data – *Bank danych* lokalnych (2015); map by the author.

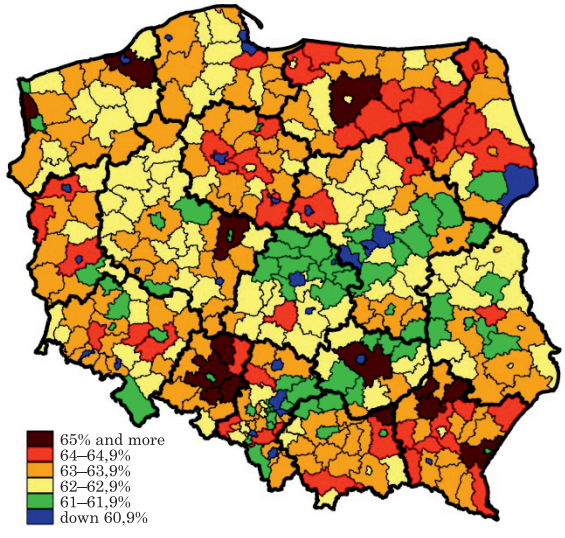

Fig. 6. Percentage of the working age subpopulation in poviats in 2020
Source: GUS data – *Prognoza ludności na lata 2014–2050...* (2014); map by the author.

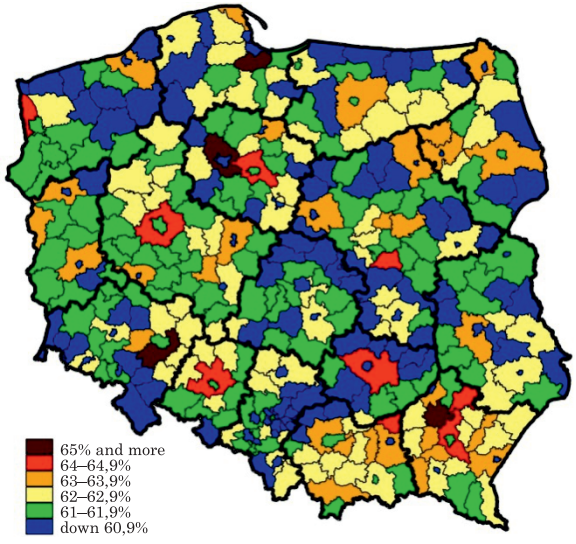

Fig. 7. Percentage of the working age subpopulation in poviats in 2030
Source: GUS data – *Prognoza ludności na lata 2014–2050...* (2014); map by the author.

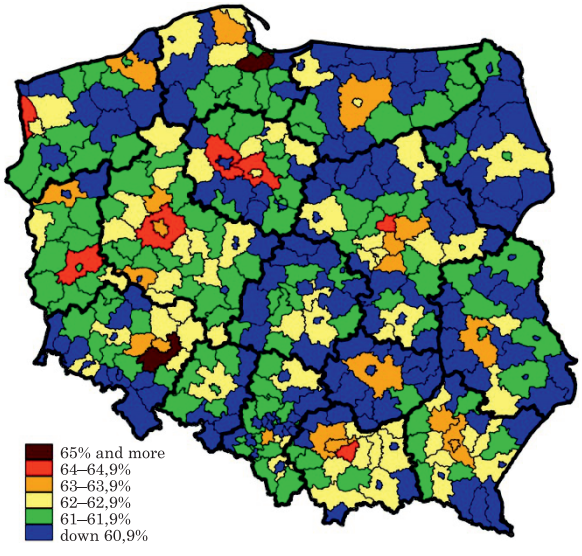

Fig. 8. Percentage of the working age subpopulation in poviats in 2040
Source: GUS data – *Prognoza ludności na lata 2014–2050...* (2014); map by the author.

One of the consequences of the changing structure of the working age population in Poland is the increase in the value of indices that express the load of the working age population with the fraction of people in the post-working age brackets. In towns, this load has been increasing progressively and demonstrably since the beginning of the analyzed period, while in villages

a tendency toward growth appeared in 2010 and will continue in the following decades (cf. Fig. 9). In 2014, there were 33 post-working age persons per 100 working age people in towns, compared to 26 post-working age persons per 100 working age people in the countryside. In the future, the value of this ratio is bound to increase. For example, it is predicted to reach 41 in towns and 31 in villages by 2030.

The dynamics of change in this ratio implicates its gradual increase in the years to come (cf. Fig. 10). For instance, in 2030 this ratio in the whole of Poland will be higher by 40.4% compared to its value in 2010, and more specifically by 50.9% in towns and by 26.5% in the country. It should be noted that such considerable changes in the load of the working age population with the fraction of people at the post-working age results from both a declining size

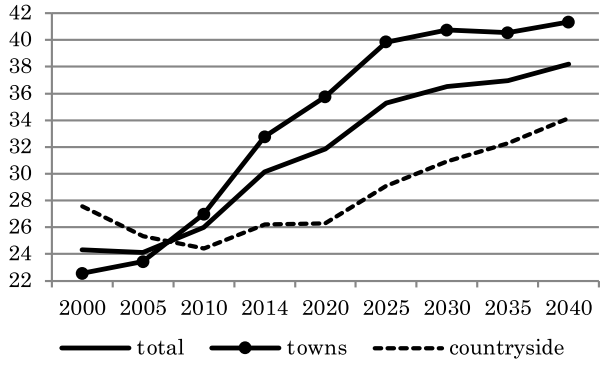

Fig. 9. Number of post-working age persons per 100 working age people (load ratio) in Poland in 2000–2040

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

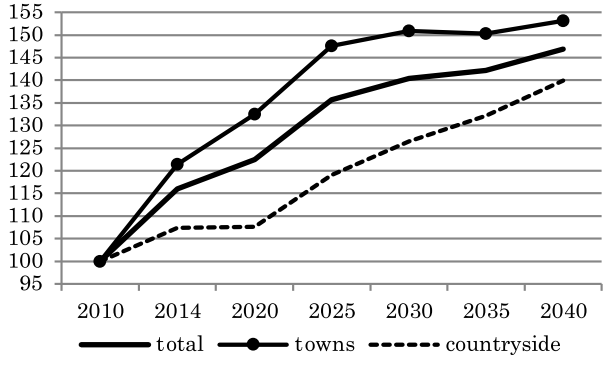

Fig. 10. Dynamics of the load ratio of post-working to working age population in Poland in 2010–2040 (2010=100)

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

Table 2
Number of post-working age people per 100 working age people (demographic load ratio) in Poland and in the Polish voivodships in the years 2000–2040

Voivodship	Total					Towns					Countryside				
	2000	2014	2020	2030	2040	2000	2014	2020	2030	2040	2000	2014	2020	2030	2040
Poland	24.3	30.2	31.8	36.5	38.2	22.5	32.8	35.8	40.7	41.3	27.6	26.2	26.3	30.9	34.2
Dolnośląskie	24.1	31.0	33.8	38.5	38.6	23.7	34.1	37.7	42.5	41.8	25.2	24.3	25.9	31.0	33.0
Kujawsko-pomorskie	22.7	29.1	31.1	36.4	38.5	22.0	32.5	35.7	41.7	43.1	23.9	24.1	24.8	29.9	33.1
Lubelskie	27.5	31.2	32.6	37.8	40.9	19.7	31.7	35.8	43.1	45.7	35.5	30.8	29.9	33.7	37.4
Lubuskie	21.3	28.2	31.1	36.8	37.8	20.3	31.0	34.8	40.6	40.5	23.2	23.5	25.4	31.1	33.9
Łódzkie	27.7	34.2	35.9	40.0	40.9	25.3	36.4	39.8	44.7	44.7	32.8	30.6	29.8	33.1	35.8
Małopolskie	24.8	28.9	29.4	33.5	35.8	23.7	33.0	35.0	38.8	39.6	26.2	25.1	24.6	29.1	32.9
Mazowieckie	27.1	31.5	32.5	34.9	35.6	25.5	33.8	35.7	37.1	36.5	30.4	27.4	27.1	31.2	34.0
Opolskie	23.6	30.4	32.0	39.2	43.4	21.1	33.3	36.6	44.1	47.1	26.5	27.5	27.5	34.5	40.0
Podkarpackie	24.6	27.9	28.9	34.7	38.7	20.1	29.7	33.7	41.7	44.0	28.1	26.6	25.8	30.4	35.5
Podlaskie	27.6	29.9	30.9	37.8	42.3	20.2	27.7	30.9	39.7	43.4	39.8	33.4	31.0	34.9	40.7
Pomorskie	21.3	28.2	30.0	34.0	35.1	22.3	32.8	35.4	39.2	39.5	19.1	19.9	21.1	26.1	28.8
Śląskie	22.5	31.6	33.9	39.4	40.9	21.7	32.8	35.8	41.5	42.5	25.7	27.7	28.1	33.3	36.6
Świętokrzyskie	28.2	32.6	34.4	40.3	42.9	22.4	35.5	40.1	48.4	50.3	33.7	30.3	30.1	34.9	38.2
Warmińsko-mazurskie	21.2	26.5	29.0	36.0	38.6	20.2	29.3	32.9	40.5	42.1	22.8	22.5	23.6	30.1	34.0
Wielkopolskie	22.2	28.0	29.6	33.8	35.2	21.7	31.6	34.5	39.2	40.2	23.0	23.6	24.2	28.2	30.5
Zachodniopomorskie	21.5	29.3	32.5	38.2	39.1	21.3	32.5	36.4	42.1	42.2	21.9	22.6	24.6	30.8	33.5

Note: data for the years 2000 and 2014 are the actual ones while those for the years t 2020, 2030 and 2040 are the ones projected by GUS
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

of the working age subpopulation and a relative increase in the post-working age fraction (cf. Figs 1 and 2).

The values of the ratio corresponding to the loading of the working age subpopulation with the post-working age fraction vary considerably across Poland (cf. Tab. 2). In 2000–2030, the lowest values of this measure have been

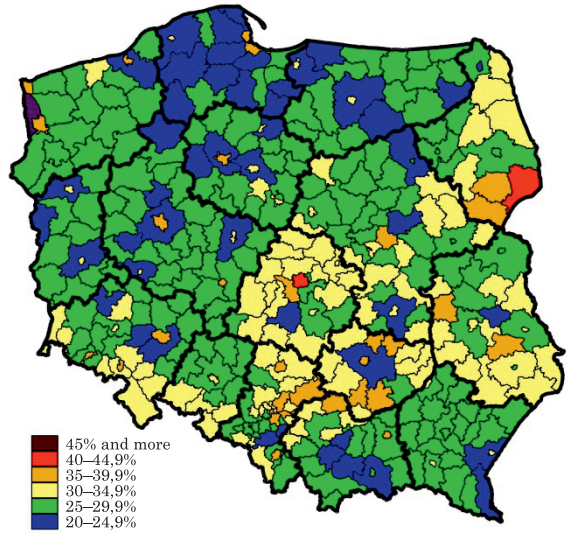

Fig. 11. Number of post-working age people per 100 working age people (load ratio) in poviats in 2014
Source: GUS data – *Bank danych lokalnych* (2015); map by the author.

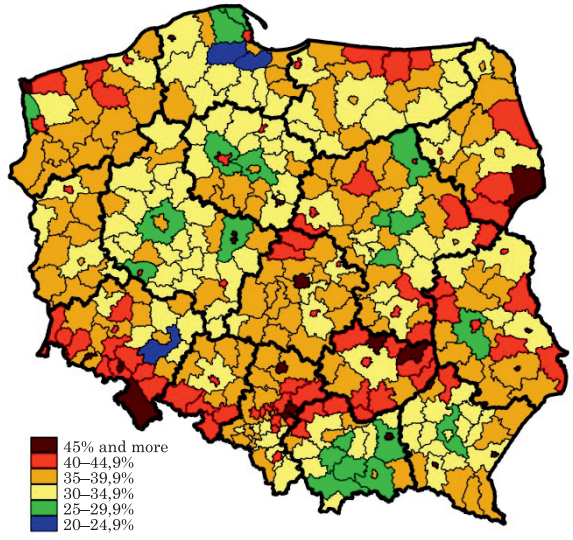

Fig. 12. Number of post-working age people per 100 working age people (load ratio) in poviats in 2030
Source: GUS data – *Prognoza ludności na lata 2014–2050...*(2014); map by the author.

(and most likely will continue to be) noted in the voivodships podlaskie and warmińsko-mazurskie, while in 2040 it will be the highest in the voivodships mazowieckie, pomorskie as well as łódzkie and świętokrzyskie. In the countryside, this ratio has or will have fallen to the lowest levels for the entire time period analyzed in the voivodship pomorskie, while being the highest in the voivodship łódzkie.

On the NTS4 level, the lowest values of the ratio in 2014 were recorded in the poviats (cf. Fig. 11): policki in the voiodship zachodniopomorskie as well as in the poviats kartuski and gdański in the voivodship pomorskie (where there were 20 persons in the post-working age per 100 working age persons), while the highest ones appeared in the city of Łódź (41 persons) the poviat hajnowski (44 persons) and the town of Sopot (47 persons). It is predicted that in 2030, the ratio will reach the lowest values in the poviats (cf. Fig. 12) gdański, kartuski and wrocławski (where there will be 23–24 persons in the post-working age per 100 working age individuals), and the highest in the poviat hajnowski (56 persons) within the following towns: Sopot, Wałbrzych and Jelenia Góra (51–53 persons).

The values of the ratio representing the load of the working age subpopulation with the subpopulations of people in the pre- and post-working age[2] followed a slightly different course (cf. Fig. 13). At the beginning of the analyzed time period, the values of this measure were characterised by a high level of discrepancy between towns and the countryside, with the values being much higher in rural areas (owing to a relatively low percentage of post-working age people and a relatively high percentage of the subpopulation composed of children). In 2013, the values of this ratio in towns and villages converged and equalled 57.6 (which meant that there were about 58 persons in the pre- and post-working age per 100 of working age persons). In the next several years we can expect the values of this measure to grow and reach higher values in towns (due to the post-working age fraction being larger than in the countryside, at relatively lower shares of the pre- and working age subpopulations).

As mentioned previously, quantitative changes in potential labor resources result from changes in the age structure of the population, which is reflected by a decreasing pre-working age subpopulation and an increasing post-working age fraction. In 2013, the two subpopulations in Poland reached the same number of people (in towns, this took place in 2010 and in the countryside it will occur after 2025). It is worth emphasizing that the quotient of the older of these two fractions by the younger one demonstrates a linear character

[2] The index is calculated as the quotient of the pre- and post-working subpopulations to the working age fraction of the population.

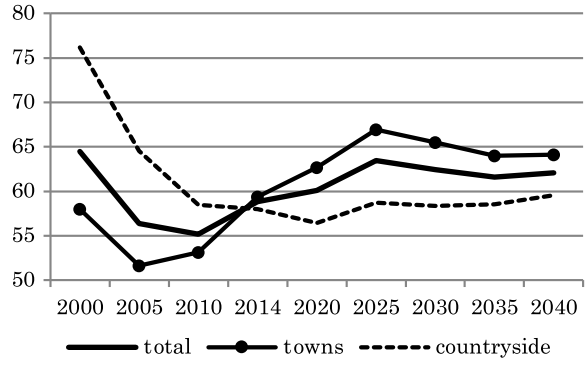

Fig. 13. The load ratio of the working age population with pre- and post-working age fractions in Poland in 2000–2040

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

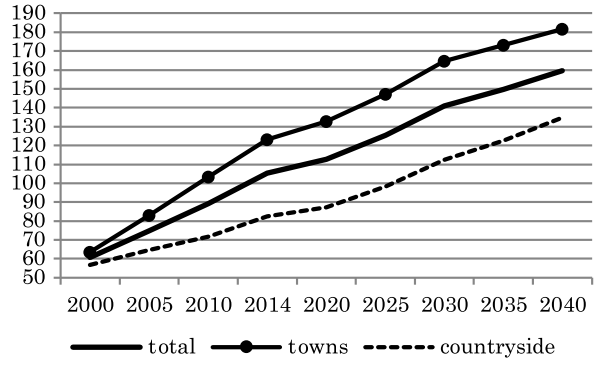

Fig. 14. Quotient of the post-working age population to the pre-working age population in Poland in 2000–2040

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); plotted by the author.

and increases with time. In 2000, there were 61 persons in the post-working age per 100 persons in the working age (64 in towns and 57 in villages); whereas in 2014, there were 105 persons in the post-working age (123 in towns and 83 in villages) per 100 working age persons. In the next several years, we can expect a growing disproportionality between these two fractions (as the older of these subpopulations continues to grow larger, while the younger is decreasing in number) and consequently an increasing value of the discussed quotient. For example, in 2030 it will most likely reach 141 in the whole of Poland (with 165 in towns and 112 in the countryside) (cf. Fig. 14).

The subpopulation of working age people (i.e. potential labor resources) is internally diverse regarding the age structure. This diversity is evident in both the territorial and temporal context. Considering the data for Poland (cf. Tab. 3) it is possible to conclude that over the time period analyzed, the share of the two youngest age fractions (i.e. 18–19 and 20–24 years of age) has been decreasing and will continue to grow smaller until 2025, while the oldest fraction (from 55 to the pension threshold age) will tend to increase throughout the entire time period.

Table 3
The structure of the subpopulation creating potential labor resources in Poland in 2000, 2014, 2030 and 2040 (total, towns, countryside)

2000										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	5.6	13.5	11.9	10.3	10.9	13.2	13.3	11.2	10.1
Towns	100.0	5.5	13.5	11.6	9.8	10.3	13.3	14.0	11.8	10.2
Countryside	100.0	5.8	13.3	12.5	11.4	11.9	13.2	12.1	10.0	10.0
2014										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	3.5	10.4	12.1	13.4	12.6	10.9	9.6	10.3	17.2
Towns	100.0	3.1	9.4	12.0	14.0	13.0	10.8	9.3	10.2	18.1
Countryside	100.0	4.2	11.9	12.2	12.5	12.0	11.1	10.0	10.4	15.7
2030										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	3.4	9.0	7.8	8.6	10.4	12.2	13.8	13.0	21.8
Towns	100.0	3.3	8.6	7.4	8.3	10.1	12.3	14.4	13.6	21.9
Countryside	100.0	3.6	9.4	8.3	9.0	10.9	11.9	12.9	12.2	21.8
2040										
Specification	total	18–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–61K/66M
Total	100.0	3.0	7.8	8.4	9.3	8.1	8.9	10.7	12.3	31.4
Towns	100.0	2.9	7.5	8.3	9.4	7.9	8.5	10.3	12.4	32.8
Countryside	100.0	3.2	8.3	8.6	9.3	8.4	9.3	11.2	12.2	29.6

Note: data for the years 2000 and 2014 are the actual ones while those for the years 2020, 2030 and 2040 are the ones projected by GUS
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

The increase of the share of the oldest age fractions within the working age subpopulation, coinciding with a decreasing contribution of the youngest fractions, has and will result in the aging of the potential labor force in Poland. In 2000–2014, the median age of the discussed subpopulation oscillated around 38 years, and was higher in towns (cf. Tab. 4). Over the next several years,

a further increase in the median value is foreseen, which will be due to the progressive demographic aging[3] of the Polish population as well as the gradual rising of the retirement age.

Table 4

The median age (in years) of the subpopulation creating potential labor resources in Poland in 2000-2040 (total, towns, countryside)

Year	2000	2005	2010	2014	2020	2025	2030	2035	2040
Total	38.2	38.1	38.1	38.3	41.0	42.3	43.5	44.9	46.6
Towns	38.7	38.5	38.3	38.5	41.2	42.5	44.0	45.6	47.1
Countryside	37.4	37.5	37.7	38.1	40.7	41.8	43.0	44.2	46.1

Note: data for the years 2000 and 2014 are the actual ones while those for the years 2020, 2030 and 2040 are the ones projected by GUS

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

Actual labor resources (actual labor force)

As previously mentioned, the actual labor force represents only a portion of the potential labor resources. The former are composed of people who are professionally active (including both employed people and unemployed ones who are seeking employment).

In 2014, the level of professional activity across the whole of Poland and within individual voivodships was comparable, being higher among men (cf. Tab. 5), which is a consequence of family roles played by women. In 2014, 56.2% of the general population, including 74.3% of the working age population, was professionally active (78.1% of men and 70.1% of women of working age). The highest professional activity was demonstrated by residents of the voivodship mazowieckie (79.7% of working age persons) and the lowest one was found in the voivodship warmińsko-mazurskie (68.1%).

In 2014, there were 67.5% of working age persons in employment, and the employment ratio was higher among men in all voivodships (cf. Tab. 5). The highest values of this index were observed in the voivodship mazowieckie (73.9%) and the lowest ones were in the voivodship warmińsko-mazurskie (61.4%).

[3] The demographic aging process is defined as an increasing number and percentage of older people in the population (as the threshold of old age is most commonly accepted as the age of 65 years). In Poland, like in other European countries, the main contributor to the aging of the population is the decreasing total fertility rate, much below the one ensuring the replacement rate (i.e. 2.1). Another significant factor is the decreasing mortality rate in elder groups of the population. More on demographic aging of populations, including its consequences, has been contained in publications prepared i.e. by *Sytuacja demograficzna osób straszych...* (2014), Kurkiewicz (2010, 2012), Nyce, Schieber (2005), Rossa (2012). *Global tendencies of aging...* (2015).

In Poland, 9.2% of the population composed of professionally active and working age people remained unemployed. The unemployment rate is characterized by a high spatial variation (cf. Tab. 5). In 2014, it was the highest in podkarpackie (14.4%) and the lowest in mazowieckie (7.3%).

Table 5
Activity rate of the total population and woring age subpopulation, employment ratio and unemployment rate among working age people in Poland and in Polish voivodships in 2014 [%]

Voivodship	Activity rate						Employment rate of working age population			Unemployment rate among working age people		
	total			working age people								
	T	M	W	T	M	W	T	M	W	T	M	W
Poland	56.2	64.7	48.5	74.3	78.1	70.1	67.5	71.4	63.1	9.2	8.6	9.9
Dolnośląskie	55.1	64.3	46.9	74.2	77.6	70.4	67.3	70.5	63.6	9.3	9.1	9.8
Kujawsko-pomorskie	55.3	64.6	46.9	73.1	78.2	67.3	65.2	71.1	58.7	10.8	9.2	12.8
Lubelskie	56.3	63.4	49.7	74.8	77.3	71.9	67.2	70.0	64.0	10.1	9.4	10.9
Lubuskie	54.1	62.1	46.6	71.6	75.5	67.1	65.6	69.5	61.1	8.4	7.9	9.6
Łódzkie	58.3	66.9	50.6	77.3	80.2	74.1	70.3	73.2	66.9	9.0	8.7	9.6
Małopolskie	55.9	63.6	48.7	73.4	77.3	69.1	66.5	70.5	62.1	9.4	8.7	10.0
Mazowieckie	61.5	69.6	54.2	79.7	83.0	76.1	73.9	77.4	70.1	7.3	6.7	7.9
Opolskie	54.0	63.2	46.0	73.1	78.0	67.8	67.1	72.6	61.6	8.0	6.9	9.2
Podkarpackie	54.5	63.1	46.4	72.5	76.8	67.4	62.1	66.2	57.2	14.4	13.9	15.1
Podlaskie	55.9	63.9	48.5	75.4	78.7	71.6	68.3	71.6	64.8	9.4	9.0	9.9
Pomorskie	55.7	65.2	46.8	72.9	78.6	66.7	66.5	71.7	60.8	8.9	8.8	8.7
Śląskie	53.8	61.6	46.7	71.6	74.7	68.1	65.3	68.8	61.5	8.8	8.0	9.7
Świętokrzyskie	55.3	63.3	47.5	73.5	76.5	69.8	64.8	67.3	61.9	11.8	12.3	11.1
Warmińsko-mazurskie	51.1	59.4	43.6	68.1	72.0	63.8	61.4	64.9	57.3	10.0	9.6	10.1
Wielkopolskie	57.7	67.8	48.5	75.1	80.5	69.1	69.2	75.4	62.4	7.9	6.4	9.7
Zachodniopomorskie	52.6	61.7	44.7	70.8	75.0	66.1	64.7	68.4	60.7	8.6	8.8	8.2

Note: the following designations were used: T – total, M – men, W – women
Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

At present (data from 2014), the potential labor force (i.e. working age people) in Poland consists of 24.1 m people, but in the following 15 to 25 years they will most likely decrease by 1.3 m and 2.2 m, respectively (cf. Tab. 6), despite raising the retirement age[4].

[4] It is worth noticing that according to the GUS forecasts, the total population of Poland will decrease in the following decades and will fall to 35.7 m in 2040.

Table 6

Potential and actual labor resources (in millions) and percentages of actual labor resources in total population in Poland and in Polish voivodships in the years 2014–2040

Voivodship	Potential labor resources [m]				Actual labor resources [m]				Actual labor resources as % of total population			
	2014	2020	2030	2040	2014	2020	2030	2040	2014	2020	2030	2040
Poland	24.23	23.82	22.89	22.01	18.00	17.70	17.01	16.35	46.8	46.4	45.7	45.8
Dolnośląskie	1.85	1.79	1.70	1.64	1.37	1.33	1.26	1.21	47.1	46.3	45.5	46.1
Kujawsko-pomorskie	1.32	1.30	1.24	1.17	0.97	0.95	0.90	0.86	46.2	45.9	45.1	45.0
Lubelskie	1.34	1.31	1.23	1.14	1.00	0.98	0.92	0.85	46.7	46.7	46.0	45.7
Lubuskie	0.65	0.63	0.60	0.58	0.47	0.45	0.43	0.41	45.7	44.9	44.1	44.4
Łódzkie	1.55	1.49	1.40	1.31	1.20	1.15	1.08	1.02	47.9	47.4	46.9	47.2
Małopolskie	2.12	2.14	2.12	2.09	1.55	1.57	1.56	1.53	46.1	46.2	45.7	45.7
Mazowieckie	3.30	3.31	3.34	3.35	2.63	2.64	2.66	2.67	49.4	48.9	49.1	49.6
Opolskie	0.64	0.62	0.56	0.50	0.47	0.45	0.41	0.37	47.0	46.9	45.4	44.7
Podkarpackie	1.35	1.35	1.29	1.23	0.98	0.98	0.94	0.89	46.0	46.3	45.4	44.8
Podlaskie	0.76	0.74	0.69	0.64	0.57	0.56	0.52	0.48	47.8	47.9	46.5	45.7
Pomorskie	1.45	1.44	1.44	1.43	1.05	1.05	1.05	1.04	45.8	45.3	44.9	45.1
Śląskie	2.90	2.78	2.58	2.42	2.08	1.99	1.85	1.73	45.2	44.5	43.5	43.6
Świętokrzyskie	0.79	0.77	0.71	0.65	0.58	0.56	0.52	0.48	46.0	45.9	44.8	44.7
Warmińsko-mazurskie	0.93	0.90	0.85	0.80	0.63	0.62	0.58	0.54	43.7	43.3	42.0	41.8
Wielkopolskie	2.19	2.18	2.15	2.11	1.65	1.64	1.62	1.59	47.4	47.0	46.6	46.8
Zachodniopomorskie	1.09	1.06	1.00	0.96	0.78	0.75	0.71	0.68	45.2	44.4	43.5	43.7

Note: data for the years 2000 and 2014 are the actual ones while those for 2020, 2030 and 2040 are projected by GUS

Source: GUS data: *Prognoza ludności na lata 2014–2050...* (2014), *Bank danych lokalnych* (2015); set in a table by the author.

In turn, the actual labor resources in Poland equal 18 m people and in 2014 corresponded to 46.8% of the working age population (the percentage was the highest in the voivodship mazowieckie and the lowest in the voivodship warmińsko-mazurskie). Assuming that the professional activity of the Polish population will remain at the same level as in 2014, the actual labor resources will decrease by 1 m in 2030 and 1.7 m in 2040, thus representing less than 46% of the working age population (cf. Tab. 6).

Summary

The share of the potential labor resources in the Polish population, equated with the working age subpopulation, has been gradually decreasing[5], which is a consequence of the changes in the age structure of the Polish population

(manifesting themselves mainly as an increasing percentage of elderly people and a decreasing percentage of children)[6].

The subpopulation that creates potential labor resources in Poland is diversified spatially, and this diversification will continue to undergo modifications in the following decades. Currently, the highest percentage of the working age subpopulation occurs in the northern and western parts of Poland, while central Poland has the lowest share of this age fraction. In the following years, the smallest percentage of the working age subpopulation will be found in the peripheries of the Polish provinces (mainly in central and eastern Poland), and the population representing the potential labor resources will concentrate mostly around large cities.

The pension age threshold recently raised in Poland will not contribute to an increase in the potential labor resources in the long term. This fraction of the general population will decrease, most distinctly in towns (due to the outflux of the oldest portion of working agepeople to the subpopulation of post-working age, with a relatively low level of people entering the working age subpopulation). The actual labor resources will diminish as well (assuming the current level of activity of the population). Thus, the presented situation should encourage some action to promote professional activity among the entire population.

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[5] A similar situation has been observed in the majority of European countries: „Low fertility rates and an aging population will likely result in the shrinking of Europe's working-age population in the coming years, notwithstanding a net inflow of migrants" (Eurostat 2015, p. 101).

[6] „The structure and profile of the EU's population has changed considerably, due in part to: lower fertility rates; changes in patterns of family formation; a desire for greater personal independence; shifts in the roles of men and women; higher levels of migration; greater geographic mobility; and increases in life expectancy" (*Eurostat regional...* 2015, p. 45).

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RETURN ON SALES FOR COMPANIES IN EASTERN POLAND

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K e y w o r d s: return on sales, Eastern Poland, convergence, divergence.

A b s t r a c t

This study has been performed in order to assess the return on sales for business enterprises in Eastern Poland, compared to companies in other Polish regions, and to explore how values of this metric have changed between 2007 and 2013. The findings can be summarized as follows: in 2007–2013, the gross return on sales generated by companies in the provinces of Eastern Poland, as well as elsewhere in the country, decreased. However, the dynamics of these changes varied greatly between individual provinces. Within the whole conglomeration of the Polish provinces, certain processes of internal convergence and divergence could be distinguished. Divergent processes were identified in two provinces located in Eastern Poland, namely the Lubelskie region and the Podlaskie region, while the other three provinces in the same part of Poland (Podkarpackie, Świętokrzyskie and Warmińsko-Mazurskie) were observed to undergo convergent processes.

RENTOWNOŚĆ SPRZEDAŻY PRZEDSIĘBIORSTW W WOJEWÓDZTWACH POLSKI WSCHODNIEJ

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S ł o w a k l u c z o w e: rentowność sprzedaży, Polska Wschodnia, konwergencja, dywergencja.

A b s t r a k t

Celem badań była ocena poziomu rentowności sprzedaży przedsiębiorstw w województwach Polski Wschodniej na tle pozostałych regionów kraju oraz zmian, jakie zaszły w tym zakresie w latach 2007–2013. Wyniki przeprowadzonych analiz, można podsumować następująco. W latach 2007–2013, zarówno w województwach Polski Wschodniej, jak i w pozostałych regionach kraju, odnotowano spadek rentowności sprzedaży brutto przedsiębiorstw. Dynamika zmian zachodzących w tym zakresie w poszczególnych województwach była jednak bardzo zróżnicowana. W zbiorowości województw obserwowano tym samym równolegle zachodzące procesy konwergencji i dywergencji wewnętrznej. W dwóch województwach Polski Wschodniej – lubelskim i podlaskim, obserwowano procesy o charakterze dywergencji, w pozostałych trzech – podkarpackim, świętokrzyskim i warmińsko-mazurskim, procesy konwergencji.

Introduction

Values achieved by macroeconomic indicators over the past several years seem to suggest that the provinces of Eastern Poland, in terms of their development, are gradually catching up with the rest of the country as well as with other European regions. In 2013, the GNP per capita in the provinces of this macro-region reached 48.4% of the EU average, whereas in the year 2000, it was no more than 35% of the same average. The improved macroeconomic situation of Poland's Eastern provinces can be evidenced by such measures as GNP growth dynamics, the economic structure measured by gross added value, the incomes of the population, the dynamics of investment inputs, the employment level and workforce productivity (*Analiza sytuacji...* 2015, p. 4–13). While absolute values of some indicators are still low, the degree to which they have changed is significant enough to claim that the distance between the economic situation of Eastern Poland and the average economic position of the whole of Poland is diminishing.

However, a question arises whether the tendency mentioned above is observable with respect to the financial condition of business entities or, more precisely, to their return on sales? Not long ago, business enterprises situated in Eastern Poland did not generate revenue as high as what was earned by businesses operating elsewhere in Poland, and they were characterized by a relatively lower return on sales (*Raport o stanie...* 2007, p. 55–205). Are the dynamics of change that have taken place since then powerful enough to diminish the economic distance between Eastern Poland and the rest of the country? To answer this question, the author pursued research that set its aim to assess the return on sales for companies in Poland's Eastern provinces, and compare those returns with the other regions of Poland. Another objective has been to trace the changes which occurred between 2007 and 2013.

The study included an appraisal of the level and dynamics of change in gross return on sales for companies in the Polish provinces located in the east of the country. The results were juxtaposed with Poland's average return on sales and results obtained in other parts of Poland. Additionally, the provinces were divided into groups with a similar level of gross return on sales. Finally, the nature of the internal processes underlying the value of gross return on sales was analyzed in all provinces and identified as having a convergent or divergent character.

The analysis was performed at the level of the administrative provinces in Poland, which is the NUTS II division level. The analysis was conducted on a full sample of business enterprises, which keep either general ledgers or revenue and expenditure registers. All companies employed at least 10 people. In light of the research methodology proposed by the Central Statistical Office

(GUS) in Poland, these enterprises were non-financial companies. Therefore, institutions such as banks, insurance companies, stock brokerages, investment services, pension societies, the National Investment Funds, higher education schools, cultural institutions acting as a legal person, and family farms in agriculture were excluded from the analysis (*Bilansowe wyniki finansowe...* 2014, p. 3, 8).

The time frame of the research spanned the years 2007 and 2013, which coincided with the entire first EU financial perspective, during which considerable funds were addressed to the development of Eastern Poland.

The investigation employed many methods of analysis, including a review of the literature, the analysis of reference sources, quantitative methods and the method of induction.

Return on sales – foundations

The idea of 'profitability' originates from the concept of 'profit', which in the broadest sense signifies a gain on capital. Profitability is generally understood as a situation where an income earned surpasses the costs of earning this income. In other words, it means earning a profit. Profitability is associated with a positive financial result (a gain). The opposite of profitability is unprofitability, which appears when the company's results are negative, i.e. they suffer a loss (*Analiza ekonomiczna...* 2013, p. 281). Thus, profitability reflects a company's ability to generate a gain or, if phrased differently, it manifests the extent to which the company's operation is profitable (*Analiza finansowa...* 2010, p. 43).

Profitability ratios provide information about the operating efficiency of a company in a time period examined, and implicate whether the company's activity helps to fulfill the main objectives of every business undertaking (GABRUSEWICZ 2014, p. 296, 297). The profitability ratios, often referred to as the rates of return, are highly diverse – both numerators and denominators can assume different forms. For example, corresponding to the vertical layout of gain and loss accounts, the profit from sales, operating profit, result on ordinary activities, gross profit or net profit can be considered as a financial result. The denominator will correspond to what shapes the above result, which are the company's assets. The values put in the denominator represent three types of return: return on assets, return on sales and return on equity (SIERPIŃSKA, JACHNA 2007, p. 195).

The fundamental condition that guarantees a company's successful operation is to sell products or services. Each company strives to achieve the best results from sales, and for any business enterprise, the key area is its ordinary

activities. A well-managed company secures a surplus revenue over the costs of obtaining that revenue, thus sustaining the company's profitability (KĄTNIK 2011, p. 144). The return on sales ratios are applied to measure a company's profitability. They are a group of metrics derived from the sales value and the profit thus generated; hence they are able to reveal whether or not sales are profitable (GRZENKOWICZ et al. 2007, p. 207). The positive return on sales is an important measure to be considered when evaluating the profitability of companies. Return on sales is also an important aspect in micro- and macroeconomic profitability evaluations. Profitable sales cover the running costs of operating a business while additionally generating funds for its further development. This is extremely important for both a company's holders and for the region in which the company is situated. The growth of the companies translates into the development of the region in question (FARELNIK, WIERZBICKA 2013, p. 135).

The following metrics are most often used to analyze profitability on sales attained by companies:

1. Return on sales (operating profitability) – it provides information about the financial results a company generates from its principal operation.

$$\text{return on sales} = \frac{\text{profit on sales}}{\text{net revenues from sales of products, goods and materials}} \times 100\%$$

The return on sales ratio is the most synthetic index among all measures applied to the profitability on sales. It tells us about the profitability arising from the company's principal operating activity, from sales, which is the purpose for which the company was set up and which is the company's driving force. The value of this index depends on (GABRUSEWICZ 2014, p. 317–319):

- the number of products sold,
- the structure of a whole range of products of different earning capacity,
- pricing policy,
- own costs of sales per unit.

The value of this index also depends on the type of company and the specific character of the business branch in which it operates.

2. Gross return on sales (gross turnover) – concerns overall profits from all of the company's activities before tax and other obligatory encumbrances.

$$\text{gross return on sales} = \frac{\text{gross profit}}{\begin{array}{c}\text{net revenues from on sales of products, goods}\\ \text{and materials + other operating revenues + financial}\\ \text{revenues + extraordinary gains}\end{array}} \times 100\%$$

The gross return on sales is the most comprehensive return on sales ratio. It specifies the percentage of earned profit before tax, which is the real gain that is achieved before the tax due is deducted (KĄTNIK 2011, p. 145). It encompasses revenues from the total ordinary activity of a company, corrected by the balance of extraordinary profits or losses. This measure is broadly used to assess the profitability of companies; it is also employed to make comparisons between companies in different branches or countries because it does not respond to changes in income taxation (GRZENKOWICZ et al. 2007, p. 209).This ratio was employed in the current study to make an assessment of the profitability of sales achieved by companies in different regions.

3. Net return on sales – specifies the contribution of net profit to the total revenue of a company.

$$\text{net return on sales} = \frac{\text{net profit}}{\begin{array}{c}\text{net revenues from on sales of products, goods}\\ \text{and materials + other operating revenues + financial}\\ \text{revenues + extraordinary gains}\end{array}} \times 100\%$$

The higher the ratio, the bigger the profit earned by the company's owners from all types of activity. In other words, this ratio shows the operating profitability having accounted for capital operations and the structure of financing and taxes (KĄTNIK 2011, p. 146). If this ratio is high enough, the company stands a better chance of survival if it is forced to temporarily set lower prices or cover higher costs of making products or providing services (KORNACKI 2008, p. 62).

Gross return on sales for companies in Eastern Poland

This appraisal of the profitability on sales attained by companies located in Eastern Poland was investigated from 2007–2013. It included the following number of business entities (Tab. 1).

In 2007–2013, the number of companies in all the provinces situated in Eastern Poland increased, but the dynamics of this increase were variable. In just one province, i.e. Podkarpackie, the number of companies increased more dynamically than the average increase observed in Poland. As a result, the share of businesses from this province compared to the total number of companies in Poland rose from 4.2% in 2007 to 4.4% in 2013.

Table 1

Number of businesses in provinces located in Eastern Poland in 2007–2013

Specification	Number of businesses in provinces		Share of the total number of businesses per province [%]		Change between 2007 and 2013	Dynamics of change from 2007–2013
	2007	2013	2007	2013		
Lubelskie	1,965	2,130	4.1	3.8	165	1.084
Podkarpackie	2,045	2,469	4.2	4.4	424	1.207
Podlaskie	1,183	1,301	2.5	2.3	118	1.100
Świętokrzyskie	1,241	1,316	2.6	2.3	75	1.060
Warmińsko-Mazurskie	1,586	1,630	3.3	2.9	44	1.028
Poland	48,165	56,432	100	100	8267	1.172

Source: the author, based on: *Bilansowe wyniki finansowe...* (2008, 2014).

In the other four provinces analyzed, the number of businesses increased less dynamically when compared to the whole of Poland, which is why their contribution to the total number of companies decreased and continued to be among the lowest in Poland.

With respect to the gross return on sales for the analyzed business entities, the following changes occurred from 2007–2013 (Tab. 2).

Table 2

Gross return on sales for companies in Eastern Poland from 2007–2013

Years	Value of gross return on sales in provinces (in %)					Poland
	Lubelskie	Podkarpackie	Podlaskie	Świętokrzyskie	Warmińsko-Mazurskie	
2007	6.5	5.8	5.3	8.3	5.0	6.1
2008	4.9	3.6	3.3	7.3	2.8	4.1
2009	4.1	4.8	3.8	4.8	3.4	4.9
2010	4.3	4.3	3.3	5.0	4.5	5.2
2011	5.8	4.4	3.2	4.9	3.4	4.8
2012	4.8	3.9	2.7	3.5	3.1	4.3
2013	5.2	5.6	3.3	2.8	4.1	4.4
Change from 2007–2013 (in percentage points)	-1.3	-0.2	-2	-5.5	-0.9	-1.7
Dynamics of change in 2007–2013	0.80	0.97	0.62	0.34	0.82	0.72

Source: the author, based on data published by the Central Statistical Office in Poland (GUS) in: *Bilansowe wyniki finansowe...* (2008–2014).

Due to the global financial crises, the gross return on sales declined in all the provinces of Eastern Poland, which was a trend throughout the whole country. The dynamics of change during that time period were highly diverse. The highest level of gross return on sales among all of the analyzed provinces, which was much higher than the average for the whole of Poland, was achieved by Podkarpackie in 2013. The strong position of this province is the result of a very small decrease in the gross return on sales compared to the one recorded in 2007. The level of gross return on sales in Podkarpackie decreased by 3% over the entire time period; whereas, the average decrease for Poland reached 28%. Two other provinces in Eastern Poland, namely Warmińsko-Mazurskie and Lubelskie, recorded a decrease in gross return on sales that was lower than the country's average: 18% and 20%, respectively. Thus, the position of these provinces improved relative to the other Polish provinces, but less significantly than in the case of Podkarpackie.

Importantly, two provinces lying in Eastern Poland – Podlaskie and Świętokrzyskie – experienced a much larger decrease in the level of gross return on sales than the average decline for the whole of Poland. The most severe decrease in gross return on sales was reported in Świętokrzyskie, where the value of this measure fell from 8.3% in 2007 to 2.8% in 2013, which signifies a 66% decrease. Such a considerable negative change in the dynamic meant that the province fell from the very high position it occupied in 2007 (2nd in Poland) to the last position in 2013, and was therefore classified as belonging to the group of provinces with a very low gross return on sales (Fig. 1).

The categorization mentioned above was performed with the standard deviations method[1]. In line with its guidelines, the provinces were classified into four typological groups. The interval borders were established according to values of the arithmetic mean of gross return on sales for the total of provinces and the value of the standard deviation of this index in 2013. The set of all analyzed objects was divided into the following four groups:

1. Group with **very high** gross return on sales, comprising objects with values of this ratio in the range of $R_0 \geq 5.32\%$;
2. Group with **high** gross return on sales, comprising objects with values of this ratio in the range of $5.32\% > R_0 \geq 4.44\%$;
3. Group with **low** gross return on sales, comprising objects with values of this ratio in the range of $4.44\% > R_0 \geq 3.57\%$;
4. Group with **very low** gross return on sales, comprising objects with values of this ratio in the range of $R_0 < 3.57\%$.

[1] More on this subject in: Kunasz (2006), p. 131–139.

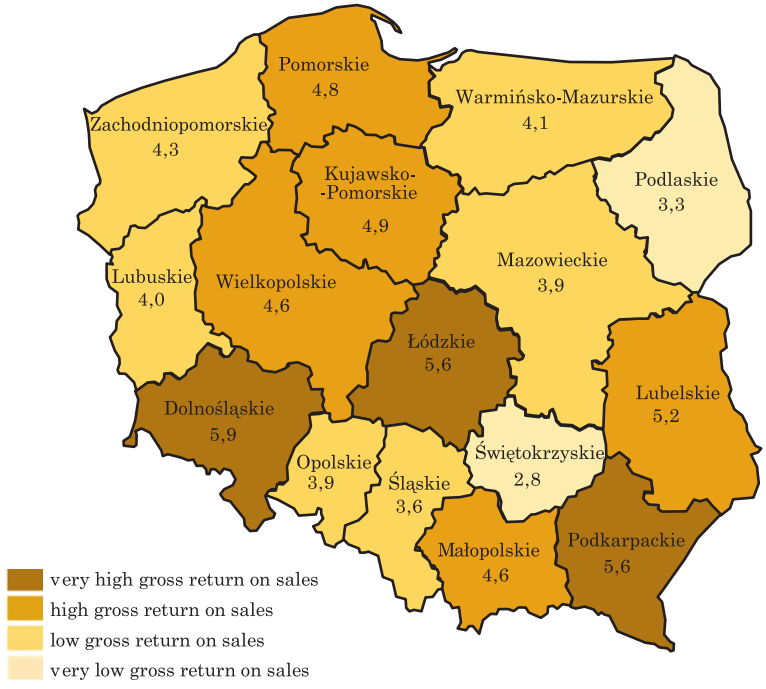

Fig. 1. Results of the categorization of provinces according to the gross return on sales for companies in 2013

Source: the author, based on *Bilansowe wyniki finansowe...* (2014).

Apart from Podkarpackie, mentioned previously, the group characterized by very low gross return on sales contained one more province situated in Eastern Poland, namely the Podlaskie province. The Warmińsko-Mazurskie province was classified as belonging to the group of provinces with low gross return on sales, while Lubelskie fell into the category comprising provinces with high gross return on sales. Significantly, one of the Eastern Polish provinces, i.e. Podkarpackie, was categorized into the group with very high gross return on sales. There were just two other provinces in this category: Dolnośląskie and Łódzkie. Noteworthy is the fact that the regional variation in the gross return on sales ratio increased slightly between 2007 and 2013, implicating that the conglomeration of Polish provinces became less heterogeneous in this respect. This finding is confirmed by an increase in the value of the variability factor, which was 18% in 2007 but grew to 20% in 2013.

Given the initially diverse situation of these provinces, the variable dynamics of changes occurring during the time period analyzed in particular provinces led to the development of two parallel processes being observed, such as internal convergence and divergence among the provinces. In order to identify these processes, all the provinces were grouped according to their

Table 3
Classification of the provinces according to the ongoing processes affecting the levels of gross return on sales achieved by companies in 2007–2013

Specification		Gross return on sales in 2007 relative to the country's average	
		lower than average	higher than average
Dynamics of change in gross return on sales from 2007–2013, in relation to average dynamics of change in the same time period	lower than average	divergence (marginalization effect)	convergence (deceleration effect)
		Lubuskie Podlaskie Śląskie	Mazowieckie Opolskie Świętokrzyskie
	higher than average	convergence (catching-up effect)	divergence (distancing effect)
		Kujawsko-Pomorskie Małopolskie Podkarpackie Pomorskie Warmińsko-Mazurskie Wielkopolskie Zachodniopomorskie	Dolnośląskie Lubelskie Łódzkie

Source: the author, based on: *Bilansowe wyniki finansowe...* (2008, 2014).

value of the gross return on sales in 2007 and the dynamics of its changes from 2007 to 2013. The results are presented in Table 3.

In most provinces, the changes which took place between 2007 and 2013 concerning the gross return on sales assumed the character of a convergent-like process. In seven provinces, this convergence can be termed as the 'catching-up' effect, while in three other provinces it was more similar to a 'deceleration' effect. Among the provinces in which convergence resembled an effect of 'catching up', there were two provinces lying in Eastern Poland. They were Podkarpackie and Warmińsko-Mazurskie, but there were also provinces from other Polish regions, namely Małopolskie, Pomorskie and Wielkopolskie. In 2007, the gross return on sales in these provinces was much below the country's average, but owing to much higher dynamics of change in this respect, their situation in relation to the others provinees has improved. The other type of convergence was observed in such provinces as Mazowieckie, Opolskie and Świętokrzyskie, due to a large decrease in the gross return on sales, stronger than the country's average. These provinces occupied worse places when ranked with respect to the return on sales. The Opolskie province, for example, was the leader in 2007, but fell to 12th place in 2013. Another province, Świętokrzyskie, was in the last place in 2013, whereas in 2007 it occupied the second position.

Six provinces, including two from Eastern Poland, underwent the process of regional divergence over the same time period. Such provinces as

Dolnośląskie, Lubelskie and Łódzkie were attaining an increasing level of gross return on sales compared to Poland's average; hence they were distancing themselves from the other Polish provinces. On the other hand, Lubuskie, Podlaskie and Śląskie were characterised by an increasingly lower gross return on sales than the country's average, which meant that their economic distance from other parts of Poland increased. For instance, in the Podlaskie province, the gross return on sales in 2007 was lower than the average value of this ratio for all Polish provinces by 14%, whereas in 2013 it was 26% lower. Unfortunately, it may indicate some marginalization of this region.

Summary

In 2007–2013, the level of the gross return on sales achieved by companies decreased, both in Eastern Poland and in the whole country. However, the dynamics of respective changes in individual provinces was highly varied. Three provinces located in Eastern Poland: Lubelskie, Podkarpackie and Warmińsko-Mazurskie, recorded a smaller decrease in gross return on sales than the average for the whole country, hence their situation relative to the other Polish regions improved. In the case of Podkarpackie, the improvement was large enough to move this province from the 9th position it occupied in 2007 in the ranking list of all Polish provinces to the second place in 2013. The return on sales decreased in this province during the time period analyzed by just 0.2 percent point (from 5.8% to 5.6%), whereas the average return on sales in the whole of Poland over the same time period decreased by 1.7 percent point (from 6.1% to 4.4%). Quite importantly, the decrease in the return on sales recorded in the other two provinces of Eastern Poland was much higher than Poland's average decrease, which means that the position of these provinces relative to the rest of the country deteriorated. The most severe decline in the value of gross return on sales occurred among the companies situated in the province Świętokrzyskie. The gross return on sales noted there went down by as much as 5.5 percent point (from 8.3% in 2007 to 2.8% in 2013), as a result of which this region lost its high, second position in the profitability rank of Polish provinces and fell to the last place.

In conclusion, two parallel processes characterized by internal convergence and divergence, including marginalization, appeared in the Polish provinces. Divergence-like processes were observed in six provinces, including two located in Eastern Poland, such as Podlaskie and Lubelskie. The remaining nine provinces in Poland experienced the processes that resembled convergence, but their actual character could be termed as either the 'catching-up' effect or the 'deceleration' effect. Convergence noticed in the provinces of Podkarpackie

and Warmińsko-Mazurskie corresponded to the 'catching-up' trend, although it proceeded at different rates. In the province Podkarpackie, the last region classified as belonging to Eastern Poland, values of the return on sales earned by companies were becoming worse than the country's average values of this ratio. Thus, the processes which occurred in this province should be termed as 'deceleration'.

In light of the above findings, it is difficult to state firmly whether the provinces situated in Eastern Poland have diminished the economic distance from other Polish regions in terms of the profitability of sales achieved by companies. The changes that did occur in this area within the three provinces, enabled them to score higher in the ranking list of Polish provinces and to diminish the distance from the country's average value of this measure. Meanwhile, the gap between the other two provinces and the rest of Poland grew deeper. Thus, considering the average return on sales of all the provinces in Eastern Poland and comparing it to the average for the remaining Polish provinces, it should be concluded that the overall situation of Eastern Poland in this aspect has worsened. In 2007, the average return on sales in the provinces of Eastern Poland was lower than the country's average by just 0.3%, whereas in 2013 it was lower by as much as 7.8%. The provinces of Eastern Poland continue to be characterized by a lower profitability of companies than the rest of the country and, unfortunately, the economic distance between these five provinces and the other Polish regions increases.

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