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EFFECT OF CAPITAL CONVERSION IN THE FORM OF A REVERSE MORTGAGE ON BENEFITS FOR SENIOR CITIZENS IN MAJOR CITIES OF POLAND

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Abstract

The aging of population is a common problem in the modern economy and finance. Reverse mortgage is one of alternative ways of raising citizens' standard of living after retiring by obtaining financial benefits accumulated in a residential property. The aim of the study is to evaluate a role of *equity release* service in providing additional household income for senior citizens illustrated by the case of a reverse mortgage. This type of service consists in transformation of non-liquid, tied-up in property capital into liquid financial resources. Thanks to capital conversion, senior citizens can supplement retirement benefits without a need to leave their property. The research hypothesis verified in the study stated that benefits paid as *equity release* in the form of a reverse mortgage provided greater support for women than for men. That hypothesis was rejected.

Keywords: household, aging, *equity release,* reverse mortgage.

JEL Class: J14, G22.

INTRODUCTION

Taking into consideration the common occurrence of population aging processes, one of the interesting, current and worth mentioning ways of alternative forms of raising a standard of living after retiring, is by obtaining financial resources accumulated in a residential property. The problem discussed in the paper that concerns a problem of aging is of crucial theoretical importance in terms of economy or finance as a scientific discipline. It is also practical for potential clients taking advantage of this type of service. In view of the abovementioned issues, the main objective of the study was to evaluate a role of *equity release* service in supplementing household income of senior citizens. This type of service will be a potential reverse mortgage. It results in transformation of non-liquid, tied-up in property capital into liquid financial resources. Thanks to capital conversion, senior citizens can supplement retirement benefits without a need to leave their property [Tse 1995: 79; Huan and Mahoney 2002: 29]. As an example, the authors made an attempt to evaluate a value of ten-year benefits from a reverse mortgage that retired senior citizens could obtain in the major cities of Poland (Warsaw, Cracow, Gdansk, Poznan, Wroclaw, Lodz) if banks decided to introduce such a product to their range of products. Due to a limited scope of the paper, the study concerns only one ten-year period. The hypothesis that was subject to empirical verification stated that potential benefits paid in a form of *equity release* as a reverse mortgage, provide greater support for women than for men.

1. AGING OF THE POPULATION VERSUS THE PENSION GAP

The main challenge of the 21st century is to face a problem of population aging. Population aging (also called demographic aging) is manifested by an increasing share of senior citizens in a specific population [Bloom et al. 2015: 649]. It is a phenomenon that is observed when transformation from lavish (a high level of births and deaths) to modern (a low ratio of births and deaths) population reproduction [Okólski 2003: 154]. Such a situation was observed in the European countries in the 19th century when changes in population structure appeared, and at the same time, socio-economic transformations concerning industrialization and urbanization took place. About one hundred years were needed to let this phenomenon spread all over Europe. Intensification of the process of population aging connected with the second demographic transformation started in the 1960s. It was linked with changes in attitudes and systems of values of young people i.e. a limited role of marriage, increasing age of starting relationships and having children. These types of demographic

behavior patterns at the end of the century were observed all over Europe [*Prognoza ludności…*, 2014: 125].

Demographic causes of population aging can primarily include [Szatur-Jaworska et al. 2006: 223–223; Sanderson and Scherbov 2005: 811–813]:

‒ a fall in a number of births (as a result of which a percentage of younger population is falling),
‒ a fall in a number of deaths (especially in younger age groups),
‒ increased life expectancy (as a result, an increase in an absolute number of older people),
‒ migration processes.

The primary measure of advancement level of population aging processes is an old-age rate [Zeug-Żebro 2015: 59–72], i.e. the proportion of people at the age of 65 and older in the total population. According to the UN classification from 1956, an individual population exceeds the threshold of demographic old age if a proportion of people at the age of at least 65 in the total population exceeds 7% [*World Population Prospects…*, 2005]. Taking into consideration the fact that from the moment of preparing that scale, a significant improvement in the population's standard of living and health, whose effect is increased life expectancy, has been observed, this threshold of demographic old age has become outdated and ceased to be appropriate for contemporary societies [Klonowicz 1979: 64–65]. In the following elaboration we will focus more on the dynamics of changes in an old-age rate i.e. the mere fact of progressive aging of the population of Poland than on the determination of the stage of demographic old age that our society experiences.

Classic measures of population aging can additionally include other measures such as a median age, dependency ratio (e.g. a number of people at post-working age per 100 people at working age) and support ratios (e.g. a number of people between 15–64 per 100 people at the age of 65 and older) [Abramowska-Kmon 2011: 8].

While analyzing the process of population aging, the rates taken into account often include a rate of population growth (percentage change of population size compared to the previous year), average life expectancy and ratios of demographic dynamics (relationship between a number of births and deaths), fertility (an average number of children per one woman at reproductive age i.e. between 15–49) and gross reproduction rate (a number of born girls per one woman of child-bearing potential).

The description of this situation in terms of selected changes in the population structure and movements in Poland over the years is presented in Table 1.

Table 1. Evolution of aging processes of Polish society

Years		1950	1960	1970	1980	1990	2000	2010	2015	2016
Rate of population growth (%)		1,7	1,1	0,8	0,9	0,2	–0,0	0,1	–0,1	–0,0
Median age	males	24,4	25,1	26,2	28,4	30,9	33,4	36,3	38,2	38,6
	females	27,1	28,3	30,3	31,0	33,7	37,4	39,9	41,6	41,9
Average life expectancy	males	56,1	64,9	66,6	66,0	66,2	69,7	72,1	73,6	73,9
	females	61,7	70,6	73,3	74,4	75,2	78,0	80,6	81,6	81,9
Population age	65 and older in total %	5,3	5,9	8,4	10,0	10,2	12,4	13,5	15,8	16,4
	post-working per 100 people at working age	12	15	19	20	22	24	26	31	33
Rate	demographic dynamics	2,643	2,986	2,039	1,970	1,403	1,028	1,092	0,935	0,985
	fertility	3,705	2,980	2,200	2,276	1,991	1,367	1,376	1,289	1,357
	gross reproduction	1,790	1,438	1,064	1,108	0,968	0,663	0,662	0,627	0,660

Source: *Rocznik demograficzny 2017*, 2017: 58–61; *Trwanie życia w 2016 r.*, 2017: 16–17 (tab. 1).

Based on the information presented in Table 1, it can be stated that aging processes of the population of Poland in the period between 1950–2016 evolved. It is reflected, interalia, by:

 − a falling rate of population growth, from 1.7% in 1950 to a minus close to 0 value in 2016,
 − a growing median age of population, from 24.4 for men and 27.1 for women in 1950 to 38.6 for men and 41.9 for women in 2016,
 − increased average life expectancy, from 56.1 for men and 61.7 for women in 1950 to 73.9 for men and 81.9 for women in 2016,
 − a growing proportion of people at 65 and older in the whole population from 5.3% in 1950 to 16.4% in 2016,
 − a growing number of people at post-working age (65+ for men and 60+ for women) per 100 people at working age (18–64 for men and 18–59 for women) i.e. growth in dependency ratio with people at post-working age from 12 in 1950 to 33 in 2016,
 − a falling ratio of demographic dynamics from 2.643 in 1950 to 0.985 in 2016,
 − a falling fertility ratio from 3.705 in 1950 to 1.357 in 2016 (i.e. below a value of 2.1 that ensures generation replacement),
 − a falling gross reproduction rate from 1.790 in 1950 to 0.660 in 2016.

According to the demographic forecast of the Central Statistical Office from 2014 comprising the period to 2050, the Polish society will still experience aging processes. Its manifestation is a predicted growing old-age rate. In 2020, 2035 and 2050 it is expected to respectively amount to 18.9%, 24.5% and 32.7% [*Prognoza ludności…*, 2014: 134 (tab. 24)]. The median age will also increase and is respectively expected in the abovementioned periods to amount to 40.3, 46.7, 50.1 for men and respectively 43.6, 50.4 and 54.8 for women [*Prognoza ludności…*, 2014: 127 (tab. 21)]. In spite of the fact that Poland is still considered in Europe a relatively young demographic nation, it is expected that in 2050 it will be one of the European countries of the most advanced degree of population aging [*Prognoza ludności…*, 2014: 165]. It is important to bear in mind that such factors as increased life expectancy and improvement of health condition should influence delayed aging symptoms i.e. moving an old-age threshold and at the same time, eliminate an actual degree of demographic old-age advancement.
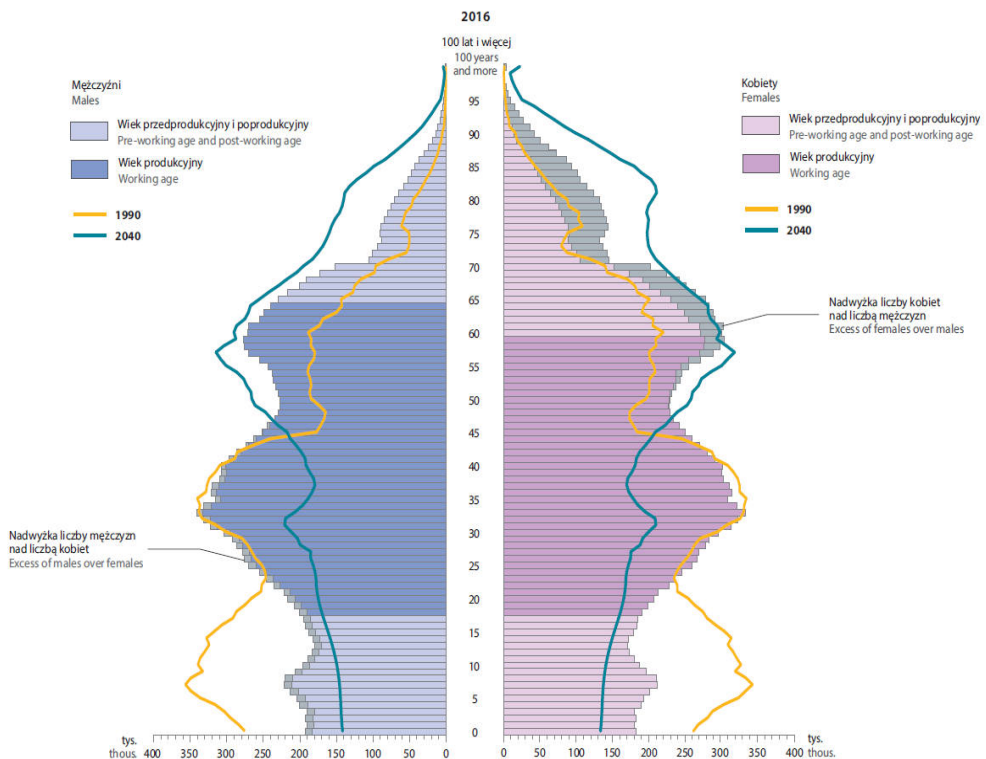

Figure 1. Structure of the population of Poland by gender and age in 1990, 2016 and 2040

Source: *Atlas demograficzny Polski*, 2017: 12.

The analysis of demographic aging can be conducted while examining changes in the population structure by gender and age. The tool that can be helpful here is the so-called age pyramid. Let us take a look for illustrative purposes at the age pyramid prepared for the population of Poland for 1990, 2016 and forecast for 2040.

As can be seen from the information presented in Figure 1, over the years the base of the age pyramid gets increasingly narrow. This phenomenon is called the aging from the bottom of the age pyramid". It is an effect of reduced fertility that is weakened by a decrease in mortality in the first years of life. Additionally, the „swelling" of the top of the pyramid is observed, which is a sign of „from the top of the age pyramid" aging and is connected with limited adult mortality who live up to increasingly advanced age. What is worth noting here is that a successive increase in a number of the oldest people in the society is observed i.e. at ripe old age (90 and older), women in particular. Due to that fact while analyzing and measuring population aging, a ratio indicating a proportion of the oldest people in the population at the age of above 65 was used.

One of the consequences of progressive population aging [Jóźwiak and Kotowska 2010: 40–55] is a pension gap i.e. a situation when gross replacement rate that is a percentage relation of the first pension to the last gross renumeration, reaches a value of below 60% [Jedynak 2017: 97–99]. The European Commission estimated that in 2013 in the EU countries, an average gross replacement rate in public pension systems amounted to 42.5% (for Poland 53%), which already meant a few percent pension gap. In the future, the situation will be even worse in this respect. According to the European Commission's forecast the analogical value in 2050 will amount to 36.4% (for Poland 31.2%) [European Commission, *The 2015*…: 255 (tab. III.182)]. It means that older people who do not accumulate sufficient funds during their professional activity to secure a certain standard of living after retiring will be threatened with poverty. One of the solutions of this problem can be *equity release* products such as a reverse mortgage that was regulated by the act of October 23, 2014 on reverse mortgage [Kowalczyk-Rólczyńska 2014: 398–410; Kuchciak 2010a: 297–309] adopted by the Polish parliament. However, still[1] no bank has introduced a reverse mortgage to their product offer [Kuchciak 2010b: 81–96]. Due to that fact it is very difficult to assess a potential of this product in the Polish market, in the context of actual supplementation of pension system. Yet, it is possible to conduct a simulation of estimated values of benefits from a reverse mortgage that retired senior citizens could obtain if banks in Poland decided to add such a product to their offer. The abovementioned objective was achieved in a form of the study described in the subsequent part of the paper.

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[1] As at 31 December, 2019.

2. ESTIMATED BENEFITS OBTAINED FROM REVERSE MORTGAGE

2.1. Description of the study

The study concerns the calculation of estimated ten-year benefits from a reverse mortgage that retired citizens [Kowalczyk-Rólczyńska 2015] could obtain if banks in Poland decided to introduce that product to their offer. These calculations were conducted separately for men and women signing such an agreement at the age between 65 to 75, who own a residential property of 30 to 70 square meters in one of the following cities: Warsaw, Cracow, Gdansk, Poznan, Wroclaw and Lodz. Adopting such data enables to precisely compare amounts of benefits, both in terms of age and gender of beneficiaries as well as the value of property.

In order to calculate estimated payments from a reverse mortgage, an account of terminated allowance was used, in particular aided with the following formula [Wieteska 2011: 260–261; Kellison 2009: 80]:

$$R = \frac{\alpha \cdot W_r}{\left[\dfrac{N_x - N_{x+n}}{D_x}\right]}$$

where:
R – amount of annual benefit paid at the beginning of every year,
$\alpha \cdot W_r$ – amount of granted reverse mortgage that is a part of market value of property at the time of signing the agreement,
$D_x = v^x l_x$ – discounted number of people that reached the age of x,
$N_x = \sum_{t=0}^{\infty} D_{x+t}$ (in practice the aggregation does not go to infinity but to a maximum age included in life expectancy tables [Zgliczyńska 2014: 243]).

Based on the data presented in the literature as α the value of 30% was adopted. A relatively low level of α results from the fact that banks, apart from calculated interest and other costs, would have to take into consideration the fact that a dramatic drop in property value, serving as collateral may occur [Meluch 2017: 7; Czech 2015: 96]. The calculations were based on a discount rate of 2.87%, announced in January 2019 [www1, access 18.04.2019].

In order to make estimations, the Life Expectancy Tables of Poland for 2017, published by the Central Statistical Office (GUS) were used. Based on the estimations for an average life expectancy, it was assumed that the calculations of payments for harmonization will be conducted for the period of ten years for all age groups.

While estimating the authors also used the data from transaction price bases of residential properties on the secondary market in selected cities in the fourth quarter of 2018, prepared in the NBP Department of Economic Analyses. On this basis, average transaction prices of residential properties were calculated, depending on a location and property area. The results are presented in Table 2.

Table 2. Average transaction prices of residential properties in selected cities in Poland in the fourth quarter in 2018

Cities	Average transaction price for one square meter (in PLN)	Average transaction price of residential properties (in PLN)				
		30 m^2	40 m^2	50 m^2	60 m^2	70 m^2
Warsaw	8 259	247 770	330 360	412 950	495 540	578 130
Cracow	6 849	205 470	273 960	342 450	410 940	479 430
Gdansk	7 499	224 970	299 960	374 950	449 940	524 930
Poznan	5 937	178 110	237 480	296 850	356 220	415 590
Wroclaw	6 191	185 730	247 640	309 550	371 460	433 370
Lodz	4 465	133 950	178 600	223 250	267 900	312 550

Source: own study based on *Baza cen nieruchomości…*, access 18.04.2019.

2.2. Presentation of results and their interpretation

In all calculations below, no potential periodical, additional costs charged by banks, insurance costs or valorization of paid benefits were taken into account. The results are expressed with an accuracy of one.

2.2.1. Potential benefits from a reverse mortgage for senior citizens from Warsaw

In case of ten-year period of payments a 65-year-old woman from Warsaw may count on additional amount of between PLN 742–1 730 a month depending on a flat area, whereas a 65-year-old man from Warsaw can expect between PLN 791–1 846 a month. To compare, a 75-year-old woman can obtain additional PLN 809–1 887 a month i.e. by PLN 67–157 more than a 65-year-old woman, whereas a 75-year-old man can obtain PLN 898–2 095 a month i.e. by PLN 107–249 more than a 65-year-old man.

Detailed results concerning monthly ten-year benefits paid from a reverse mortgage to senior citizens who own a residential property in Warsaw are shown in Table 3.

Table 3. Monthly amounts of ten-year benefits from a reverse mortgage for senior citizens from Warsaw by age, gender and flat area

Age	Amounts of monthly benefits for senior citizens from Warsaw (in PLN) – 10 years									
	30 m^2		40 m^2		50 m^2		60 m^2		70 m^2	
	F	M	F	M	F	M	F	M	F	M
65	742	791	989	1 055	1 236	1 318	1 483	1 582	1 730	1 846
66	745	797	994	1 063	1 242	1 329	1 490	1 595	1 739	1 861
67	749	804	999	1 073	1 248	1 341	1 498	1 609	1 748	1 877
68	753	812	1 005	1 083	1 256	1 353	1 507	1 624	1 758	1 895
69	758	820	1 011	1 094	1 264	1 367	1 516	1 641	1 769	1 914
70	764	830	1 018	1 106	1 273	1 383	1 528	1 659	1 782	1 936
71	770	840	1 027	1 120	1 284	1 400	1 540	1 681	1 797	1 961
72	778	852	1 037	1 136	1 296	1 420	1 555	1 704	1 814	1 988
73	786	866	1 048	1 154	1 311	1 443	1 573	1 731	1 835	2 020
74	797	881	1 062	1 174	1 328	1 468	1 593	1 761	1 859	2 055
75	809	898	1 078	1 197	1 348	1 496	1 617	1 796	1 887	2 095

Source: own study based on *Baza cen nieruchomości…*, access 18.04.2019.

2.2.2. Potential benefits from a reverse mortgage from senior citizens from Cracow

In case of ten-year period of payments a 65-year-old woman from Cracow may count on an additional amount of between PLN 615–1435 a month, depending on a flat area, whereas a 65-year-old man from Cracow can expect between PLN 656–1 531 a month. To compare, a 75-year-old woman can obtain additional PLN 671–1 565 a month, i.e. by PLN 56–130 more than a 65-year-old woman, whereas a 75-year-old man can obtain PLN 745–1737 a month, i.e. by PLN 89–206 than a 65-year-old man.

Detailed results concerning monthly ten-year benefits paid to senior citizens who own a residential property in Cracow from a reverse mortgage are shown in Table 4.

Table 4. Monthly amounts of ten-year benefits from a reverse mortgage for senior citizens from Cracow by age, gender and flat area

Age	Amounts of monthly benefits for senior citizens from Cracow (in PLN)									
	30 m^2		40 m^2		50 m^2		60 m^2		70 m^2	
	F	M	F	M	F	M	F	M	F	M
65	615	656	820	875	1 025	1 093	1 230	1 312	1 435	1 531
66	618	661	824	882	1 030	1 102	1 236	1 323	1 442	1 543
67	621	667	828	889	1 035	1 112	1 242	1 334	1 449	1 556
68	625	673	833	898	1 041	1 122	1 250	1 347	1 458	1 571
69	629	680	838	907	1 048	1 134	1 258	1 361	1 467	1 587
70	633	688	844	917	1 056	1 147	1 267	1 376	1 478	1 606
71	639	697	852	929	1 064	1 161	1 277	1 394	1 490	1 626
72	645	707	860	942	1 075	1 178	1 290	1 413	1 505	1 649
73	652	718	869	957	1 087	1 196	1 304	1 436	1 522	1 675
74	661	730	881	974	1 101	1 217	1 321	1 461	1 542	1 704
75	671	745	894	993	1 118	1 241	1 341	1 489	1 565	1 737

Source: own study based on *Baza cen nieruchomości*…, access 18.04.2019.

2.2.3. Potential benefits from a reverse mortgage from senior citizens from Gdansk

In case of ten-year period of payments, a 65-year-old woman from Gdansk may count on an additional amount of between PLN 673–1 571 a month, depending on a flat area, whereas a 65-year-old man from Gdansk can expect between PLN 718–1 676 a month. To compare, a 75-year-old woman can obtain additional PLN 734–1 713 a month, i.e. by PLN 61–142 more than a 65-year-old woman, whereas a 75-year-old man can obtain PLN 815–1 902 a month, i.e. by PLN 97–226 than a 65-year-old man.

Detailed results concerning monthly ten-year benefits paid to senior citizens who own a residential property in Gdansk from a reverse mortgage are shown in Table 5.

Table 5. Monthly amounts of ten-year benefits from a reverse mortgage for senior citizens
from Gdansk by age, gender and flat area

| Age | Amounts of monthly benefits for senior citizens from Gdansk (in PLN) | | | | | | | | | |
| | 30 m² | | 40 m² | | 50 m² | | 60 m² | | 70 m² | |
	F	M	F	M	F	M	F	M	F	M
65	673	718	898	958	1 122	1 197	1 347	1 436	1 571	1 676
66	677	724	902	965	1 128	1 207	1 353	1 448	1 579	1 689
67	680	730	907	974	1 134	1 217	1 360	1 461	1 587	1 704
68	684	737	912	983	1 140	1 229	1 368	1 475	1 596	1 720
69	688	745	918	993	1 147	1 241	1 377	1 490	1 606	1 738
70	693	753	925	1 005	1 156	1 256	1 387	1 507	1 618	1 758
71	699	763	932	1 017	1 165	1 272	1 399	1 526	1 632	1 780
72	706	774	941	1 032	1 177	1 290	1 412	1 547	1 647	1 805
73	714	786	952	1 048	1 190	1310	1 428	1 572	1 666	1 834
74	723	800	964	1 066	1 206	1 333	1 447	1 599	1 688	1 866
75	734	815	979	1 087	1 224	1 359	1 469	1 630	1 713	1 902

Source: own study based on *Baza cen nieruchomości*…, access 18.04.2019.

2.2.4. Potential benefits from reverse mortgage from senior citizens from Poznan

In case of ten-year period of payments, a 65-year-old woman from Poznan may
count on additional amount of between PLN 533–1 244 a month, depending
on a flat area, whereas a 65-year-old man from Poznan can expect between
PLN 569–1 327 a month. To compare, a 75-year-old woman can obtain ad-
ditional PLN 581–1 357 a month, i.e. by PLN 48–113 more than a 65-year-old
woman, whereas a 75-year-old man can obtain PLN 645–1 506 a month, i.e. by
PLN 76–179 more than a 65-year-old man.

Detailed results concerning monthly ten-year benefits paid to senior citizens
who own a residential property in Poznan from a reverse mortgage are shown
in Table 6.

Table 6. Monthly amounts of ten-year benefits from a reverse mortgage for senior citizens
from Poznan by age, gender and flat area

| Age | Amounts of monthly benefits for senior citizens from Poznan (in PLN) | | | | | | | | | |
| | 30 m² | | 40 m² | | 50 m² | | 60 m² | | 70 m² | |
	F	M	F	M	F	M	F	M	F	M
65	533	569	711	758	888	948	1 066	1 137	1 244	1 327
66	536	573	714	764	893	955	1 071	1 146	1 250	1 338
67	538	578	718	771	897	964	1 077	1 156	1 256	1 349
68	542	584	722	778	903	973	1 083	1 167	1 264	1 362
69	545	590	727	786	908	983	1 090	1 179	1 272	1 376
70	549	596	732	795	915	994	1 098	1 193	1 281	1 392
71	554	604	738	805	923	1 007	1 107	1 208	1 292	1 409
72	559	613	745	817	932	1 021	1 118	1 225	1 304	1 429
73	565	622	754	830	942	1 037	1 131	1 244	1 319	1 452
74	573	633	764	844	954	1 055	1 145	1 266	1 336	1 477
75	581	645	775	860	969	1 076	1 163	1 291	1 357	1 506

Source: own study based on *Baza cen nieruchomości*…, access 18.04.2019.

2.2.5. Potential benefits from a reverse mortgage from senior citizens from Wroclaw

In case of ten-year period of payments a 65-year-old woman from Wroclaw may count on additional amount of between PLN 556–1 297 a month, depending on a flat area, whereas a 65-year-old man from Wroclaw can expect between PLN 593–1 383 a month. To compare, a 75-year-old woman can obtain additional PLN 606–1 415 a month, i.e. by PLN 50–118 more than a 65-year-old woman, whereas a 75-year-old man can obtain PLN 673–1 570 a month, i.e. by PLN 80–187 more than a 65-year-old man.

Detailed results concerning monthly ten-year benefits paid to senior citizens who own a residential property in Wroclaw from a reverse mortgage are shown in Table 7.

Table 7. Monthly amounts of ten-year benefits from a reverse mortgage for senior citizens from Wroclaw by age, gender and flat area

Age	Amounts of monthly benefits for senior citizens from Wroclaw (in PLN)									
	30 m^2		40 m^2		50 m^2		60 m^2		70 m^2	
	F	M	F	M	F	M	F	M	F	M
65	556	593	741	791	927	988	1 112	1 186	1 297	1 383
66	559	598	745	797	931	996	1 117	1 196	1 303	1 395
67	562	603	749	804	936	1 005	1 123	1 206	1 310	1 407
68	565	609	753	812	941	1 014	1 129	1 217	1 318	1 420
69	568	615	758	820	947	1 025	1 137	1 230	1 326	1 435
70	573	622	763	829	954	1 037	1 145	1 244	1 336	1 451
71	577	630	770	840	962	1 050	1 155	1 260	1 347	1 470
72	583	639	777	852	971	1 065	1 166	1 278	1 360	1 490
73	589	649	786	865	982	1 081	1 179	1 298	1 375	1 514
74	597	660	796	880	995	1 100	1 194	1 320	1 393	1 540
75	606	673	808	897	1 010	1 122	1 212	1 346	1 415	1 570

Source: own study based on *Baza cen nieruchomości*…, access 18.04.2019.

2.2.6. Potential benefits from reverse mortgage from senior citizens from Lodz

In case of ten-year period of payments, a 65-year-old woman from Lodz may count on additional amount of between PLN 401–935 a month, depending on a flat area, whereas a 65-year-old man from Lodz can expect between PLN 428–998 a month. To compare, a 75-year-old woman can obtain additional PLN 437–1 020 a month, i.e. by PLN 36–85 more than a 65-year-old woman, whereas a 75-year-old man can obtain PLN 485–1 133 a month, i.e. by PLN 57–135 more than a 65-year-old man.

Detailed results concerning monthly ten-year benefits paid to senior citizens who own a residential property in Lodz from reverse mortgage are shown in Table 8.

Table 8. Monthly amounts of ten-year benefits from a reverse mortgage for senior citizens from Lodz by age, gender and flat area

Age	Amounts of monthly benefits for senior citizens from Lodz (in PLN)									
	30 m^2		40 m^2		50 m^2		60 m^2		70 m^2	
	F	M	F	M	F	M	F	M	F	M
65	401	428	535	570	668	713	802	855	935	998
66	403	431	537	575	671	719	806	862	940	1 006
67	405	435	540	580	675	725	810	870	945	1 015
68	407	439	543	585	679	732	815	878	950	1 024
69	410	444	547	591	683	739	820	887	956	1 035
70	413	449	551	598	688	748	826	897	963	1 047
71	416	454	555	606	694	757	833	909	972	1 060
72	420	461	561	614	701	768	841	921	981	1 075
73	425	468	567	624	709	780	850	936	992	1 092
74	431	476	574	635	718	794	861	952	1 005	1 111
75	437	485	583	647	729	809	874	971	1 020	1 133

Source: own study based on *Baza cen nieruchomości…*, access 18.04.2019.

CONCLUSION

It must be stated that *equity release* may play a significant role in providing benefits for senior citizens from their properties. Depending on specificity and various conditions, there may be a variety of obtained benefits. The results of conducted research show that the highest payments can be expected by the residents of Warsaw and the lowest by Lodz residents. It is connected with the fact that property prices are the highest in Warsaw and in Lodz – the lowest, and a value of property significantly affects an amount of obtained payments.

Apart from a property value, amounts of benefits depend on a gender and age of a property owner who concludes a reverse mortgage agreement. Taking that into consideration, the highest benefits could be offered to men who at the moment of joining the program are at the age of 75. It is related to the fact that average life expectancy for this group is the lowest (women of the same age generally live longer than men) and theoretically, a bank could get their money back faster. What is worth noting here is the fact that the higher beneficiary's age,

the bigger difference in amounts of paid benefits between women and men. It must be also mentioned that similar amounts of benefits could be granted to a 66-year-old man and a 74-year-old woman.

Conducted calculations lead to the conclusion that benefits from a reverse mortgage would definitely increase senior citizens' income. For a 10-year period of paid benefits, income for men would monthly increase on average by between PLN 428 to 2 095, whereas benefits for women between PLN 401 to 1 887. However, it must be kept in mind that benefits from a reverse mortgage are generally not life annuities, so a potential growth in seniors' budget would be only periodical. In the course of the studies the authors made a falsification of the hypothesis assumed initially which stated that higher benefits are paid to women than men. Such a state of affairs results mainly from a longer potential life expectancy for women.

Let us note that an overall amount of payment from a reverse mortgage does not exceed 37% of initial property value regardless of an owner's age and gender. On the one hand, such a situation might cause seniors' disappointment that the amount of a reverse mortgage is only 1/3 of initial property value. On the other hand, it must be noted that after an owner's death, potential heirs would be obliged to pay back accumulated debt if they wished to keep the property (the bank under no condition earns on increases in property prices or the beneficiary's premature death).

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