IMPACT OF SAVINGS WITHIN THE CAPITAL PENSION SYSTEM ON THE FLOW OF FUNDS ACCOUNTS

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1. Introduction

In economic analyzes, savings can be considered on a microeconomic or macroeconomic scale. In the microeconomic approach, it is emphasized that savings of individuals or households are accumulated as a result of their propensity to save. Savings are treated as a way of attain their objectives, often long-term related to, for example, securing old age. The importance of this saving motive seems to grow due to increasing longevity and unfavorable forecasts for the decline in the replacement rate at retirement (European Commission 2018; OECD 2019). Numerous empirical studies indicate that households are not saving enough for retirement (see e.g. Campbell 2006; Lusardi and Mitchell 2011).

Simultaneously, on the macroeconomic scale, savings provide the sources of financing investments in the economy through financial institutions as intermediaries in the flow of funds between entities with a surplus and those with a demand for them. Financial savings gathered by households circulate in the financial system and therefore finance the debt of other sectors, which, in turn, cover their expenses by incurred liabilities, e.g. the investments of corporations. In this way, financial savings and tangible investments are closely related, linking the financial and "real" sphere of the economy.

Considering these two perspectives on the savings exploration, the study therefore focuses on achieving two main objectives. The first one is to indicate the changes in the structure of household financial savings with particular emphasis on the share of retirement savings, including compulsory savings in open pension funds (until 2014) and voluntary retirement savings in the form of employee pension scheme (PPE), individual retirement account (IKE), individual security pension account (IKZE). The second objective is to examine the impact of savings within the capital pension system on the financial system reflected by flow of funds accounts. The role of households' retirement savings in the network of intersectoral linkages in the financial system has been examined on the basis of financial input-output model. Multipliers of the model indicate the increase in the flow of funds induced by the unit increase in the supply of households' funds. Simulation analyses based on these multipliers concern changes in financial assets and liabilities of institutional sectors as well as possible limitations of tangible

investments financing through the financial system resulting from a decrease in supply of funds due to the planned liquidation of open pension funds.

The research is based on statistical data published in the Eurostat database, i.e. annual accounts – financial balance sheets by institutional sectors and four subsectors of financial corporations. Statistical data derived from the annual financial accounts are constructed in accordance with *European System of Accounts ESA 2010* (Eurostat 2013), published in the Eurostat database.

The structure of the paper is the following. The first part is a brief literature review on saving reasons, paying special attention to savings aimed at securing old age. In the next part the structure of flow of funds accounts and the idea of the financial input-output model as a tool for simulation analyses are described. The third part is an short empirical report on the changes in households' financial assets structure in Poland in 2000-2018[1] against the backdrop of the EU. Finally, simulation analysis results are presented. The concluding paragraph contains a brief summary and some directions of future research.

2. Propensity to save for retirement

Saving means limiting consumption during a given period, i.e. refraining from spending part of the income in order to meet current needs, taking into account future ones (e.g. after the end of professional activity or its reduction). Among the motives (factors) of saving mentioned by Keynes (1936), particularly important from the point of view of saving for retirement are: the foresight motive based on predictions about the relationship of current and future income, the precautionary motive – creating reserves for unforeseen expenses, to bequeath property. Future pensioners save to ensure an adequate standard of living in material and cultural terms, also during retirement, enabling them to spend their free time in a pleasant or even extraordinary way (e.g. having the opportunity to participate in tourist trips, travel abroad, etc.).

It seems that the propensity to save for retirement, as the implementation of the aforementioned motives for saving, should grow in connection with the increase in life expectancy, which leads to the extension of the retirement period. When longevity increases households need more wealth to finance their retirement consumption. Research conducted by Cocco and Gomes (2012) indicates that individuals who expect to live longer and have higher earnings save more.

From the perspective of institutions operating within the pension system, increasing life expectancy leads to an increase in their expenses which causes underfunding if at the same time the working age population is decreasing. The remedy for growing underfunding of these institutions, especially state-sponsored pension schemes, is a reduction in retirement payments or an increase in contributions. Predictions of low pensions in the future should generate a need for households and individuals to save more for retirement.

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[1] The analyzed time period results from the availability of statistical data compiled by the standards of ESA 2010.

The increase in the propensity to save for retirement on a macroeconomic scale requires the following factors: growing importance of employer programs, government endorsement, financial educations, advertising (e.g. public awareness campaigns on the subject). One way to institutionally stimulate the propensity to save voluntarily are tax and other incentives for funds held in particular types of saving account. Tax incentives increase the rate of return to saving but they effectively contribute to increasing savings for retirement resulting from reducing consumption level as opposed to simply moving funds from one form of saving to another (Attanasio et al. 2004). Since financial products are becoming more and more complex financial literacy seems to be an increasingly important factor of retirement planning behavior (Fornero and Monticone 2011). Numerous studies show that financial literacy positively and significantly affects the probability of participation in a private pension scheme (see e.g. van Rooij et al. 2012, Lusardi and Mitchell 2011). Moreover, research conducted by Fornero and Monticone (2011) indicates too low financial knowledge, which is one of the barriers to saving, especially in the context of voluntary forms of saving for retirement (see also Behrman et al. 2012).

Empirical research on American expenditures and savings (Choi et al. 2002) referring to behavioral theory of the life cycle show that people postpone the decision to save, although they are aware of the need to save, they are also characterized by a passive attitude towards planning savings for retirement. It is difficult to indicate research on behavioral inclinations of Poles in terms of saving for retirement. Some elements of this theory are included in the research by Liberda's team (Liberda et al. 2012). The results of their analysis show that the perception of income affects the household saving. More precisely, if the household perceives its disposable income as average or at least sufficient to fulfil the household needs, this household saves quite a high share of income.

3. Analytic framework

Flow of funds accounts (FFA), which are the basis of empirical analyses reported in the paper, show financial assets acquired by institutional sectors[2] and liabilities incurred by these sectors in the form of various financial instruments[3]. FFA in the national accounts system are referred to as financial accounts. The data are compiled in accordance with the European System of Accounts ESA 2010 (Eurostat 2013). FFA are presented in two forms: financial flows and stocks.

[2] Six institutional sectors are distinguished in the system of national accounts: non-financial corporations, financial corporations, general government, households, non-profit institutions, rest of the world. Financial accounts are also compiled for four sub-sectors of financial institutions: 1) monetary financial institutions, 2) Other Financial Institutions (except ICPFs), financial auxiliaries, CFIs, and money lenders, 3) Non-MMF investment funds, 4) Insurance corporations and Pension Funds. Household sector and non-profit institutions serving households are combined.

[3] Financial accounts are compiled for over twenty financial instruments in eight groups: 1) Special drawing rights (SDRs), 2) Currency and deposits, 3) Debt securities, 4) Loans, 5) Equity and investment fund shares, 6) Insurance, pensions and standardised guarantees, 7) Financial derivatives and employee stock options, 8) Other accounts receivable/payable.

Flows are recorded as financial transactions, other changes in volume and revaluation account, while stocks of assets and liabilities are shown in the form of financial balance sheets. Financial transactions take place between resident institutional units, and between them and the rest of the world. They show how the surplus or deficit of the capital account is financed by transactions in financial assets and liabilities. More precisely, the financial account indicates how net borrowing sectors obtain resources by incurring liabilities or reducing assets, and how net lending sectors allocate their surpluses by acquiring assets or reducing liabilities. All financial flows represent the difference between the opening financial balance sheet at the start of the year and the closing balance sheet at the end of the year.

Financial balance sheets provided by Eurostat take the form of asset-by-sector Tables[4] of financial assets (E in Table 1) and liabilities (R in Table 2). The data contained in Tables E and R show financial instruments in which entities (institutional sectors) invest surplus of funds and financial instruments in which they incur liabilities, respectively. Each financial instrument is recorded as asset of one entity and simultaneously as liability of another[5] therefore the total amount of financial assets must be equal to the total amount of liabilities.

Table 1. Matrix of financial assets

Sectors / Financial instruments	j	$s_i^E = \sum_j e_{ij} = \sum_j r_{ij}$
i	$\mathbf{E} = [e_{ij}]$ Assets of sector j in the form of i-th instrument	$\mathbf{s^E}$ Total amount of i-th financial instrument
$\sum_i e_{ij}$	$\mathbf{e}^{\mathrm{T}}$ Total assets of sector j	
$\varepsilon_j = z_j - \sum_i e_{ij}$	$\boldsymbol{\varepsilon}^{\mathrm{T}}$ Excesses of liabilities over assets of sector j (if exist, 0 otherwise)	
$z_j = \max(\sum_i e_{ij}, \sum_i r_{ij})$	$\mathbf{z}^{\mathrm{T}}$ Stock of assets or liabilities of sector j, whichever is larger	

Source: own elaboration based on Tsujimura and Mizoshita 2004.

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[4] They are analogous to commodity-by-industry make and use tables in classic input-output analysis – cf. Miller and Blair 2009, pp.185-187.
[5] Only monetary gold does not have an equivalent in liabilities on the financial balance sheet in order to preserve the double registrar principle. Therefore, this instrument has been excluded from the flow of funds table.

Table 2. Matrix of liabilities

Financial instruments \ Sectors	j	$s_i^R = \sum_j e_{ij} = \sum_j r_{ij}$
i	$\mathbf{R} = [r_{ij}]$ Liabilities of sector j in the form of i-th instrument	$\mathbf{s^R}$ Total amount of i-th financial instrument
$\sum_i r_{ij}$	$\mathbf{r^T}$ Total liabilities of sector j	
$\rho_j = z_j - \sum_i r_{ij}$	$\boldsymbol{\rho}^{\mathbf{T}}$ Excesses of assets over liabilities of sector j (if exist, 0 otherwise)	
$z_j = \max(\sum_i e_{ij}, \sum_i r_{ij})$	$\mathbf{z^T}$ Stock of assets or liabilities of sector j, whichever is larger	

Source: own elaboration based on Tsujimura and Mizoshita 2004.

However, this method of recording flows of funds does not show who (which sector) is the creditor and who is the debtor regarding the financial instrument. The sector-by-sector square matrix (intersectoral flow of funds Table) is constructed from a set of balance sheets of financial assets (E) and liabilities (R). The idea of compilation procedure of intersectoral flows tables, proposed by Tsujimura and Mizoshita (2004), is based on input-output methodology (see also Klein 2003; Okuma 2012; Trębska 2018). It was adopted in this study to construct the financial input-output table for financial flows in Poland in 2018. The scheme of financial input-output table is shown in table 3.

Table 3. Financial input-output table (asset oriented system)

sector \ sector	j	ρ_k	z_k
k	$\mathbf{Y} = [y_{kj}]$	$\boldsymbol{\rho}$	$\mathbf{z}$
ε_j	$\boldsymbol{\varepsilon}^{\mathbf{T}}$		
z_j	$\mathbf{z^T}$		

Source: own elaboration based on Tsujimura and Mizoshita 2004.

The y_{kj} element of matrix Y reflects flows of funds from sector j to sector k as a realization of the j-th sector's demand for financial instruments issued by sector k. In a different sense, y_{kj} shows the j-th sector's supply of funds to sector k[6]. Vectors ρ, ε^T, z are the same as those in Tables of assets and liabilities (see Table 1, Table 2).

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[6] Since each element of matrix Y has double interpretation, Tables of intersectoral flows can be based on liability-oriented system or on asset-oriented system. Liability-oriented

The following balancing equation is true for table 3:

$$Y \cdot i_n + \rho = z \tag{1}$$

where Y is $n \times n$ square matrix, i_n is the summing vector (n-element unity column), n is number of sectors.

Taking into account the formula (1), and setting matrix $\mathbf{C} = \mathbf{Y} \cdot \hat{\mathbf{z}}^{-1}$ ($\hat{\mathbf{z}}$ is diagonal matrix of z_j), a financial input-output model is obtained:

$$\mathbf{C} \cdot \mathbf{z} + \rho = \mathbf{z} \tag{2}$$

Thus,

$$\mathbf{z} = (\mathbf{I} - \mathbf{C})^{-1} \rho = \mathbf{\Gamma} \cdot \rho \tag{3}$$

γ_{kj} elements of matrix $\mathbf{G}$ are the financial multipliers, which indicate the supply of funds in sector k induced by the increase by unit in the j-th sector's supply of funds (increase in savings). The column sums of matrix $\mathbf{G}$, i.e. total multipliers show the total effect – the sum of the increases in all institutional sectors' resources z_j.

Assuming an increase in the supply of funds, which is recorded as $\Delta\rho$ in financial input-output model, $\Delta z = (I - C)^{-1} \Delta\rho$ for each institutional sector and total increase in financial flows $\Delta Y = C \cdot \Delta \hat{\mathbf{z}}$ can be determined. The row and column sums of ΔY show increase in liabilities (Δr) of sector k and increase in assets (Δe) of sector j respectively as a result of $\Delta\rho$ – changes of savings. The increase in savings implies changes in demand for funds aimed at tangible investments of sectors whose liabilities excess financial assets: $\Delta\varepsilon = \Delta z - \Delta e$.

4. Retirement savings in the structure of Polish households' financial assets

Securing the old age period is one of the motives for households' saving. This saving goal can be achieved by accumulating assets in various forms, not only financial ones. However, the savings analysis presented in this paragraph of the paper is limited to financial assets. It is based on Eurostat database – financial balance sheets. Attention is focused on those financial instruments that are important in terms of household savings, e.g. currency and deposits, equity and investment fund shares, life insurance and annuity entitlements, pension entitlements. All of these assets can be a form of old age security.

The specificity of the structure of Polish households' financial assets consists primarily in a relatively high share of currency and deposits and a small share of insurance systems, pension and standardized guarantee schemes, especially life insurance and annuity entitlements (see Fig. 1).

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financial input-output table is a transposition of table based on asset-oriented system. Columns of table Y in liability-oriented system show sectors which demand the funds that are supplied by sectors reflected in rows. Vector $\boldsymbol{\varepsilon}$ of excesses of liabilities over assets (investments) is exogenous.

In the group of UE28 countries the share of currency and deposits in households' assets fluctuated between 28% and 31% in 2004-2018, only in 2008-2009, i.e. during the financial crisis and poor economic conditions in the capital markets, it increased to 33%. In Poland, this share decreased from 60% in 2000 to 34.5% in 2007 and ranged from 44 to 50% in the years 2008-2018. While the share of current deposits grew due to the increasing prevalence of settlement accounts, the share of other deposits decreased mainly because of low real interest rate. This may mean that the importance of deposits other than transferable as a form of saving for retirement has decreased.
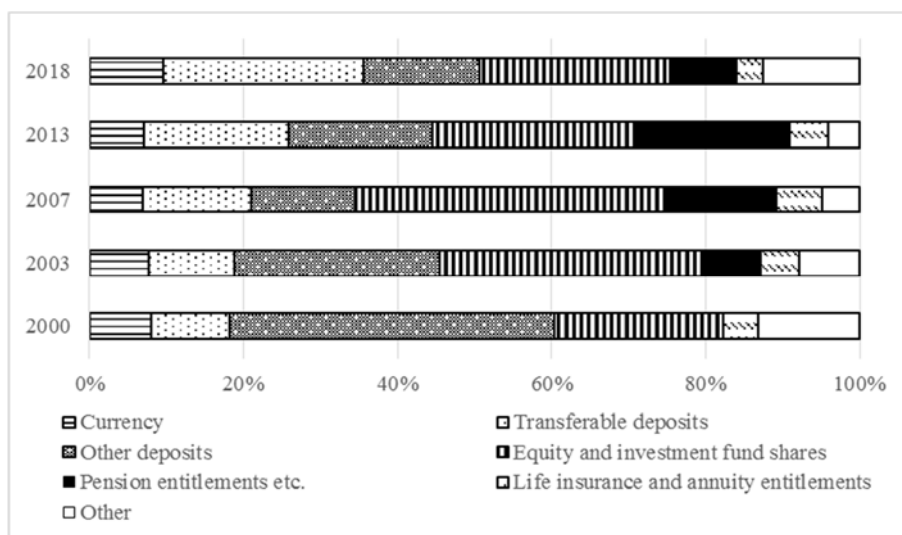

Fig. 1. Structure of households' financial assets[7] in Poland in selected years of the period 2000-2018
Source: own elaboration based on Eurostat Database (update: 31-01-2020).

The decline in interest in the long-term deposits was accompanied by an increase in the share of equities in households' financial assets. This share exceeded 40% in 2007 in Poland (28.5% in the UE28), but the financial crisis and the significant downturn in the capital markets led to a 50% decrease in stock of equities in 2008. A similar trend was observed in most EU countries.

The share of life-insurance in financial assets of Polish households ranged between 3.4 and 7% in the analyzed period (the average for UE28 oscillates around 15%) without a clear upward trend. Only the increase in the interest of households in life insurance combined with insurance capital fund is visible, which might be treated not only as precautionary saving, but also as a kind of saving for retirement.

Formally, securing the old age period as a reason of saving is realized by instruments related to pension systems, including savings in open pension funds

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[7] Data for household sector and non-profit institutions serving households are combined, but assets of non-profit institutions constituted less than 1,5%.

(compulsory until 2014 in Poland) and voluntary retirement savings within the capital pension system in the form of employee pension scheme (PPE), individual retirement account (IKE), individual security pension account (IKZE), etc. In financial accounts, these assets are recorded as pension entitlements (financial claims that current and former employees hold against their employers, a scheme designed to pay pensions or an insurer). These are reserves created by open and employee pension funds for the payment of pensions for their members, as well as funds accumulated under employee pension programs, on individual retirement accounts and individual retirement accounts. Pension entitlements are assets of the households sector. On the other hand, pension entitlements can be the liabilities of any institutional sector, although in practice they are mainly liabilities of subsectors of insurance corporations and pension funds. The entitlements related to social security funds subsector, which is part of the general government sector, are not recognized in financial accounts.

The share of pension entitlements in the households' assets grew systematically until 2013, reaching 20%, which was similar to the average in the UE28. However, due to a series of acts[8] changing regulations of the pension scheme in Poland, this share decreased to 10% in 2014 (8.7% in 2018) with a decrease of assets collected in open pension funds by almost 50%.

The stock of voluntary retirement savings, which are accumulated for achieving old age security in the capital pension system, was steadily rising to reach 23.8 billion PLN in 2018 (see Fig. 2). The total share of PPE, IKE and IKZE slightly exceeded 1% of total financial assets of households in 2016 (1.1% in 2018).
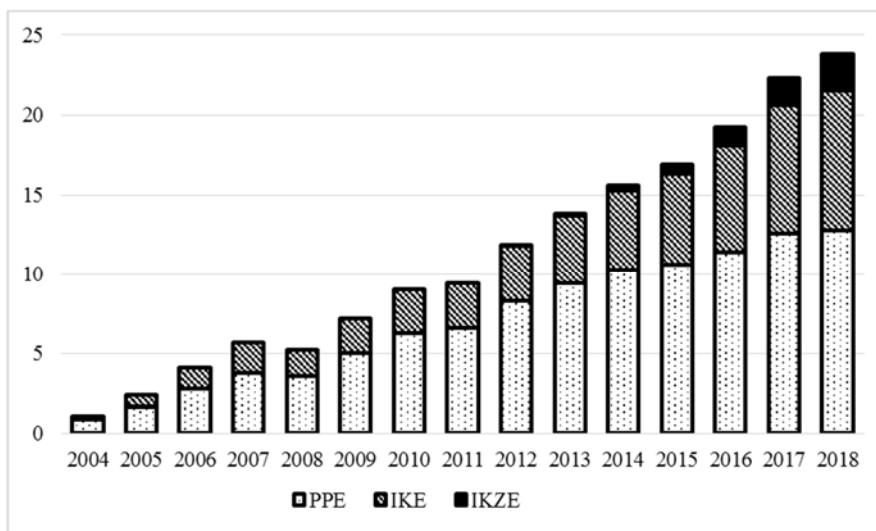

Fig. 2. Voluntary pension entitlements (in billion PLN)
Source: own elaboration based on data from The Polish Financial Supervision Authority.

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[8] These acts involve transfer of part of the funds from the open pension funds to the social security finds and reduced contribution transferred to open pension funds from 2011 onwards (J.o.L. 2011 No. 75 item 398 as amended) and the abolition of compulsory participation in the capital part of the pension scheme from 2014 (J.o.L. 2013, item 1717).

The liquidation of open pension funds (OFE) in Poland, planned for 2020, consisting in the transformation of entitlements in OFE into individual retirement accounts (IKE), will lead to a significant increase in the resources of voluntary retirement savings.

5. Impact of the changes in pension entitlements in private schemes on intersectoral flow of funds

Financial input-output model is used herein as a tool of simulation analyses aimed at estimating effects of the liquidation of open pension funds (OFE) in Poland planned for 2020. Pension entitlements in OFE will be transformed into individual retirement accounts (IKE) after their reduction by a transformation fee of 15%. Savers will have the option of transferring entitlements in OFE into social security funds (public pension scheme).

Pension entitlements in OFE are recorded in the system of national accounts in financial accounts as assets of households and simultaneously as liabilities of pension funds (sub-sector of financial corporations). The transformation of pension entitlements in OFE into IKE means the change in the form of retirement savings. The amount of savings will decrease due to the transformation fee or declarations of funds transfer to social security funds. The structure of financial institutions in which households allocate their retirement savings will also change since IKE are managed by various types of financial institutions (not only pension funds). Data on assets accumulated on IKE by account operators, provided by The Financial Supervision Authority, indicate that about 22% of assets in this form are managed by banks, 17% by investment funds, 31% by entities conducting brokerage activities and 30% by insurance institutions and voluntary pension funds. The scheme of flows due to OFE liquidation presents Fig.3.
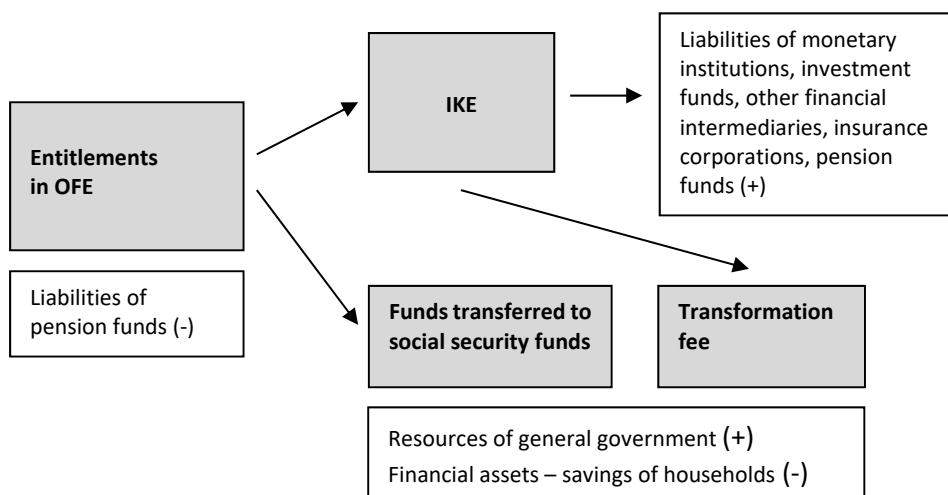

Fig. 3. Scheme of flows due to OFE liquidation
Source: own elaboration.

All these changes in assets and liabilities are introduced into financial input-output table (cf. table 3) compiled for 2018 by the following disturbances:
- changes of flows from households to financial corporations (every sub-sectors) recorded by relevant elements of the Y matrix, what modifies matrix C coefficients in the model (see formula (2)),
- decreases in total amount of households assets on z^T and z vectors,
- decrease in excess of assets over liabilities of households on ρ vector.

The main aim of the simulations is to determine the effects of the liquidation of open pension funds if it was introduced in 2018, when the stock of pension entitlements in OFE was 157.3 billion PLN.

Several variants of simulation can be considered:
1) The whole amount of pension entitlements in OFE (157.3 billion PLN in 2018) would be transformed into IKE, financial assets (savings) of households would decrease by 23.6 billion PLN (15% of 157.3).
2) 20% of the amount of pension entitlements in OFE would be transferred into social security funds (31.5 billion PLN), the remaining 125.8 billion PLN would be transformed into IKE, financial assets of households would decrease by 50.3 billion PLN (31.5 plus 15% of 125.8). This simulation variant is based on forecasts provided by The Polish Ministry of Finance.
3) The whole amount of pension entitlements in OFE would be transferred into social security funds, financial assets of households would decrease by 157.3 billion PLN.

In every variants the increase in general government resources due to transformation fee and funds transformed to social security funds would be distributed as current expenditures.

Above mentioned changes connected with OFE liquidation cause decrease in households savings in the form of financial assets. The larger amount of entitlements in OFE are transferred into social security funds, the greater decrease in savings level is. If the whole amount of pension entitlements in OFE was transformed into IKE, financial assets of households would decrease by 1.2%. On the contrary, transfer to social security funds of all entitlements in OFE would cause a decrease in financial assets of households by 7.8%. The structure of this sector's assets as the claims on other sectors also would change. In 2018 households' claims on insurance corporations and pension funds constituted 13.9% of households' financial assets but this share would decrease due to OFE liquidation. The scale of decrease depends on how much funds accumulated in the form of pension entitlements in OFE would be transferred into social security funds and how much would be transformed into IKE. The increase in the share of other sectors results from both decrease in the stock of households' assets and increase in financial institutions' liabilities in the form of IKE (cf. Fig. 4).
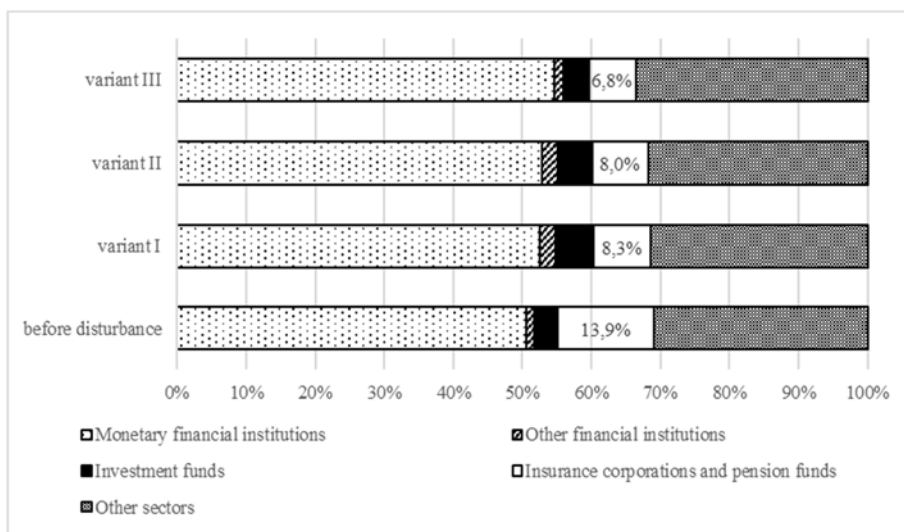
Fig. 4. Changes in the sectoral structure of households' financial assets
Source: own elaboration.

Changes in the structure of households' financial assets, which are reflected in **C** matrix in financial input-output model (cf. formula (2)), implies changes in multipliers (elements of matrix **G**), calculated according to formula (3). Financial input-output multipliers indicate that the supply of households' funds has the strongest impact on financial flows between sectors (in the table before disturbance, as well as in all variants of simulation). An increase in supply of this sector's funds by 1 billion causes an increase in financial resources of all sectors by 5.3 billion in total (5.26-5.28 depending on the simulation variant) as a direct effect and indirect effects resulting from chain reactions within the financial system (for comparison: the effect of the same increase in the supply of rest of the world sector's funds is equal to 4.4 billion). Changes in household savings have the greatest impact on the financial resources of corporations (each additional billion causes increase in corporations' liabilities by 1.3 billion). Effects of decrease in households' supply of funds presented in table 4 combine the effects of initial disturbance and cross-sectoral feedback within the financial system (chain reaction) that is determined by multiplier matrix. The greater effects observed for insurance corporations and pension funds result from the greater initial decrease in this sub-sector's liabilities.

Decrease in households' savings implies decrease in investments that are financed by them – corporations' investments will decrease to the greatest extend. Chain reactions linking household assets with corporations' liabilities may include, inter alia, households' (or institutions investing on their behalf) financial investments in equity and investment fund shares issued by corporations. Similarly, there may be a reduction in the households' acquisition of debt securities issued by the general government sector, which reduces the financing this sector's tangible investments.

Table 4. Effects of decrease in households' supply of funds by 50.3 billion PLN (second variant of simulation)

Sector	Initial disturbance of		Effects (initial, direct and indirect) in		
	liabilities	assets	liabilities	assets	excess of liabilities over assets
Non-financial corporations			-65.7	-32.7	-33.0
Monetary financial institutions	23.5		-35.6	-59.2	
Other financial institutions	18.2		11.8	-5.0	-1.4
Investment funds	33.2		25.9	-7.2	
Insurance corporations and pension funds	-125.2		-132.3	-6.8	-0.3
General government			-29.6	-14.0	-15.7
Households; non-profit institutions		-50.3	-15.8	-116.5	
Rest of the world			-24.1	-24.1	
Total	-50.3 billion -0.5%		-265.6 billion -2.7%		-50.3 billion -2.0%

The scale of total effects of OFE liquidation in particular simulation variants is proportional to the decrease in households savings (cf. Fig. 5), since the total multipliers for households saving change are almost the same in every simulation variants.
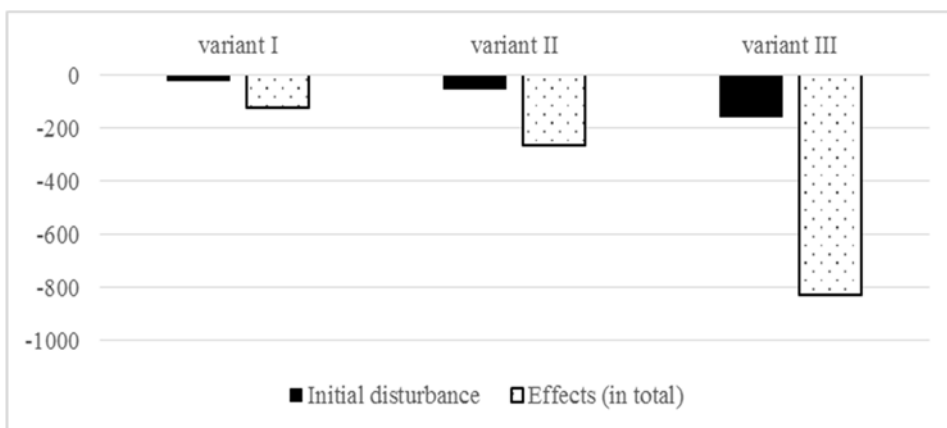

Fig. 5. Aggregated results of three simulation variants (in billion PLN)
Source: own elaboration.

Reducing household savings by 23.6 billion PLN (variant I) would result in a decrease in financial assets by 124.6 billion PLN (1.3%) as a sum of initial, direct and indirect effects. In turn, in the opposite extreme variant of the simulation, a decrease in households' excess of assets over liabilities by 157.3 billion PLN (variant III) would reduce the stock of financial assets by 827.6 billion PLN (assuming the financial input-output table structure is fixed).

6. Conclusion

Redesigning pension systems is inevitable due to demographic structure changes observed in most developed countries in the world. Since policies cannot substantially alter demographic trends, institutions need to adapt to them. The share of retirement-age population expands and the working-age population shrinks with declining fertility and increasing longevity. The share of GDP spent on financing pensions increases[9] and is projected to rise further (Góra 2019). Simultaneously, pensions will be reduced relative to wages (European Commission 2018). In this situation, it seems that institutional changes aimed at increasing the role of voluntary retirement savings are desirable. But if this makes the pension system so complex that it is difficult to understand for the average person, it leads misunderstanding about how the system works. The newest adjustment of the Polish pension system is designed in such way that the transformation of pension entitlements in open pension funds (OFE) into individual retirement accounts (IKE) is automatic, i.e. it does not require any action of holders of assets in OFE. Only people who want to transfer funds to social security funds (public part of the pension system) must make relevant declaration.

The study is not intended to assess whether this change will positively impact the finances of future pensioners. Such an assessment would require an analysis of its potential impact on changes in the willingness to save voluntarily for retirement. The results of simulation analyses presented in the study show the effects of reducing household savings. This reduction, on the one hand, is a consequence of the 15% transformation fee associated with the conversion of the entitlements in OFE into individual retirement accounts (IKE). On the other hand, it may result from the transfer of these entitlements to social security funds, which are not treated as household savings in SNA.

Simulations were conducted on the basis of financial input-output table for Poland in 2018 (the newest data available in Eurostat database), so formally the results show what the effect of the liquidation of OFE would be if it took place in 2018. In this sense, it is therefore a counterfactual simulation. However, since the structures of intersectoral flows are characterized by low variability, these results may constitute an estimation of the effects of OFE liquidation planned for 2020 in Poland. Assuming that only 20% of the amount of pension entitlements in OFE would be transferred into social security funds, financial assets of households

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[9] Old age pensions as a percentage of GDP in European Union increased by 1.5 pp. in the period 2005-2017 (data on pensions from Eurostat database, update: 01.02.2020).

would decrease by 1.2%. It means that, the stock of household savings being the excess of assets over liabilities would shrink by 3.5% (2% of excess of assets over liabilities in total). While the 0.5% decrease in the flows of funds within the financial system does not have to be unambiguously negatively assessed, the reduction of the savings resource that can be used to finance tangible investments may constitute a limitation of corporations' activity (assuming the financial input-output table structure is fixed). This results from the principle of balancing of assets (as supply of funds) and liabilities (reflecting the demand for funds).

Although the methodology employed in the study is quite common internationally, it is relatively rare in Poland. The study presented herein is the first application of the simulation method based on financial input-output table for the Polish financial system. The applied approach disturbs not only savings (elements of the exogenous vector in the model), but also coefficients reflecting the structure of intersectoral flows of funds.

The classic input-output multiplier method used for production process analysis seems to be well enough examined from its beginnings (Leontief 1936). However, some of the principles of input-output analysis used for system of financial accounts simulations, may raise some reservations. Input-output multipliers show the effects of increasing selected elements of the exogenous vector (savings in the studied version of financial model) which are measured in the model by output increase (financial resources) assuming that the input-output coefficients are fixed (matrix $\mathbf{C}$). Therefore, the following issues require testing: 1) stability of model coefficients, 2) equality of marginal and average increments of intersectoral flows of funds, 3) consequences of the switching from net lending to net borrowing sector (and vice versa), and many others concerning chain reactions within the financial systems. These issues verification will be direction of the author's further research on the financial input-output models application.

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