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TRANSFORMING UNIVERSAL PENSION FUND SAVINGS INTO AN EFFECTIVE SUPPLEMENTARY MECHANISM FOR PENSION SECURITY IN BULGARIA[3]

Universal pension funds in Bulgaria were introduced in 2002 as part of a major reform of the national social security system. They were intended to become a key component of the pension framework, complementing the pay-as-you-go pillar over the medium and long term. However, more than two decades later, these funds continue to play a marginal role in providing retirement income. This paper addresses three central questions: (1) What are the main factors preventing universal pension funds from effectively supporting current retirees? (2) To what extent can they contribute to pensioners' income over the next 5 to 15 years? (3) What regulatory changes are necessary to enhance the long-term viability of fully funded pension pillars? The study employs Monte Carlo simulations, descriptive and statistical analysis, and a combination of deductive and systematic approaches. The research shows that universal pension funds could become an effective tool for supplementing the pay-as-you-go component of the social security system – but only if further reforms are implemented. At present, they can hardly fulfil this role due to several factors: the unjust reduction of the individual coefficient, the relatively short accumulation period for the first cohort of retirees, and the assumed conservative investment strategy, which does not favour returns exceeding the growth rate of average insurable income, crucial for the benefit amount due by the first pillar of the pension system.
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1. Introduction

Bulgaria's social security system underwent a significant transformation in the late 1990s, evolving into a three-pillar structure. Following the recommendations of the World Bank (1994), Bulgarian policymakers introduced comprehensive regulations that reshaped the

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structure and functioning of the national pension system. As a result of these reforms, the so-called universal pension funds were established as a key component of the system.

This study investigates the performance of Bulgaria's universal pension funds over the past two decades and evaluates their potential to become effective mechanisms for supplementing the first pillar of the pension system in both the medium and long term. The research is guided by three primary objectives: (1) to identify the main reasons behind the relatively low asset accumulation among the first cohort of retirees eligible for benefits from universal pension funds; (2) to assess the likelihood that future retirees (over the next 15 years) will receive benefits sufficient to offset the anticipated reduction in state pension payments; and (3) to propose regulatory changes necessary to enhance the role of second-pillar pension funds as a supplement element of the first pillar.

The methodology employed includes standard Monte Carlo simulations based on historical yields and corresponding standard deviations to project expected returns from universal pension funds through 2040. Additionally, the study estimates future pension benefits from both the first and second pillars using current mortality tables and regulatory frameworks governing mandatory pension schemes. Descriptive and statistical analyses are also applied in selected sections of the paper.

The findings suggest that universal pension funds have the potential to effectively supplement the first pillar of the pension system. However, this outcome is contingent upon further reforms, particularly in the methodology used to calculate reductions in state pension benefits and in the investment strategies employed by these funds.

2. Literature Review and Theoretical Framework

2.1. Literature Review

Universal pension funds in Bulgaria were established in response to the adverse demographic trends that significantly impacted the country during the 1990s. The long-term consequences of an ageing population were expected to undermine the sustainability of the dominant pay-as-you-go pillar of the pension system. It was accurately anticipated that a shrinking workforce combined with a growing proportion of retirees would lead to persistent deficits in the state social security system, placing an increasing financial burden on younger generations.

Davis (1995) explores the advantages of fully funded pension components, including higher returns, stronger incentives for contribution compliance, and reduced dependency on demographic shifts. However, he also highlights key risks such as high inflation, economic recessions, and heavy reliance on financial market performance – all of which can result in a significant erosion of accumulated assets just before retirement.

Bulgaria's universal pension funds operate as defined contribution schemes, exposing insured individuals to substantial risks. These schemes consist of two distinct phases: the accumulation phase and the pay-out phase, each associated with specific risk factors. Blake (2006) identifies asset price, interest rate, and currency risks during accumulation, and

interest rate and longevity risks during decumulation. Rocha and Vittas (2010) add liquidity and bequest risks to the list of concerns in the payout phase. More recently, Barembruch and Bielawska (2023) emphasise the investment risk and the persistent underperformance of returns relative to public expectations, which can undermine the credibility and long-term viability of pension institutions. Kirov and Beneva (2024) highlight modern risk types – such as environmental, social, and governance (ESG) risks – within the investment process during the accumulation phase of pension funds.

Despite these risks, there is substantial academic support for fully funded pension schemes, particularly in contexts of demographic decline. Pandurska (2018), Whitehouse (2007) and Yermo (2012) examine the positive impact of such schemes on long-term pension system sustainability. Kirov (2010) highlights key features of private pension schemes, including personal account accumulation, indirect access to financial markets, and returns that facilitate asset growth throughout one's career. Reports from the OECD (2007, 2018) and the European Commission (2012) further underscore the benefits of capital-funded components in ensuring adequate post-retirement income. Daneva (2016, 2018) also demonstrates how capital-based pension schemes can enhance system resilience. Similar findings are presented by Gochev and Manov (2003), while Sokurenko et al. (2024) advocate for multi-pillar pension systems in ageing societies, recommending their adoption in Ukraine. Recent EU initiatives, such as the European Tracking Service (ETS) and pension dashboards, aim to enhance transparency and portability of pension rights across Member States (AEIP, 2023). A notable example is the Pan-European Personal Pension Product (PEPP), established by Regulation (EU) 2019/1238, which introduces a standardised, voluntary personal pension scheme across Member States. PEPP aims to provide savers with greater choice, portability, and transparency, while fostering competition among providers and supporting the objectives of the Capital Markets Union (EIOPA, 2024; Barr, 2022). Despite its potential, early evaluations indicate limited uptake due to heterogeneous tax regimes and low public awareness, prompting calls for reforms to enhance its scalability and attractiveness (Van Meerten & Hulshof, 2022; EIOPA, 2024). Similarly, EIOPA and EFAMA advocate for auto-enrolment and life-cycle investment strategies to improve saver engagement and adequacy (EFAMA, 2025; EIOPA, 2025). Thus, a substantial body of research supports the role of fully funded pillars in strengthening pension system sustainability, while also emphasising the need to effectively manage associated risks to ensure balanced and efficient outcomes.

2.2 Theoretical Framework

Bulgaria is among several Central and Eastern European countries that reformed their pension systems by incorporating fully funded components[4]. The regulatory framework for the new system was introduced in 1999, enabling the launch of second-pillar pension funds in 2000 and 2002[5]. Two types of funds operate under the mandatory second pillar: professional pension funds, which cover individuals working in hazardous conditions (labour categories I and II), and universal pension funds, which apply to all individuals born after

[4] Similar pension reforms are implemented in Hungary (1998), Poland (1999), Croatia (2002), Baltic countries (2000-2002), Slovakia (2004), Romania (2008)

[5] Professional pension funds started in 2000, and universal pension funds began two years later in 2002.

December 31, 1959, regardless of their occupation. Universal pension funds have been accumulating substantial resources over the past 23 years and are expected to play a key role in supplementing the state pay-as-you-go system in the long term. These funds entered the decumulation phase in 2021, beginning to pay benefits to the first cohort of retirees born after 1960. However, many of the early pensioners were unable to accumulate sufficient resources to meet the requirements for receiving lifelong benefits. As a result, a significant number of them are ineligible for annuity payments and can only access their funds through deferred or lump-sum payments.

Table 1. Insured individuals granted with annuity payments and benefits as periodic payments towards 31.03.2025

Type of pension benefit	Number of individuals
Annuity (life-long) payment	5 838
Periodic payments	25 295

Source: www.fsc.bg (Financial Supervision Commission).

The regulatory amendments introduced in 2021 established specific conditions for receiving a life-long pension benefit (annuity payment) from universal pension funds. Under these rules, insured individuals must accumulate sufficient resources to finance at least 15% of the state minimum pension benefit. This linkage between the benefits provided by universal pension funds and those from the state pillar is intended to ensure that the payments are aligned with economic realities and, to some extent, comparable to state-funded pensions.

However, the commencement of the distribution phase coincided with an unprecedented period of annual increases in the minimum pension benefit – marking the highest growth rates in Bulgaria's pension history. This rapid escalation significantly raised the threshold required for individuals to qualify for annuity payments, thereby complicating the ability of many early retirees to meet the new criteria.

Table 2. Annual growth of the state minimum pension benefit for the period 2020-2025

Year	Minimum pension benefit amount (BGN)	Annual growth rate (%)
2020	250.00	
2021	300.00	20
2022	467.00	55.67
2023	523.04	12
2024	580.57	11
2025	630.50	8.60

Source: www.noi.bg (National Social Security Institute).

Between 2020 and 2025, the minimum state pension benefit in Bulgaria increased by a cumulative 152.20%, significantly altering the amount required to finance an annuity payment from private pension funds. In 2021, an individual needed approximately 9,000 BGN to secure a life-long pension benefit of at least 45 BGN per month. By 2025, however, the amount required to finance a comparable benefit of 94.58 BGN had risen to over 17,000

BGN[6]. This dramatic increase is particularly problematic for individuals with low insurable incomes, who are the most likely to rely on minimum pension benefits and the least likely to accumulate sufficient funds within such a short timeframe.

One consequence of this rapid growth in state pension benefits is the widening deficit of the state pension fund, which is increasingly financed through substantial subsidies from the national budget. This growing reliance on general taxation not only raises fiscal sustainability concerns but also introduces distortions in the calculation of individual pension entitlements. Specifically, the current methodology for adjusting the individual coefficient – used to determine the reduction in state pension benefits for those remaining in the second pillar – fails to account for the state subsidy. As a result, the reduction applied is disproportionately large and arguably unjust.

Another major factor contributing to the low accumulation in personal pension accounts is the historically low level of insurable income and contribution rates during the early years of the reform. Between 2002 and 2011 – half of the accumulation period for the first cohort eligible for fully funded pension benefits – monthly contributions ranged from 2 to 14 BGN for individuals on minimum income, 5.20 to 30 BGN for those on average income, and 17 to 100 BGN for those on maximum income. Although contributions gradually increased between 2012 and 2021, they remained insufficient[7] to generate the capital required to finance even the minimum projected monthly benefit of 94.98 BGN in 2025.

Compounding these issues is the relatively short accumulation period for individuals born in the 1960s, who have contributed for only 20 years – roughly half the duration expected for those who begin contributing at the start of their working lives. In such a context, it is highly unlikely that investment returns alone – especially under conservative regulatory constraints and persistently low interest rates following the 2008 global financial crisis – could bridge the gap.

Taken together, these factors raise serious concerns about the future of the fully funded components of Bulgaria's pension system, particularly its mandatory elements. Nearly 25 years after their introduction, professional and universal pension funds have yet to meet public expectations as effective complements to the pay-as-you-go system. The question, then, is what lies ahead over the next 15 years. The following section of this study explores this issue by applying a set of reasonable assumptions to identify the conditions under which universal pension funds could evolve into a more effective mechanism for enhancing the sustainability of Bulgaria's pension system.

3. Data and Methodology

Universal pension funds were originally conceived as instruments to complement the pay-as-you-go component of Bulgaria's pension system. From the outset of the reform, it was anticipated that a portion of the pension benefit for individuals insured under the second pillar

[6] The exact amount depends on the exact pension age of the insured individual and his/her universal pension fund.
[7] The contribution for the UPF's estimated on the average insurable income in 2024 is 82 BGN.

would be financed by their selected universal fund. Accordingly, the reduction in the state pension benefit was designed to reflect the share of contributions redirected from the first pillar to the second. The rationale behind this regulation was straightforward: if part of the contribution is allocated to a universal pension fund, then a corresponding portion of the benefit should be paid by that fund.

However, determining the exact share of the benefit to be covered by the universal fund remains a contentious issue, particularly in light of the substantial subsidies provided by the state budget to the first pillar. A regulatory amendment introduced in 2015 further complicated the system by allowing insured individuals to transfer their accumulated resources from the universal pension fund back to the state system, thereby avoiding the reduction in their first pillar pension benefit. This change effectively positioned the two pillars as competitors rather than complementary components of a unified pension framework. The proposed reform is highly contentious in several dimensions. It presupposes, albeit implicitly, that both pillars operate under analogous principles and financing mechanisms. Permitting individuals to transfer resources between the fully funded pension fund and the pay-as-you-go component disregards the foundational principle underpinning second-pillar schemes. Under the fully funded model, individuals are required to accumulate assets through regular contributions and returns from investments. These returns are subject to market volatility and may be negative in certain periods. Consequently, withdrawals during adverse market conditions are likely to result in a diminution of accumulated wealth rather than its preservation. Similarly, re-entering the second pillar at a time when asset prices are at their peak exposes individuals to heightened risk, as the probability of subsequent price corrections is significant. Repeated transfers between pillars throughout a working life amplify these risks, rendering losses almost inevitable. To ensure the viability of the second pillar, it is essential to maintain the regular and timely payment of contributions. Ultimately, the fiscal burden of such inefficiencies would be borne by the state budget.

The decision to transfer funds must be made several years prior to retirement[8], introducing additional uncertainty into the system. This pre-retirement window is expected to extend to five years, a period during which numerous unpredictable factors may influence the performance of the second pillar, particularly the value of accumulated assets.

The pension benefit an individual ultimately receives is influenced by three primary factors: the level of insurable income throughout their working life, the investment return generated by the pension fund, and the expected life expectancy after retirement. Among these, the most volatile and uncertain factor is the yield realised by the pension fund. This study seeks to evaluate the projected yields over the next 5, 10, and 15 years for seven universal pension funds currently operating in the Bulgarian market. The analysis employs standard Monte Carlo simulations based on historical returns and volatility data spanning the period from July 1, 2004, to June 30, 2025[9]. Projections for insurable income are derived from its average growth rate over the past 15 years, while life expectancy estimates are based on mortality tables published by the National Statistical Institute and currently used by all universal pension funds. The study also applies the existing methodology for calculating reductions in

[8] Art.4b in Social insurance code.
[9] This is the period for which there are estimated values of 1 pension unit for each of the funds.

the individual coefficient and compares the full and reduced pension benefits provided by the first pillar. Using three distinct scenarios for the evolution of insurable income over a working lifetime, the analysis estimates the amount accumulated in individual accounts and the corresponding pension benefits payable by each fund.

Monte Carlo simulations of the future value of a pension unit include 1,000 iterations for each working day between July 1, 2025, and December 31, 2040 – a 15-year horizon. For each day, the 5th, 50th, and 95th percentiles are calculated, representing pessimistic, realistic, and optimistic scenarios, respectively. These simulated values are critical for estimating the pension benefits provided by the second pillar. The simulations follow Geometric Brownian Motion (GBM) in the form of:

$$P_{t+1} = P_t * e^{[\left(\mu-\frac{1}{2}\sigma^2\right)\Delta t+\sigma\sqrt{\Delta t}Z} \quad (1)$$

where:

P_{t+1} – Simulated future value of the asset at time t+1

P_t – Current value of the asset (initial value)

μ – Historical mean return

σ – Historical standard deviation (volatility)

Δt – Time interval (e.g., 1/252 for one day)

Z – Random value from a standard normal distribution N(0,1)

e – The mathematical constant $e \approx 2.718$, the base of the natural logarithm

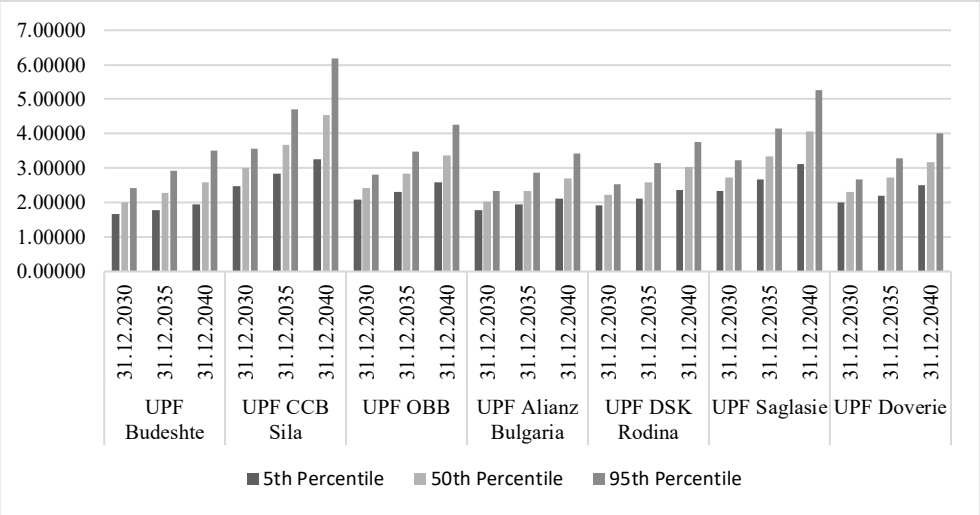
Although the empirical return of the fund does not strictly follow a normal distribution, we use GBM as a simulation model due to its established role in financial modelling, its ability to capture exponential growth with volatility, and its practical applicability in scenario generation.

4. Empirical Results

The simulated values presented in Figure 1 indicate that, based on historical yields over the past 21 years, the 50th percentile values for the pension unit range from 1.99 to 2.99 over the next five years, from 2.29 to 3.68 over the next ten years, and from 2.60 to 4.53 over the next fifteen years. The value of a single pension unit is a critical variable in estimating the total amount accumulated in an individual's account during each of these periods.

To assess the potential outcomes, three scenarios were simulated, corresponding to individuals contributing based on minimum, average, and maximum insurable income levels. For the purposes of this analysis, it is assumed that contributions began at the inception of the reform, on January 1, 2002. The estimated annuity pension benefits under the 5th, 50th, and 95th percentile scenarios are presented in the following tables.

Figure 1. Simulated values of 1 pension unit for the next 5, 10 and 15 years



Source: own calculations.

Table 3. Estimated annuity pension benefit under the 5th, 50th and 95th percentile for a person who contributed on the average insurable income

	UPF Doverie			UPF Saglasie			UPF DSK Rodina		
contributions paid on the average income	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*
pension after 5 years	100.16	112.42	124.16	110.29	124.17	140.81	97.99	108.90	120.69
pension after 10 years	161.23	183.28	206.09	178.22	204.97	236.59	156.76	177.02	200.58
pension after 15 years	253.35	286.71	329.06	281.87	327.44	378.22	243.66	278.65	314.02
	UPF Alianz Bulgaria			UPF OBB			UPF CCB Sila		
contributions paid on average income	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*
pension after 5 years	96.05	106.33	117.84	100.16	112.42	124.16	110.29	124.17	140.81
pension after 10 years	152.23	169.71	193.65	161.23	183.28	206.09	178.22	204.97	236.59
pension after 15 years	233.88	267.73	305.74	253.35	286.71	329.06	281.87	327.44	378.22
	UPF Budeshte								
contributions paid on the average income	*5th*	*50th*	*95th*						
pension after 5 years	97.99	108.90	120.69						
pension after 10 years	156.76	177.02	200.58						
pension after 15 years	243.66	278.65	314.02						

Source: own estimations.

The primary objective of this analysis is to evaluate the extent to which universal pension funds can provide annuity payments that fully compensate insured individuals for the reduction in pension benefits from the first pillar. The estimated full and reduced pension

amounts over the next 5, 10, and 15 years – based on minimum, average, and maximum insurable income levels – are presented in the following tables[10].

Table 4. Estimated annuity pension benefit under the 5th, 50th and 95th percentile for a person who contributed on the minimum insurable income

	UPF Doverie			UPF Saglasie			UPF DSK Rodina		
contributions paid on the minimum income	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*
pension after 5 years	55.05	61.51	67.63	60.21	67.46	76.14	53.93	59.66	65.85
pension after 10 years	95.08	107.03	119.26	104.30	118.69	135.58	92.61	103.58	116.29
pension after 15 years	160.47	179.07	202.76	176.90	202.38	230.10	154.69	174.43	193.98
	UPF Alianz Bulgaria			UPF OBB			UPF CCB Sila		
contributions paid on the minimum income	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*
pension after 5 years	52.93	58.33	64.37	57.17	63.74	71.62	58.90	67.56	76.54
pension after 10 years	90.05	99.48	112.47	98.80	110.10	124.10	100.86	118.55	137.75
pension after 15 years	148.75	168.03	189.26	162.55	186.14	209.85	170.81	202.24	238.33
	UPF Budeshte								
contributions paid on the minimum income	*5th*	*50th*	*95th*						
pension after 5 years	51.55	58.40	66.31						
pension after 10 years	87.74	100.69	117.47						
pension after 15 years	147.91	168.02	195.49						

Source: own estimations.

Table 5. Estimated annuity pension benefit under the 5th, 50th and 95th percentile for a person who contributed on the maximum insurable income

	UPF Doverie			UPF Saglasie			UPF DSK Rodina		
contributions paid on maximum income	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*
pension after 5 years	273.97	309.96	344.96	305.20	346.53	396.10	267.49	299.64	334.54
pension after 10 years	394.14	456.19	521.41	442.13	518.29	609.28	382.08	439.11	505.87
pension after 15 years	554.39	644.42	758.47	628.41	751.28	892.88	530.92	623.67	720.56
	UPF Alianz Bulgaria			UPF OBB			UPF CCB Sila		
contributions paid on the maximum income	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*	*5th*	*50th*	*95th*
pension after 5 years	261.77	292.06	326.16	285.91	322.96	367.40	299.84	349.23	401.31
pension after 10 years	370.25	419.79	487.14	412.41	472.62	547.45	429.54	523.45	627.75
pension after 15 years	507.95	596.47	699.00	565.52	675.65	793.90	609.41	762.51	944.46
	UPF Budeshte								
contributions paid on the maximum income	*5th*	*50th*	*95th*						
pension after 5 years	252.72	290.61	334.87						
pension after 10 years	355.38	421.44	508.04						
pension after 15 years	495.18	590.51	722.30						

Source: own estimations.

[10] In order to estimate the amount of the benefit for the next 5, 10 and 15 years, it is assumed that the average, minimum and maximum insurable income grow with an average rate equal to the last 15 years average (this is the average growth rate for the years between 2010 and 2024).

Table 6. Estimated full and reduced amount of the pension benefit due by the state PAYG pension system for an individual insured on average income

	Average insurable income		
Benefit Type	in 5 years	in 10 years	in 15 years
Full amount	1291.96	1848.97	2646.12
Reduced amount	1115.14	1538.37	2118.98
Difference	176.82	310.59	527.14
Available full compensation from UPF	NO	NO	NO

Source: own estimations.

Table 7. Estimated full and reduced amount of the pension benefit due by the state PAYG pension system for an individual insured on a minimum income

	Minimum insurable income		
Benefit Type	in 5 years	in 10 years	in 15 years
Full amount	651.61	978.07	1469.54
Reduced amount	557.13	804.12	1159.81
Difference	94.48	173.95	309.73
Available full compensation from UPF	NO	NO	NO

Source: own estimations.

Table 8. Estimated full and reduced amount of the pension benefit due by the state PAYG pension system for an individual insured on the maximum income

	Maximum income		
Benefit Type	in 5 years	in 10 years	in 15 years
Full amount	3978.97	5360.04	7228.95
Reduced amount	3461.22	4512.95	5885.09
Difference	517.75	847.09	1343.87
Available full compensation from UPF	NO	NO	NO

Source: own estimations.

The estimations presented above clearly indicate that, under the current assumptions, Bulgaria's universal pension funds are unable to fully compensate insured individuals for the reduction in pension benefits from the first pillar. This trend is likely to persist in the coming years unless legislative changes are introduced to enhance the role of universal pension funds as effective supplement mechanisms for the pay-as-you-go system.

5. Policy Implications

Two critical issues must be addressed to improve the long-term viability of the second pillar. First, the methodology used to calculate the reduction in the individual coefficient for insured persons requires substantial revision. Currently, this formula does not account for the increasing share of pension financing provided through state budget subsidies. A more equitable approach would involve adjusting the reduction coefficient to reflect the proportion of pension funding derived from these subsidies. This would ensure fairer treatment for individuals who continue contributing to their universal pension accounts and reduce the

incentive to opt out of the second pillar before retirement. In turn, this would strengthen the role of universal funds in supplementing the overall pension system.

The second issue concerns the relatively low investment returns achieved by pension funds. The simulations in this study are based on historical yields from July 1, 2004 – the date of the introduction of pension units – through mid-2025. Over this 21-year period, annual returns have ranged between 2.5% and 4%, significantly lagging behind the growth rate of insurable income. While this discrepancy is partly due to the low initial income base, it remains a key factor influencing the adequacy of pension benefits from the first pillar. Moreover, the initial two decades of Bulgarian pension fund operations have been characterised by a succession of significant crises, each exerting an adverse impact on realised yields. Specifically, these include the Global Financial Crisis of 2008, which disrupted international capital markets; the COVID-19 pandemic in 2020, which precipitated unprecedented economic uncertainty; and, more recently, the geopolitical instability stemming from the war in Ukraine. In addition, the period since 2022 has witnessed an extraordinary tightening of monetary policy by major central banks, resulting in a sharp increase in interest rates. This development, in turn, has negatively affected the market valuation of fixed-income instruments, which constitute the predominant share of Bulgarian pension fund portfolios.

Although the growth rate of insurable income is expected to decline in the future, it is essential that pension funds achieve returns that exceed wage growth in order to fulfil their intended role. In theory, the return on capital typically surpasses wage growth over the long term – a dynamic well-documented by Piketty (2014). While temporary reversals are possible, sustained wage growth above capital returns is generally unsustainable under normal economic conditions. If capital returns fall below wage growth, investment incentives diminish, leading to reduced capital formation, lower productivity, and ultimately slower wage growth.

Therefore, it is reasonable to expect that returns on financial assets in Bulgaria will eventually outpace wage growth. However, this outcome depends on regulatory reforms that allow pension funds to pursue more dynamic investment strategies. Pension companies should be permitted to invest more aggressively in variable-income instruments, particularly when the investment horizon is long. While conservative investment behaviour is typical for pension funds, it may not serve the best interests of insured individuals in an environment of persistently low interest rates. Achieving an optimal balance between risk and return is difficult if universal pension funds are restricted to a single, conservative portfolio. The long-debated introduction of multifund structures must be resolved to provide pension companies with greater flexibility in asset allocation. Simulations in this study show that when returns exceed wage growth, asset accumulation over a 15-year period can generate benefits sufficient to offset the reduction in first pillar pensions – even without changes to the individual coefficient reduction methodology.

Ultimately, investment returns are a decisive factor in the success of defined contribution pension schemes. Bulgaria's experience reinforces this point. Pension funds possess a significant comparative advantage in capital markets due to their long investment horizons. Over a 35-40 year period, they can tolerate short-term volatility in pursuit of higher long-term returns. While investment risk cannot be eliminated – particularly in defined

contribution systems – greater exposure to growth-oriented assets increases the probability of achieving the returns necessary to support pension adequacy. This is especially critical in a prolonged period of high inflation and rising insurable incomes.

6. Conclusion

Universal pension funds in Bulgaria currently manage assets exceeding 25 billion BGN. Originally established to serve as a long-term supplement mechanism for the pay-as-you-go pillar of the pension system, these funds have yet to be recognised as an effective component of pension security, even 23 years after their inception. Some insured individuals with personal accounts have opted to transfer their accumulated resources back into the first pillar, thereby mitigating the reduction in pension benefits associated with remaining in the second pillar.

This study employed standard Monte Carlo simulations – based on historical returns and volatility – to project the future value of pension units over 5-, 10-, and 15-year horizons for seven universal pension funds operating in Bulgaria. Using current regulatory frameworks and mortality tables published by the National Statistical Institute, the analysis assessed the likelihood that these funds could provide benefits sufficient to fully offset the reduction in first pillar pensions. Unfortunately, the results do not favour the pension funds. The primary obstacles include an inequitable methodology for calculating the reduction in the individual coefficient and the extraordinary growth in insurable income over the past two decades, which has significantly increased the value of first pillar benefits. The investment returns realised by universal pension funds have consistently lagged behind the growth rate of insurable income, further diminishing their ability to provide adequate compensation.

Despite these challenges, universal pension funds remain a vital element of Bulgaria's pension system and possess the potential to effectively supplement the pay-as-you-go component. However, this potential can only be realised through further reforms—specifically, the adoption of a fairer approach to calculating the individual coefficient and the implementation of more dynamic investment strategies. These changes are essential to ensuring that pension funds can protect the interests of insured individuals and fulfil their intended role within the broader pension framework.

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Contribution of individual authors

Jeko Milev carried out the simulations of the future values of one pension unit and estimations regarding pension benefits due by the first and the second pillar.

Kliment Robev was responsible for the Statistics and the organisation of the text.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used Copilot in order to check the text for grammatical and lexical errors in English. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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