
Career-Risk-Adjusted Selection of Retirement Instruments in India: A Multi-Criteria Decision-Making Framework for Personalised Retirement Planning

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The process of retirement planning for Indians could be described as a comparison of financial arrangements ranging from different points of view such as benefit security, ability to accumulate wealth, costs, liquidity, taxation, lifecycle management and diversification. When the income of an employee is not certain, considering career risk becomes more complex since it determines an individual's ability to withstand financial losses. This study proposes a career-risk-adjusted multi-criteria decision-making (MCDA) model to compare the Employees' Provident Fund (EPF), Employees' Pension Scheme (EPS), National Pension System (NPS), Public Provident Fund (PPF) and Atal Pension Yojana (APY). The framework incorporates bounded rationality, life-cycle thinking, asset-liability matching and diversification of portfolios. All seven criteria are judged using a shared decision matrix and there are two normative decision profiles: high career risk and stable career. For the present study, as there is no expert-judgment dataset available, transparent scenario weights are used instead of presenting the Best-Worst Method (BWM) weights, which is also known as observed preferences. The main method of ranking is Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), and the second one is Simple Additive Weighting (SAW) as a robustness check. The results show that the priority of the alternatives varies depending on the decision profile; in the high-career-risk scenario, the relative importance is higher to security and liquidity while in the stable-career scenario it is higher to accumulation, lifecycle management and diversification. This means that the results of the analysis support a conditional, not universal, definition of retirement-instrument suitability. The contribution of the study is a clear and

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unambiguous link between the risk of employment income and the choice of retirement products, and a foundation for future empirical testing using expert or household level data.

Keywords: retirement planning; career risk; income volatility; India; pension instruments; multi-criteria decision-making; TOPSIS; VIKOR; bounded rationality; lifecycle investing.

1. Introduction

Retirement planning is a long-term decision where uncertainty is present. Personal investment decisions involve how much to save, what percentage of retirement assets to move into one asset class or another, the amount of market risk to take, and the amount of liquidity to keep. These choices are not based merely on the financial resources of the individual. Reliability in future income is also important due to the significance of labour income as one of the household resources in the accumulation phase. If job security is the risk factor, the amounts that a person can afford to lose can be different than the amount that a person with a steady income can afford to lose.

India offers a relevant context for exploring this issue as it has instruments with the materially different institutional characteristics in its retirement system. EPF and EPS are related to social security system related to employment, which are managed by the Employees' Provident Fund Organisation. NPS is an investment & asset-allocation defined-contribution pension plan. PPF is a long term small saving product and APY is a pension product offering a guaranteed minimum pension to eligible subscribers. The security, accumulation capacity, liquidity, lifespan and diversification characteristics of these arrangements vary, however (Employees' Provident Fund Organisation [EPFO], 2026; India Post, 2026; Pension Fund Regulatory and Development Authority [PFRDA], 2026a, 2026b).

This size of the pension system further emphasizes the need for clear pension decision support. As of 20 September 2026, there were 2.33 crore subscribers to the NPS and 7.98 crore active APY accounts in it, according to data from

PFRDA. These are the dimensions of the regulated pension system, and do not necessarily mean that one instrument is better than another for a person (PFRDA, 2026c).

One of the key challenges in retirement-product selection is that people have to consider multiple factors at once. The concept of bounded rationality (Simon 1955; Giarlotta & Petralia 2024) implies that decision makers have constraints on the amount of information they can process and the time they have to make their decisions. In this context, MCDA can be helpful because it provides a way to make the criteria and trade-offs explicit, rather than simply a choice between a return or a security measure.

The research problem of this research is, whether the relative position of retirement instruments changes when considering the career risk in the weighting of the decision criteria. Current comparisons of retirement products typically focus on individual products or specific attributes. The present approach, on the other hand, embeds four key instruments in a shared decision matrix, and test them against two career-risk scenarios explicitly specified. The following questions are raised in the study: (1) Do the instruments differ on seven decision criteria? (2) Do the priorities of the decision criteria vary between high and stable career? (3) Are the priorities of the decision criteria different in different decision making models, namely TOPSIS, SAW and VIKOR? (4) Does the overall ranking change in the two cases? (5) How sensitive is the ranking when major criterion weights change?

The study contributes three interrelated ways. Firstly, it distinguishes between career stability and background demographics as effective retirement risk capacity. Second, it integrates life-

cycle reasoning, asset-liability matching and bounded rationality in one MCDA. Third, it separates normative modelling assumptions from the empirical evidence such that the resulting rankings are not reported as universal product recommendations; and finally, it provides robustness checks, so that the rankings are not presented as universal product recommendations.

2. Literature Background and Conceptual Development

The principles of retirement saving go back to the models of life cycle theory and permanent-income theory (Modigliani and Brumberg, 1954; Friedman, 1957). Studies subsequently find that income uncertainty leads to precautionary saving and alters portfolio behaviour (Skinner, 1988; Deaton, 1991; Carroll, 1997; Bertaut & Haliassos, 1997). Labor income is also a non-traded asset, hence the level of financial risk that an individual can rationally withstand also depends on the risks and flexibility of labor income (Bodie et al., 1992; Viceira, 2001; Cocco et al., 2005; Gomes & Michaelides, 2005). Additional evidence cited in Sanchez & Wellschmied (2020) also suggests that career-related uncertainty does not persist across the career. The empirical evidence on the life cycle is also more recent, and it indicates that income shocks can have an impact on shifts in saving rates and asset allocations (Gomez-Cardona, 2026).

Other lifecycle models also provide insights into how consumption smoothing, precautionary saving and financial wealth allocation choices react to uncertainty about income, financial wealth and retirement dates (Gourinchas & Parker, 2002; Feigenbaum, 2008). The dynamic link between investment risk, time horizon and lifetime wealth was first established in the earlier portfolio-selection models of Merton (1969, 1971) and Samuelson (1969). Additionally, income risk may interact with borrowing constraints and background risk and impact on the set of feasible portfolios (Guiso et al., 1996). Combined, this literature indicates that career income should not be considered as a solely demographic indicator, but as part of the overall

risk environment. The present structure does not econometrically estimate these relationships; they are used to motivate the scenario-specific weighting structure.

Retirement readiness relies on the build-up and maintenance of resources during the working years and on the capacity of the resources to be used to sustain post-retirement consumption. Life-cycle reasoning suggests that the risk exposure that is desired may vary as a person approaches retirement. But, age is not the only factor of effective risk capacity. The reliability of the earnings can also impact one's ability to cope with financial shocks. More recent studies of labor income uncertainty and life-long wealth planning also show that income shocks can impact saving and asset allocation choices (Gomez-Cardona, 2026; Hu et al., 2025).

The four instruments analyzed in this study are used for different institutional purposes. Accumulated provident fund saving and pension-related benefits are provided under the framework EPFO under the employment (EPFO, 2026). NPS offers an individual pension account with investment options and asset-allocation strategies based on investment life-stages (PFRDA, 2026a). PPF is a small savings scheme of the government that is long-term in nature and has a fixed period of 15 years and has a stipulated clause for withdrawal and extension of the period (India Post, 2026). APY is designed for eligible subscribers and offers a minimum pension at age 60, guaranteed by the government, subject to the terms and conditions of the scheme (PFRDA, 2026b). Comparisons are not possible if instruments are not structurally the same; more than one performance indicator is needed.

A second methodological basis comes from the decision structuring literature. A distance-based multi-criteria method that uses positive and negative ideal solutions for evaluating alternatives was developed by TOPSIS (Hwang & Yoon, 1981); a systematic approach for decomposing complex decisions and for eliciting priorities was established by AHP (Saaty, 1980). The concept of compromise-ranking was extended by VIKOR to the case of conflicting criteria (Opricovic &

Tzeng, 2004; 2007), and there have been many applications of VIKOR in TOPSIS in various financial and managerial decision making issues as described in subsequent reviews (Behzadian et al., 2012). Another structured criterion weighting approach is called the Best-Worst Method (Rezaei, 2015). Because of this explicit normativity it is useful to use these methods here, as they are methods that allow the study to explicitly expose the consequences of stated preferences without claiming that one weight vector is the population.

The additional behavioural context of retirement-product selection is provided by financial literacy and decision capability. Studies have correlated financial literacy to financial planning and investment participation (Lusardi & Mitchell, 2014; van Rooij et al., 2011) and positive association between financial literacy and financial planning has been reported in the Indian context (Klapper et al., 2015). There have also been recent studies to examine the association with retirement planning behaviour and sustainable retirement planning with digital financial literacy in India (Khurana & Sharma, 2026; Yadav et al., 2026). Strong evidence also exists for the motivational and cognitive pathways linking income risk and retirement saving, reinforcing the importance of incorporating income risk and decision context into retirement planning (Hu et al., 2025).

Here, career risk is considered as uncertainty in regard to employment continuity, income, career advancement or potential income disruption. It's important because human capital and financial

capital are two important components of retirement preparation. If the person is in an uncertain income position then a reduction in financial assets can happen at the same time as a decline in the primary source of income for the household. Under high career risk, therefore, asset-liability matching serves as a conceptual foundation to give higher value to downside protection. On the other hand, a worker who has relatively stable earnings might be able to tolerate the fluctuations in investment returns if his or her retirement is far away.

The bounded rationality is also used in the framework. Some of the factors that may be part of a retirement decision include eligibility requirements, tax treatment, withdrawal conditions, contribution structure, investment choices and long-term risk. Stating these attributes as actual criteria diminishes the mental load of comparison and exposes the assumptions. As a result, methods like TOPSIS, SAW and VIKOR, which do not change from normative preference to objective facts are suitable for use as decision structuring methods in MCDA (Opricovic & Tzeng, 2004; Rezaei, 2015).

The conceptual hypothesis is therefore simple: the risk capacity depends on career risk and life-cycle position; the relative weight attached to retirement criteria depends on risk capacity; and relative weight attached to retirement criteria can alter relative position of retirement instruments even if the product characteristics do not change. The proposition is tested in a scenario model that is transparent, not by a survey of respondents.

Conceptual pathway for career-risk-adjusted retirement-instrument selection

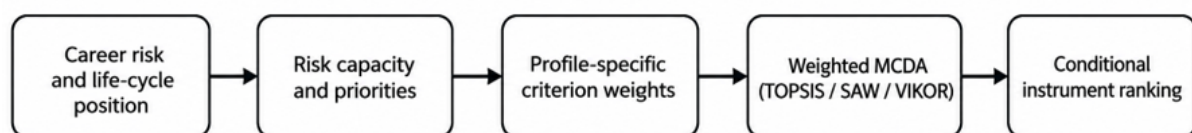


Figure 1. Conceptual pathway for career-risk-adjusted retirement-instrument selection.

3. Methodology

3.1 Research design and alternatives

The study is descriptive and normative. It does not predict preferences of the population and it

does not rely upon data from individual respondents. Instead, it builds a repeatable decision model using a decision matrix that is displayed explicitly and two weight vectors that are specific to each scenario. There are four

alternatives: A1 = EPF/EPS, A2 = NPS, A3 = PPF and A4 = APY. In an actual decision-support application, the concept of eligibility is

screened before considering an alternative. This is particularly applicable for APY, which has its entry and eligibility criteria (PFRDA, 2026b).

3.2 Criteria and operationalisation

Table 1. Evaluation criteria and operationalisation.

Code	Criterion	Operational meaning	Direction
C1	Benefit security and downside protection	Protection and predictability of retirement benefits	Benefit
C2	Wealth accumulation potential	Potential for long-term retirement accumulation	Benefit
C3	Cost and administrative efficiency	Relative cost and administrative burden	Benefit
C4	Liquidity and withdrawal flexibility	Access to funds under applicable rules	Benefit
C5	Tax efficiency	Relative tax treatment across the retirement cycle	Benefit
C6	Lifecycle risk management	Ability to adjust risk exposure over time	Benefit
C7	Diversification and investment choice	Breadth of investment and allocation choices	Benefit

Each alternative is scored from 1 to 9 on each criterion. The scale is comparative within the defined model: a score of 9 indicates that the alternative is assessed as strongest among the four on that criterion. The scores are therefore

model inputs, not observed consumer ratings, realised returns or population estimates. This distinction is important because the validity of the final ranking depends partly on the quality of these normative inputs.

3.3 Career-risk profiles and criterion weights

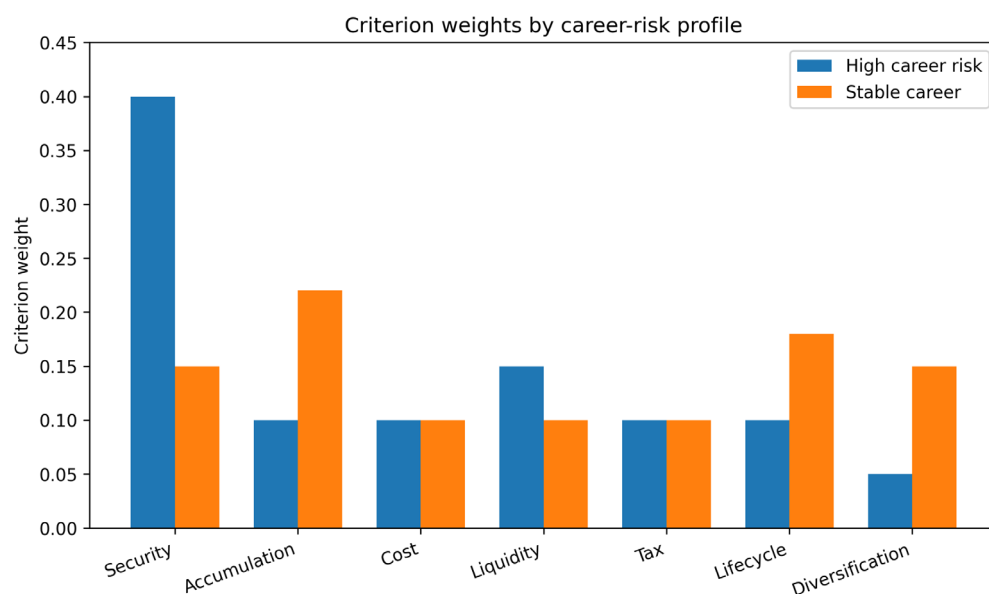


Figure 2. Criterion weights used for the two career-risk profiles.

Two profiles are specified to represent different decision environments. The high-career-risk profile represents relatively unstable employment income, uncertain earnings progression or a meaningful possibility of income interruption. The stable-career profile represents relatively predictable employment income and a comparatively greater capacity to tolerate

investment variability. The weights are scenario assumptions. The original design identified the Best-Worst Method as a preferred empirical weighting procedure, but no expert-elicitation dataset is available in the present study; accordingly, BWM is retained as a future validation route rather than being presented as if it had been empirically applied.

Table 2. Criterion weights under the two career-risk profiles.

Criterion	High career risk	Stable career
C1 Security	0.4	0.15
C2 Wealth accumulation	0.1	0.22
C3 Cost efficiency	0.1	0.1
C4 Liquidity	0.15	0.1
C5 Tax efficiency	0.1	0.1
C6 Lifecycle management	0.1	0.18
C7 Diversification	0.05	0.15
Total	1.0	1.0

The decision matrix is: EPF/EPS = (9, 6, 8, 6, 8, 6, 5); NPS = (7, 9, 8, 5, 8, 9, 9); PPF = (9, 6, 9, 5, 8, 4, 3); and APY = (9, 4, 8, 3, 7, 4, 4). These values are retained from the submitted model and are interpreted as comparative normative assessments.

3.4 MCDA procedure and robustness testing

In TOPSIS, the vectors in a decision matrix are normalised, $r_{ij} = x_{ij} / \sqrt{\sum_i x_{ij}^2}$. The normalised values are multiplied by the criterion weights to obtain the weighted normalised matrix. The positive ideal solution is the best value for each benefit criterion and the negative ideal solution is the worst value. The separation measures are $S_i^+ = \sqrt{\sum_j (v_{ij} - v_j^+)^2}$ and $S_i^- = \sqrt{\sum_j (v_{ij} - v_j^-)^2}$. The closeness coefficient is given by $C_i = S_i^- / (S_i^+ + S_i^-)$ and closer values to the positive ideal

(Opricovic & Tzeng, 2004) mean a greater relative closeness to the positive ideal.

Both SWA and VIKOR are used as a transparent weighted-sum benchmark and VIKOR offers a compromise-ranking perspective. The three-method design is not intended to give the false sense of confidence in data that would be gained from a single method; it is instead designed to test if the overall general pattern of the profile is maintained when the aggregation logic is altered. Sensitivity analysis is then used to test the sensitivity of the security weight and to see how the relative position of the main alternatives change with this weight.

4. Results

4.1 Comparative characteristics and decision matrix

Table 3. Comparative characteristics of the retirement instruments.

Criterion	EPF/EPS	NPS	PPF	APY
Benefit security	High	Moderate to high	High	High
Wealth accumulation potential	Moderate	High potential	Moderate	Low to moderate
Cost and administrative efficiency	High	High	High	High
Liquidity and withdrawal flexibility	Moderate	Low to moderate	Low to moderate	Low
Tax efficiency	High	High	High	Scheme dependent
Lifecycle risk management	Moderate	High	Low	Low
Diversification and investment choice	Moderate	High	Low	Moderate

The comparative matrix shows why no single instrument dominates every dimension. EPF/EPS and PPF receive relatively strong security assessments, whereas NPS receives higher assessments on accumulation potential, lifecycle management and diversification. APY is distinguished by its guaranteed minimum pension structure for eligible subscribers. These are institutional characteristics used for modelling, not estimates of realised investment performance.

4.2 TOPSIS results

The TOPSIS closeness coefficient of EPF/EPS, NPS, PPF and APY are 0.6465, 0.5834, 0.5121 and 0.3808 respectively, under the high-career-risk weights. The outcome is primarily driven by the 0.40 weighting on security and downside protection. It should, therefore, be read as the results of the above scenario assumptions.

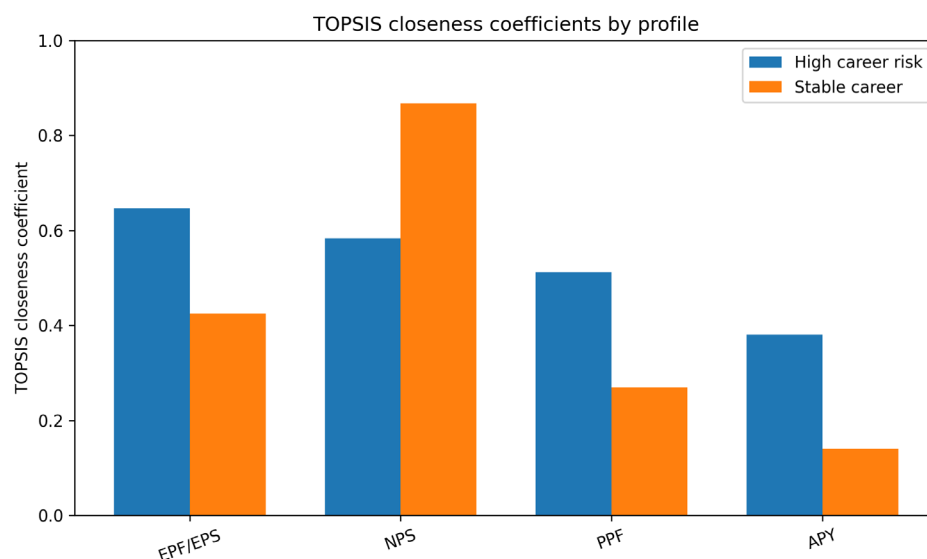


Figure 3. TOPSIS closeness coefficients under the two career-risk profiles.

Table 4. TOPSIS results under the high-career-risk profile.

Rank	Alternative	TOPSIS coefficient
1	EPF/EPS	0.6465
2	NPS	0.5834
3	PPF	0.5121
4	APY	0.3808

Under the stable-career weights, NPS has the largest TOPSIS closeness coefficient (0.8673), followed by EPF/EPS (0.4250), PPF (0.2698) and APY (0.1407). In this scenario, accumulation, lifecycle management and diversification receive greater relative weight. The change in ordering illustrates the central mechanism proposed by the framework: changing the decision profile changes the relative importance of the same product characteristics.

Table 5. TOPSIS results under the stable-career profile.

Rank	Alternative	TOPSIS coefficient
1	NPS	0.8673
2	EPF/EPS	0.4250
3	PPF	0.2698
4	APY	0.1407

4.3 Robustness across SAW and VIKOR

Table 6. Cross-method ranking comparison.

Profile	Method	Model ordering
High career risk	TOPSIS	EPF/EPS > NPS > PPF > APY
High career risk	SAW	EPF/EPS > PPF > NPS > APY
High career risk	VIKOR	EPF/EPS > PPF > APY > NPS
Stable career	TOPSIS	NPS > EPF/EPS > PPF > APY
Stable career	SAW	NPS > EPF/EPS > PPF > APY
Stable career	VIKOR	NPS > EPF/EPS > PPF > APY

The robustness results show that the leading alternative remains the same within each profile, although the middle positions under high career risk are more sensitive to the aggregation method. Under the stable-career profile, the ordering is consistent across all three methods. This distinction is analytically important: the model provides stronger evidence for the stability of the profile-level leader than for every position in the complete ranking.

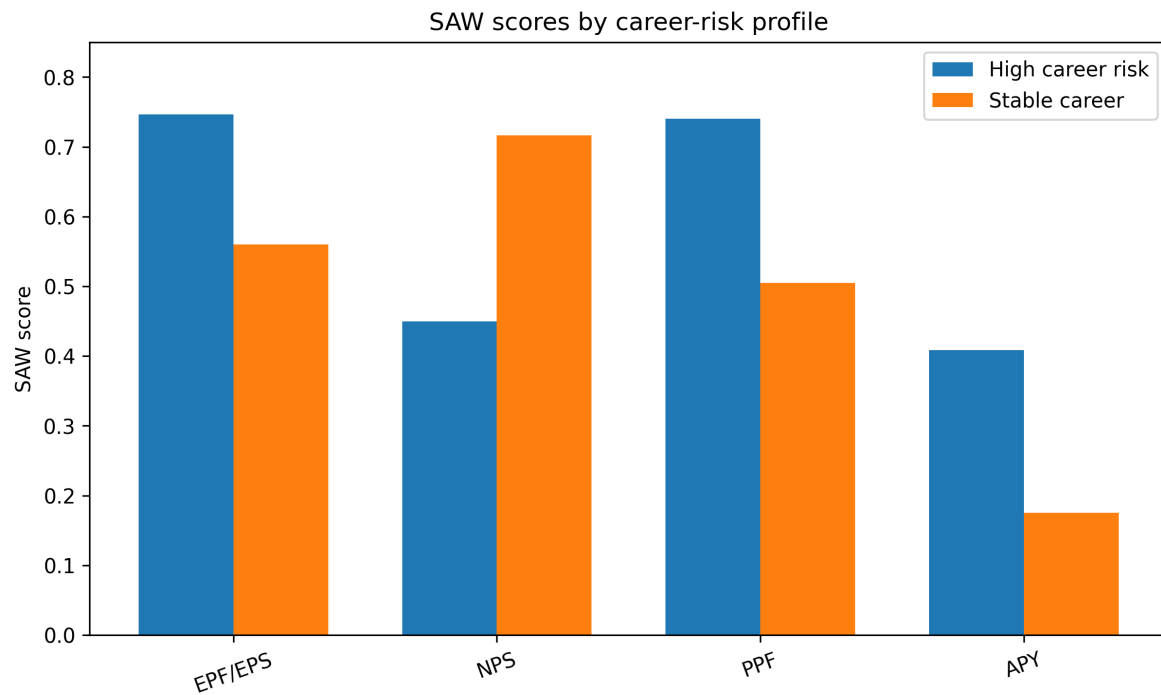


Figure 4. SAW scores under the two career-risk profiles.

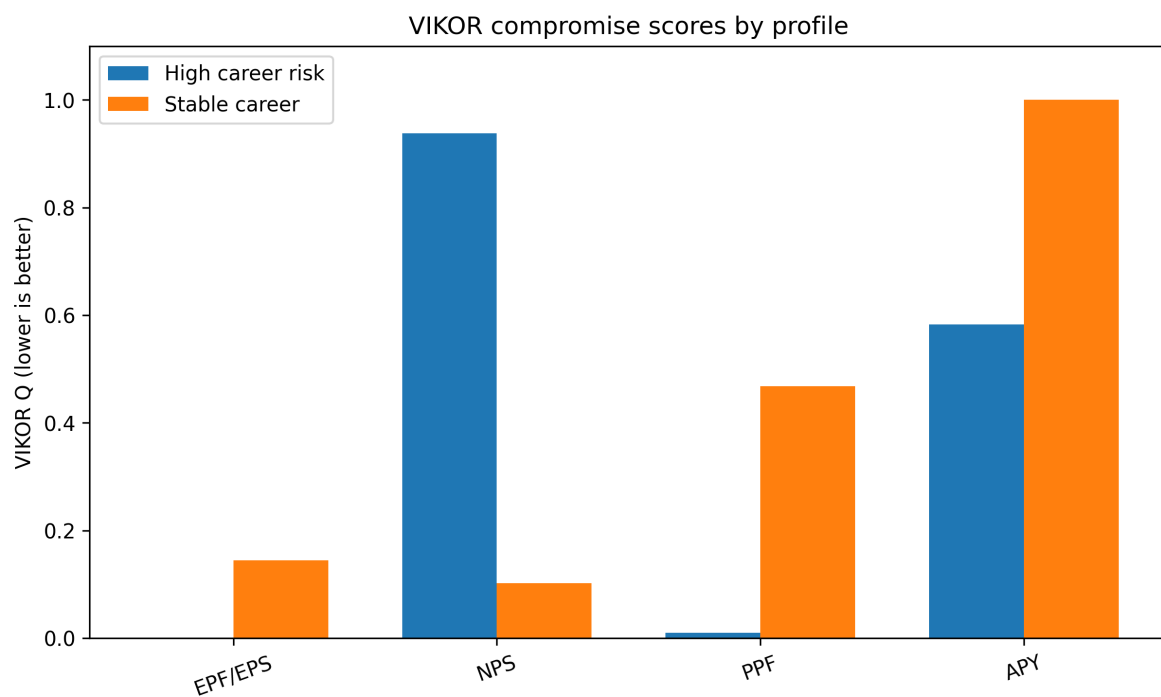


Figure 5. VIKOR compromise scores under the two career-risk profiles; lower Q indicates greater compromise closeness.

Table 7. SAW scores under the two career-risk profiles.

Alternative	SAW: high risk	SAW: stable career
EPF/EPS	0.7467	0.5600
NPS	0.4500	0.7167

PPF	0.7400	0.5047
APY	0.4083	0.1750

Table 8. VIKOR compromise scores under the two career-risk profiles.

Alternative	VIKOR Q: high risk	VIKOR Q: stable career
EPF/EPS	0.0000	0.1446
NPS	0.9384	0.1023
PPF	0.0099	0.4684
APY	0.5833	1.0000

4.4 Sensitivity and decision switching

The model inputs and cross-method results are directly accessible via figures 2-5. The two scenarios have the main differences in the relative weight given to security, accumulation, lifecycle management and diversification, as illustrated in Figure 2. These weights are then translated into the results of the TOPSIS, SAW and VIKOR outputs in figures 3 – 5 respectively. The figures represent explanatory illustrations of the model inputs, which are normative rather than empirical representations of the preferences of respondents.

Sensitivity analysis shows that the model is very sensitive to security importance, accumulation and diversification importance. As the security weight grows, the security alternatives get more important and the relative importance of NPS improves; as the weight of accumulation, lifecycle management and diversification grows, so does the relative importance of NPS. It is not the case that there is one best weight, but rather that the implication is that a particular weight is correct. Instead, the outcome shows that choice of retirement products is preference-sensitive and must be presented along with the choice profile and the product assumptions that are employed to determine the profile.

Model sensitivity curve indicates a security weight sensitivity crossing between EPF/EPS and NPS. This interpretation in terms of the decision switch is helpful: the same product features can result in varying rankings depending on the

decision maker's priorities. The sensitivity result should therefore be interpreted as a scenario analysis and not as a statistical confidence interval.

5. Discussion and Implications

The findings corroborate the theoretical hypothesis that career risk should be part of retirement-risk assessment. Labour income uncertainty also poses a challenge to the financial capacity of the household, because it leaves the household's financial capacity vulnerable to two types of risk: stability of labour income and potential volatility of financial assets. The relative position of instruments that offer various types of security can therefore vary when there is a higher weighting on security. This is in line with lifecycle evidence that income shocks can impact saving and asset allocation (Gomez-Cardona, 2026; Hu et al., 2025).

The findings also shed light on the security-growth trade-off. EPF/EPS are comparatively strong on security and NPS has strong model scores on accumulation potential, lifecycle management and diversification. APY has a more limited role since the design focuses on a guaranteed minimum pension for eligible subscribers. These differences are not expressed in a universal product hierarchy in the framework. Rather, it illustrates the varying relative importance of these in the context of a decision.

Theoretically, the study adds to the concept of lifecycle reasoning by including career stability as a determinant of risk capacity. It also brings bounded rationality to a real-world financial decision, by narrowing down a large but implicit list of considerations to a limited and explicit list. The framework from an asset-liability viewpoints takes into account future retirement consumption as a large liability and labour income as an important asset whose volatility plays a significant role in the asset/liability ratio of human and financial capital.

Advisers and digital pension platforms should start with the profile, these results indicate. Before ranking alternatives eligibility needs to be checked; thereafter career stability and income variability should be evaluated in conjunction with age, retirement horizon, retirement wealth, and liquidity needs and risk capacity. The system should reveal the criterion weights and demonstrate the impact of changes in priorities. In fact, this transparency is of particular importance, as shown in the present study, because the ranking can be different in case of a change in the profile.

Policy-level, similar presentation of retirement instruments may simplify the making of trade-offs. Digital decision support systems may show eligibility, product features, stated priorities of the user, as well as the sensitivity of the resulting ranking. The intent would be to facilitate rather than supplant the individual individual, in the process of making a decision. Before operational implementation, the eligibility and product conditions may change in the current scheme rules, hence it is advisable to check the eligibility condition and product condition in the current scheme rules (PFRDA, 2026a and 2026b; India Post, 2026).

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6. Conclusion

In this study, a career-risk adjusted MCDA framework is developed to compare the performance of EPF/EPS, NPS, PPF and APY in the context of retirement planning in India. The model is based on 7 criteria and 2 profiles of career risk norms. Under high career risk, the TOPSIS results vary from one profile to another, with EPF/EPS having the highest coefficient, while under stable career risk, the highest coefficient is that of NPS. Both methods, SAW and VIKOR, generally confirm the profile-level distinction, with the ordering of intermediate alternatives being more sensitive under what is defined as high career risk.

The main point is thus methodological and not promotional: the suitability of a retirement instrument will be determined by the criteria, weights and eligibility conditions in retirement choice. The framework is not meant to indicate that any one instrument is always the better choice. Its usefulness is in revealing and replicating the assumptions in a conditional comparison.

The one drawback is the normative scores and the criterion weights. There is no evidence of consumer preferences or expert opinions. The study doesn't either model stochastic salary growth, inflation, returns to the market, or combinations of portfolios/longevity risk. Future research should be carried out with the implementation of the Best-Worst Method, the use of normative scores should be avoided where possible, the framework should be validated using household data, and stochastic lifecycle simulation should be incorporated. These extensions would enable the proposed framework to shift from a transparent decision model to empirical validation.

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