



# Joint Colloquium of the IACA, PBSS and IAAHS Sections of the International Actuarial Association

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## **Pension Finance and the Significance of Defined Benefit Pension Plans**

(through considering the essence of Liability Driven Investment)

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# Background of LDI emergence

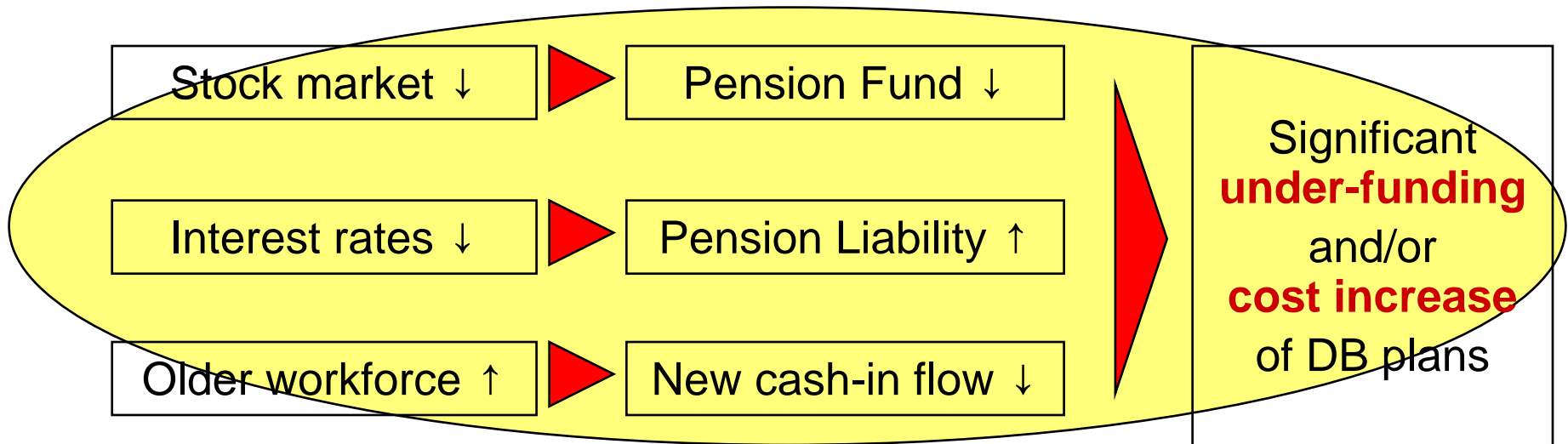
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LDI (Liability Driven Investment) is now becoming popular because ...

- Plan sponsors want to avoid excessive fluctuation of **pension costs**.
- Accounting changes have directly influenced to **pension liabilities**.
- Funding regulations are severer than before toward **under-funding**.
- **Closed plans** should be more controllable.

# Background of LDI emergence

Especially for avoiding the next crisis of DB plans under another ‘**perfect storm**’ (Absolute return strategies have also been driven in this context.)



**Perfect Storm**

# Concept of LDI

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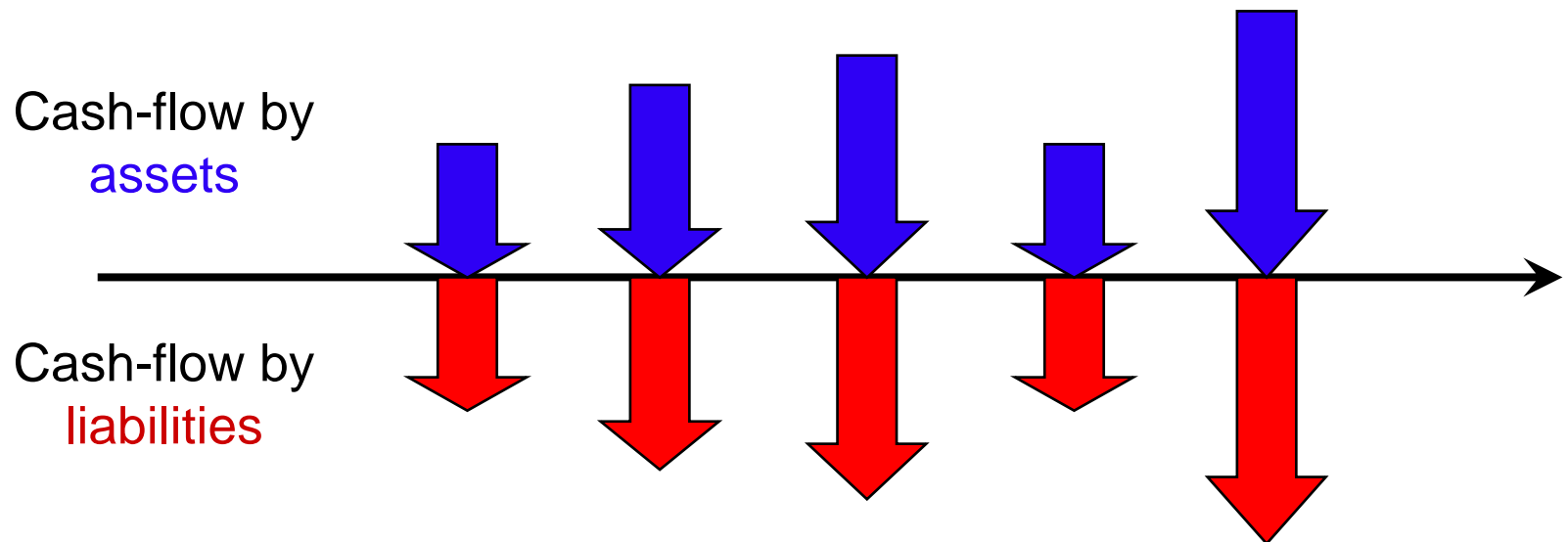
LDI seems to be a kind of fashion words that many people have different interpretations.

In general consensus, LDI is simply the practice of investing against a **benchmark reflecting liabilities, not reflecting markets** as traditional investment strategies.

Therefore, LDI should be considered in a context of **Asset Liability Management (ALM)**.

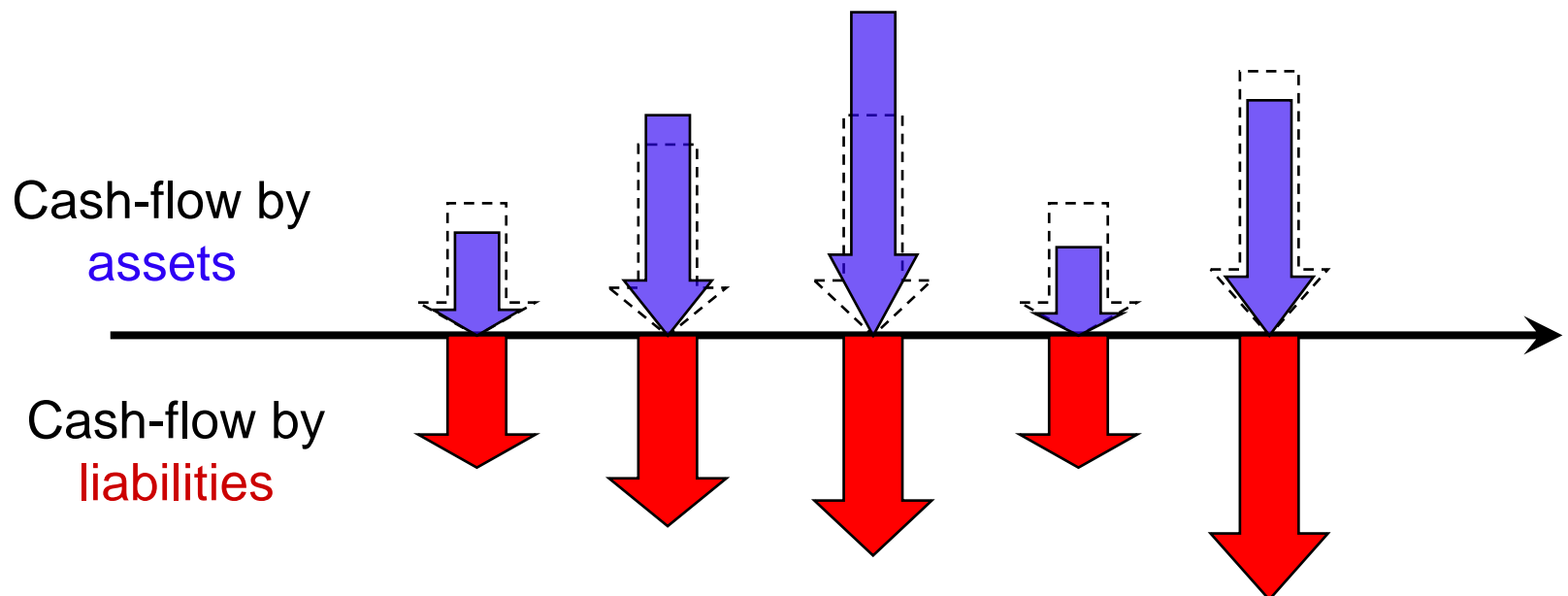
# Risk-free portfolio against liabilities

At first, we should consider **the risk-free portfolio** (base-line) against pension liabilities. It should be **cash-flow matching** of assets for liabilities that can offset market fluctuations.



# Seeking opportunity better than risk-free

Next, we may seek **opportunity of investment better than risk-free**. It means bearing some risks not to match cash-flow of liabilities.



# Definition of Pension Liabilities

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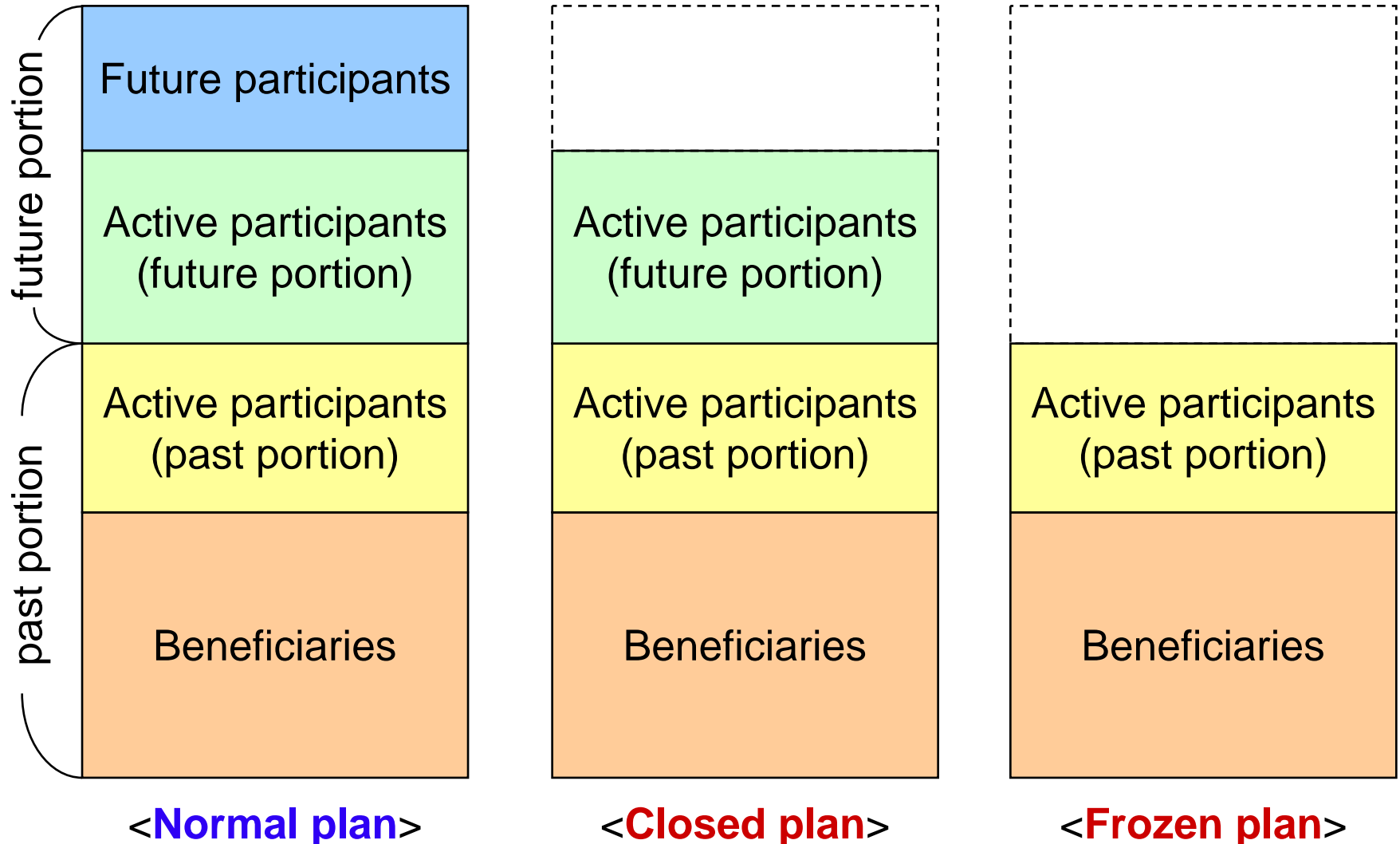
For ALM, the most important thing is **how we should define pension liabilities**.

There are several types of pension liabilities such as for **funding or accounting**.

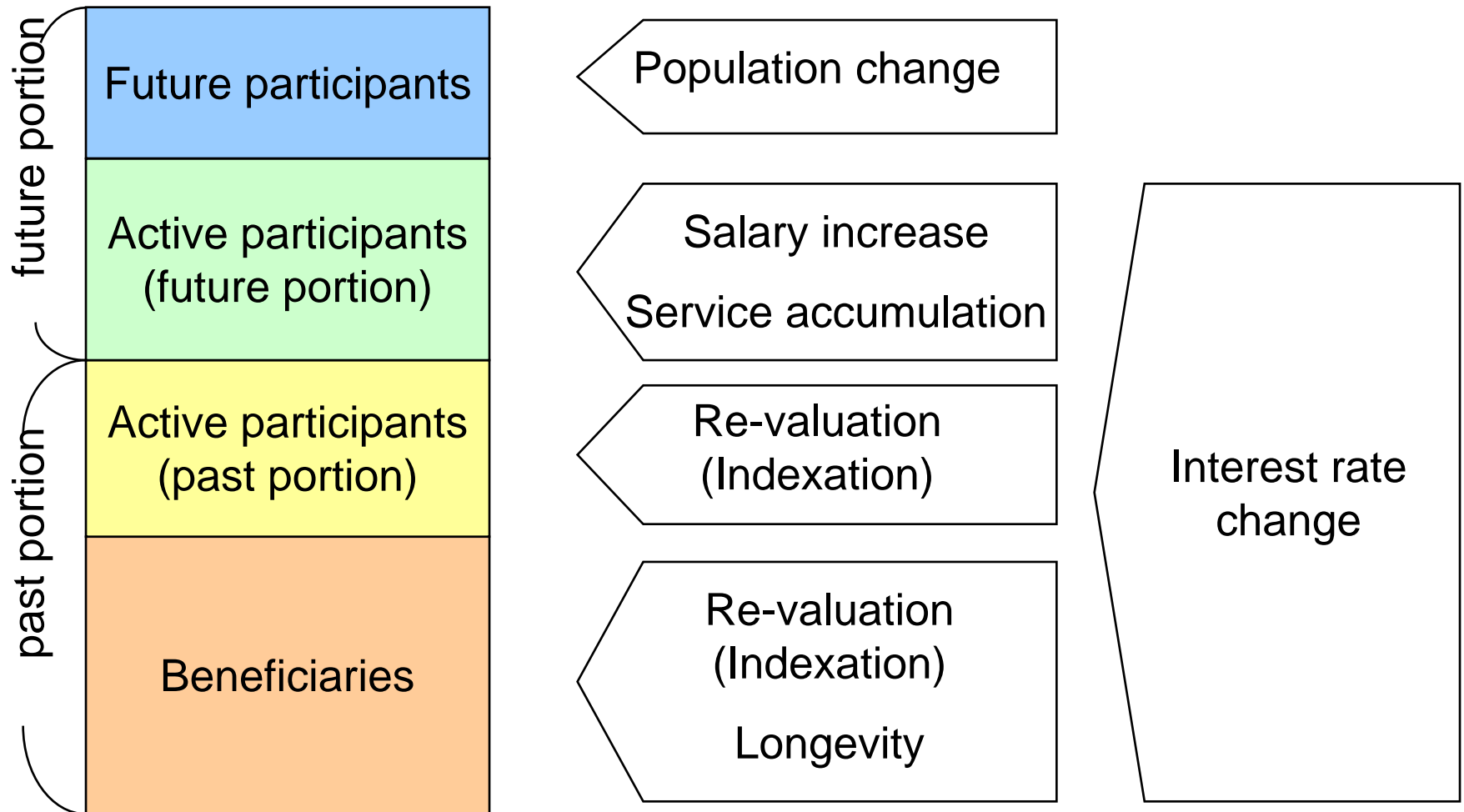
Also, pension liabilities are divided into **past portion and future portion**.

(Here, I would like to avoid 'past service liabilities' that have special meaning.)

# Structure of Pension Liabilities



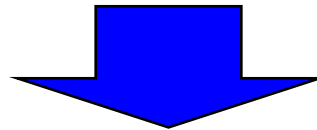
# Volatility of Pension Liabilities



# Variation of Pension Liabilities

Liabilities	Portion	Past portion recognition	Discount rates	Salary increase
Funding	<u>Future + Past</u> → Past	<u>Spread</u>	<u>Single</u> → Multiple	<u>Include</u>
Pension protection	<u>Past</u>	<u>Immediate</u>	<u>Single</u> → Multiple	<u>Exclude</u>
Accounting	<u>Past</u>	<u>Spread</u> → Immediate	<u>Single</u>	<u>Include</u>

Current Japan

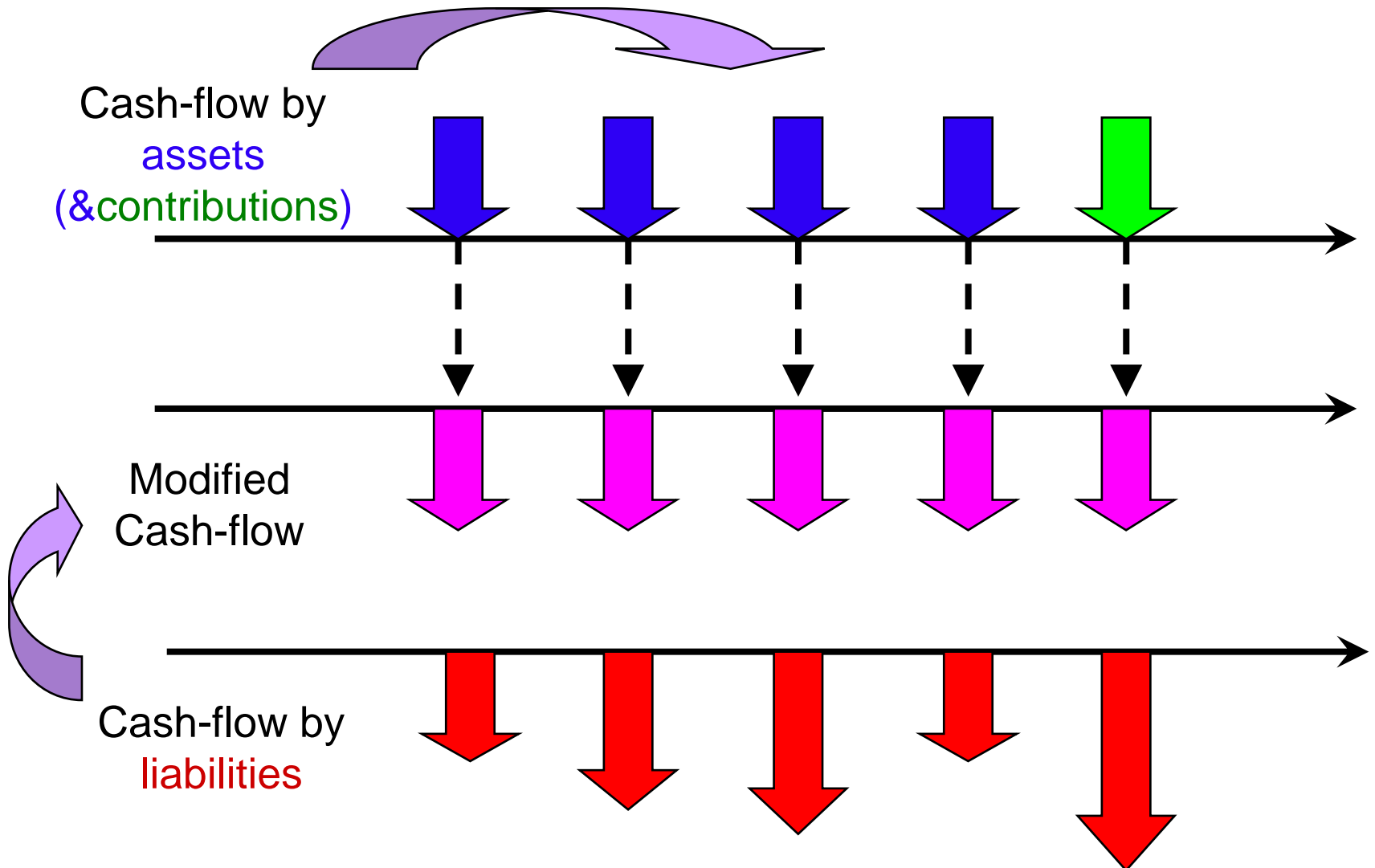


Unified	Past	Immediate	Yield curve	Exclude
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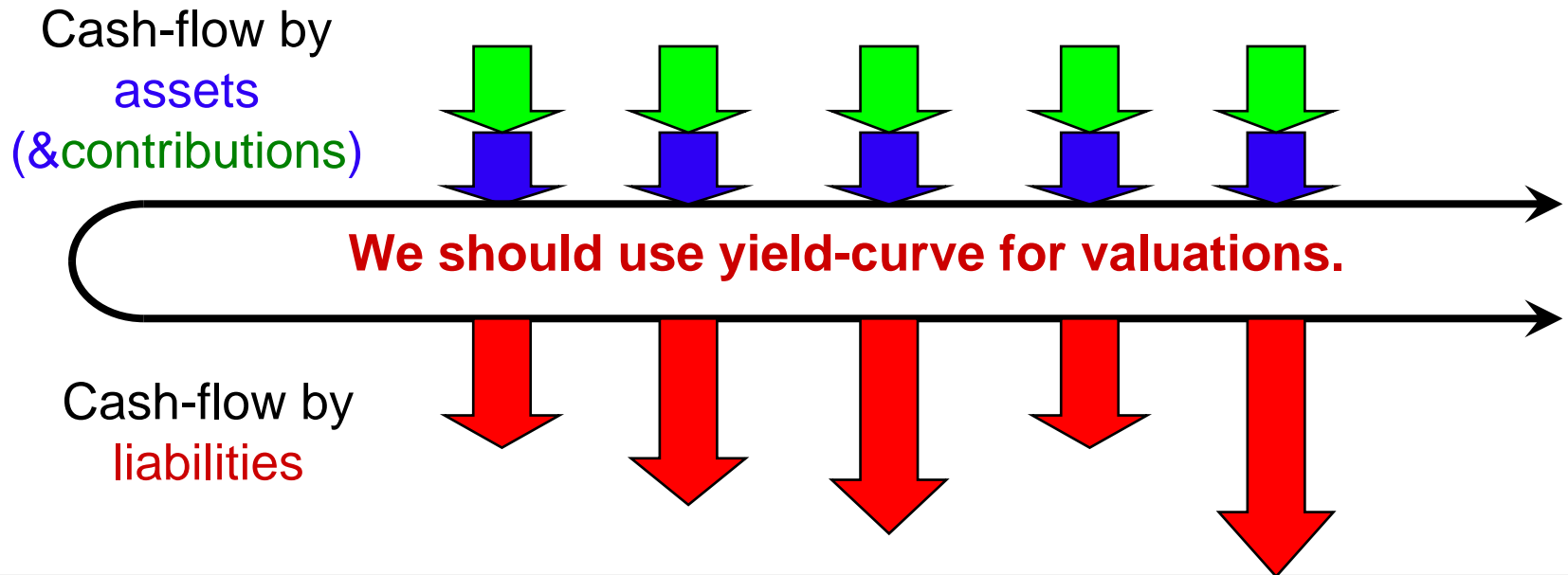


**Advanced ALM**

# Effectiveness of Financial Engineering



# Origin of Pension Finance



Pension finance should take into account of **mark-to-market movement**.  
It is necessary to **unify pension liabilities** for many purposes.  
It is important to recognize that pension benefits are financed by  
**assets** and **promises** in DB plans.  
(past contributions) (future contributions)

# The significance of corporate pensions

<Corporation and Pension Fund>

