

Current Situation of Pension ALMs for Japanese Corporate Pension Plans

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Abstract

Pension ALMs, which were introduced to Japanese corporate pension plan management in the early 1990s, have become one of the most important tools for corporate pension plan management, particularly for setting investment strategies. The current situation of pension ALMs in Japan, including their methods and popularity, is reported on the basis of the statistical data available. The discussion on the possibility and usefulness of LDI will be also discussed.

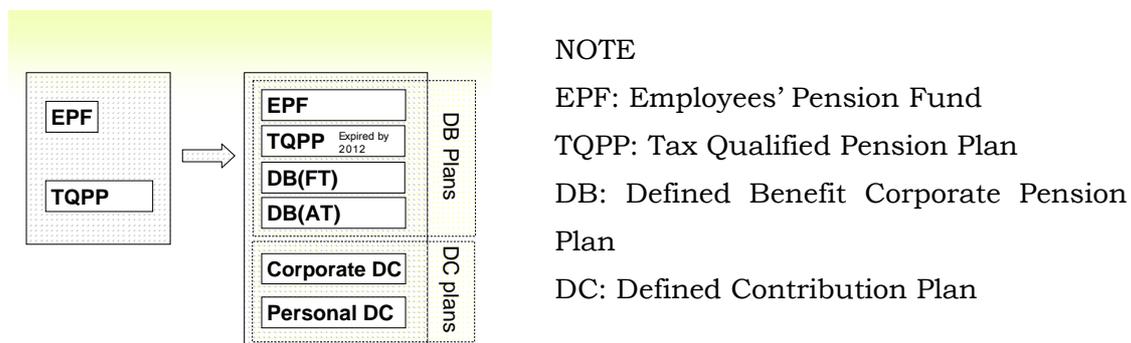
Keywords

pension ALMs, investment strategies, LDI

1. Introduction

The Japanese corporate pensions system was dramatically reformed around 2000. System reform included the introduction of new corporate pension plans, namely Defined Contribution Plans (DC Plans) and Defined Benefit Corporate Pension Plans (DB Plans) (see Figure 1). The background of those reforms were (a) historically low investment performance and significant underfunding of defined benefit pension plans, (b) corporations' preference to reduce defined benefit pension plan burdens and abolish corporate pension plans for cost-cutting because of the long-term stagnant economy, (c) employment policy change at corporations from Japanese style management (lifetime or long-term employment, seniority-based pay system) to American style (short-term employment, performance-based pay system), and (d) introduction of new accounting standards for retirement benefits, which disclosed the underfunded situation of corporate retirement benefit plans.

Figure 1. Corporate pension systems reform



DC Plans, which were introduced as part of the recent reforms, reached two million in participants and two trillion yen in assets in 2006, and has been gradually increasing. But they are still only 12 percent of participants and 3 percent of assets among all corporate pension plans respectively. See Table 1 below for details about participants and accumulated assets for the different corporate pension plans in Japan.

In Japan, though DC Plans are gradually increasing in participants and assets, DB Plans are still dominant and will be so for at least a further few decades if DB Plans can succeed to be financially sound and sustainable in a volatile modern financial market. ALM would be one of the tools to help with the financial and risk management of DB

plans (we refer to it as Pension ALM hereafter), and it will depend on the robustness of future ALMs whether DB plans can survive in the 21st century.

Table 1. Numbers of Corporate Pension Plans, Participants and Amounts of Assets(as of Sept.1.2006.)

Plan Name	#Plans	#Participants (10thousands)	Vol.of Assets* (100million yen)
EPFs	672	530	31.1
TQPP*	45,090	567	15.6
DB(Fund Type)	603	□	20.9
(Agreement Type)	1,607		8.3
DC (Corporate Type) ****	1,997***	197**	2.0+

*2006.3 **2006.6 ***2006.7 +Trust banks only

****DC(Personal Type) 69 thousand participants (as of 2006.6)

Source : Pension Fund Association(2006a)、 Pension Information(2006)

2. Historical review on Pension ALMs Introduction and Popularization

Asset Liability Management was originated as a tool to manage assets and liabilities as a whole in American financial institutions in the 1970s, particularly to stabilize income by mitigating the mismatch of asset and liabilities resulting from changes in interest rates. Then, the idea of ALM was introduced to pension plan management. Before the introduction of ALM, the asset side (allocation and implementation) and liability side (pension plan design and funding) were managed independently.

The first announcement on Pension ALM in Japan was, as far as I know, the lecture to managers of Employees' Pension Funds by Mr Rojer C. Urwin¹, Watson and sons, in Tokyo in 1991.

He mentioned in his lecture that his company studied Pension ALM in 1980s and started providing such services since the early 1990s. They provided Pension ALM services to 25 pension plans, and one to five pension plans introduced pension ALMs in

the UK in those days. He also mentioned that ALM was the projection of the future financial situation of the pension plan, which meant that his ALM was a simulation type ALM which will be mentioned later.

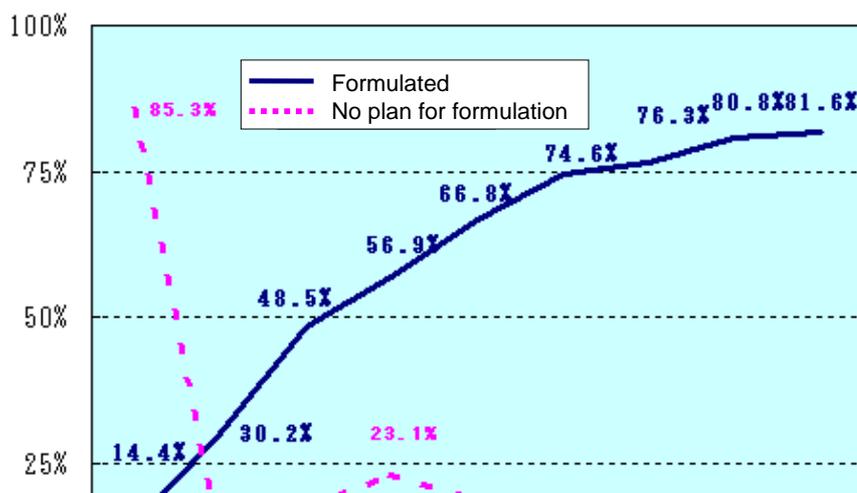
In 1990s the deregulation on investment of Japanese pension plan assets had progressed, which included market value basis asset valuation, abolishment of investment 5:3:3:2 regulation², deregulation of the discount rate assumption and guidelines on roles and responsibilities for investment managers. Therefore pension fund sponsors had acquired the tools to change the asset mix of pension assets to better match the assets with the liabilities or to ensure any mismatching was understood and managed. The guideline issued from the government in 1997 stated that “ policy asset mix should be reasonably decided using ALM”. With such deregulation of pension fund investment, pension ALMs became popular in the late 1990s and early 2000s.

However, there is no statistical data available which directly shows the popularity of ALMs among corporate pension plans. But Figure 2, which shows percentages of EPFs Formulating Strategic Asset Mix, suggests that almost all corporate pension plans are using ALMs for formulating their asset mix strategies at present.

Table 2 Chronological list on Pension ALMs in Japan

- 1980s Introduction of ALMs to financial institutions
- 1991 R.C.Urwin gave a lecture on Pension ALM
- 1997 Asset became evaluated on the basis of market value(EPF)
 - Abolishment of investment 5:3:3:2 regulation(EPF)
 - Deregulation of discount rate assumption(EPF)
 - Guideline on roles and responsibilities for investment managers(EPF)
- 2000 Introduction of accounting standards for retirement benefits
- 2004 Charge for ALM study became payable from Funding Account(EPF)
- Late 90s-early00s Pension ALMs became popular

Figure 2 Percentages of EPFs Formulating Strategic Asset Mix



3.Types of ALMs Used for Pension Funds in Japan

ALMs are now provided by Trust banks, Life insurance companies and Consulting firms to corporate pension plans in Japan. Yamashita and Yato (2002) classified them into three categories; (1) Simulation type ALMs, (2) Balance sheet type ALMs, and (3) Optimization type ALMs. See Figure 3 below for a classification of the types of Pension ALMs.

(1) Simulation type ALMs: In this type, several asset mixes are selected from the efficient frontier, and are used to simulate a lot of pension plan asset amounts in several years, say 3, 5 and 10 years (Monte Carlo simulation) and compare them with the liability forecast. Results are usually shown as funding ratios or required contribution rates with variation (see Figure 4).

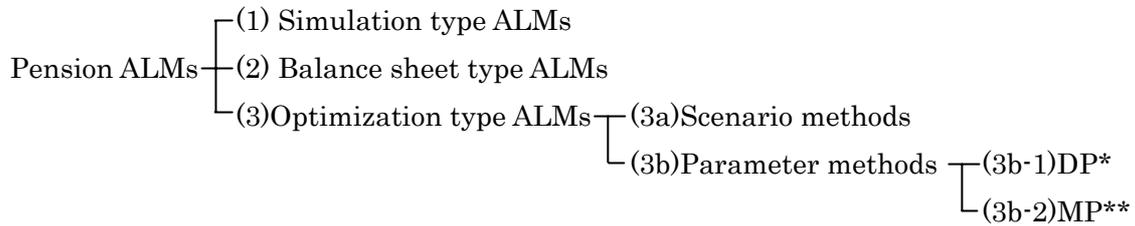
This type of ALM has been very widely used, but no asset versus liability optimization is done in this model, so that pension plan managers have to select final portfolios based on their own senses and experiences.

(2) Balance sheet type ALMs: In this type, both durations of asset and liability of the pension plan are calculated and the investment mix is chosen based on duration matching, or producing the least variation of surplus (asset-liability). Though this is traditional ALM for financial institutions, how the expected return, risk and correlations of liability can be calculated in the pension plan is a problem (Liability is not estimated on the mark-to-market basis in Japan). In addition to that, the bond yield has been historically low over the past decade in Japan and there has been scarce possibility to use this type of ALM because this type tends to include more bonds to avoid asset-liability mismatch.

Some consulting firms are recommending to use this type of ALM to manage assets and liabilities better, but very few pension plans have introduced this type of ALM.

(3) Optimization type ALMs: This is the type which calculates the optimized asset mix by using mathematical programming. This type of ALM is at the research stage, and practical application to pension plans have not been reported.

Figure 3 Classification of Pension ALMs



Notes: DP*=Dynamic programming, MP**=Markovian programming

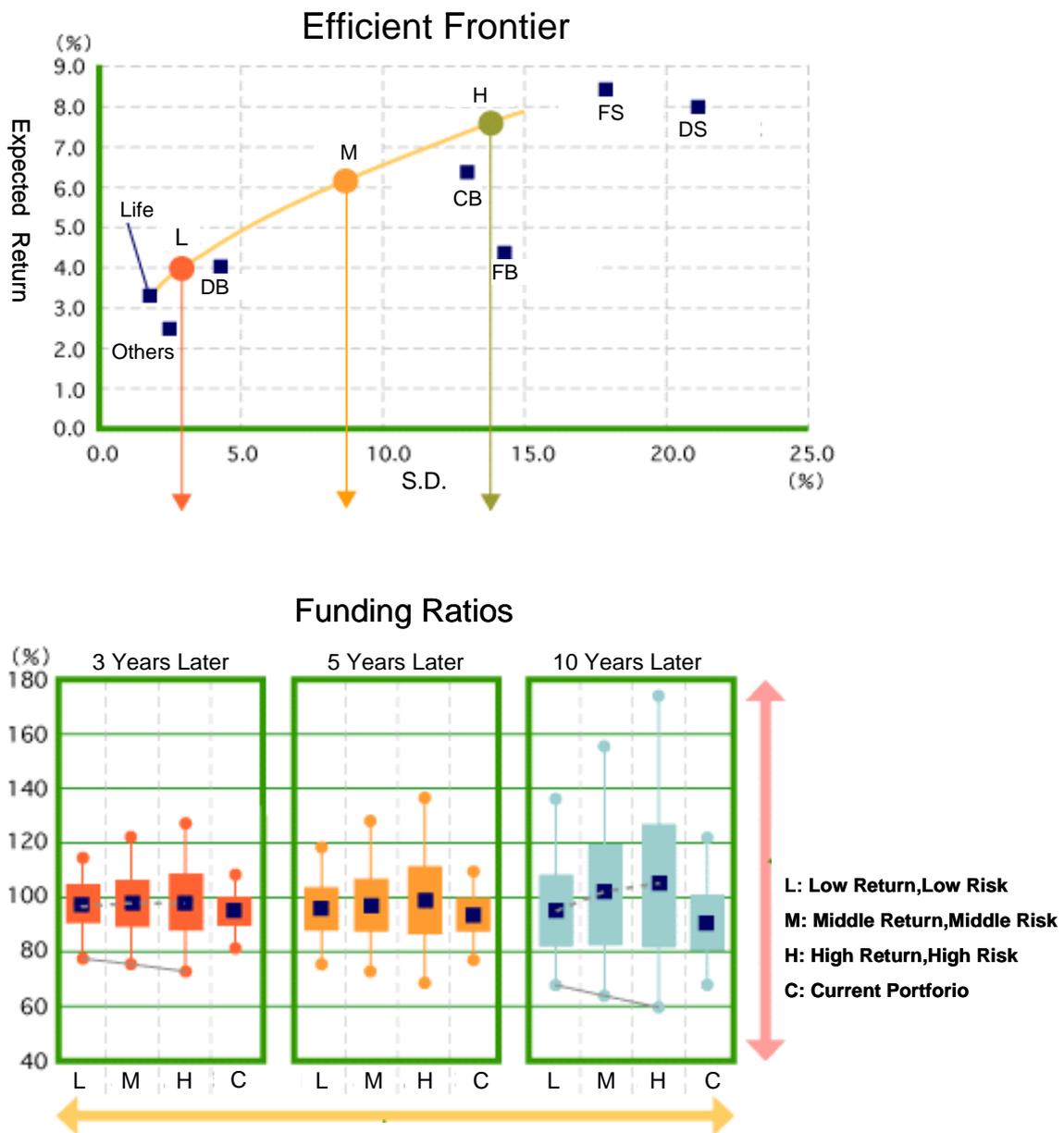
Source: Yamashita and Yato (2002)

The ALMs currently used by corporate pension plans in Japan are mostly simulation type ALMs. The reason is partly historical in that the first introduced ALM in the 1990s was a simulation type in Japan. Another reason is that simulation type ALMs are simple and it is easy to understand their methods and results. In addition, financial regulations have not been arranged yet to be appropriate to introduce more sophisticated ALMs which are more mark-to-market. For example, interest rate has been historically low, and liability evaluation method is still rather traditional but not yet mark-to-market.

Figure 4 shows the typical output of the simulation type ALMs. Pension plan sponsors select their most favorite portfolio from several alternatives. One of the big problems here is that they have to select their portfolio which they think to be the best not on the basis of some sort of theory but their senses and experiences.

Therefore the simulation type ALM sometimes becomes just a tool for plan sponsors to reaffirm the adequacy of the current portfolio and for 'peace of mind'.

Figure 4 Typical Output in the Simulation Type ALMs



Source: Mitsubishi UFJ Trust bank Home Page

4. Discussions

(1) Necessity of ALMs

Though DB Plans are still dominant in Japan, it will be necessary for them to be financial sound and sustainable for plan sponsors to succeed to survive in the 21st century. Two alternative methods could be possible for DB plans to have stable financing; (1) stable liability and stable asset evaluations, or (2) mark-to-market

liability and asset evaluations and manage their volatility by ALM.

Smoothing methods are used for assets and liabilities in pension plan evaluation to achieve stable figures. But this method cannot completely mitigate the volatilities in a volatile modern financial market and can sometimes conceal the true economic values. In the latter method, the estimated values of assets and liabilities are volatile, up and down. But if we succeed to manage the asset and liability volatility by ALM, we can get the stable pension plan management as a result. This would be the only practical way for financing corporate pension plans in a volatile modern financial market.

Although there exists a strong worldwide trend to DC plans from DB plans, I believe that DC plans will not be able to support the financial security needs of retirees with long life expectancies. It is fortunate for Japanese people that DB plans are still dominant in Japan, so that they can expect to receive a defined benefit at retirement without the worry of investment risk if they succeed to maintain DB plans in the future.

The ALM is an indispensable tool to help manage DB plan financial risks, particularly for maturing pension plans which Japanese society is facing. The simulation type ALMs have already been popular among corporate pension plans, but they are not enough, particularly as they have no theoretical basis to select the most appropriate portfolios. Japanese corporate pension plan managers might need more sophisticated ALMs when the historically low interest rate returns back to a more normal position.

Much effort has been made to develop more sophisticated methods to obtain more reasonable parameters in ALMs. Another effort is to develop multi-period ALMs because pension plan management is a very long term issue, but the ALM has been in essence a one-period model so far, so that current ALMs cannot cover well whole period of pension plan management. Effort is also made on developing ALMs which consider the perspectives of each stakeholder to the corporate pension plan. These efforts are still in the development stage, but will be necessary for the practical use of ALMs in the future.

(2) On the Liability Driven Investment (LDI)

The Liability-Driven Investment has been discussed in Europe and the US recently due to the changes in funding regulations and accounting standards. It has been discussed in Japan, but it is thought that there would be little possibility in the near future for

corporate pension plans to introduce LDI because recent funding regulation changes are unlikely to require plan sponsors to adopt a more mark-to-market basis valuation approach. However, it is thought that pending reform of accounting standards might trigger the movement to adopt more sophisticated ALMs, such as LDI.

LDI could be thought to be one type of ALM. But there could be some differences with traditional ALMs, which include the liability being evaluated at market value, it intends to get higher return than liability portfolio. LDI is not simply asset-liability matching and is more sophisticated as it uses derivatives such as interest swaps. Usuki (2006) identified the following difficulties to introduce LDI to Japanese corporate pension plans at present; (1) Some Japanese corporate pension plans are still underfunded, (2) It is highly possible for future increases in interest rates, (3) difficulty to calculate benefit cash flow, particularly in cash balance plans, and (4) pension plan managers are not familiar with derivative trading.

He pointed out that accounting standards which require the recognition of mark-to-market assets and liabilities might be introduced to Japan in a few years, which might stimulate the introduction of LDI. He also pointed out that the finance section of sponsoring companies would be required to implement LDI with pension plan managers to compensate for their lack of derivative management experience and to manage the company's financial statements in a more holistic fashion.

It would be reasonable to continue an interest in and to study LDI as one of ALMs in Japanese present situation.

5. Conclusion

The Japanese corporate pensions system has dramatically reformed around 2000, including the introduction of DC plans.

DB plans are still dominant and it is very important to manage corporate pension plans in a financially sound and sustainable way. To do that, ALMs, which were introduced to Japan in 1990s, are a very useful tool for corporate pension plan managers.

ALMs have already been widely used by Japanese corporate pension plans. But they are simulation type ALMs, so the corporate pension plans might require more sophisticated ALMs such as balance sheet type ALMs, optimization type ALMs or LDIs,

when the historically low interest rate will be recovered.

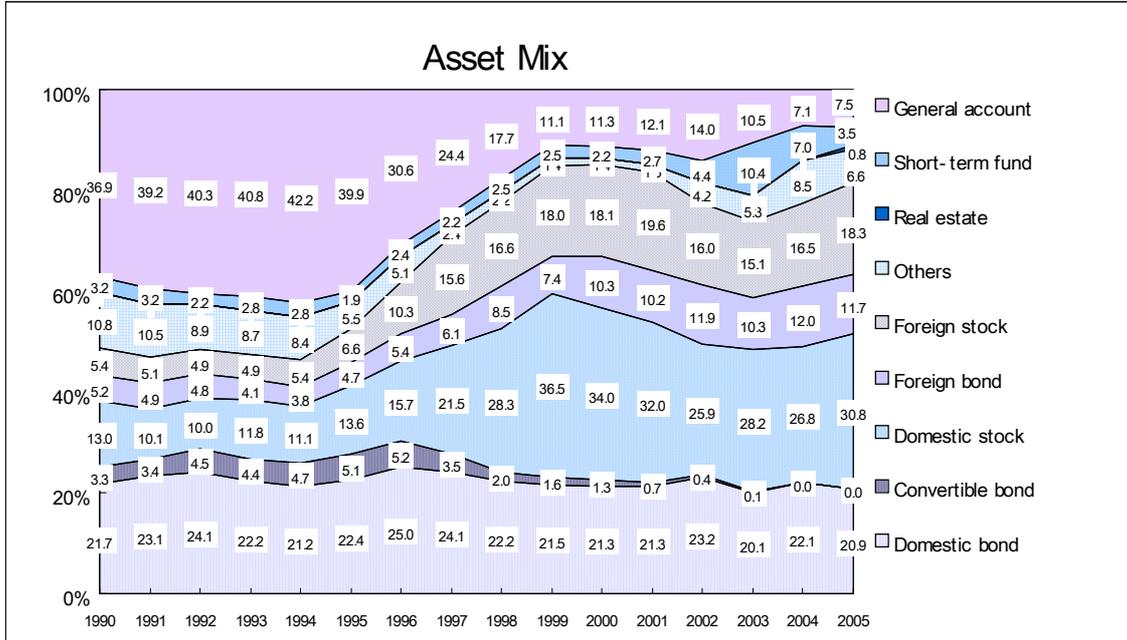
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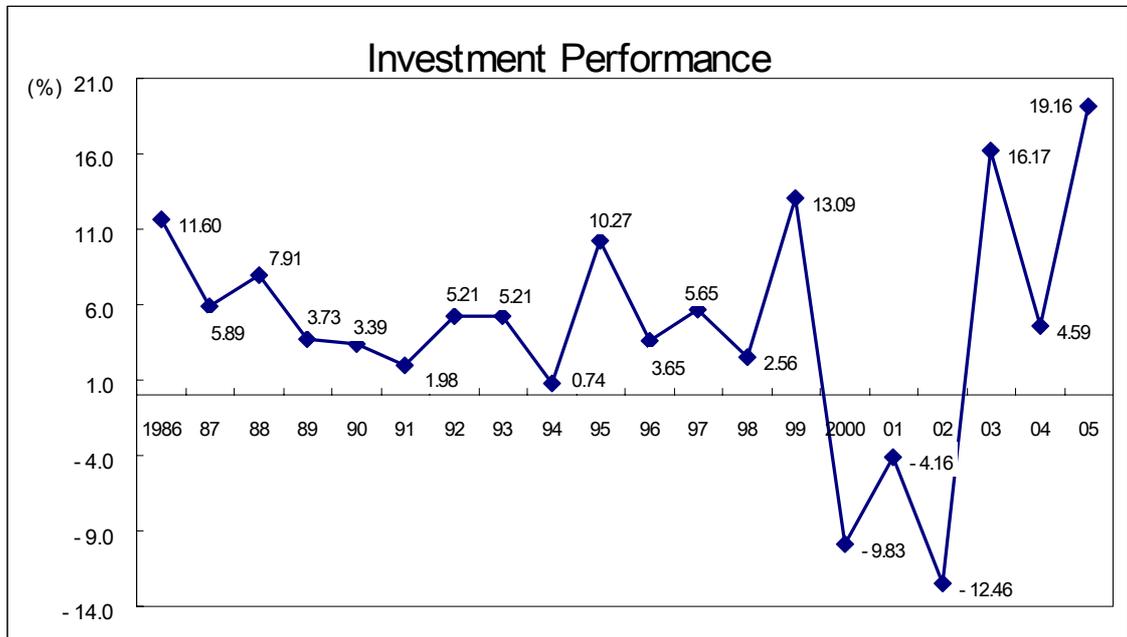
¹ Roger .C.Urwin, "Asset liability modeling in UK pension plans(Lecture note)", Employees' Pension Fund Association, Nov. 2000(Japanese)

² 5:3:3:2 regulation means pension assets must be invested to assets with a guaranteed principal 50% or more, domestic equities 30% or less, foreign currency dominated assets 30% or less, and real estate 20% or less.

Appendix Asset Mix and Investment Performance (EPFs)



Note: Figures are both EPFs and DBs in 2004 and 05.



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