European Federation of Pharmaceutical Industries and Associations

EFPIA Position on NHI Price system reform based on long term view

Opinion based on drug market simulation till 2025

EFPIA Japan
April 14, 2015

Today's program

EFPIA position for NHI price reform	Chair, EFPIA Japan Dr. Carsten Brunn
Detail planning and results of drug market simulation to 2025	Chair, EFPIA Pricing and Economics Committee Mr. Kuniyuki Hara
What we can learn from simulation by EFPIA	Nihon University School of Pharmacy Professor Dr. Makoto Shiragami
Q&A	

European Federation of Pharmaceutical Industries and Associations

EFPIA position for NHI price reform

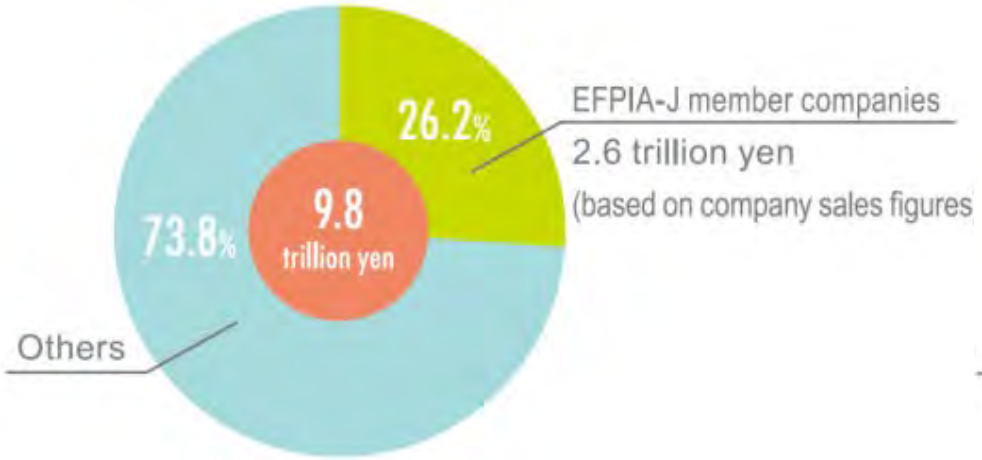
EFPIA Japan
Chair, Dr. Carsten Brunn
April 14th, 2015

EFPIA Japan Mission

- **Our Mission**
  - Contribute to healthcare and patients in Japan by early introduction of innovative medicines and vaccines
- **What we do to achieve our Mission**
  - Encourage access to the most innovative therapies in the shortest possible time
  - Support Japan in becoming a more dynamic and attractive place in which to invest
  - Be a trusted healthcare partner

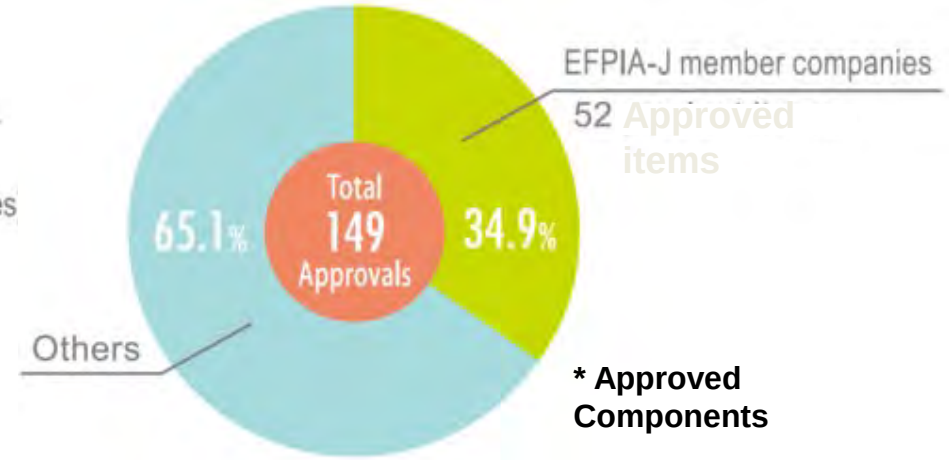
EFPIA has been contributing Japan through development and marketing of innovative new drugs

- **EFPIA-J member companies in Japan sales (2013)**



Source: IMS Japan Pharmaceutical Market
Data period:2013 Dec. MAT
©2013 IMS Health
EFPIA-J sales: EFPIA Japan figures)

- **The number of approved new drugs * (2011-2013)**



*** Approved Components**

Source: EFPIA Japan figures are based on data provided by "The Central Social Insurance Medical Coundil"

Japan succeeded in eliminating the drug lag while promoting development of innovative drug

- Drug lag
  - Succeeded in eliminating drug lag by strengthening PMDA
- Development of innovative drug
  - Establish AMED to seamlessly support research from basic to clinical application
- Early access to innovative drug
  - Introduction of fixed-term conditional approval system for regenerative medicine products
  - Introduction of “Sakigake” designation system

Improvement in R&D environment including innovation premium has boosted drug R&D in Japan

Examples of research investment into Japan

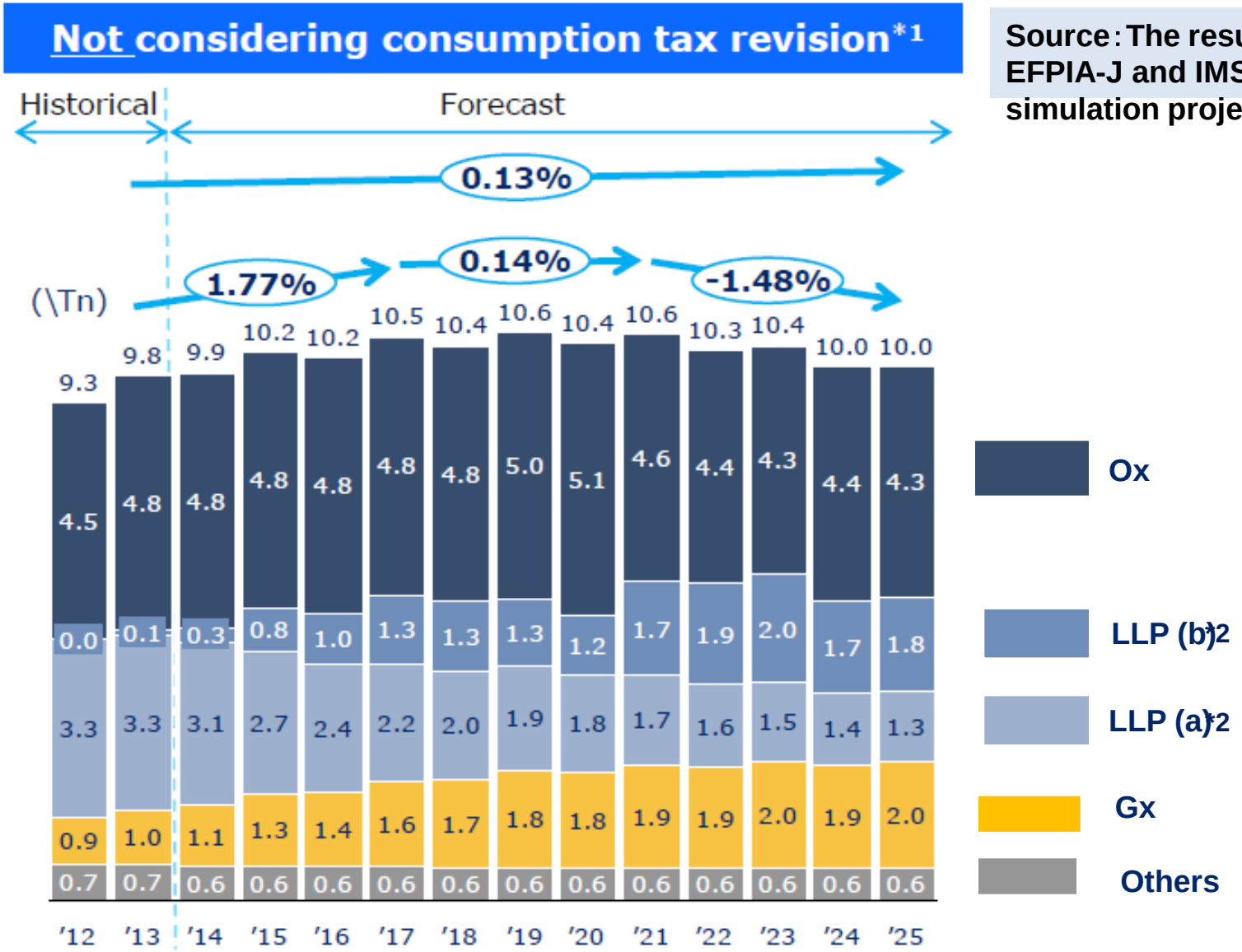
Time	comp any	Overview of investment
2015 Jan.	G	First collaborative research agreement with Tokyo metropolitan geriatric hospital on bio-electronics research
2014 Sep.	B	Contracted 2 year collaboration agreement with Kyoto University Office of Society-Academia Collaboration for Innovation in area of cardiology, oncology, hematology, gynecology and ophthalmology in search of new drug candidate
2014 Jun.	B	Established “Open Innovation Center” in search of drug seeds in Japan
2014 Mar	B	Collaborative research with CiRA Kyoto University and iHeart Japan
2014 Mar.	A	Signed memorandum for joint research with Osaka University in cardiology drug re-profiling
2013 Nov.	S	Signed collaboration agreement with National Cancer Center for promotion of cancer research in Japan
2008 Nov	B	Opened up Kobe Pharma Research Institute

Number of drug development project

From press release of each company

* RfUD = Requested for unapproved drugs

Current pricing system is working well for patients and controlling drug costs for Japanese government



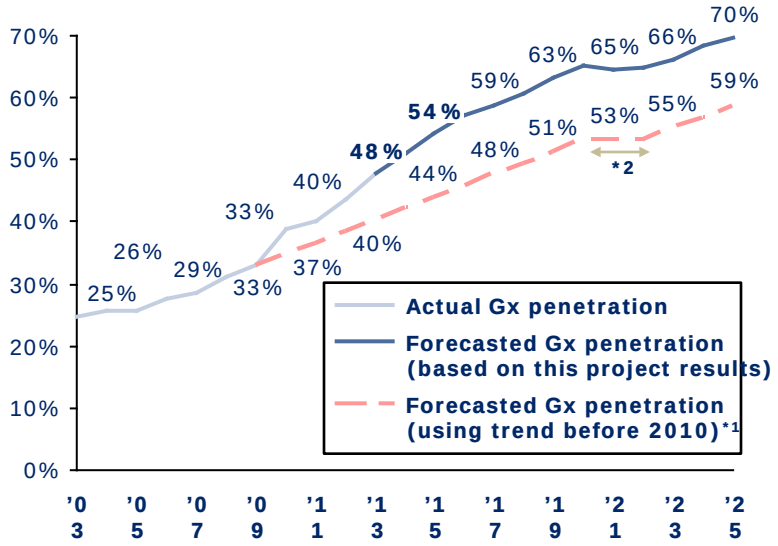
Source：The result from EFPIA-J and IMS joint simulation project

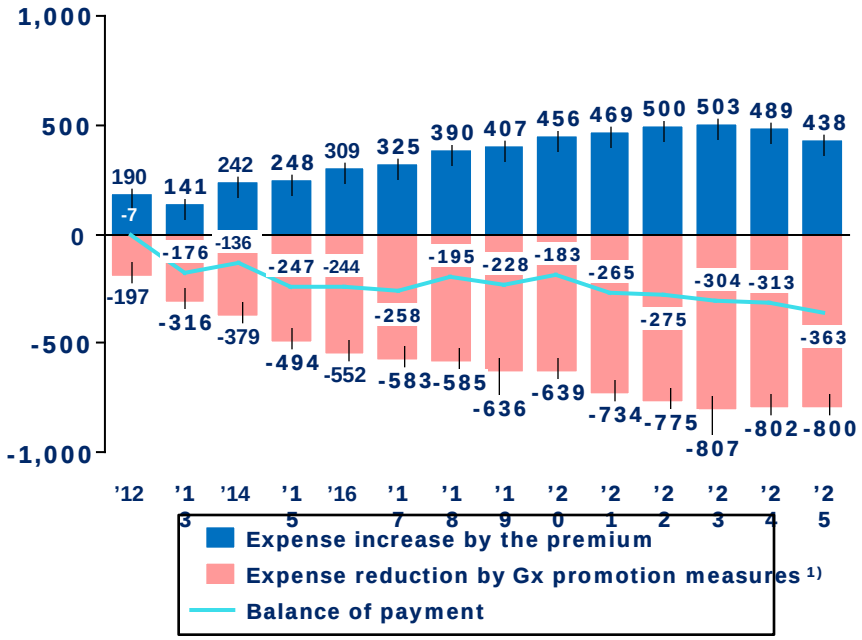
*1 Consumption tax rate was fixed at 5% through the forecast period

*2 LLP (a) is the LLP whose Gx was launched before 2013, LLP (b) is the other LLP

Savings from Gx promotion are greater than cost of “Innovation premium”

Balance of payment (¥Bn)





- **Without additional measures for Gx penetration, Gx penetration rate would grow according to the trend before 2010 and reached at 59% in 2025**

	Average impact per year	Sum of impact (2012-2025)
Expense increase	¥365 Bn	¥5,105 Bn
Expense reduction	¥⊿593 Bn	¥⊿8,298 Bn

*1 We used Gx penetration trend from 2006 to 2009
*2 We assumed Gx penetration rate will not grow in 2021 and 2022, same as this project calculation result

Source：The result from EFPIA-J and IMS joint simulation project

Innovation premium should be continued

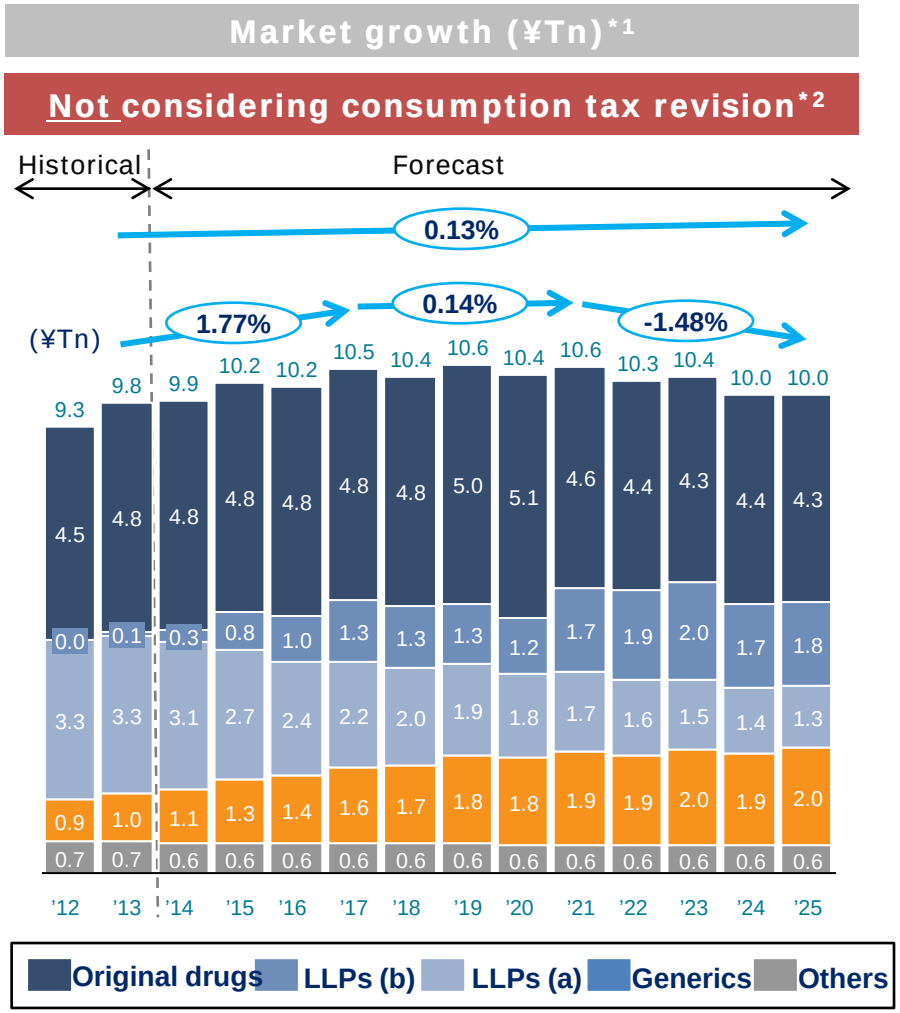
- The “innovation premium” has boosted drug development in Japan
- Drug Expenditure in Japan will be broadly stable over the next decade, as a result of effective generic promotion measures
- Savings from this generic promotion are greater than the costs of the “innovation premium”

Further reward for innovation could be explored

An Unnecessary Step: Potential Annual Price Revision

- Practical difficulties of annual revision:
  - Actual market price is unlikely to be accurately reflected for many newly marketed drugs
  - Increased burden for hospitals, pharmacists and wholesalers
  - Balance between NHI drug price revision and bi-yearly medical fee reimbursement revision could be disrupted
- Annual NHI drug price revision could weaken efforts by pharmaceutical companies to bring innovative medicines to Japanese patients, opening risk of new drug lag

Summary



- Drug market is broadly flat if the current pricing system continued.
  - Generics will grow to 2 trillion by 2025 by various generic promotion policies
  - LLP will be reduced due to price reduction by Z2 rule and further penetration of generics
- Innovation premium should be continued in current form
  - Option for further reward for innovation considered.
- Annual price revision should be avoided

*1 LLP (a) is the LLP whose Gx was launched before 2013, LLP (b) is the other LLP
*2 Consumption tax rate was fixed at 5% through the forecast period

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Detail planning and results of drug market simulation to 2025

EFPIA Japan
Kuniyuki Hara
Chair, Pricing and Economics Committee
April 14, 2015

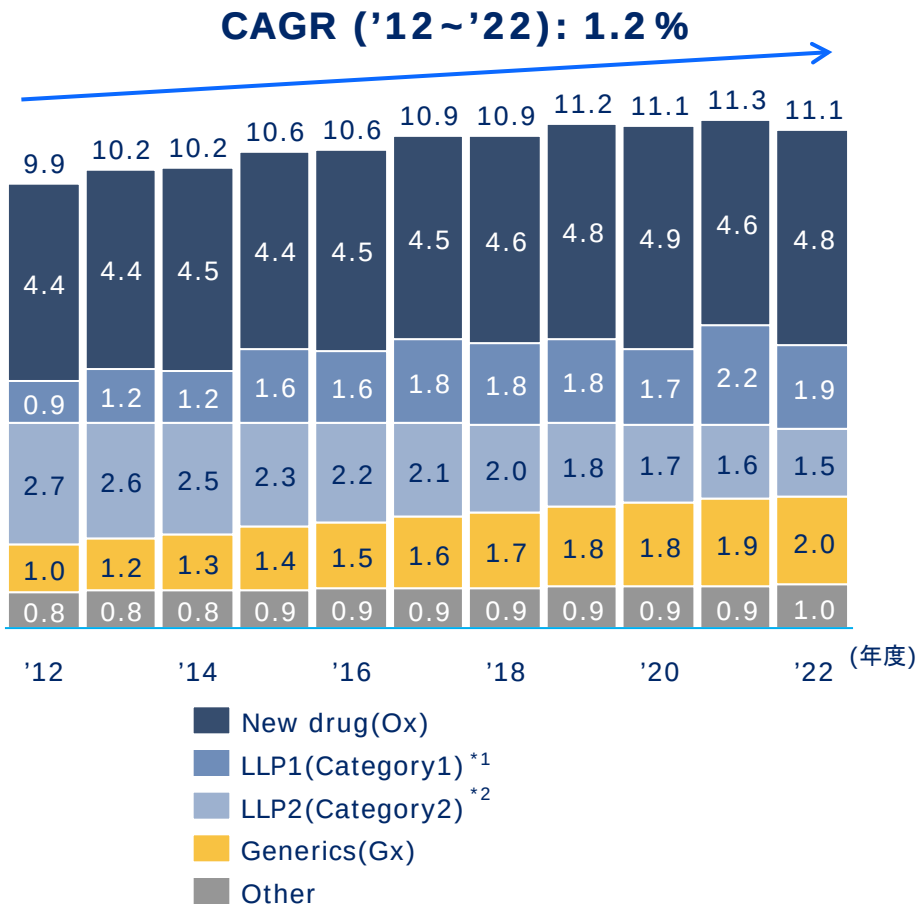
Introduction

Research on medical expenditure and drug expenditure

Objectives :

- To make an informed decision about allocation of budget and NHI price system based solid data, EFPIA, in cooperation with IMS, made forecast of ethical drug market for next 12 years till 2025 based on current NHI price system incorporating most updated environmental factors

At 2012 project, EFPIA made forecast till 2022



*1 LLP whose Gx has been launched by Mar. 2010(Prior to 2009)
*2 LLP whose GX launched after Apr. 2010 but before 2022

Main topics	Assumption
1 **Further promotion of generic and its penetration**	**Set penetration peak to 40-80%** *(Actual for past 2 years:33- 66%,* ***120%*** *up expected)*
2 **Policy change in additional cut to LLP**	0% additional reduction for each NHI price revision
3 **Expansion of special price reduction**	5% special cut at first NHI price revision after first generic launch
4 **Expansion of re-pricing for market expansion**	0.37% market shrink assumed for every price revision
5 **Number of newly launched medicinal entities**	Set average to 40 *(10% increase from actual of past 2 years)*
6 **Sales forecast of newly launched medicinal entities**	Set peak quarterly sales to 2.5 Bio yen (10 Bio yen /year)

Source: EFPIA-IMS Project "Making Innovation Premium Permanent" (2012)

efpia European Federation of Pharmaceutical Industries and Associations

ims consulting group

Method of simulation

Study Methodology: Introduction

EFPIA/IMS conducted a simulation study into drug expenditures

Underlying factors and assumptions

- The new premium pricing rule imposes a one-time payback (price reduction) at the time of loss of exclusivity (LoE) to compensate for previous exemptions.
- There are Patented Drugs that currently generate large sales that will lose exclusivity in the coming years.
- Generic erosion has been accelerated by the political measure.
- Assumptions were made on:
  - The Gx penetration ratio for newly genericized products
  - New products launch estimates
  - NHI drug price reduction rate

Study Methodology: Overall Assumptions

Sample, Market Forecast and New Drug Pricing Scheme etc. Assumptions

Category	Assumptions
Three product categories	Depending on the Gx situation 1) 1st Gx Launch until 2009 2) 1st Gx Launch from 2010-2025 3) New drugs to be launched in 2014-2025
New launches	42 NMEs each year during 2014-2017 45 NMEs each year during 2018-2025
Estimated sales for a new product	JPY10 billion peak sales for small molecules/year JPY 8 billion peak sales for biologics/year
Data: Extrapolation method	Based on data from IMS database; sales trend by ATC category*
Timing of LoE	11 years after launch
Gx penetration	It is assumed by ATC that Gx penetration % after 2012.2Q is 2.25 times larger than that before 2010.2Q and erosion rate of the mols whose peak sales over 30BnJPY assumed 1.5 times faster than other mols
Applicable drugs for premium	81% of the sales estimate of new molecules are assumed to be covered by the premium
Price revision rate	Estimated by each product category (New product with/without premium, LLPs, Gxs etc)

* Anatomical Therapeutic Chemical Classification (category)

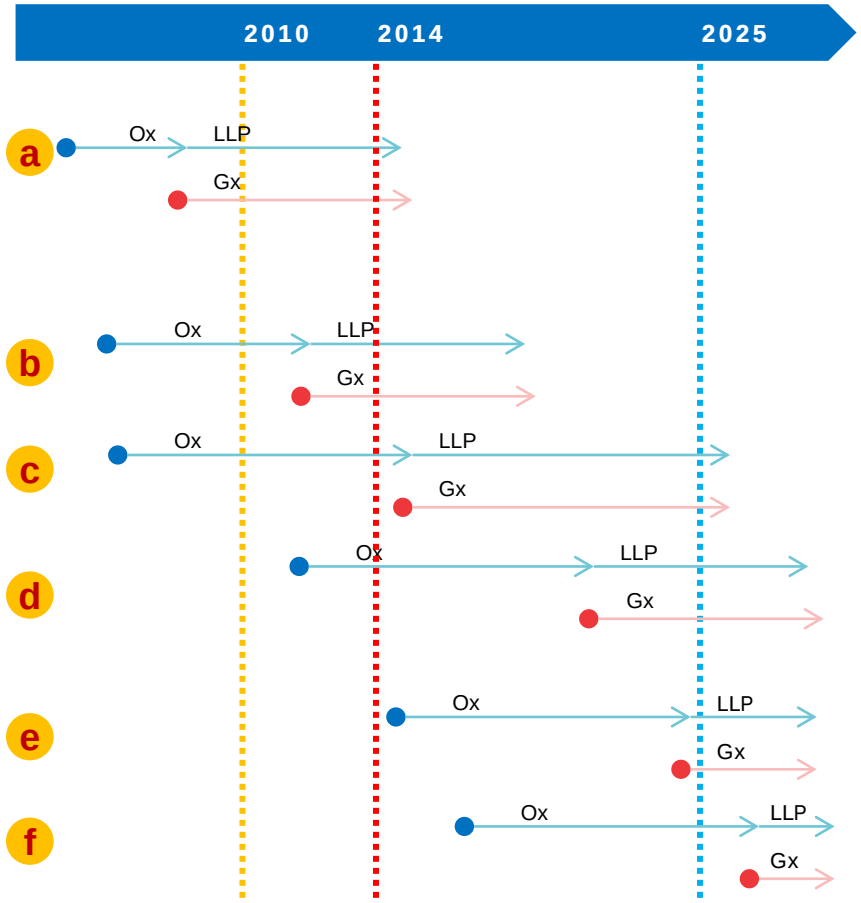
We divide drugs into 3 categories based on the launch timings of new drugs and the 1st Gx products

Drugs Launched in the past ~2013

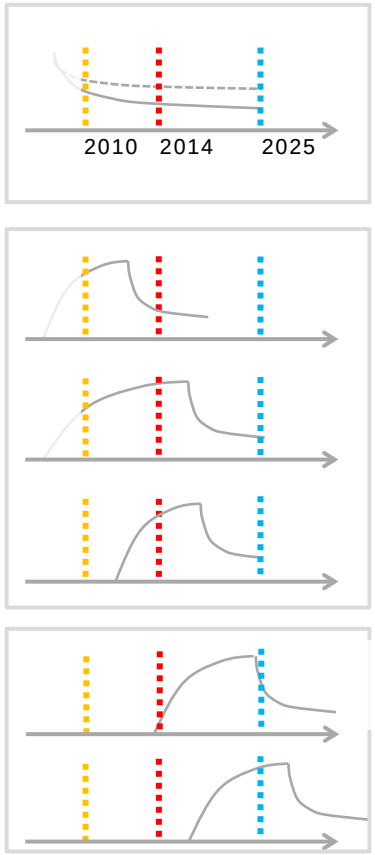
Category 1
1st Gx Launch ~2009

Category 2
1st Gx Launch 2010~2025

Category 3
New Drugs to be launched in 2014~2025



Sales Trends

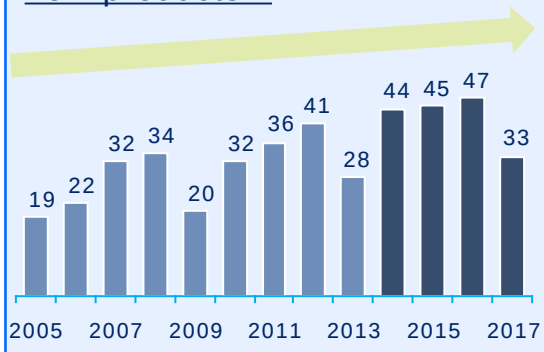


Key

The number of new launches is considered to reach at 45 yearly in 2025

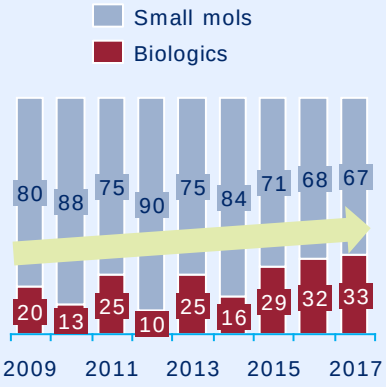
Category 3 a3 **Estimate the # of new launch**

Total # of approvals and estimated launches of new products [1)]



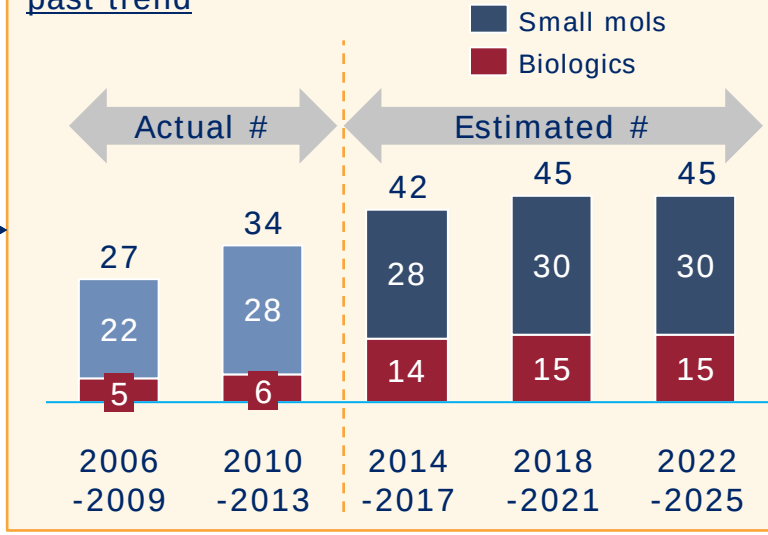
The # of approved drugs tends to increase

% of biologics among new approvals [1)2)]



The % of biologics among new approvals also tends to increase

Estimated # of new launches based on the past trend



※ The # of new launches and % of biologics are considered to increase along with the past trend, although they are assumed to peak out considering the trend of development activities

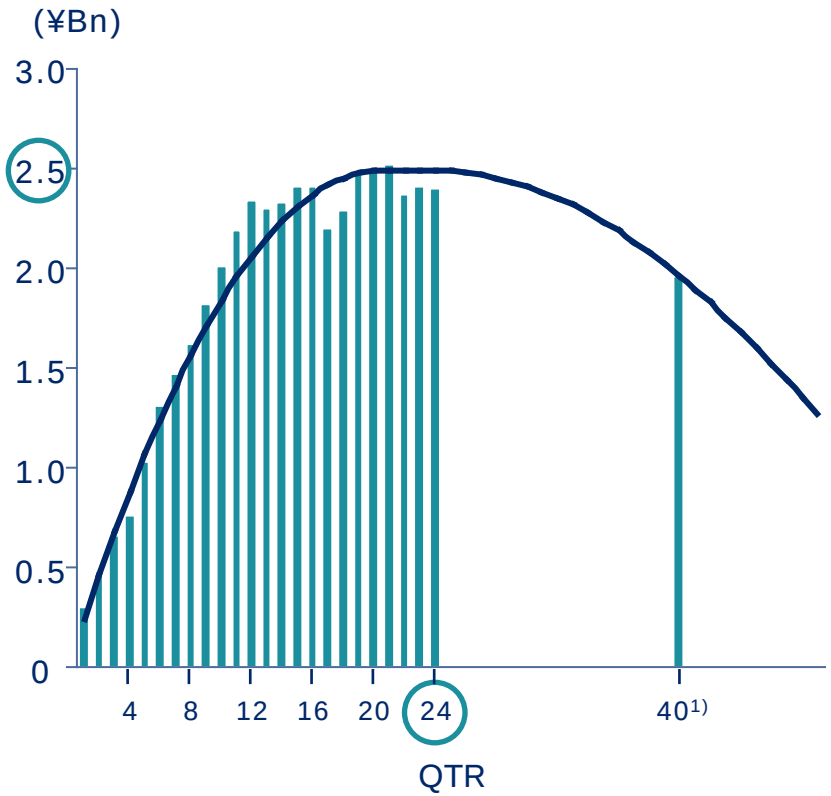
1) Office of Pharmaceutical Industry Research News, July 2014. The # of future launches is estimated considering the actual development status
2) We calculate the % of biologics in future based on the pipeline

Key

The peak sales of new launches per molecule are ¥2.5 Bn (small mols) and ¥2.0 Bn(biologics) at 20-qtrs after the launches

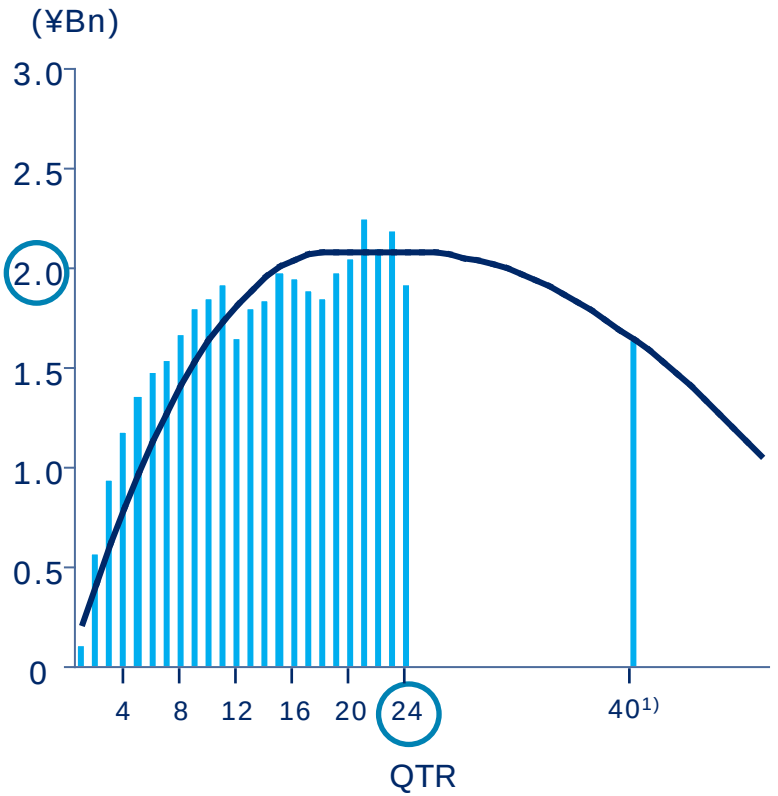
Category 3 b7 **Estimate the sales of new launches**

Sales (Small mols)



For small mols, peak sales is set at **¥2.5 Bn** and it is achieved at 20th quarter

Sales (Biologics)



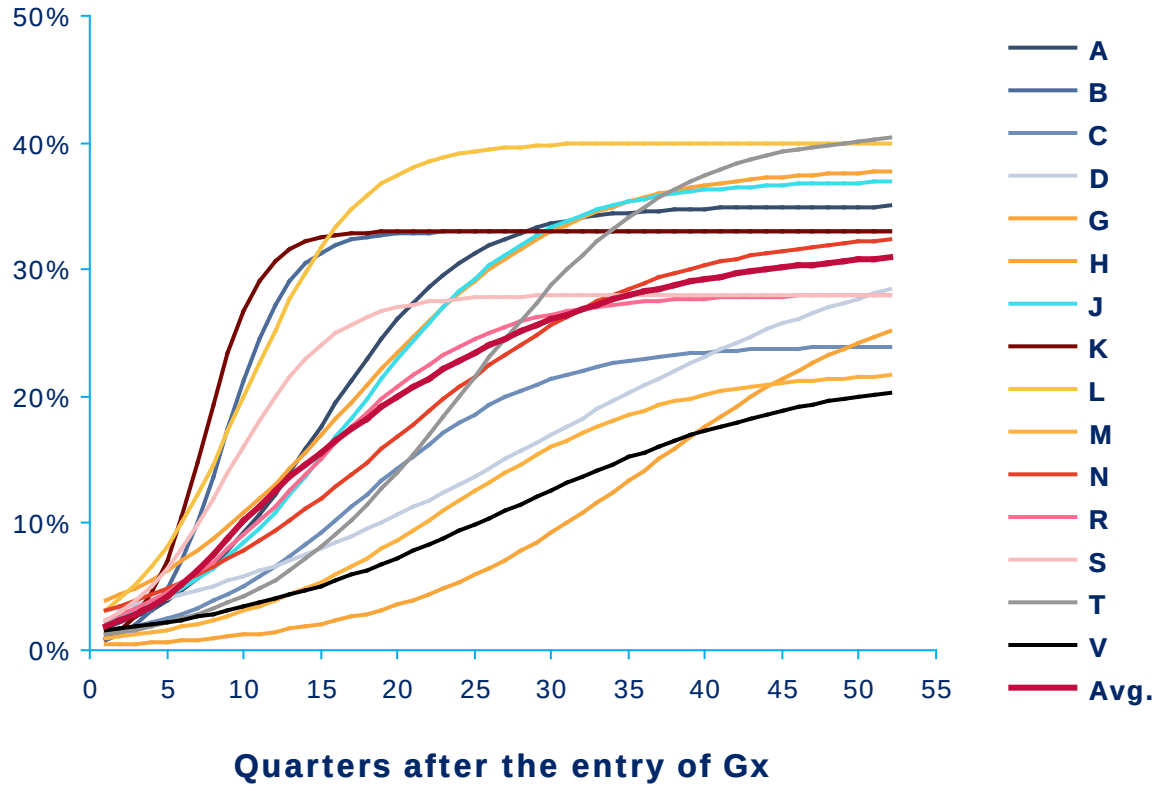
For biologics, peak sales is set at **¥2.0 Bn** and it is achieved at 20th quarter

1) Sales at 40 QTR were estimated to be 79% value of collectively-averaged sales of small mols & biologics

The model of Gx erosion curves was developed by ATC

Category 2 b3 **Define Gx erosion curve**

Gx erosion before 2010. 2Q (the total volume of each molecule =100%)



ATC Code	TA
A	ALIMENTARY T.& METABOLISM
B	BLOOD & B.FORMING ORGANS
C	CARDIOVASCULAR SYSTEM
D	DERMATOLOGICALS
G	G.U.SYSTEM & SEX HORMONES
H	SYSTEMIC HORMONES
J	SYSTEMIC ANTI-INFECTIVES
K	HOSPITAL SOLUTIONS
L	ANTINEOPLAST+IMMUNOMODUL
M	MUSCULO-SKELETAL SYSTEM
N	NERVOUS SYSTEM
P	PARASITOLOGY
R	RESPIRATORY SYSTEM
S	SENSORY ORGANS
T	DIAGNOSTIC AGENTS
V	VARIOUS

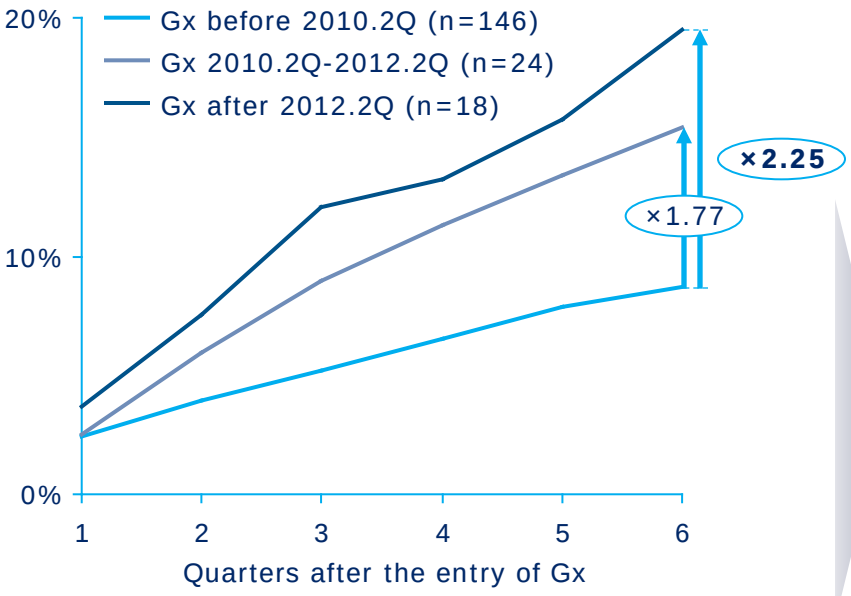
The Gx erosion curves are estimated considering the past trends by ATC

Key

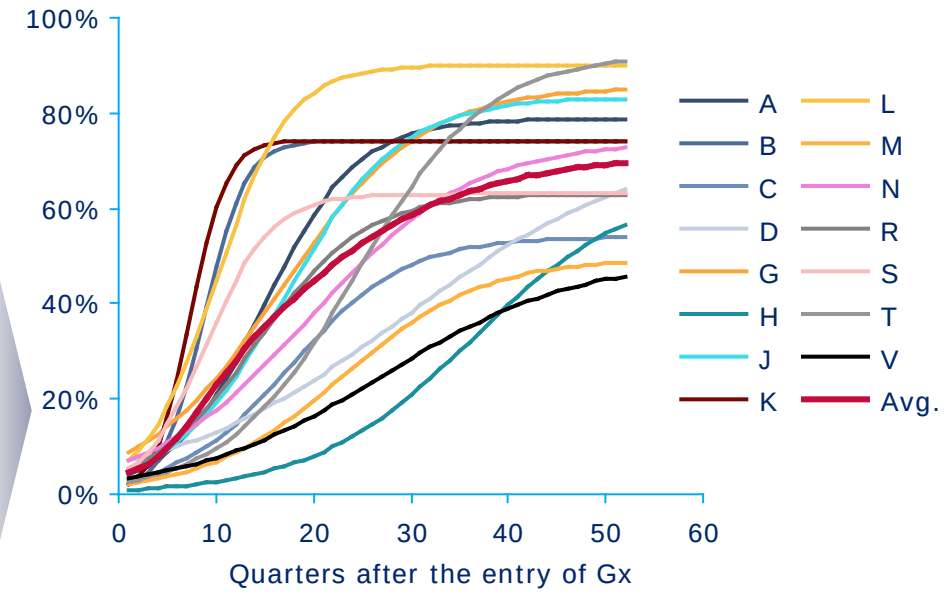
The Gx penetration rate of molecules launched after 2012.2Q is considered to be 2.25 times more than before

Category 2 b3 **Define Gx erosion curve**

Difference of Gx erosion according to the Gx entry timing (the total volume of each molecule =100%)



Estimated Gx erosion curve by anatomical therapeutic chemical (ATC) classification*1



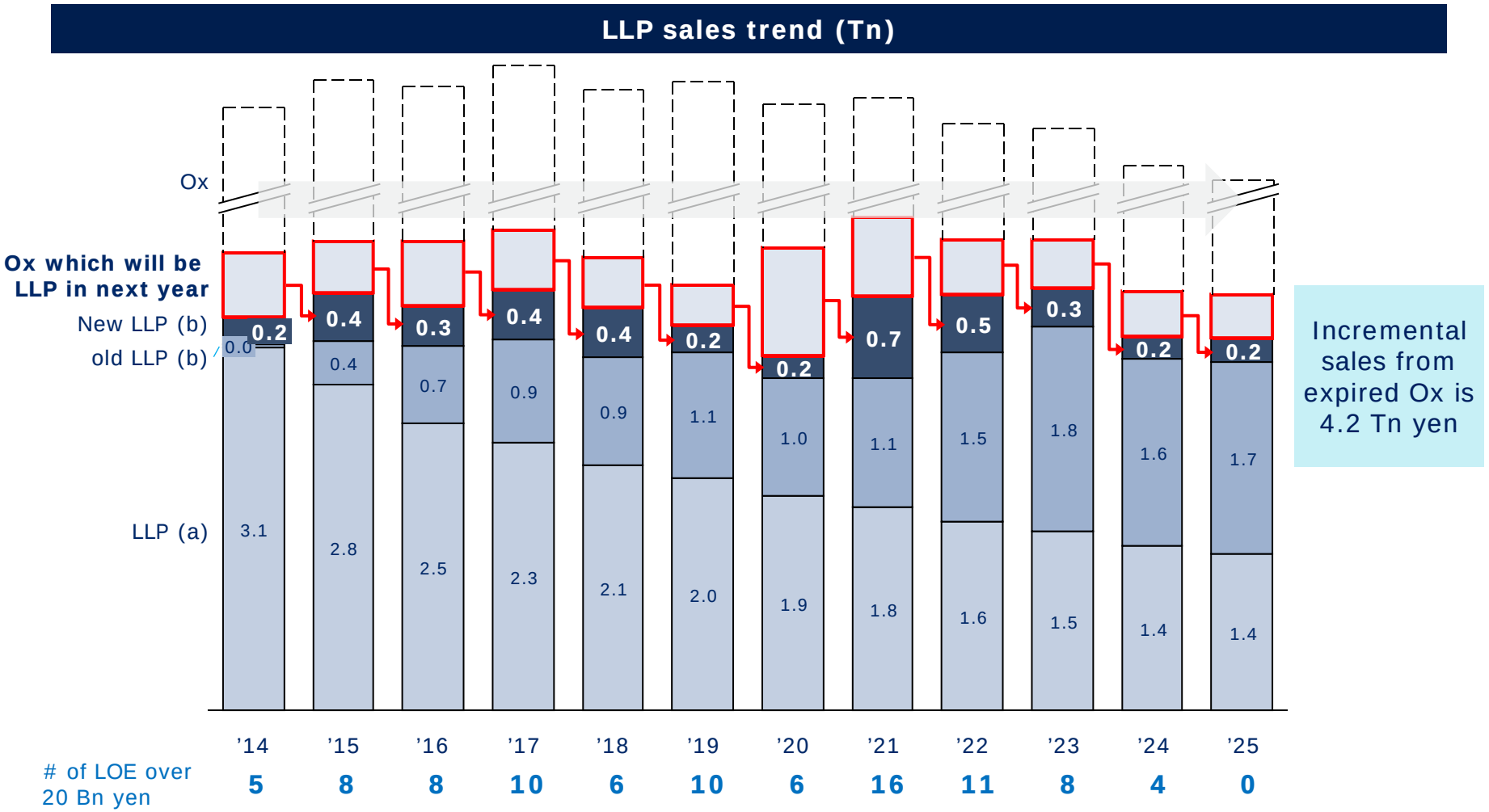
- Recently, Gx penetration rate is increasing
- We consider the recent promotion of Gx and set Gx erosion curve as 2.25 times of Gx erosion rate before 2010.2Q

- The Gx erosion curves are estimated based on the past trends by ATC considering the recent promotion of Gx (x2.25)

*1 The mols whose peak sales potential is over ¥30 Bn are assumed to be eroded by Gx 1.5 times faster than other mols

Revised

In spite of incremental sales from expired Ox, LLP sales will not increase because of drastic decrease of LLP (a)



Incremental sales from expired Ox is 4.2 Tn yen

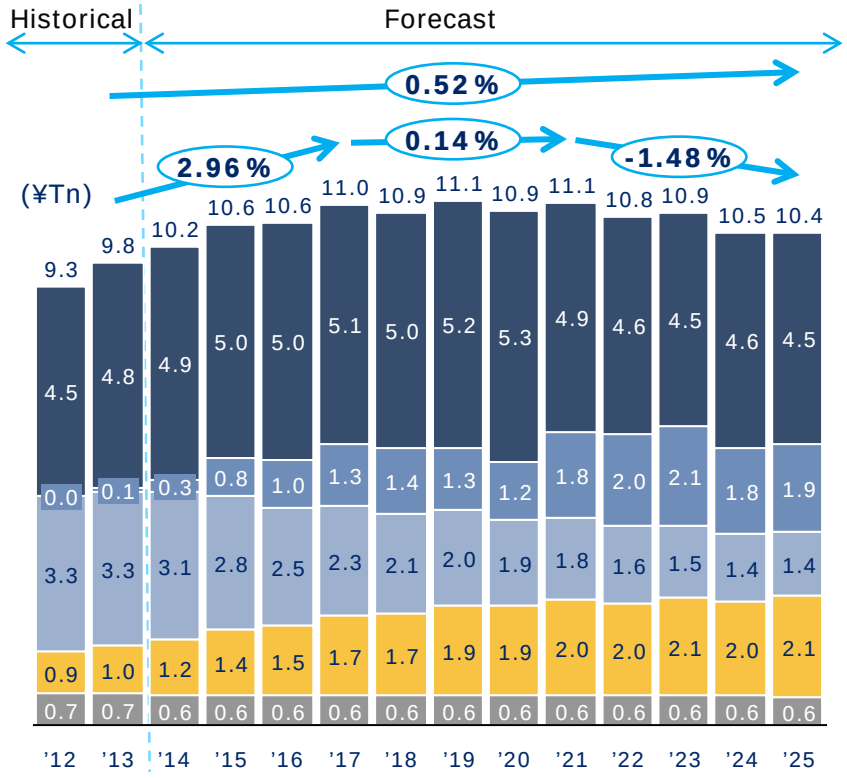
Result of simulation

Base case

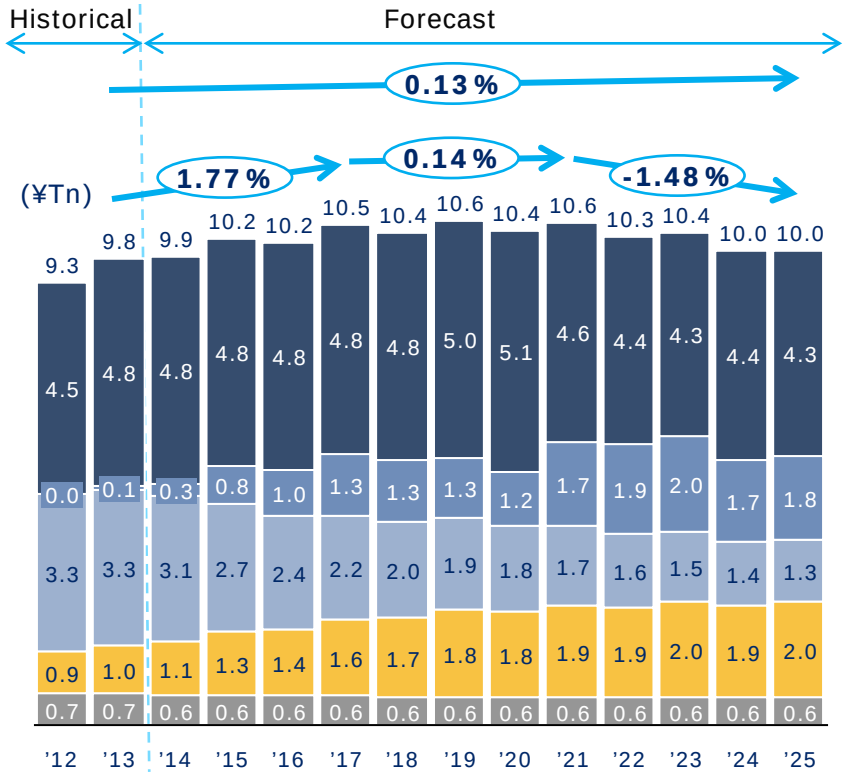
The market will grow at a CAGR of 0.52%('13-'25), starting at 2.96% of first 3 years (with consumption tax revision)

Market growth (¥Tn)*1

Considering consumption tax revision



Not considering consumption tax revision*2



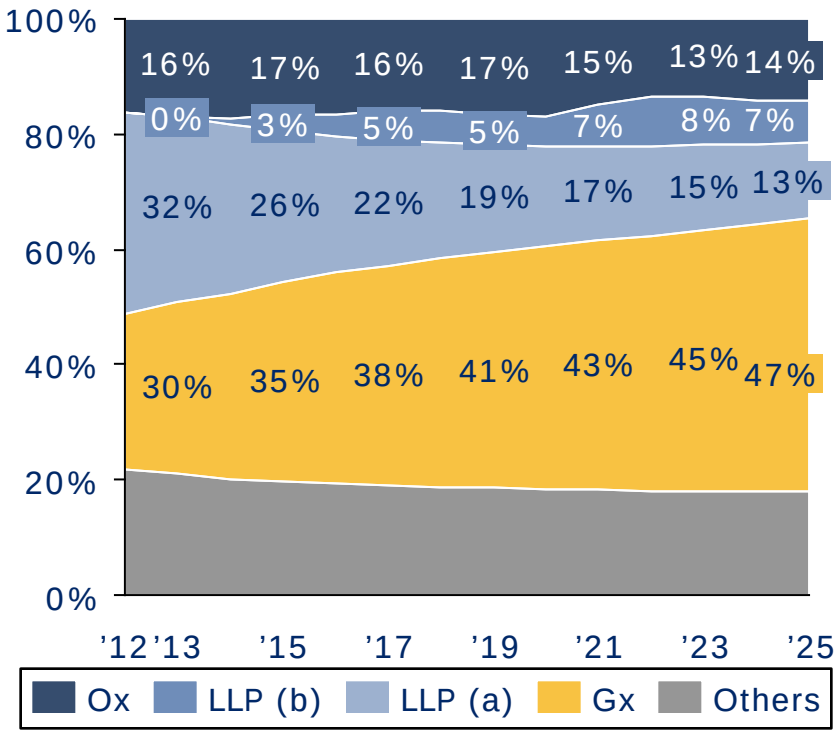
Ox | LLP (b) | LLP (a) | Gx | Others

*1 LLP (a) is the LLP whose Gx was launched before 2013, LLP (b) is the other LLP
*2 Consumption tax rate was fixed at 5% through the forecast period

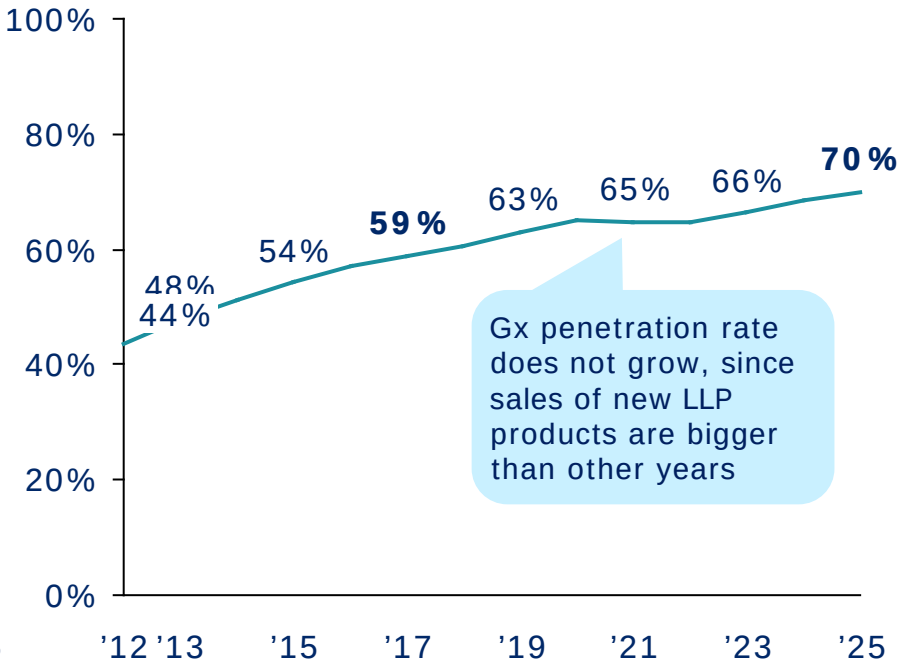
Gx will increase by volume and value. On the other hand, LLP (a) will shrink due to Gx penetration and Z2 rule

Market composition (Volume base)

Market composition by each group



Gx penetration rate

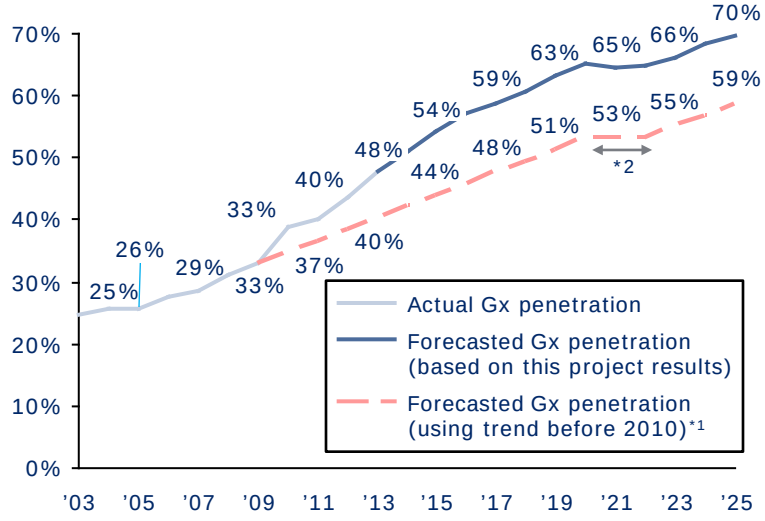


In 2025, Gx penetration will be 70% by volume (new Gx penetration definition)

The expense increase by price premium is estimated to be lower than the expense reduction by Gx promotion

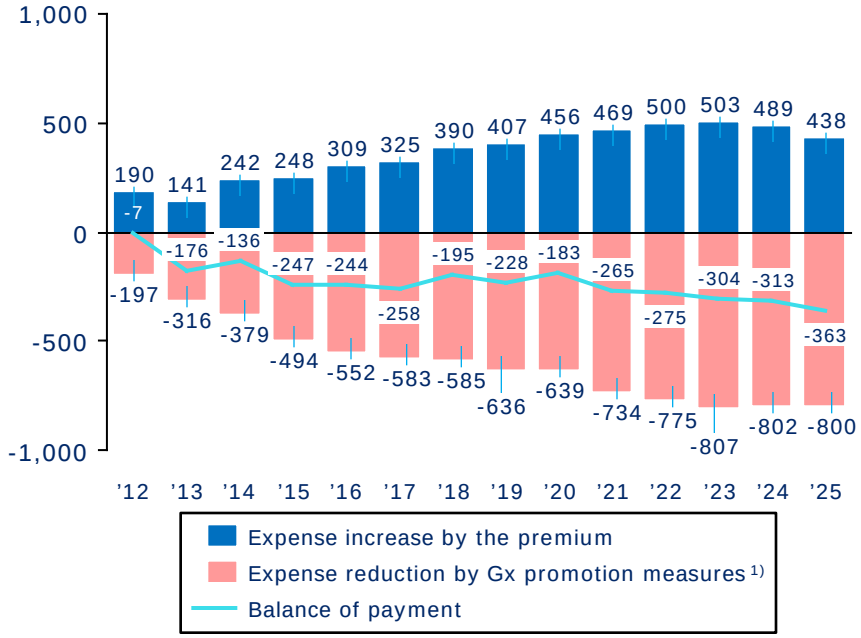
Balance of payment (¥Bn)

Forecasted Gx penetration rate w/ or w/o Gx promotion measures



- Without additional measures for Gx penetration, Gx penetration rate would grow according to the trend before 2010 and reached at 59% in 2025

Expense change of premium and Gx penetration

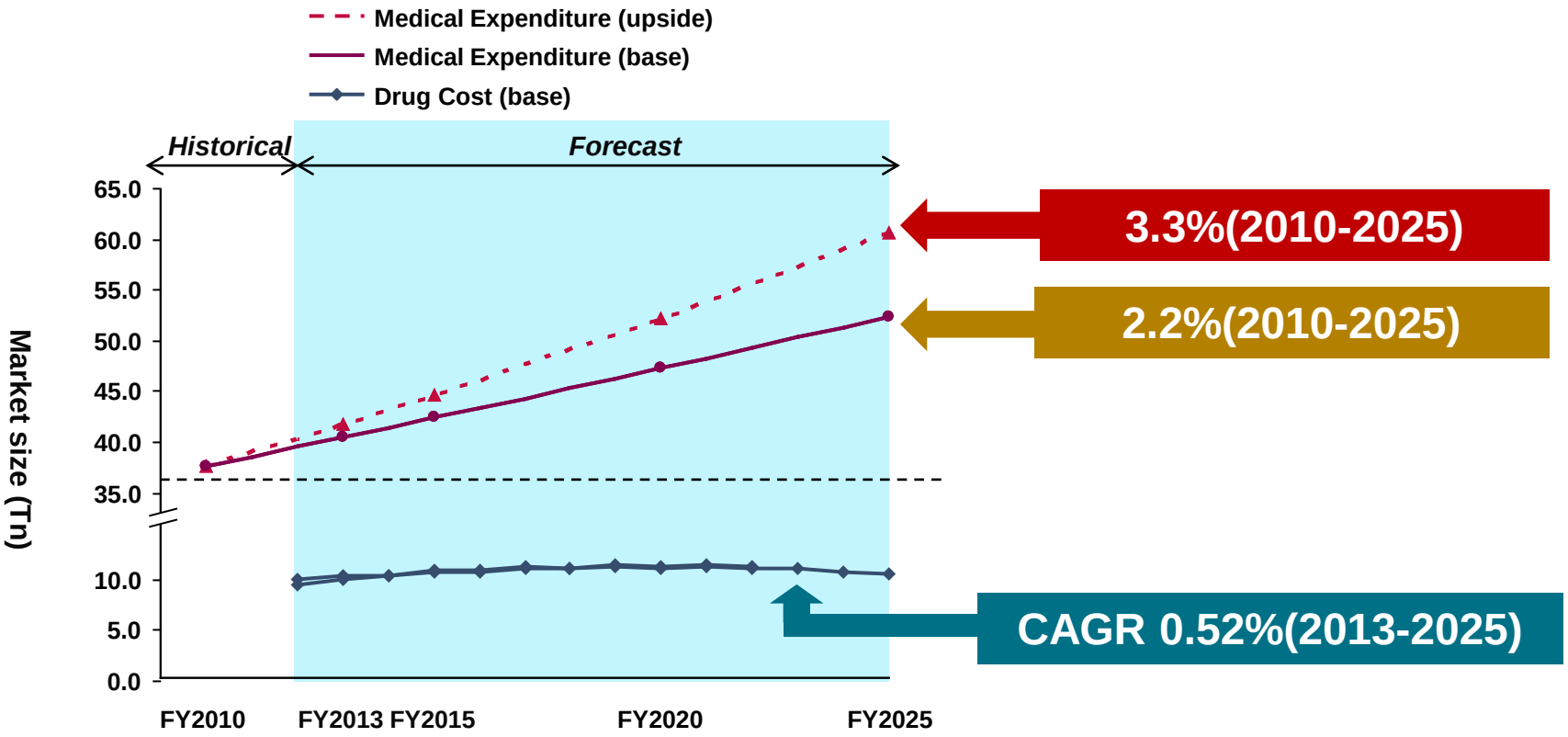


	Average impact per year	Sum of impact (2012-2025)
Expense increase	¥365 Bn	¥5,105 Bn
Expense reduction	¥⊿593 Bn	¥⊿8,298 Bn

*1 We used Gx penetration trend from 2006 to 2009
*2 We assumed Gx penetration rate will not grow in 2021 and 2022, same as this project calculation result

Results: CAGR of drug market is almost stable and quite lower than that of medical expenditures

Estimated growth rate of ethical drug market (CAGR 0.52%) is lower than that of medical expenditure by MHLW (CAGR 2.2%)



1) MHLW Estimation of National Medical Expenditure (2010.10.25), IMS edited
2) IMS estimation of drug expenditure, 2012-2022, “Base” scenario forecast on this project

Results: The Simulation Predicts A Balanced Picture

Key Issue: Drug expenditures will grow less than total national healthcare costs

- **The compound annual growth rate (CAGR) of drug costs will be 0.13% in the next 12 years (fixed tax rate at 5%), which is less than the MHLW's cost estimate of 2.2% growth in healthcare costs**
- **The ethical drug market will reach 10.4 trillion yen in 2025 from 9.8 trillion yen in 2013**
- **The expense increase by price premium is estimated to be lower than the expense reduction by Gx promotion**
- **The share of patented drugs will stabilize and LLP market share will shrink.**
- **Gx market share will increase to 59% by 2017 and 70% by 2025 in new index even with the premium pricing system.**

Conclusion: EFPIA Proposes More Rewarding Innovation including Making The Current Rule Permanent

Key Point: The premium pricing rule facilitates innovation without increasing total drug expenditures

- Current pricing system is working well for patients and controlling drug costs for Japanese government
- The current rule facilitates earlier and larger investments in drug development in Japan
- The current rule is designed to pay back premium benefits at LoE, and the simulation predicts that this system will work in a very balanced way
- This rule will also be instrumental in moderating total drug expenditures while reducing LLP market share and increasing Gx penetration

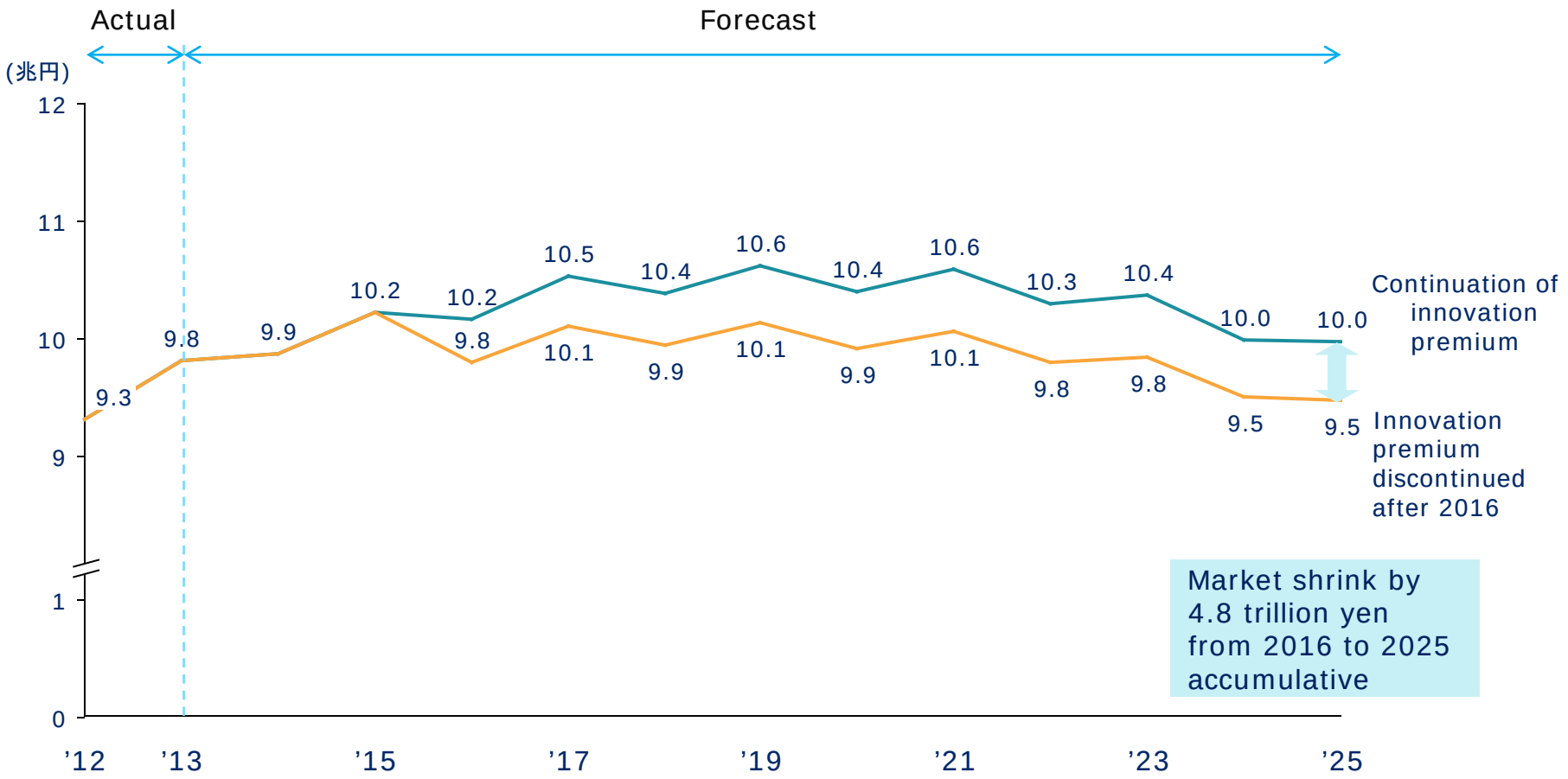
- To encourage innovation, secure access, and contain the increase of costs, we strongly recommend that the current rule should be institutionalized in addition to more rewarding innovation.

Additional simulation results

- Importance of innovation premium
- Expansion scenario and shrink scenario for drug market

In case innovation premium discontinued, it may shrink the innovative pharmaceutical market by around 10% in 2025

Market growth （trillion yen）*1



*1 consumption tax is fixed at 5% for entire forecast period

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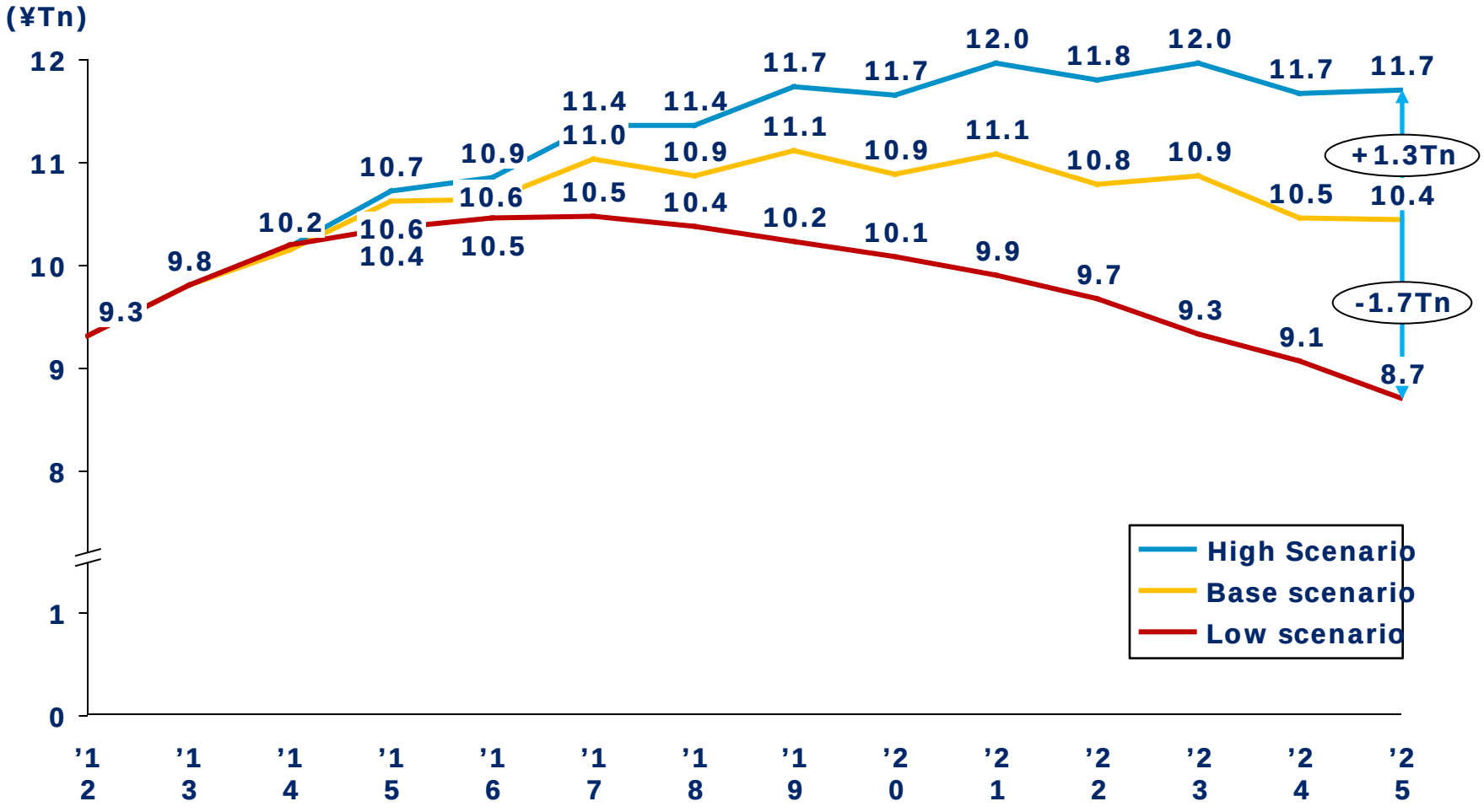
Revised

The market will be ¥11.7 Tn in 2025 by high scenario. On the other hand, it will be ¥8.7 Tn by low scenario

Market growth (according to the scenarios)



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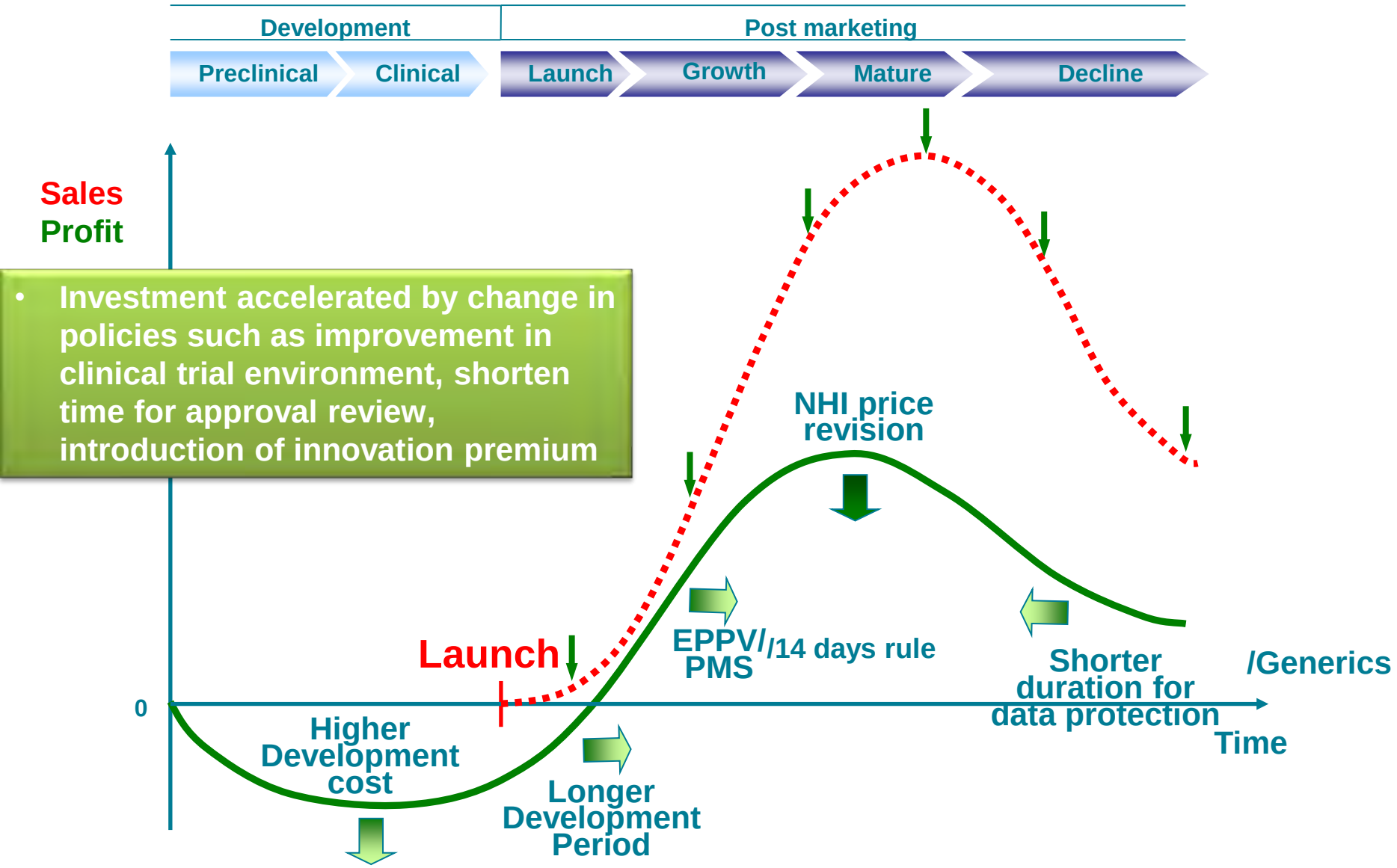
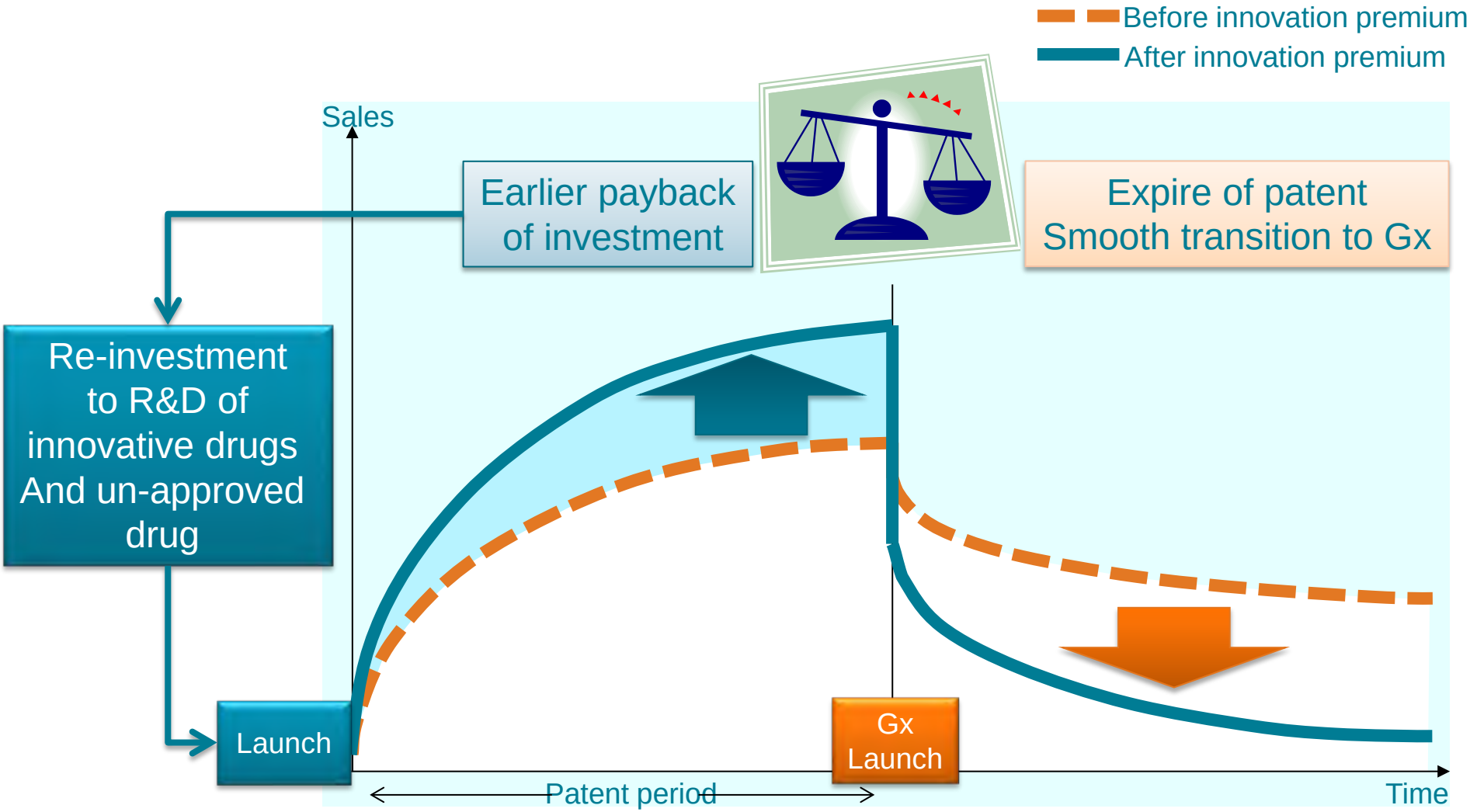
Investment environment of Japan

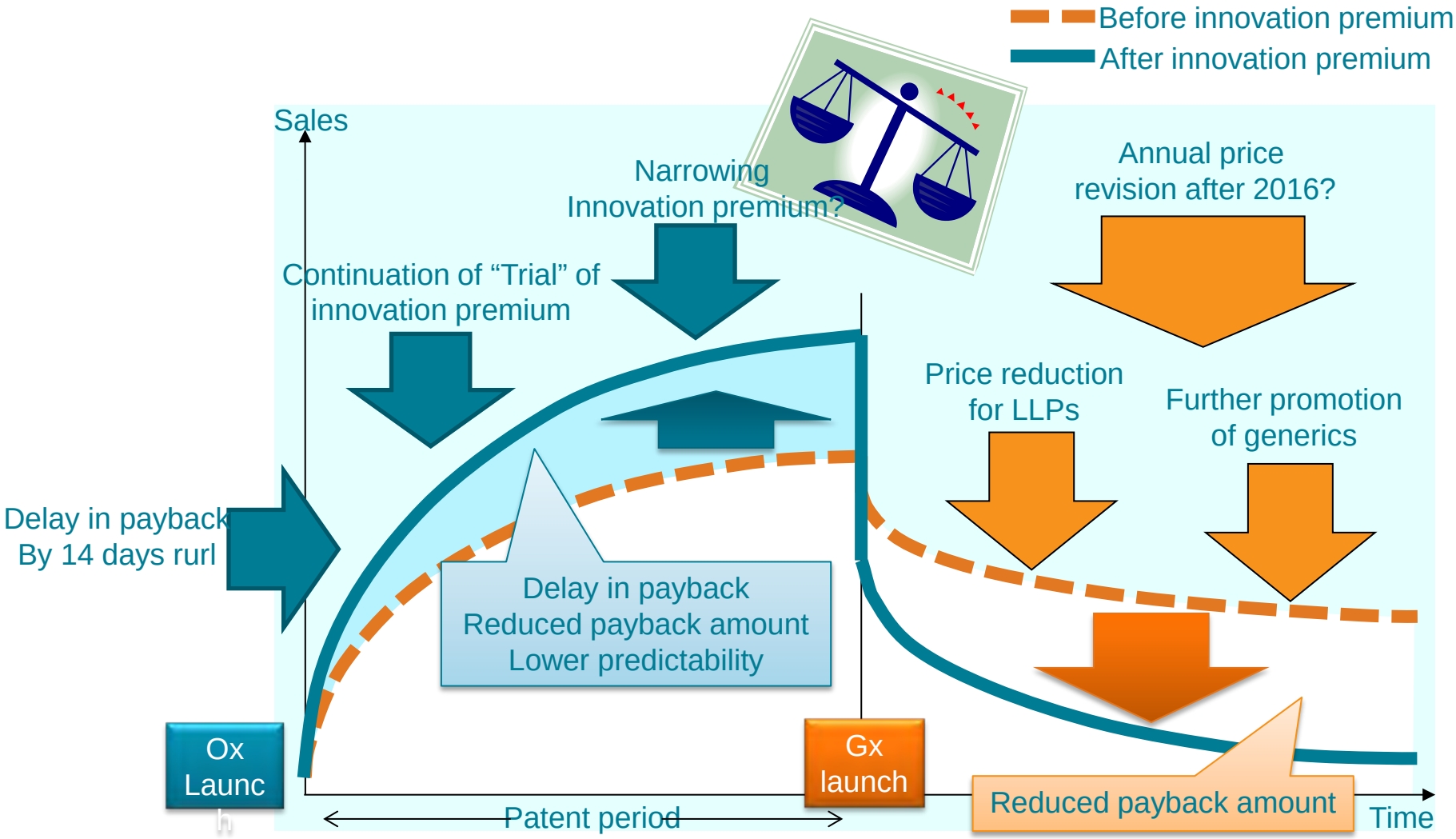
The attractiveness of Japanese drug market (mid 2000)
Higher pressure for ROI of pharma (conceptual)



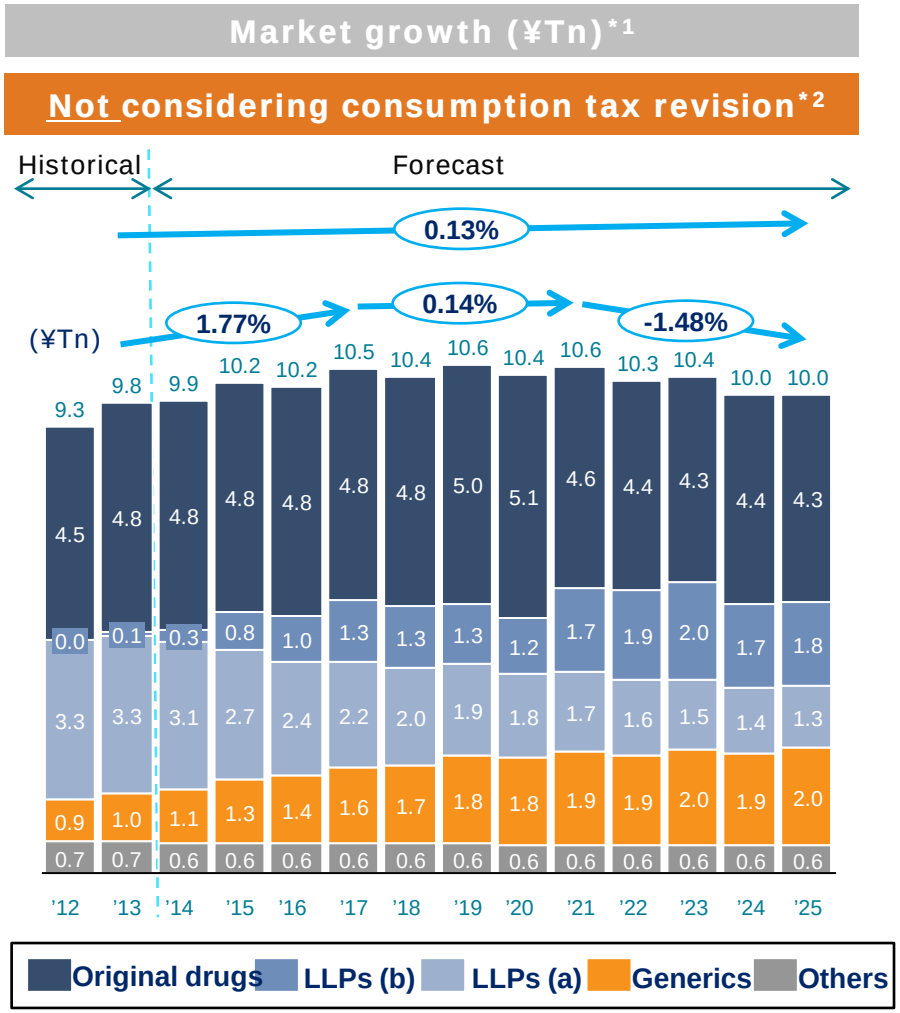
Good balance between early payback of R&D investment and smooth transition to Gx after patent expiration



Balance between early payback of R&D investment and smooth transition to Gx after patent expiration (losing balance)



Summary



- Drug market is broadly flat if the current pricing system continued.
  - Generics will grow to 2 trillion by 2025 by various generic promotion policies
  - LLP will be reduced due to price reduction by Z2 rule and further penetration of generics
- Innovation premium should be continued in current form
  - Option for further reward for innovation considered.
- Annual price revision should be avoided

*1 LLP (a) is the LLP whose Gx was launched before 2013, LLP (b) is the other LLP
*2 Consumption tax rate was fixed at 5% through the forecast period

efpia

European Federation of Pharmaceutical Industries and Associations

End

About “EFPIA/IMS joint market simulation”

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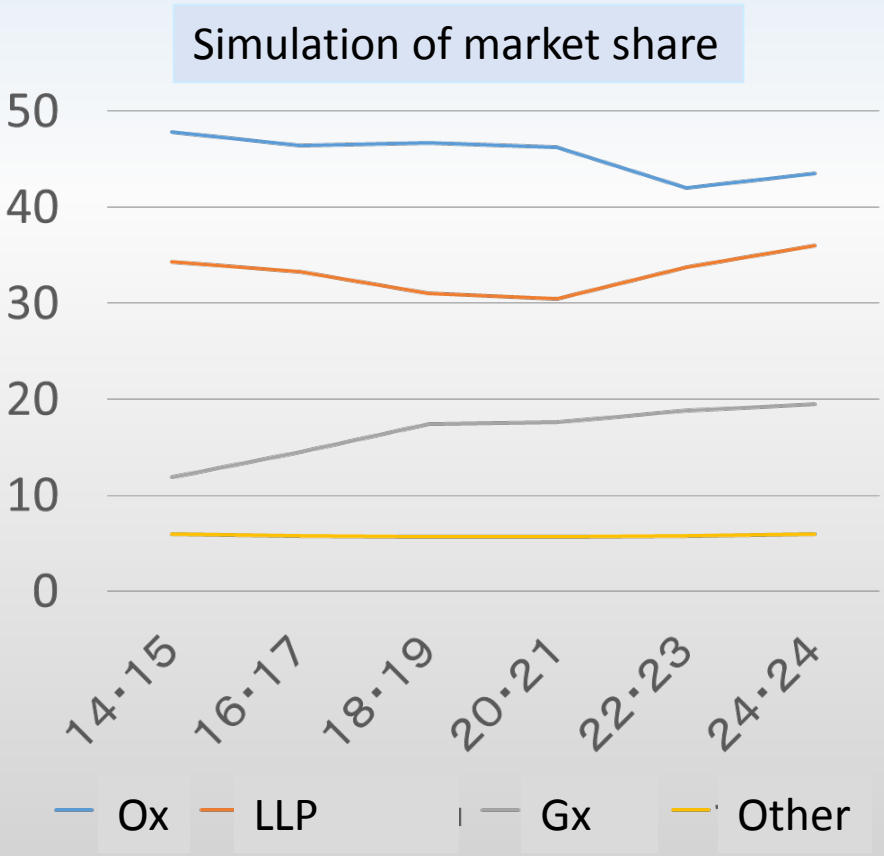
If we summarize the result of simulation

- If we summarize the data by 2 year term since the market repeats cycle of shrinking in the NHI price revision year and expanding the next year



We can find out the following

- Drug market total and new drugs market will hit peak at 2018-2021 and will start decrease
- Share of LLP will decrease and it hit its lowest in 2020-2021 and then it will increase
- Gx will continue to increase and in 2024-2025, it will reach 1.6 times than that of 2014-2015.
- Share of new drug will gradually decrease
- LLP will decrease its share to 2020-2021 but will increase later
- Share of Gx will increase drastically
- Reason for increase in LLP is due to some blockbuster drugs becoming LLP. If we consider after 5-10 years of this simulation, LLP market will decrease rapidly.

Validity of this simulation

- The simulation is based on following assumptions
  - No major change in pricing and reimbursement system
  - Fewer development of blockbuster drugs
  - Penetration of Gx
- There is possibility that simulation may lose validity if these assumptions become inapplicable

Factors to be considered about assumptions (1)

- Following policy changes have been in discussion. Not all may be introduced but all of each will shrink the market
  - Overall market: change in frequency of NHI price revision, exclusion of OTC similar drug from reimbursement
  - New drugs: Introduction of HTA, discontinuation of or change in qualification for innovation premium
  - LLPs: Expansion of Z2, Introduction of reference pricing system to LLP
  - Gx: Price decrease on Gx

Factors to be considered about assumptions (2)

- Market will be affected by trends of Biological products and Biosimilars
  - Major part of new drugs will be biological products. Are there any possibility that they will become bigger products than expected?
  - There may be possibility that sales of LLP biological products market will not decrease depending on the acceptance of biosimilars.
- Whether penetration and expansion of Gx use will continue
  - Not many additional measures left to further accelerate use of Gx
  - Whether Gx can win confidence from medical practitioners
  - Acceptance of biosimilars

In summary

- Expansion of new drug market will provide funds for further new drug development and accelerate introduction of promising new drugs from foreign countries
- The fund, at least part of, generated by switching of LLPs to Gx or price reduction should be allocated to new drugs
- But we need to give consideration how to realize it
- Institutionalization of innovation premium can be a method but it needs good explanation how the purpose can be achieved by that.