

# Student Loan Programs in Korea: Financial Projection and Policy Issues

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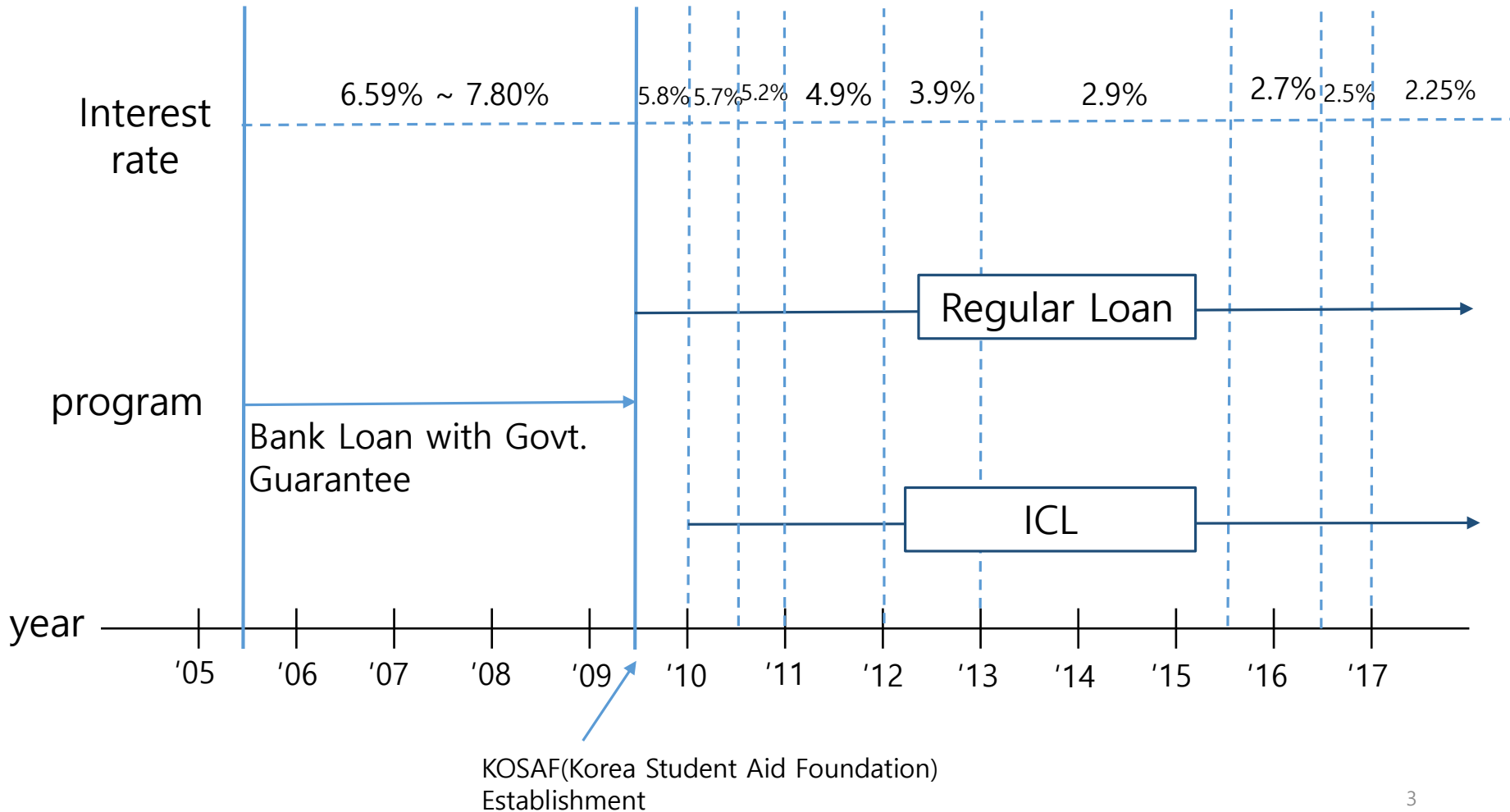
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## I. Student Loan Programs in Korea

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# History of Loan programs



# Regular Loan Program

- ① Starting from 2009, 2<sup>nd</sup> semester
- ② Eligibility: Undergraduate and Graduate,  
Below of age 55  
Regardless of Family Income Level  
Enrolled students should have completed 12 or more credits and have a grade of 70 or higher out of 100 in the previous semester
- ③ Loan Limit: Full Tuition & Fees and Living Expense(up to 2M Won per year)
- ④ Loan Period: Maximum 20 years
  - (Deferment Period) Interest Repayment only – Max 10 years
  - (Repayment Period) Interest and Principal Repayment – Max 10 years
- ⑤ Interest Rate: Fixed Rate('17.1<sup>st</sup> Semester 2.25%)

- ① **Starting from 2010**
- ② **Eligibility: Undergraduate**
  - Below of age 35**
  - Family Income Level of 8/10 or lower**
  - Enrolled students should have completed 12 or more credits and have a grade of 70 or higher out of 100 in the previous semester**
- ③ **Loan Limit: Full Tuition & Fees and Living Expense(up to 3M Won per year)**
- ④ **Loan Period:**
  - (Repayment Period) From the year of income level 18.56M won/year**
  - (Repayment Rate) 20% of yearly income exceeding 18.56M won**
  - (Repayment Method) Automatic payroll deduction by National Tax Authority**
- ⑤ **Interest Rate: Floating Rate('17.1<sup>st</sup> semester 2.25%)**

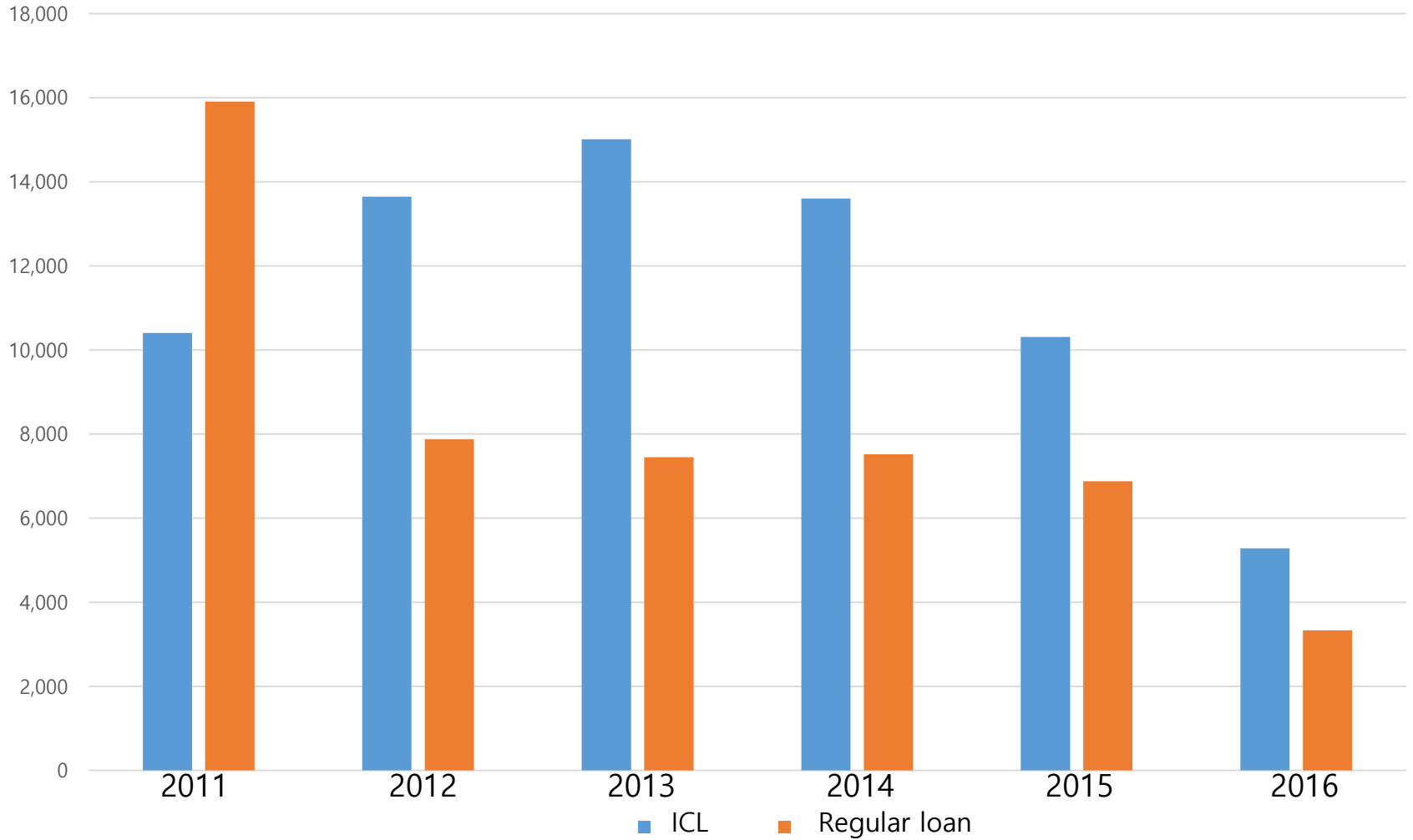
# Yearly Loan Supply/Repayment/Remaining Balance

(100M.won)

year		2009	2010	2011	2012	2013	2014	2015	2016 1/2
Regular loan	supply	12,014	19,205	15,980	8,114	7,709	7,831	7,549	3,635
	repayment	401	1,982	3,805	5,310	6,822	9,917	10,552	
	remaining balance	11,609	28,832	41,007	43,812	44,699	41,883*	38,860**	
ICL	supply	-	8,456	10,873	15,150	17,811	16,386	13,705	6,586
	repayment	-	450	803	2,187	3,975	5,868	7,324	
	remaining balance	-	8,006	18,076	31,038	44,874	55,392	61,774	
total	supply	<b>12,014</b>	<b>27,661</b>	<b>26,853</b>	<b>23,264</b>	<b>25,520</b>	<b>24,217</b>	<b>21,254</b>	
	repayment	<b>401</b>	<b>2,432</b>	<b>4,608</b>	<b>7,498</b>	<b>10,797</b>	<b>15,785</b>	<b>17,876</b>	
	remaining balance	<b>11,609</b>	<b>36,838</b>	<b>59,083</b>	<b>74,850</b>	<b>89,574</b>	<b>97,275*</b>	<b>100,634</b>	

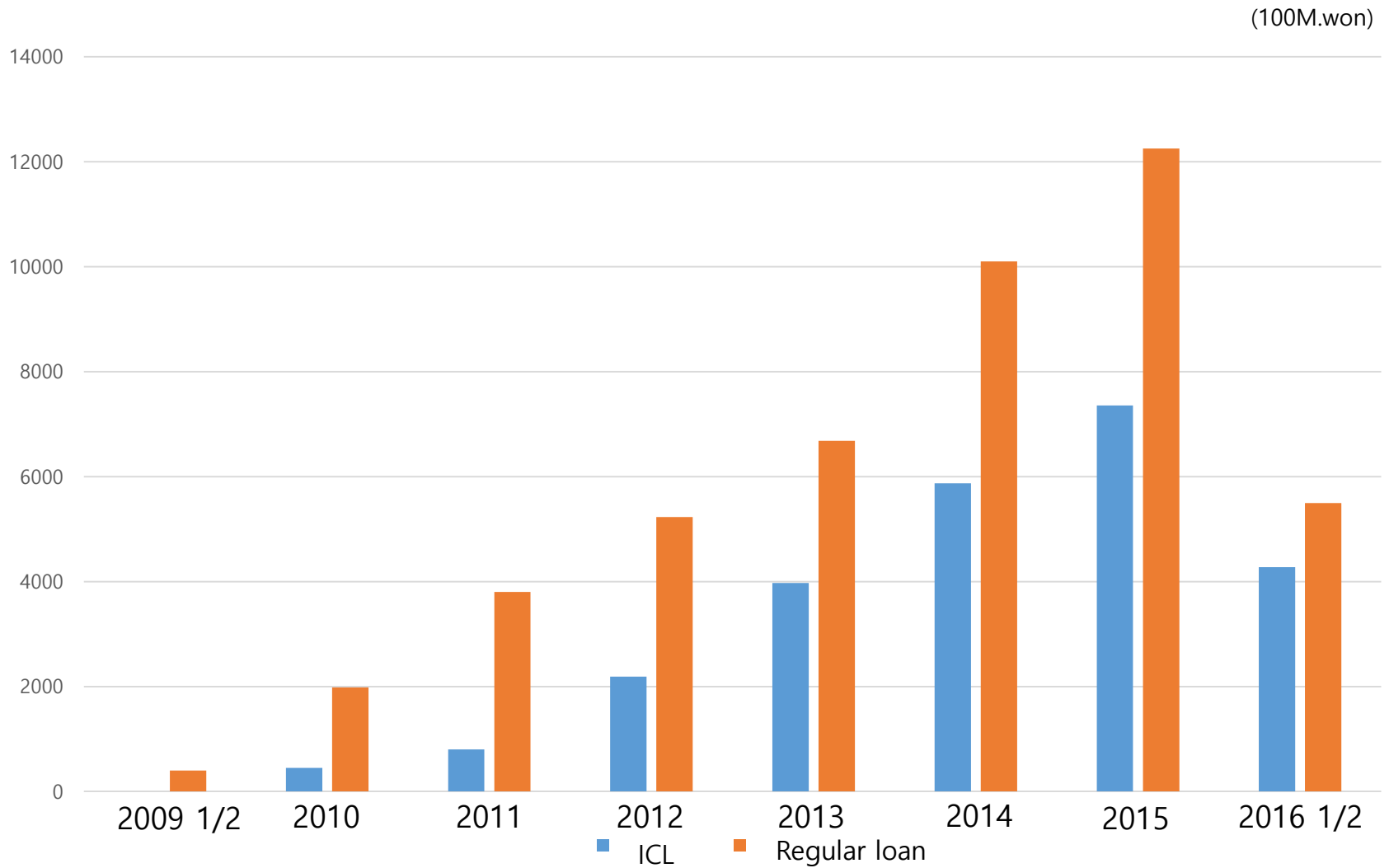
# Yearly Loan Supply

(100M.won)

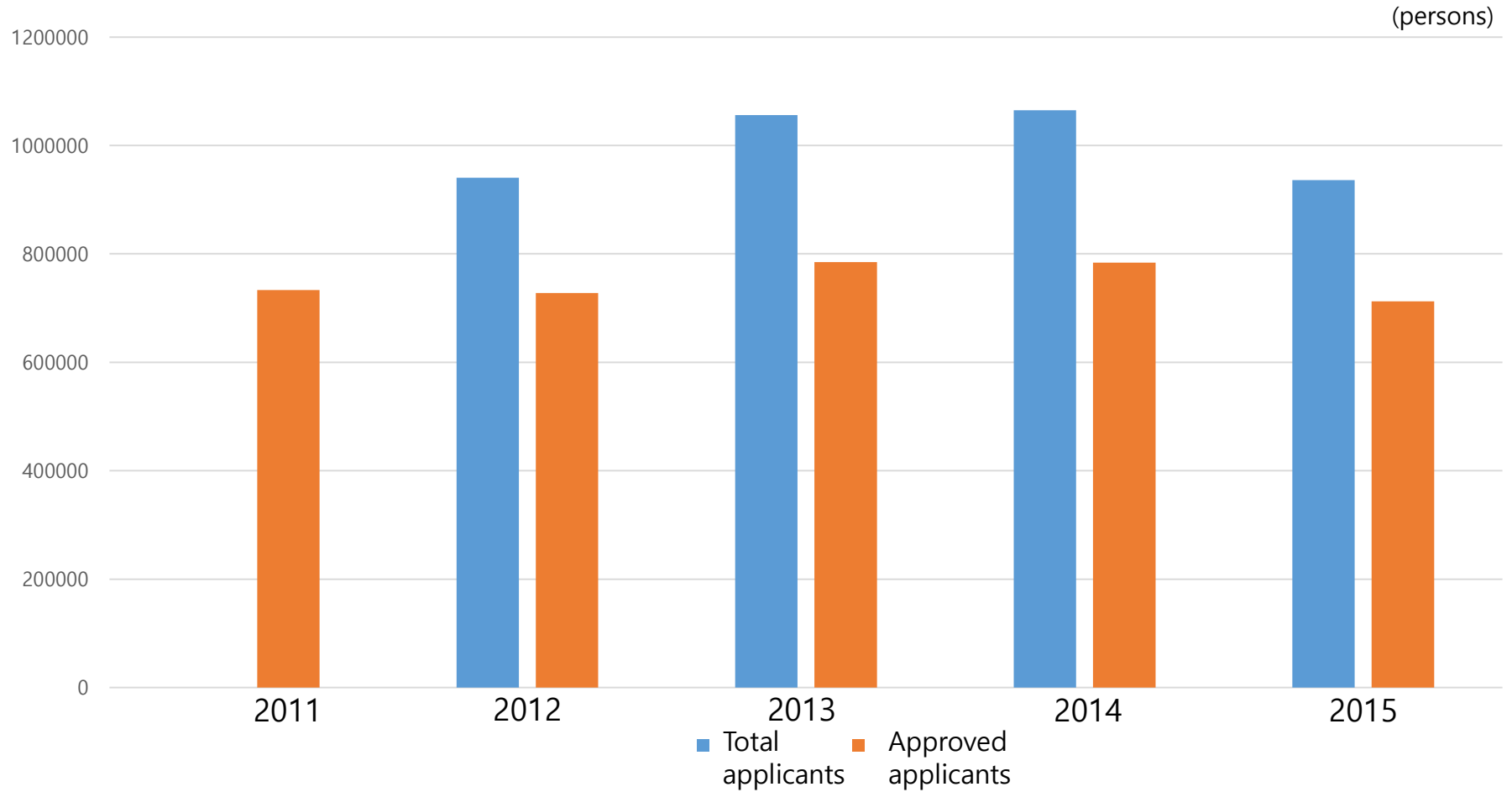




# Yearly Loan Repayments



# Yearly Loan Applicants and Approval



# Trend of Interest Rates

- Same level of interest rate for both regular loan and ICL
- Regular loan : fixed rate at the starting time of loan.
- ICL : floating rate

(%)

2009	2010		2011	2012	2013	2014	2015		2016		2017
2/2	1/2	2/2					1/2	2/2	1/2	2/2	1/2
5.8	5.7	5.2	4.9	3.9	2.9		2.7		2.5	2.25	

# Loan Balances for different interest rates

(persons, 100M.won)

		5.8%	5.7%	5.2%	4.9%	3.9%	2.9%	2.7%	total
<b>Regular loan</b>	<b>Balances</b>	1,512	3,756	3,654	7,676	4,660	32,198	2,838	56,294
	<b>Number of persons</b>	50,049	105,715	50,131	110,419	55,978	350,614	22,149	745,055
<b>ICL</b>	<b>Balances</b>	-	-	-	-	-	-	63,200	63,200
	<b>Number of persons</b>	-	-	-	-	-	-	934,412	934,412
<b>total</b>	<b>Balances</b>	1,512	3,756	3,654	7,676	4,660	32,198	66,038	119,494
	<b>Number of persons</b>	50,049	105,715	50,131	110,419	55,978	350,614	956,561	1,422,697

※ As of end of 2015

# Total College Students and Debtors

(persons, 100M.won)

		'09 2/2	2010	2011	2012	2013	2014	2015
Total students		-	2,174,035	2,329,145	2,340,818	2,340,732	2,351,712	-
Regular loan	Number of persons	329,026	532,483	650,688	663,576	669,021	689,027	745,055
	Balance	11,609	28,832	41,007	43,812	44,699	51,893	56,294
ICL	Number of persons	-	169,087	308,564	529,198	709,816	849,289	934,412
	Balance	-	8,006	18,076	31,038	44,874	56,359	63,200
total	Number of persons	329,026	631,781	832,202	998,230	1,156,861	1,305,443	1,422,697
	Balance	11,609	36,838	59,083	74,850	89,574	108,252	119,494

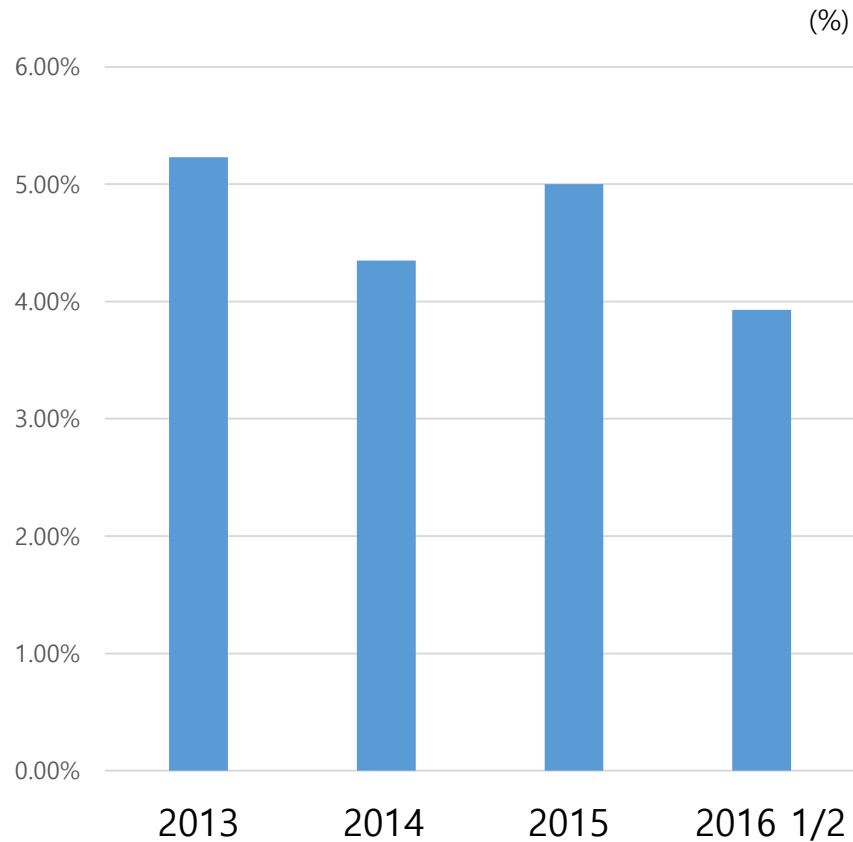
# Delinquency

(persons, %, 100M.won)

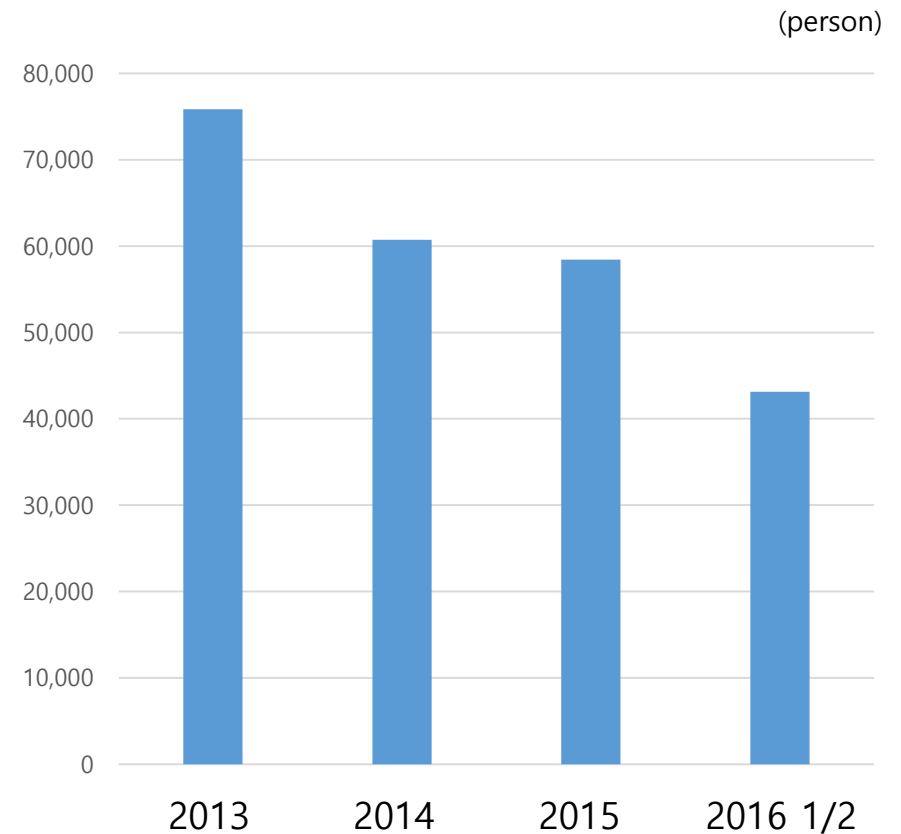
		2009	2010	2011	2012	2013	2014	2015
Regular loan	Number of delinquent persons	10,770	27,450	55,571	58,956	50,203	43,193	44,667
	Delinquent amount	400	1,188	2,627	2,891	2,303	1,905	2,065
	Delinquency rate	3.45	4.12	6.45	6.73	5.31	4.68	5.52
Bank	Delinquency rate	0.63	0.77	0.77	0.88	0.76	0.64	0.74(Nov.)
Credit card co.	Delinquency rate	1.7	1.6	2.2	2.2	2.1	1.9	1.9(June)
SPCs	Delinquency rate	-	2.24	3.88	6.78	9.20	10.93	12.40(May)

# Delinquency

## <Delinquency rate>



## <number of delinquent persons>



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# Financial Projection of Regular Loan Program

- ◆ Source: Micro data from KOSAF
- ◆ Summary of Basic Data

<yearly supply of regular loan>

		Supply(100M.won)	Number of account	Number of person
2010		19,205	632,704	373,342
2011		15,980	575,713	306,296
2012		8,115	306,574	158,090
2013		7,709	293,895	138,337
Including Conversion loan	2014	18,158	434,423	259,508
	2015	16,866	451,050	293,738
Excluding Conversion loan	2014	7,831	297,549	139,411
	2015	7,549	283,940	139,482

- ◆ **Observations: 2,694,359 accounts, 988,499 persons**
  - Average loan balance per accounts: 3.19 M Won
  - Average number of accounts per person: 2.73 accounts
  - Average loan balance per person: 8.70 M Won

# Financial Projection of Regular Loan Program

- ◆ Average Deferment and Repayment Periods is not much different for different vintage years

(month)

Vintage year		Average deferment	Average payment	Average duration
2010		43.7	65.0	108.7
2011		41.7	65.8	107.6
2012		36.8	73.7	110.5
2013		36.7	70.0	106.6
Including Conversion loan	2014	30.4	71.6	102.0
	2015	30.5	69.1	99.6
Excluding Conversion loan	2014	36.3	69.8	106.2
	2015	35.7	69.0	104.6

2010-2015	Average deferment	Average payment	Average duration
Including Conversion loan	37.4	68.5	105.9
Excluding Conversion loan	39.6	68.0	107.6

# Financial Projection of Regular Loan Program

## ◆ Delinquency rate (example of vintage 2010)

(account)

		2010	2011	2012	2013	2014	2015
2010	D1	2.01%	6.92%	9.98%	8.42%	5.96%	5.27%
	D2	-	1.39%	4.40%	5.40%	3.27%	3.48%
	D3	-	-	1.00%	2.82%	1.77%	2.11%
	CB	0.00%	0.00%	0.02%	0.28%	0.39%	0.56%
2011	D1		2.70%	9.16%	8.47%	6.42%	5.87%
	D2		-	2.03%	4.83%	3.76%	3.83%
	D3		-	-	1.29%	1.95%	2.52%
	CB		0.00%	0.01%	0.32%	0.39%	0.55%
2012	D1			2.16%	4.91%	5.46%	5.39%
	D2			-	1.34%	2.69%	3.41%
	D3			-	-	0.70%	1.88%
	CB			0.00%	0.22%	0.36%	0.53%
2013	D1				1.24%	3.55%	4.11%
	D2				-	0.76%	2.01%
	D3				-	-	0.51%
	CB				0.03%	0.22%	0.54%
2014	D1					0.47%	2.09%
	D2					-	0.30%
	D3					-	-
	CB					0.01%	0.26%
2015	D1						1.05%
	D2						-
	D3						-
	CB						0.08%

index: D1; delinquent experience in 3 month

D2: D1 status last for 2 years

D3: D1 status last for 3 years

CB: registered as bad credit at Credit Bureau

# Financial Projection of Regular Loan Program

- ◆ Cash flow projection for regular loan program
  - Grouping borrows according to  
g=(deferment period, repayment period)

$$F_t = \left( \sum_{g=1} B_{g,t} + a \times \sum_{g=1} r_g \times B_{g,t-1} \right) - \sum_{g=1} R_{g,t} + \sum_{g=1} A_{g,t}(X_t)$$

$$B_{i,t} = B_{i,t-1} - I[m_{i,t-1} = 0] \times I[d_{i,t} = 0] \times \frac{B_{i,0}}{n_i}$$

$$B_{g,t} = \begin{cases} B_{g,0} & \text{if } t \leq t_1 \\ B_{g,t-1} - (1 - \alpha_g) \frac{1}{n_g} B_{g,0} & \text{if } t > t_1 \end{cases}$$

$$R_{g,t} = a_t \times (1 - \alpha_{g,t}) \times r_g \times B_{g,t-1}$$

$t_1$ : ending period of deferment

$g$ : group (deferment period, payment period)

$d_g$ : probability of default for group  $g$

$B_{it}$ : principal Balance of account  $i$  at  $t$

$B_{i0}$ : Beginning Balance of account  $i$

$n_i$ : contractual repayment period of account  $i$

$m_{i,t-1}$ : remaining deferment period of account  $i$  at  $(t-1)$

$r_i$ : interest rate of account  $i$

$R_{it}$ : interest accrual of account  $i$  at  $t$

$A_{it}$ : new loan amount for account  $i$  at  $t$

$d_{it}$ : default indicator

$X_t$ : demographic and macroeconomic factors at  $t$

# Financial Projection of Regular Loan Program

## ◆ (Existing Account);

- Grouping by (deferment period, repayment period)
- Cash flow according to new loan, interest repayment, principal repayment, and default rate.
- Default probability is estimated by Probit Regression for each group

## ◆ (Estimation of Future Loan Demand);

- Mainly driven by demographic factor and macro economy
- Macro economic assumption of CPI and tuition growth

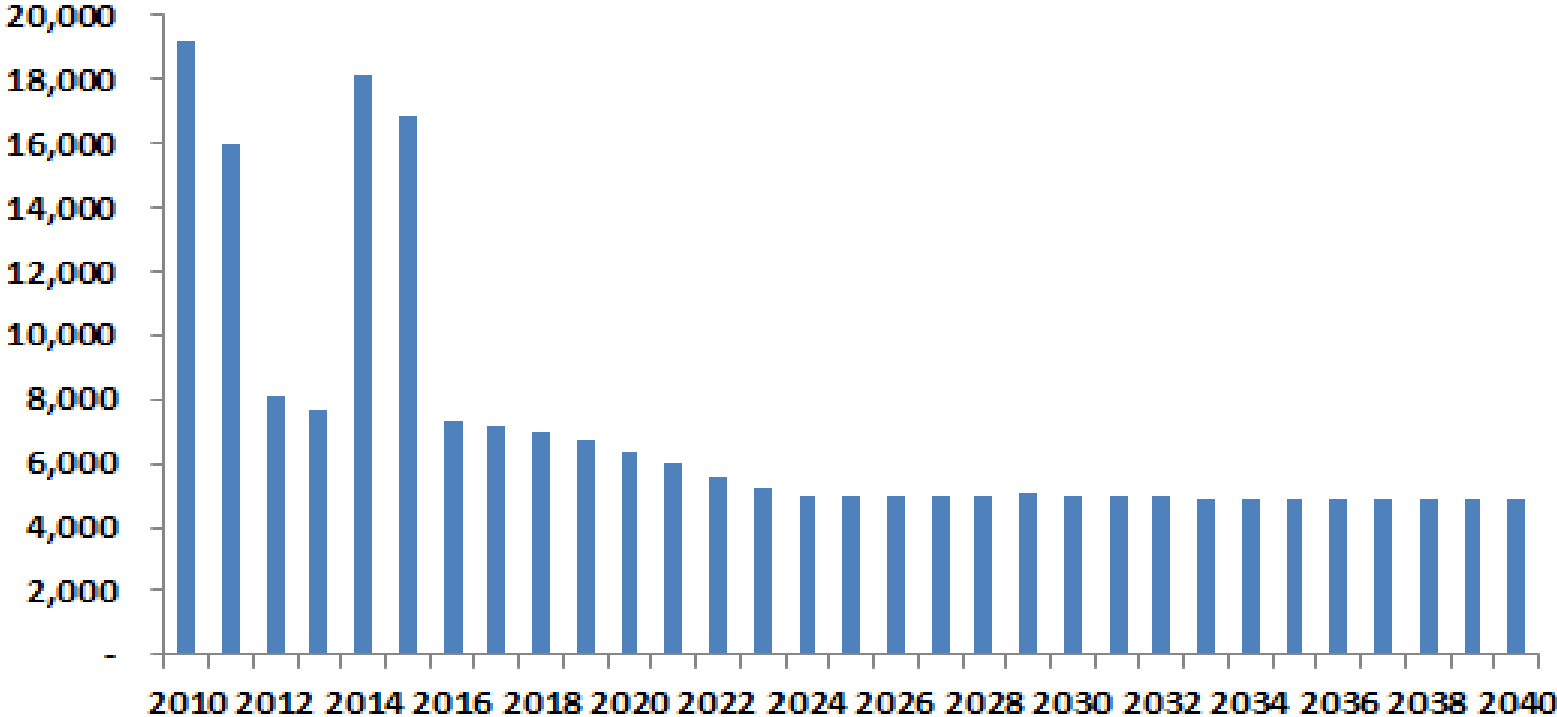
**end of period loan balance = (principal balance of existing account) + (interest accrual at t) – (interest and principal repayment at t) + (new loan supply at t)**

# Financial Projection of Regular Loan Program



## <New loan demand>

(100M.won)

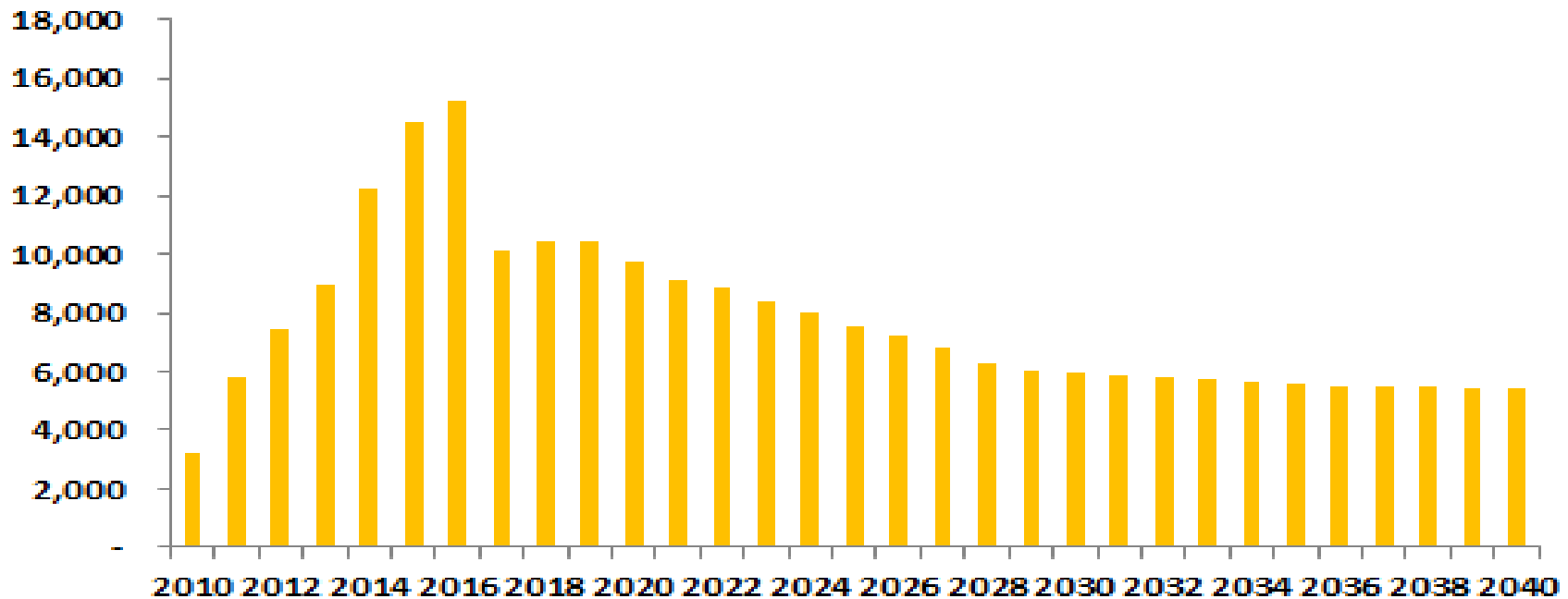


Note: after 2016 is expectation.

# Financial Projection of Regular Loan Program

## <Repayment of principle and interests>

(100M.won)

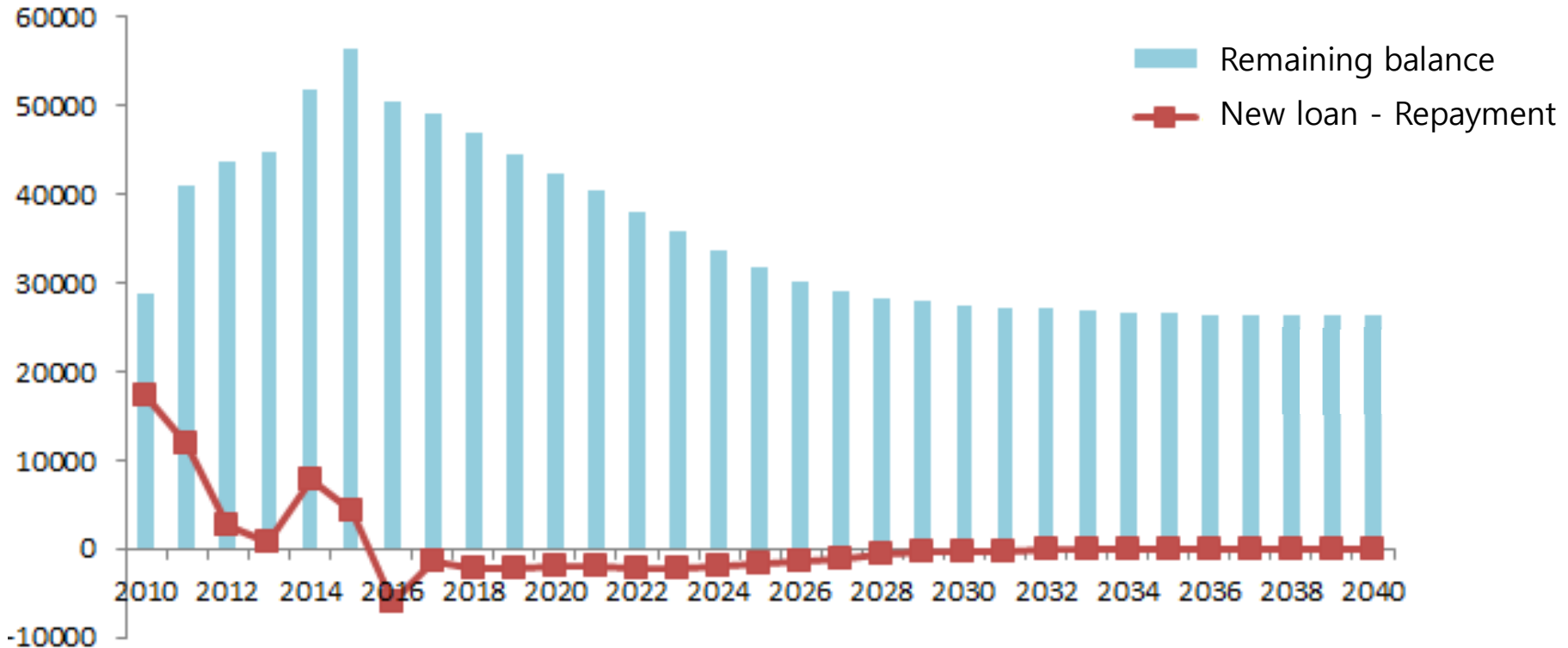


Note: After 2016 is expectation.

# Financial Projection of Regular Loan Program

## <Remaining Balance>

(100M.won)



Note: after 2016 is expectation.



# Financial Projection of Regular Loan Program

year	New loan	Repayment of principal	Repayment of interest	Funding cost of KOSAF	Yearly cash flow	Remaining loan Balance
2010	19,205	1,982	1,249	1,251	-17,225	28,832
2011	15,980	3,804	2,006	1,711	-11,881	41,007
2012	8,115	5,310	2,179	2,051	-2,677	43,812
2013	7,709	6,821	2,132	1,952	-708	44,699
2014	18,158	10,234	2,039	2,025	-7,910	51,893
2015	16,866	12,446	2,057	1,935	-4,298	56,294
2016	7,355	13,264	1,989	1,761	6,137	50,385
2017	7,145	8,521	1,573	1,564	1,385	49,009
2018	6,938	9,000	1,441	1,391	2,112	46,947
2019	6,736	9,108	1,306	1,372	2,306	44,575
2020	6,376	8,549	1,191	1,289	2,075	42,402
2021	5,972	8,026	1,083	1,196	1,941	40,348
2022	5,606	7,862	989	1,072	2,173	38,092
2023	5,196	7,456	901	1,032	2,129	35,831
2024	4,985	7,148	822	963	2,022	33,668
2025	4,929	6,816	753	901	1,739	31,781
2026	4,945	6,513	694	844	1,418	30,213
2027	4,964	6,176	647	761	1,098	29,001
2028	4,988	5,639	617	738	530	28,351
2029	5,050	5,452	599	727	274	27,948
2030	4,961	5,353	588	702	278	27,556
2031	4,965	5,274	579	688	200	27,247
2032	4,985	5,197	571	660	123	27,035
2033	4,901	5,126	566	659	132	26,810
2034	4,895	5,059	561	656	69	26,646
2035	4,892	5,003	557	653	15	26,535
2036	4,886	4,959	555	653	-25	26,462
2037	4,880	4,925	553	653	-55	26,417
2038	4,869	4,900	552	654	-71	26,386
2039	4,852	4,882	552	655	-73	26,356
2040	4,838	4,868	552	656	-74	26,326

# Financial Projection of ICL

- ◆ Source: Micro data from KOSAF
- ◆ Summary of Basic Data

Year	Supply(100M.won)	Number of account	Number of person	Loan amount per borrower (10 thousand Won)
2010	8,456	355,729	174,412	485
2011	10,873	474,311	215,643	504
2012	15,150	792,644	342,586	442
2013	17,812	902,810	390,001	457
2014	17,358	888,006	391,241	444
2015	14,198	773,984	347,259	409

- ◆ Observations: 4,187,484 accounts, 1,057,702 persons
  - Average loan balance per accounts: 2.0 M Won
  - Average number of accounts per person: 3.96 accounts
  - Average loan balance per person: 7.92 M Won

# Financial Projection of ICL

## <yearly ICL supply and remaining balance>

(100M.won)

	2010	2011	2012	2013	2014	2015	
2010	Number of account	355,729	335,793	328,165	314,006	294,488	270,387
	ICL principal	8,456	8,192	8,026	7,735	7,306	6,754
	Remaining balance(%)	-	97.31	93.10	87.02	79.13	69.61
	Remaining number of account(%)	-	94.40	92.25	88.27	82.78	76.01
2011	Number of account	-	474,311	468,888	459,624	444,122	419,315
	ICL principal	-	10,873	10,745	10,548	10,213	9,673
	Remaining balance(%)	-	-	97.60	93.98	88.22	80.41
	Remaining number of account(%)	-	-	98.86	96.90	93.64	88.41
2012	Number of account	-	-	792,644	783,103	765,701	736,650
	ICL principal	-	-	15,150	14,966	14,658	14,137
	Remaining balance(%)	-	-	-	96.16	92.13	85.66
	Remaining number of account(%)	-	-	-	98.79	96.60	92.93
2013	Number of account	-	-	-	902,810	887,249	858,310
	ICL principal	-	-	-	17,812	17,507	16,982
	Remaining balance(%)	-	-	-	-	92.33	87.94
	Remaining number of account(%)	-	-	-	-	98.28	95.07
2014	Number of account	-	-	-	-	888,006	868,944
	ICL principal	-	-	-	-	17,358	16,994
	Remaining balance(%)	-	-	-	-	-	94.57
	Remaining number of account(%)	-	-	-	-	-	97.85
2015	Number of account	-	-	-	-	-	773,984
	ICL principal	-	-	-	-	-	14,198
	Remaining balance(%)	-	-	-	-	-	-
	Remaining number of account(%)	-	-	-	-	-	-

# Financial Projection of ICL

## <vintage 2010 ICL supply and remaining balance>

(100M.won)

	2010	2011	2012	2013	2014	2015	
<b>2010 Freshmen</b>	Number of account	192,786	177,112	173,806	168,664	161,925	152,449
	ICL principal	4,742	4,536	4,461	4,352	4,192	3,955
	Remaining balance(%)	-	97.83	94.97	90.83	84.77	76.81
	Remaining number of account(%)	-	91.87	90.15	87.49	83.99	79.08
	Not-repaying accounts(%)	-	87.58	83.82	78.43	71.09	61.69
<b>2010 Sophomore</b>	Number of account	67,169	65,415	63,876	61,303	57,474	52,799
	ICL principal	1,537	1,514	1,482	1,430	1,349	1,248
	Remaining balance(%)	-	97.14	93.04	86.94	79.02	68.75
	Remaining number of account(%)	-	97.39	95.10	91.27	85.57	78.61
	Not-repaying accounts(%)	-	92.06	86.01	78.10	67.28	54.44
<b>2010 Junior</b>	Number of account	48,783	47,461	46,515	44,267	40,668	35,834
	ICL principal	1,125	1,108	1,089	1,041	963	857
	Remaining balance(%)	-	97.51	92.46	84.26	73.08	60.65
	Remaining number of account(%)	-	97.29	95.35	90.74	83.37	73.46
	Not-repaying accounts(%)	-	92.50	85.26	74.41	60.07	43.12
<b>2010 Senior</b>	Number of account	46,592	45,417	43,588	39,433	34,155	29,082
	ICL principal	1,041	1,024	985	904	795	688
	Remaining balance(%)	-	95.12	85.87	73.89	61.73	49.72
	Remaining number of account(%)	-	97.48	93.55	84.63	73.31	62.42
	Not-repaying accounts(%)	-	89.14	75.79	61.41	44.43	32.07
<b>2010 Senior+</b>	Number of account	399	388	380	339	266	223
	ICL principal	10	10	10	9	7	6
	Remaining balance(%)	-	96.19	85.36	67.80	55.17	39.89
	Remaining number of account(%)	-	97.24	95.24	84.96	66.67	55.89
	Not-repaying accounts(%)	-	90.73	75.19	50.88	39.10	22.81

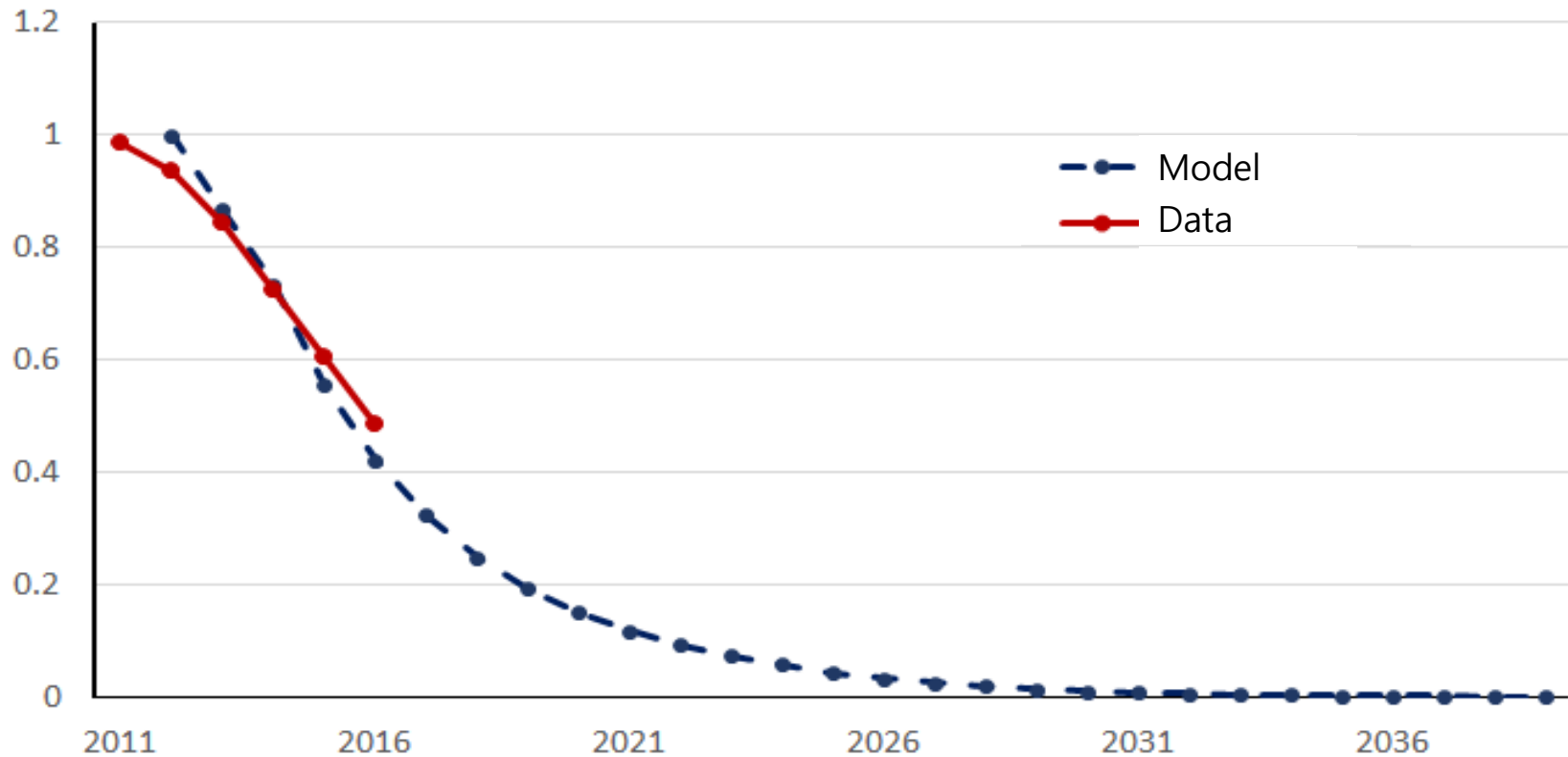
## ◆ Stylized facts and estimation strategy

- Voluntary Repayment is much more substantial than mandatory repayment
- Labor market participation assumption is very crucial
- Matching our available repayment data(2010~2015) with cash flow from dynamic labor market model prediction
- Assumption
  - ✓ Part-time workers are not paying back mandatory repayment.
  - ✓ Full-time worker wage is based on wage data of Statistics Bureau.
  - ✓ Remaining loan balance until the age of 40 is assumed to be not payed back.

# Financial Projection of ICL

## <Remaining ICL balance after entering labor market>

(%)

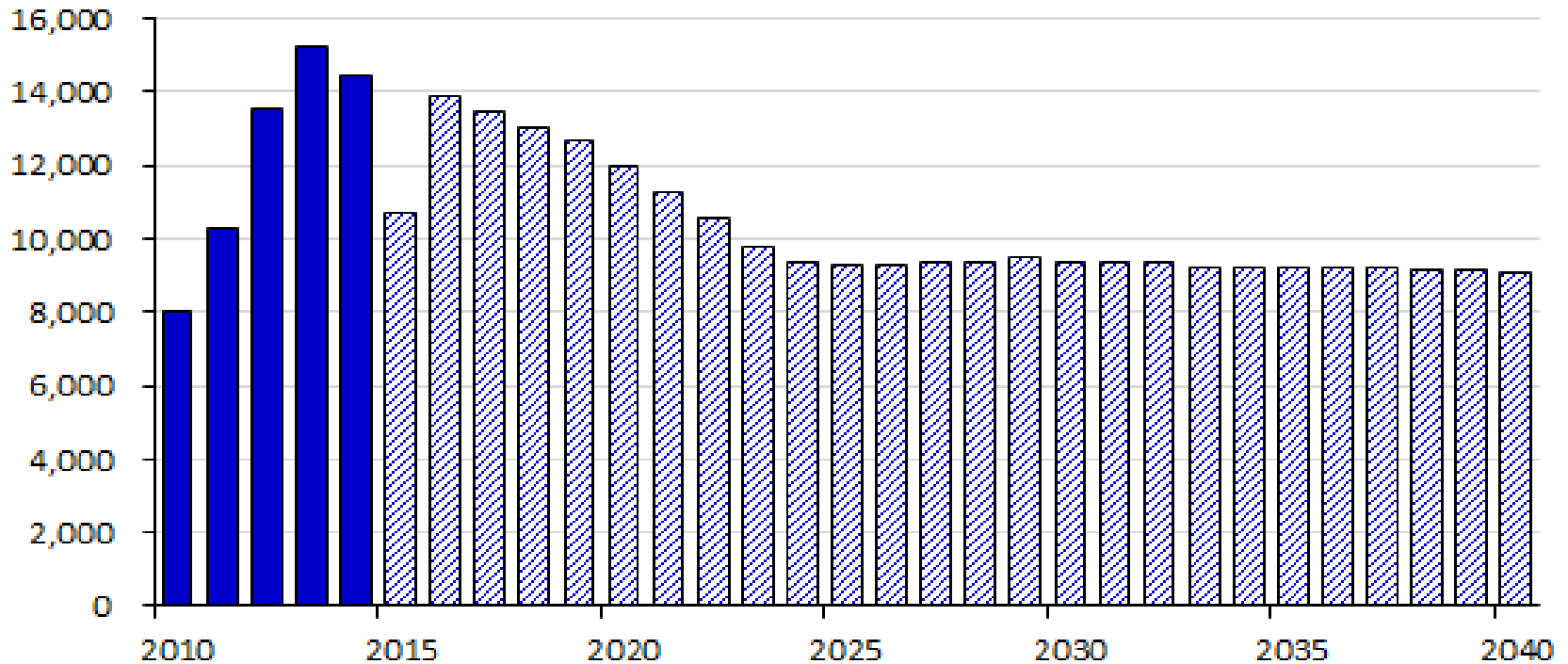


Senior student 2010 vintage loan case

# Financial Projection of ICL

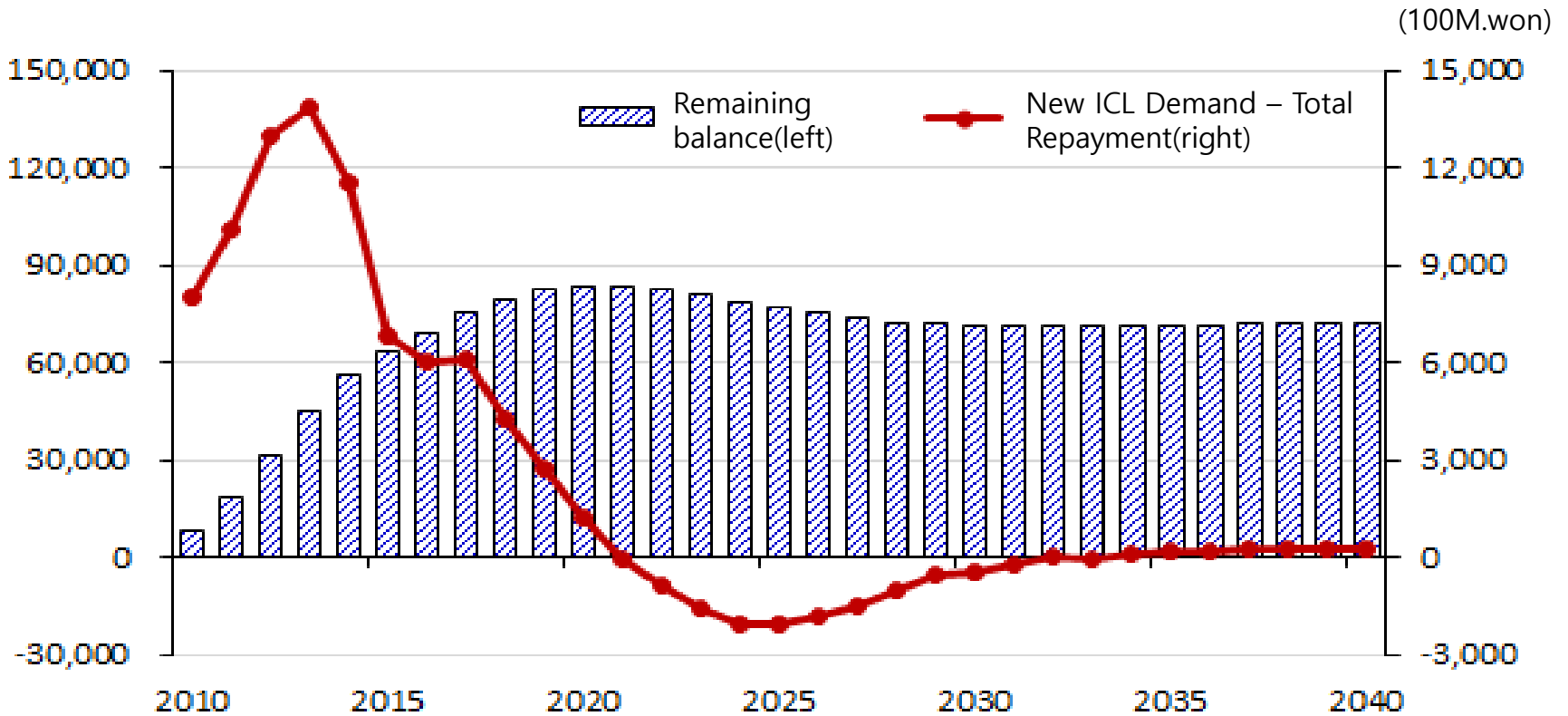
## <New ICL Demand>

(100M.won)



# Financial Projection of ICL

## <Remaining balance>





# Financial Projection of ICL

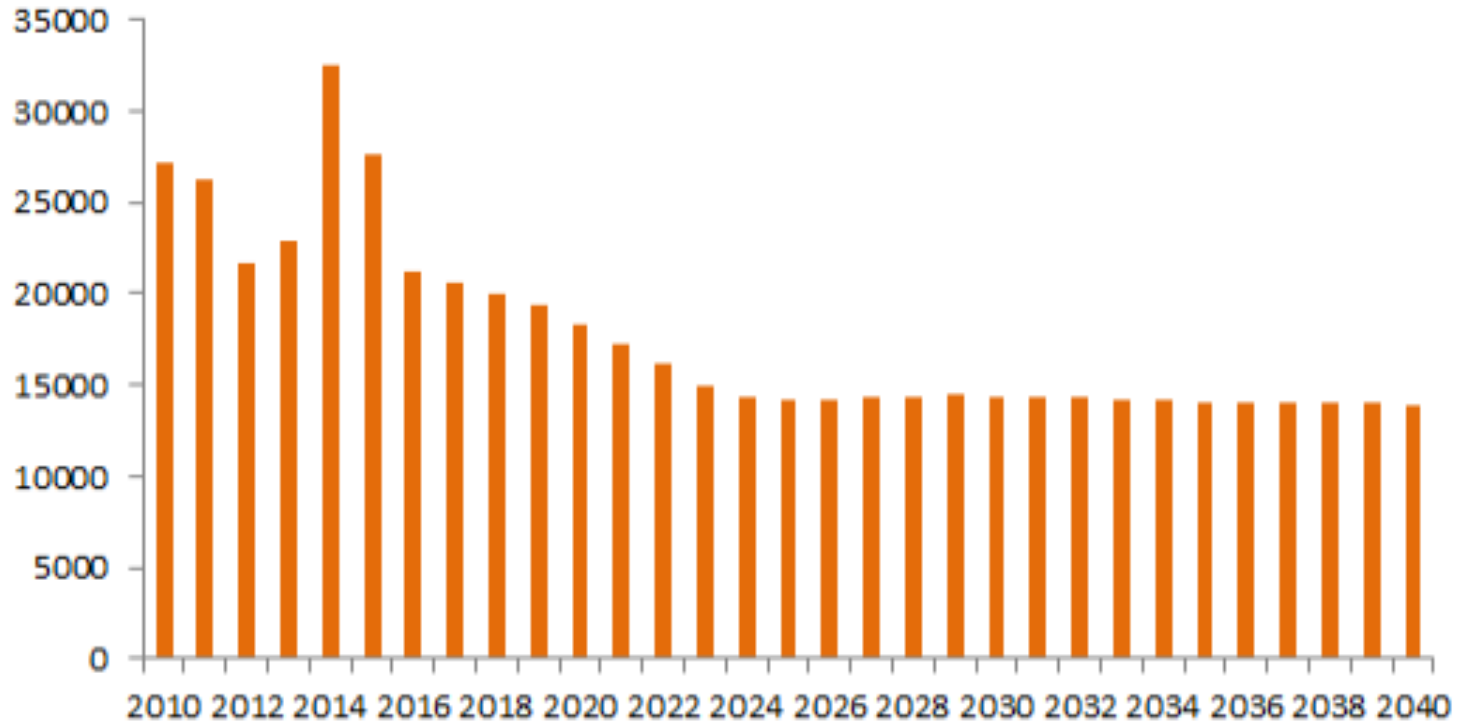
(100M.won)

year	New ICL Demand	Total Repayment	Yearly cash flow	Remaining Balance
2010	8,006	0	-8,006	8,006
2011	10,285	215	-10,070	18,076
2012	13,546	584	-12,962	31,038
2013	15,215	1,378	-13,836	44,874
2014	14,424	2,939	-11,485	56,359
2015	10,733	3,892	-6,841	63,200
2016	13,847	7,838	-6,009	69,209
2017	13,452	7,400	-6,052	75,261
2018	13,061	8,793	-4,268	79,529
2019	12,682	9,934	-2,748	82,277
2020	12,004	10,839	-1,166	83,442
2021	11,243	11,341	98	83,344
2022	10,553	11,418	865	82,480
2023	9,781	11,406	1,624	80,855
2024	9,386	11,458	2,072	78,784
2025	9,280	11,346	2,066	76,718
2026	9,311	11,134	1,823	74,894
2027	9,345	10,826	1,481	73,414
2028	9,391	10,446	1,055	72,358
2029	9,508	10,104	596	71,762
2030	9,339	9,811	472	71,290
2031	9,348	9,565	217	71,073
2032	9,385	9,396	11	71,062
2033	9,227	9,274	47	71,015
2034	9,216	9,159	-56	71,072
2035	9,209	9,074	-135	71,207
2036	9,198	9,009	-189	71,396
2037	9,188	8,955	-233	71,629
2038	9,167	8,913	-253	71,882
2039	9,135	8,881	-254	72,136
2040	9,108	8,852	-255	72,391

# Financial Projection of (regular loan + ICL)

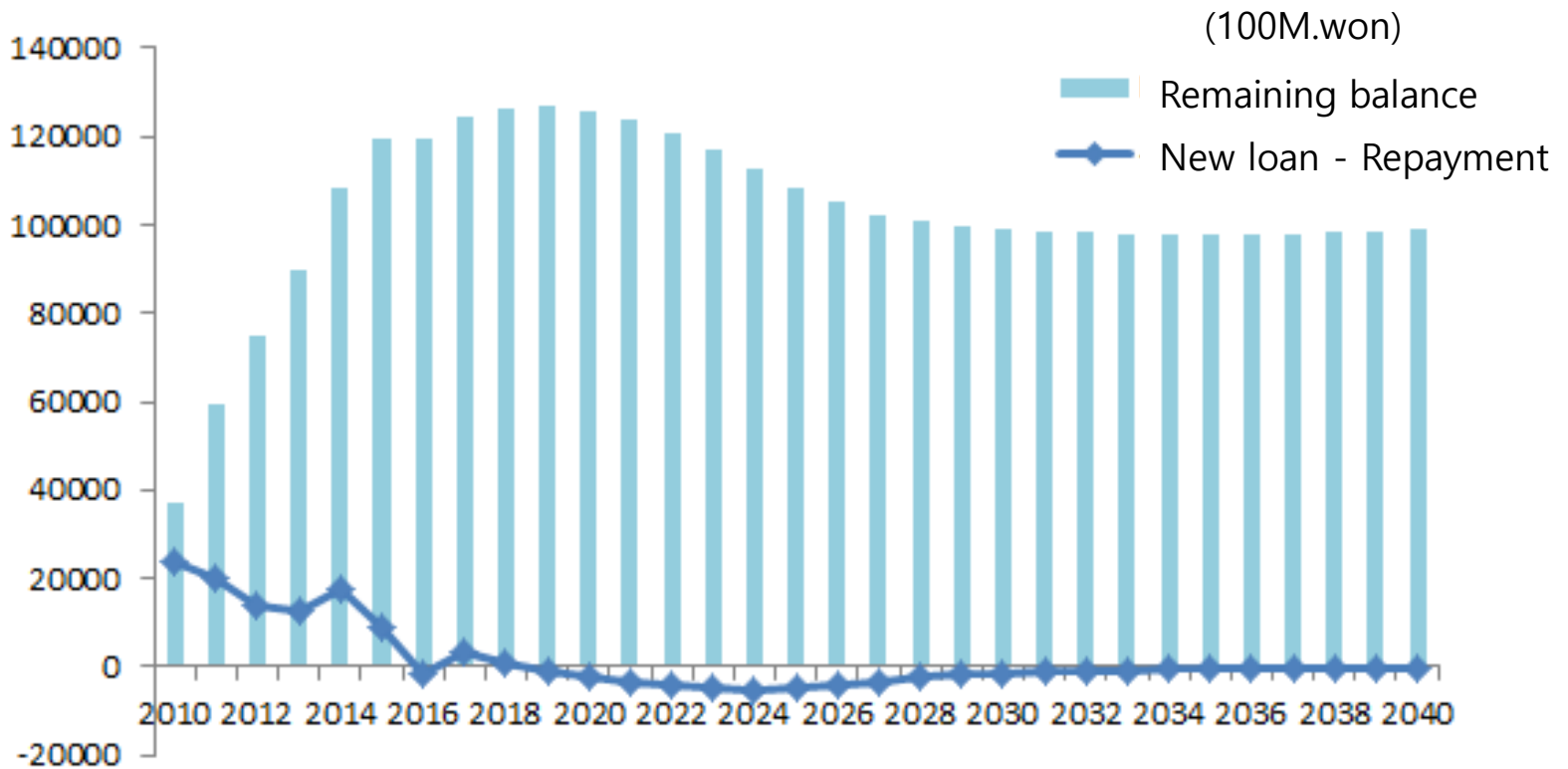
## <New loan demand>

(100M.won)



# Financial Projection of (regular loan + ICL)

## <Remaining Balance>



# Financial Projection of (regular loan + ICL)

(100M.won)

year	New loan	Total repayments	Yearly cash flow	Remaining loan balance
2010	27,211	3,231	-25,231	36,838
2011	26,265	6,025	-21,951	59,083
2012	21,661	8,073	-15,639	74,850
2013	22,924	10,331	-14,544	89,573
2014	32,582	15,212	-19,395	108,252
2015	27,599	18,395	-11,139	119,494
2016	21,202	23,091	128	119,594
2017	20,597	17,494	-4,667	124,270
2018	19,999	19,234	-2,156	126,476
2019	19,418	20,348	-442	126,852
2020	18,380	20,579	909	125,844
2021	17,215	20,450	2,039	123,692
2022	16,159	20,269	3,038	120,572
2023	14,977	19,763	3,753	116,686
2024	14,371	19,428	4,094	112,452
2025	14,209	18,915	3,805	108,499
2026	14,256	18,341	3,241	105,107
2027	14,309	17,649	2,579	102,415
2028	14,379	16,702	1,585	100,709
2029	14,558	16,155	870	99,710
2030	14,300	15,752	750	98,846
2031	14,313	15,418	417	98,320
2032	14,370	15,164	134	98,097
2033	14,128	14,966	179	97,825
2034	14,111	14,779	13	97,718
2035	14,101	14,634	-120	97,742
2036	14,084	14,523	-214	97,858
2037	14,068	14,433	-288	98,046
2038	14,036	14,365	-324	98,268
2039	13,987	14,315	-327	98,492
2040	13,946	14,272	-329	98,717

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**III. Policy Issues**

## ◆ Long term financial projection of KOSAF

- Limited data (5~6 years)
- Voluntary repayment is substantial.
- Behind motives of 'voluntary repayment' is black-box:
  - ✓ family support
  - ✓ concerns for accumulation of interests and etc.

# Policy Issues

## ◆ Policy direction of Korean Gov. and Political Parties

- Decrease of loan interest rate
- Interest rate determination: Discretion based → Rule based
  - ✓ Funding rate based.
  - ✓ Market rate based
  - ✓ Risk based : Funding rate +  $\alpha$ (risk premium)
  - ✓ Social Subsidy based
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- Optimization of KOSAF funding structure: ALM
  - ✓ Long-term financial projections
  - ✓ Minimization of spreads of KOSAF bonds
- Interest subsidy for low income level households
- Income tax deduction for repayments of loans
- More favorable asset-to-income conversion formula to verify income level
- More generous loan applicability criterion
  - ✓ Age
  - ✓ Income level
  - ✓ GPA limit
  - ✓ Foreign college
  - ✓ Increase of loan amount (living expenses)