

Mirae Asset Securities Co., Ltd.
Choong-hyun Kim, CFA choonghyun.kim@miraeasset.com



096530 KQ · Medtech

Seegene

Impact of falling COVID-19-related revenue is easing

(Maintain)
Trading Buy

Target price
W25,000 ▼

Upside
18.2%

Current price (8/17/23)
W21,150

KOSDAQ	886.04	Market cap (Wbn)	1,105	Shares outstanding (mn)	52	Foreign ownership (%)	9.8
--------	--------	------------------	-------	-------------------------	----	-----------------------	-----

Report summary

Revenue comes in line; operating losses continue, but SG&A expenses fall to lowest level in 11 quarters

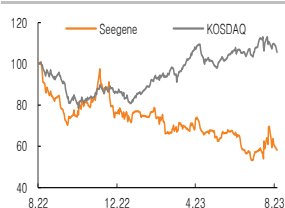
In 2Q23, Seegene's COVID-19-related revenue (test kits and reagents) slumped 75% YoY to W16.8bn. Instruments/other revenue also declined 20% YoY to W18.2bn. However, non-COVID-19 test kit revenue grew 31% YoY to W49.9bn, bringing overall revenue in line with the consensus. Operating losses continued, but SG&A expenses fell 24% YoY to the lowest level in 11 quarters.

Trading at a 12-month forward EV/EBITDA of 8x, a discount to global peers (14x) and the three-year average (9x)

Non-COVID-19 test kit revenue per PCR detection machine, which fell to W6.3mn during the pandemic, has recovered to W8.9mn. In 4Q23, we forecast that figure to surpass the pre-pandemic level (W11.7mn). The number of PCR detection machines installed has also increased to 5,600 units from 1,800 units pre-pandemic. Given non-COVID-19 test kit revenue trends and cost-saving efforts, we expect quarterly revenue to continue to grow sequentially from 3Q23 through 4Q24. We expect Seegene to swing to an operating profit in 4Q23, with full-year OP margin recovering to double-digit levels from 2024.

Key data

Price performance



(%)	1M	6M	12M
Absolute	1.9	-21.3	-42.2
Relative	4.0	-29.7	-45.1

Earnings and valuation metrics

(Dec.)	2021	2022	2023F	2024F	2025F
Revenue (Wbn)	1,371	854	354	395	476
OP (Wbn)	667	196	-30	39	99
OP margin (%)	48.7	23.0	-8.5	9.9	20.8
NP (Wbn)	537	182	-1	42	91
EPS (W)	10,274	3,488	-18	795	1,738
ROE (%)	62.1	16.3	-0.1	4.0	8.5
P/E (x)	5.9	7.8	-	26.7	12.2
P/B (x)	2.8	1.1	0.9	0.9	0.9
Dividend yield (%)	1.6	2.9	3.8	3.8	3.8

Notes: Under non-consolidated K-IFRS; NP is attributable to owners of the parent
Source: Company data, Mirae Asset Securities Research estimates

2Q23 review

Revenue meets consensus, but operating loss is worse than expected

For 2Q23, Seegene reported revenue of W84.9bn (-34% YoY), in line with the consensus. By region, revenue was W11bn (+34% YoY) in Korea, W6.5bn (-46% YoY) in North America, W45.3bn (-36% YoY) in Europe, and W22.1bn (-41% YoY) in Asia/the Middle East.

COVID-19-related revenue (kits and reagents) slumped 75% YoY to W16.8bn, but revenue from non-COVID-19 test kits (respiratory, women's health, gastrointestinal, etc.) grew 31% YoY to W49.9bn. Respiratory revenue grew 7% YoY to W12.2bn, driven by respiratory bacterial testing (+88% YoY). Women's health revenue grew 11% YoY to W12.2bn, while HPV revenue increased 43% YoY to W7.3bn. Gastrointestinal revenue expanded 67% YoY to W11bn, spurred by the accelerating transition from traditional testing (cell culture) to PCR testing. Other revenue jumped 80% YoY to W7.2bn.

Instruments/other revenue declined 20% YoY to W18.2bn. The company sold 161 units in the quarter: 73 extraction machines (2,953 units cumulatively) and 88 detection machines (5,679 units cumulatively). Asia accounted for 40% of installations, Europe 56%, and other regions 4%.

At the operating level, the company remained in the red (loss of W9.7bn). However, SG&A expenses shrank 24% YoY to W57.1bn, the lowest level in 11 quarters. In particular, R&D spending, which skyrocketed to W34.7bn in 2Q22, dropped to W17.5bn (the lowest level since 1Q21), suggesting cost-saving efforts are continuing.

Table 1. 2Q23 review

(Wbn, %, %p)

	2Q22	1Q23	2Q23			Growth	
			Actual	Mirae Asset Securities	Consensus	YoY	QoQ
Revenue	128.4	90.0	84.9	86.5	86.5	-33.9	-5.7
OP	13.0	-13.8	-9.7	-0.5	-0.5	TTR	RR
OP margin (%)	10.1	-15.3	-11.4	-0.6	-0.6	-21.5	3.9
NP	25.2	2.1	-2.5	1.1	1.1	TTR	TTR

Note: Under K-IFRS

Source: Company data, FnGuide, Mirae Asset Securities Research estimates

Table 2. Earnings forecast revisions

(Wbn, %)

	Previous		Revised		% chg.		Notes
	23F	24F	23F	24F	23F	24F	
Revenue	356.2	401.9	354.3	395.1	-0.5	-1.7	Reflected 2Q23 results
OP	1.2	51.2	-29.6	39.1	-2,669.8	-23.6	
Pretax profit	23.9	60.0	-1.4	51.6	-105.7	-14.0	
NP	17.2	42.7	-1.0	41.5	-105.6	-2.7	
EPS (W)	329	817	-18	795	-105.6	-2.7	

Note: Under K-IFRS

Source: Mirae Asset Securities Research estimates

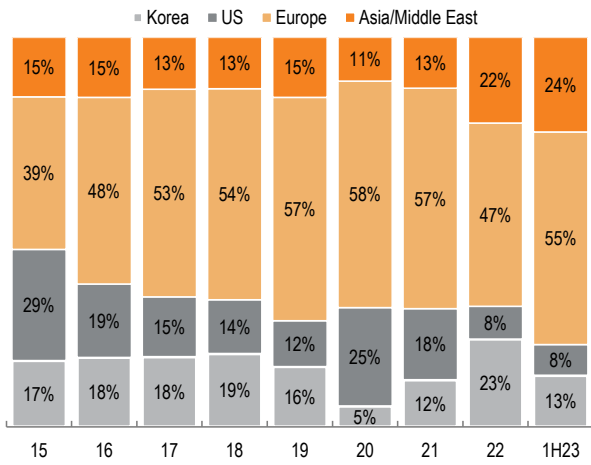
Table 3. Quarterly and annual earnings

(Wbn)

	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	2022	2023F	2024F
Revenue	451.5	128.4	150.8	122.8	90.0	84.9	85.4	93.9	853.6	354.3	395.1
Products	372.9	105.6	115.5	108.2	67.7	66.7	66.1	76.8	702.2	277.3	296.6
COVID-19	321.2	59.3	64.2	47.3	13.3	10.3	7.3	5.2	492.0	36.1	10.6
Respiratory	4.9	11.4	11.1	16.2	10.8	12.2	13.2	20.6	43.6	56.8	69.3
Women's health	11.7	11.0	11.9	11.6	11.8	12.2	13.2	13.9	46.2	51.1	62.3
HPV	4.7	5.1	5.5	6.6	6.3	7.3	7.8	8.3	21.9	29.7	36.2
GI	6.0	6.6	8.7	10.4	9.8	11.0	11.7	13.2	31.7	45.8	55.8
Extraction reagents	20.3	8.2	8.8	8.7	8.1	6.5	5.3	6.1	46.0	26.0	23.4
Other	4.1	4.0	5.3	7.4	7.6	7.2	7.7	9.4	20.8	31.9	38.9
Instruments	78.6	22.8	35.3	14.6	22.4	18.2	19.3	17.2	151.4	77.0	98.5
OP	199.7	13.0	-32.2	16.1	-13.8	-9.7	-6.1	-0.1	196.5	-29.6	39.1
NP (owners of the parent)	165.5	25.2	-11.1	2.6	2.1	-2.5	-2.3	1.8	182.1	-1.0	41.5
Revenue growth (%)	28.3	-57.7	-50.6	-70.0	-80.1	-33.9	-43.4	-23.5	-37.7	-58.5	11.5
Products	32.0	-57.2	-55.1	-69.7	-81.8	-36.8	-42.8	-29.0	-38.6	-60.5	7.0
COVID-19	42.9	-70.2	-67.2	-83.7	-95.9	-82.6	-88.6	-89.0	-45.9	-92.7	-70.7
Respiratory	-31.9	123.5	42.3	82.0	120.4	7.0	18.5	27.3	50.3	30.2	22.1
Women's health	55.3	29.4	16.7	2.7	0.9	10.9	10.5	19.9	23.1	10.5	22.0
HPV	34.3	27.5	31.0	29.4	34.0	43.1	41.4	25.4	30.4	35.4	22.0
GI	39.5	17.9	27.9	65.1	63.3	66.7	34.7	27.3	37.8	44.3	22.0
Extraction reagents	-36.2	-60.0	-66.9	-71.3	-60.1	-20.7	-39.6	-29.6	-57.9	-43.4	-10.0
Other	21.9	-2.4	-10.2	29.8	85.4	80.0	44.8	27.3	9.1	53.3	22.0
Instruments	13.4	-60.0	-26.7	-72.3	-71.5	-20.3	-45.4	17.3	-33.4	-49.1	27.9
OP margin (%)	44.2	10.1	-21.4	13.1	-15.3	-11.4	-7.1	-0.1	23.0	-8.4	9.9
Net margin (owners of the parent, %)	36.7	19.5	-7.5	2.4	2.3	-3.0	-2.7	1.9	21.3	-0.3	10.5

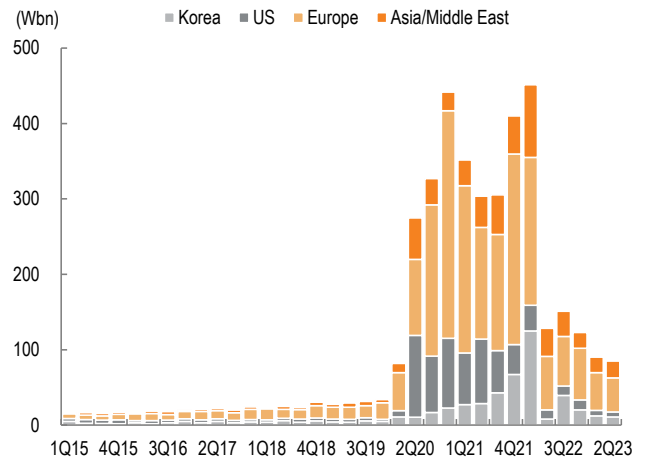
Source: Company data, Mirae Asset Securities Research

Figure 1. Revenue breakdown by region



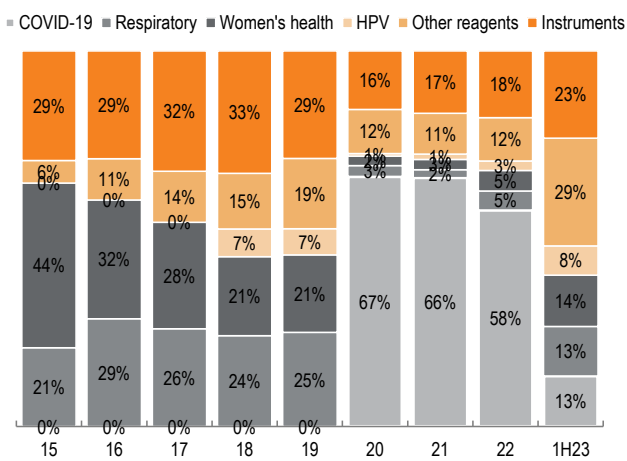
Source: Company data, Mirae Asset Securities Research

Figure 2. Revenue by region



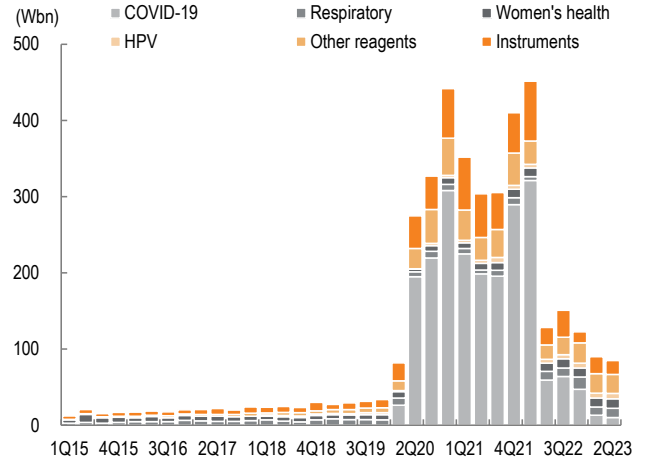
Source: Company data, Mirae Asset Securities Research

Figure 3. Revenue breakdown by category



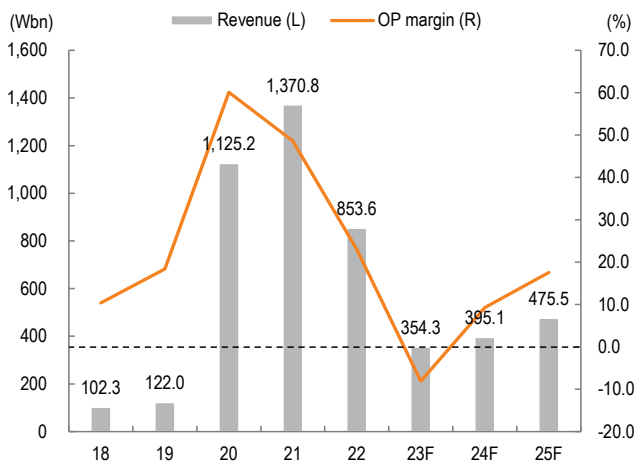
Source: Company data, Mirae Asset Securities Research

Figure 4. Revenue by category



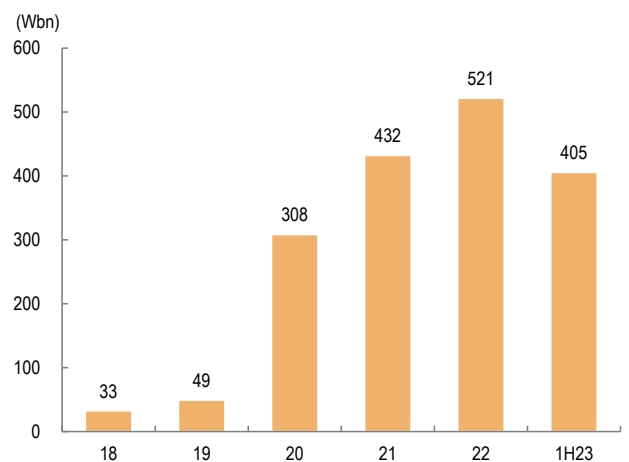
Source: Company data, Mirae Asset Securities Research

Figure 5. Revenue and OP margin



Source: Company data, Mirae Asset Securities Research

Figure 6. Cash and cash equivalents



Source: Company data, Mirae Asset Securities Research

Earnings forecasts and valuation

Earnings forecasts

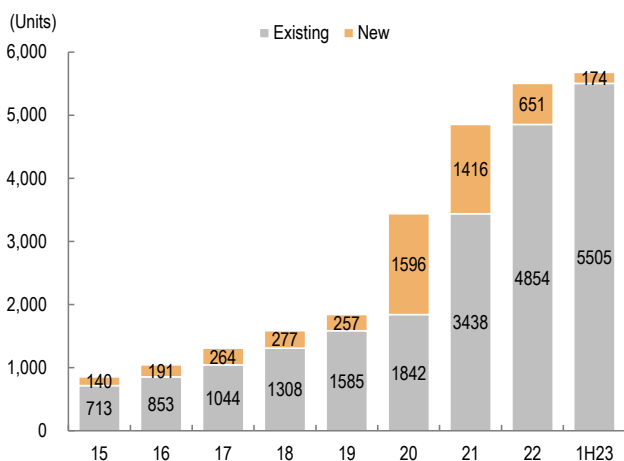
After peaking at W321.2bn in 1Q22, COVID-19 test kit revenue has been rapidly shrinking since 2Q22, amounting to just W10.3bn in 2Q23 (the lowest level since sales began). As a percentage of overall revenue, COVID-19-related revenue declined from 86% in 1Q22 to 15% in 2Q23. On a positive note, the YoY decrease in COVID-19-related revenue eased to W49bn in 2Q23 from around W307.9bn in 1Q23. As the impact of falling COVID-19-related revenue on earnings has waned, visibility on future earnings has improved.

In the post-pandemic age, non-COVID-19 test kits will be key to Seegene’s earnings outlook. Sales activities for non-COVID-19 test kits were severely limited during the pandemic due to the disproportionate share of COVID-19 revenue. Non-COVID-19 test kit revenue per machine fell to W6.3mn in 1Q22 from a quarterly average of W11.7mn prior to the pandemic, which means that machine utilization was roughly halved.

In 2Q23, non-COVID-19 test kit revenue per machine recovered to W8.9mn. HPV test kit revenue is already back above the pre-pandemic level. Revenue from gastrointestinal test kits (for which sales activities started during the pandemic) is also steadily growing, spurred by the transition from the traditional cell culture method to PCR testing. Women’s health and respiratory test kit revenues have yet to recover to pre-pandemic levels, but are gradually picking up. Given current trends, we expect average revenue per machine to return to the pre-pandemic level by 2024.

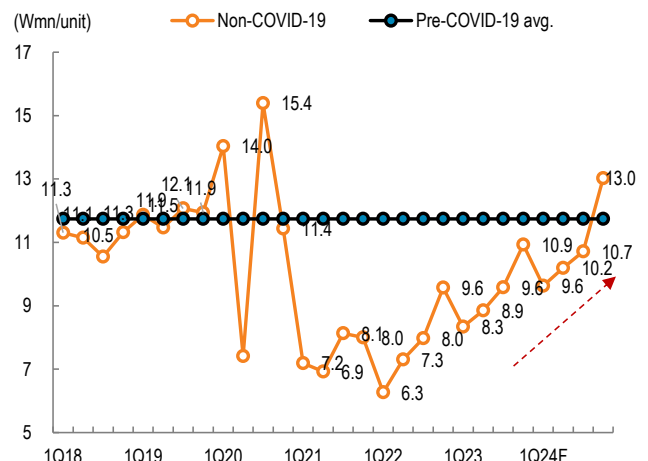
Even more encouraging than the pickup in revenue per machine is the steady growth in the number of machines installed. Indeed, 5,600 PCR detection machines are now installed, up from 1,800 at end-2019. This means that if revenue per machine returns to the pre-pandemic level, the company would generate more than three times the revenue it made during the pandemic.

Figure 7. More than 5,600 PCR detection machines installed globally



Source: Company data, Mirae Asset Securities Research

Figure 8. Non-COVID-19 kit revenue per machine

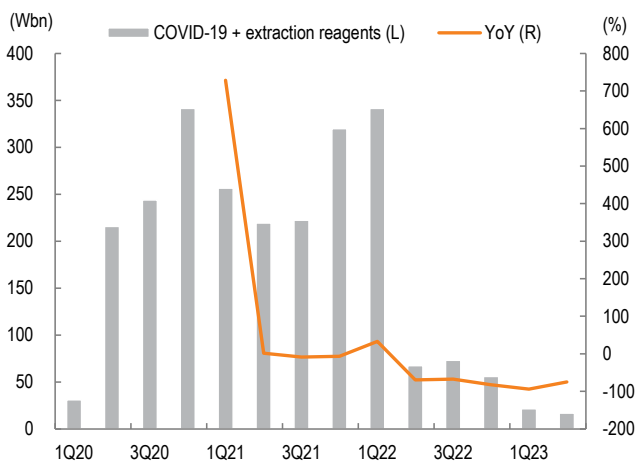


Source: Company data, Mirae Asset Securities Research

On a negative note, the share of licensed products has increased amid the sharp drop in overall revenue, pushing up the COGS ratio. That said, SG&A expenses remain under tight control. After rising to W65bn in 4Q22, quarterly SG&A expenses sequentially declined throughout 1H23. In 2Q23, labor expenses fell to W13.9bn, the lowest level in 13 quarters, thanks to a drop in head count (head office) to 880 (from 1,187 in 1Q22). R&D spending also dropped to W17.5bn, the lowest level in nine quarters.

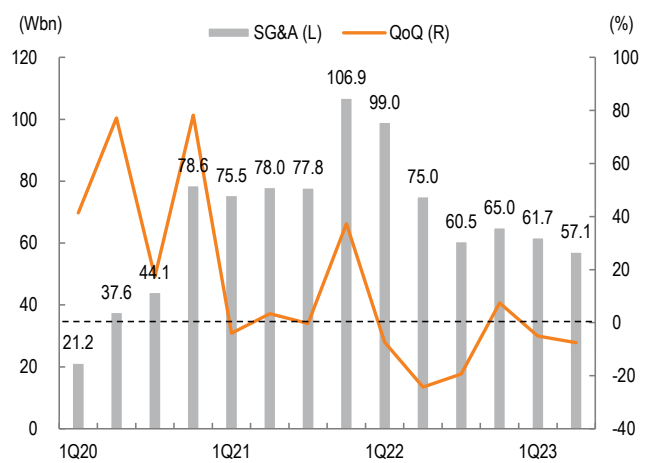
Given non-COVID-19 test kit revenue trends and cost-saving efforts, we expect quarterly revenue to continue to grow sequentially from 3Q23 through 4Q24. We also expect Seegene to swing to an operating profit in 4Q23. OP margin will likely recover at an accelerating rate in 2024 and normalize to pre-pandemic levels over time.

Figure 9. COVID-19 kit revenue



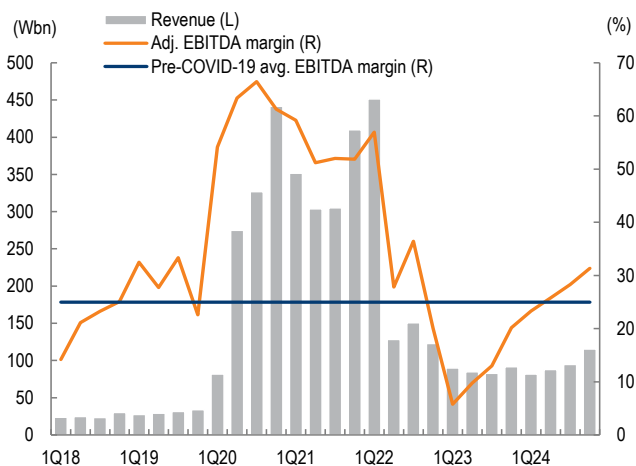
Source: Company data, Mirae Asset Securities Research

Figure 10. SG&A expenses and QoQ chg.



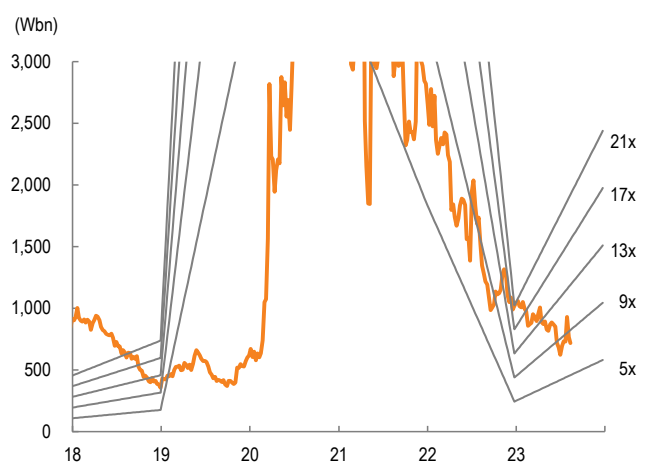
Source: Company data, Mirae Asset Securities Research

Figure 11. Adj. EBITDA margin



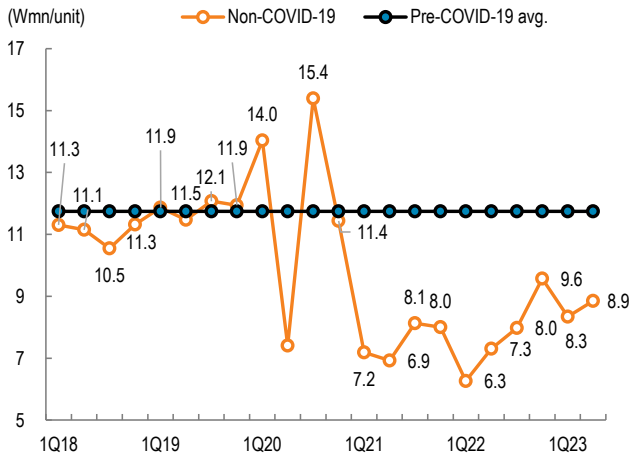
Source: Company data, Mirae Asset Securities Research

Figure 12. 12-month forward EV/EBITDA band



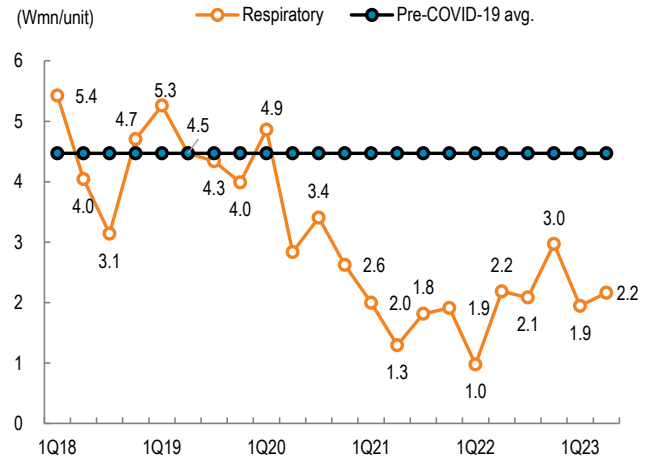
Source: Company data, Mirae Asset Securities Research

Figure 13. Non-COVID-19 kit revenue per machine



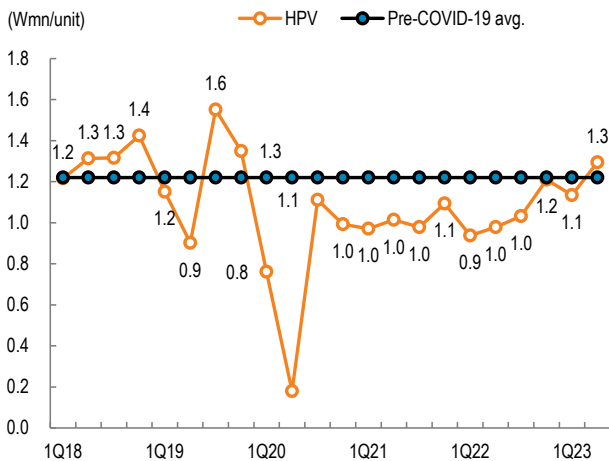
Source: Company data, Mirae Asset Securities Research

Figure 14. Respiratory kit revenue per machine



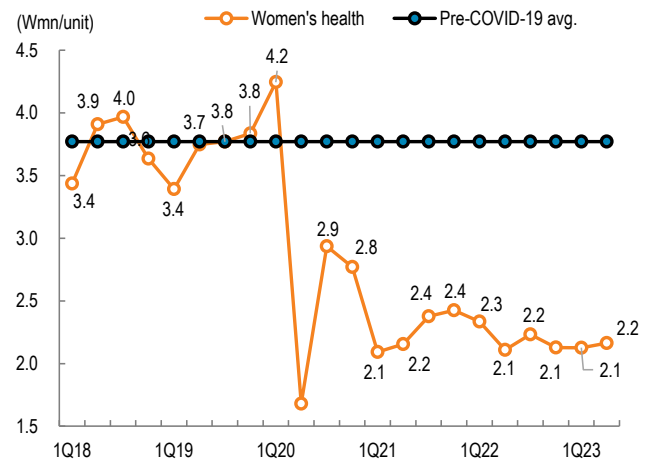
Source: Company data, Mirae Asset Securities Research

Figure 15. HPV kit revenue per machine



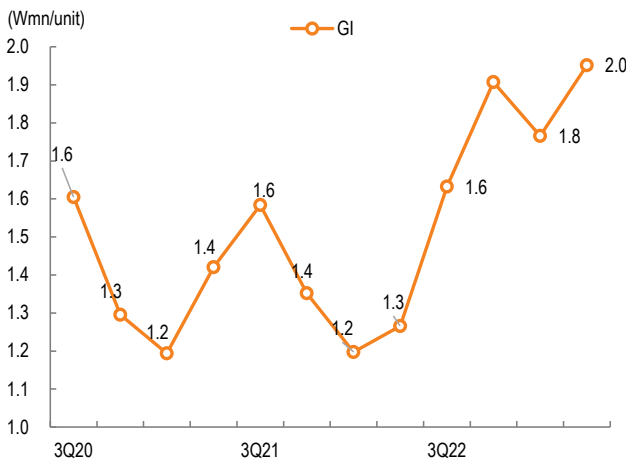
Source: Company data, Mirae Asset Securities Research

Figure 16. Women's health kit revenue per machine



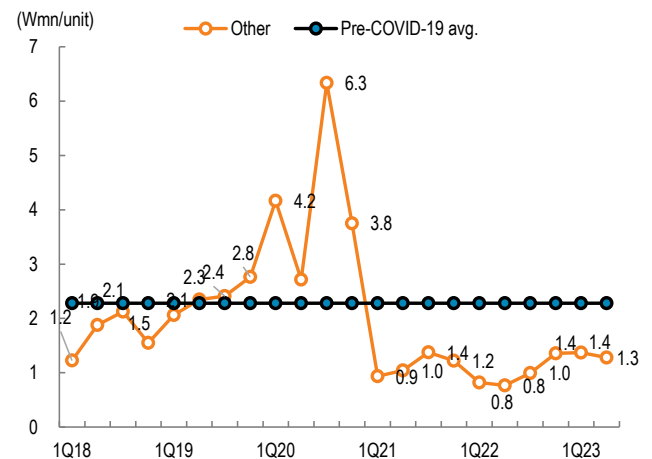
Source: Company data, Mirae Asset Securities Research

Figure 17. Gastrointestinal kit revenue per machine



Source: Company data, Mirae Asset Securities Research

Figure 18. Other revenue per machine



Source: Company data, Mirae Asset Securities Research

OneSystem project update

This year, as part of its post-pandemic business strategy, Seegene has begun to forge global partnership agreements under a technology-sharing initiative known as OneSystem. By sharing its syndromic PCR technologies with exclusive partners in countries around the world, the company aims to rapidly expand its sales network and product portfolio. Seegene allows partnering companies (through newly created subsidiaries or joint ventures) to use its technology to develop/sell PCR reagents in their respective countries.

Seegene signed its first technology-sharing agreement with Hy Laboratories (Israel) in March. And in June, Seegene announced an extended partnership with Werfen (Spain), with which it already collaborates in the Spanish and Portuguese markets; Seegene plans to expand its Spain/Portugal sales force to 12 by 2025 and double its non-COVID-19 revenue in these markets (from the 2023F level).

In June, the firm announced a partnership with Springer Nature, securing access to the publishing company's global network of top-tier scientists and professionals. Starting in 2H23, Seegene plans to recruit researchers to jointly conduct verification/clinical trials in relation to over 15 new product development projects. To this end, the firm will create its own space within Springer Nature's website. Going forward, the company plans to expand its technology-sharing partnerships in key export markets, including Europe and Asia.

Maintain Trading Buy and lower TP to W25,000 (from W25,800)

We lower our target price on Seegene to W25,000 (from W25,800) to reflect our earnings forecast revisions. With our new target price implying 18.2% upside to the current price, we maintain our Trading Buy recommendation.

Shares of Seegene are trading at a 12-month forward P/E of 43x—much higher than the global peer average of 21x. Based on 12-month forward EV/EBITDA, however, the stock is trading at 8x, a discount to global peers (14x) and its three-year average (9x).

Figure 19. Net buying by investor type vs. market cap

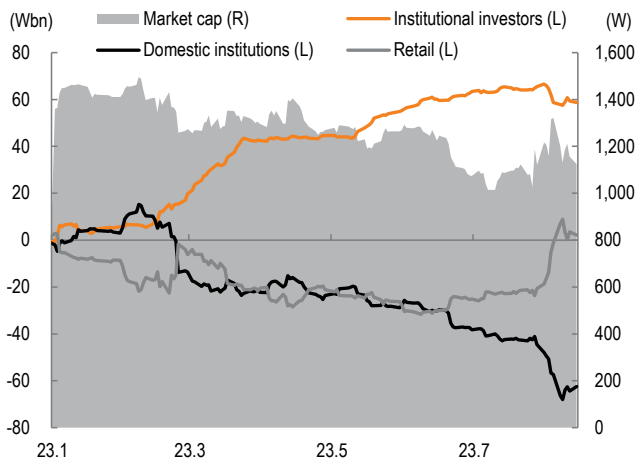
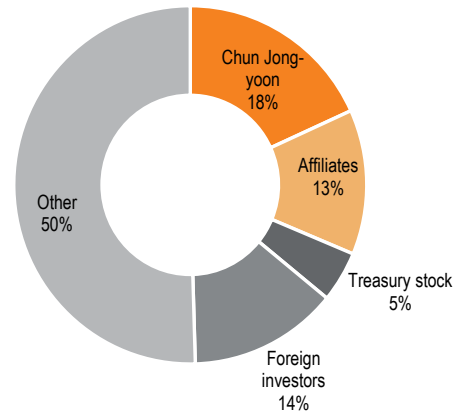


Figure 20. Ownership breakdown



Source: QuantiWise, Mirae Asset Securities Research

Source: QuantiWise, Mirae Asset Securities Research

Table 4. Global peer valuation table

Company	Market cap	OP margin (%)			P/E (x)			P/S (x)			ROE (%)			Revenue		
		22	23F	24F	22	23F	24F	22	23F	24F	22	23F	24F	22	23F	24F
Roche	326,854	26.6	32.8	33.7	19.0	14.1	12.9	3.4	3.6	3.5	42.7	46.1	42.5	89,019	89,730	93,383
Thermo Fisher	276,463	18.7	23.3	23.7	34.0	23.6	21.5	4.8	4.7	4.4	13.3	18.3	19.2	58,046	57,439	61,138
Abbott	244,082	19.2	22.1	21.9	31.9	23.9	22.7	4.6	4.6	4.4	14.0	19.0	19.7	56,415	52,459	55,055
Danaher	252,583	27.6	28.4	27.7	28.9	28.8	26.3	6.1	6.6	6.3	13.0	12.1	12.0	40,671	37,661	39,611
Labcorp	25,670	11.9	13.9	14.6	13.5	15.8	14.6	1.4	1.6	1.5	8.7	12.6	13.5	19,226	16,393	16,576
Hologic	24,563	33.7	30.0	29.7	25.5	19.1	18.8	4.6	4.6	4.5	9.5	18.8	17.1	6,049	5,354	5,424
Quest	20,087	14.4	16.1	16.3	18.1	15.3	14.7	1.6	1.6	1.6	12.5	16.0	15.6	12,772	12,074	12,295
Sysmex	15,201	17.9	18.2	18.6	35.5	30.6	27.6	3.9	3.6	3.3	12.1	13.2	13.4	3,969	4,184	4,536
Rewity	19,483	22.4	29.0	30.0	48.3	24.6	21.2	5.2	5.1	4.7	12.8	7.7	8.5	4,280	3,774	4,092
bioMerieux	16,235	16.4	16.4	17.0	24.5	23.3	21.1	3.1	3.0	2.8	13.4	12.2	12.2	4,873	5,401	5,749
Bio-Rad	15,334	17.2	16.0	17.6	34.0	30.7	27.1	4.2	4.1	3.8	-4.9	4.1	4.7	3,621	3,664	3,901
Qiagen	13,563	24.8	26.6	27.4	26.4	21.1	19.8	5.1	5.1	4.7	9.8	12.2	12.0	2,768	2,664	2,855
DiaSorin	7,462	25.8	23.9	25.6	28.7	24.6	21.7	4.3	4.3	4.1	12.3	12.6	13.3	1,848	1,706	1,804
Quidel	6,687	25.8	19.4	20.6	34.3	15.0	13.5	1.6	1.7	1.7	0.9	6.5	6.9	4,221	3,979	3,979
SD Biosensor	1,486	39.1	-35.0	-6.3	1.3	-	-	0.4	2.1	2.2	35.3	-12.2	-1.7	2,932	700	667
Seegene	1,110	23.0	0.3	12.7	-	-	-	2.3	3.1	2.8	-0.8	1.5	4.0	854	356	402
Avg.		22.8	17.6	20.7	26.9	22.2	20.3	3.5	3.7	3.5	12.8	12.5	13.3	19,473	18,596	19,467

Source: Bloomberg, Mirae Asset Securities Research

Seegene (096530 KQ)

Income statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Revenue	854	354	395	476
Cost of revenue	357	156	146	156
GP	497	198	249	320
SG&A expenses	300	228	210	221
OP (adj.)	196	-30	39	99
OP	196	-30	39	99
Non-operating profit	30	29	13	14
Net financial income	2	13	12	14
Net income from associates	9	2	0	0
Pretax profit	226	-1	52	113
Income tax	43	0	10	23
Profit from continuing operations	182	-1	41	90
Profit from discontinued operations	0	0	0	0
NP	182	-1	41	90
Attributable to owners	182	-1	42	91
Attributable to minority interests	0	0	0	-1
Total comprehensive income	188	4	41	90
Attributable to owners	188	4	41	89
Attributable to minority interests	0	0	0	1
EBITDA	254	30	91	144
FCF	256	65	15	65
EBITDA margin (%)	29.7	8.5	23.0	30.3
OP margin (%)	23.0	-8.5	9.9	20.8
Net margin (%)	21.3	-0.3	10.6	19.1

Cash flow statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Operating cash flow	319	82	35	85
NP	182	-1	41	90
Non-cash income/expenses	215	35	44	49
Depreciation	55	55	48	43
Amortization	3	4	3	3
Other	157	-24	-7	3
Chg. in working capital	79	25	-58	-51
Chg. in AR & other receivables	234	17	-26	-25
Chg. in inventory	-69	9	-52	-44
Chg. in AP & other payables	-24	-2	9	8
Income tax	-162	1	-10	-23
Cash flow from investing activities	-104	-40	-20	-20
Chg. in PP&E	-63	-18	-20	-20
Chg. in intangible assets	-9	-3	0	0
Chg. in financial assets	-1	2	0	0
Other	-31	-21	0	0
Cash flow from financing activities	-145	-148	-30	-31
Chg. in financial liabilities	0	-37	7	6
Chg. in equity	-2	-4	0	0
Dividends	-51	-28	-37	-37
Other	-92	-79	0	0
Chg. in cash	89	-97	-16	72
Beginning balance	432	521	425	408
Ending balance	521	425	408	480

Source: Company data, Mirae Asset Securities Research estimates

Balance sheet (summarized)

(Wbn)	2022	2023F	2024F	2025F
Current assets	903	799	867	1,015
Cash & equivalents	521	425	408	480
AR & other receivables	110	95	122	147
Inventory	158	153	204	249
Other current assets	114	126	133	139
Non-current assets	488	456	425	362
Investments in associates	37	38	38	0
PP&E	258	230	202	179
Intangible assets	24	23	20	17
Total assets	1,391	1,255	1,292	1,377
Current liabilities	170	186	217	246
AP & other payables	41	44	57	69
Short-term financial liabilities	101	100	107	113
Other current liabilities	28	42	53	64
Non-current liabilities	70	32	34	36
Long-term financial liabilities	58	24	24	24
Other non-current liabilities	12	8	10	12
Total liabilities	240	218	250	282
Equity attributable to owners	1,147	1,035	1,040	1,093
Capital stock	26	26	26	26
Capital surplus	66	63	63	63
Retained earnings	1,163	1,123	1,127	1,181
Minority interests	3	3	2	2
Shareholders' equity	1,150	1,038	1,042	1,095

Key valuation metrics/ratios

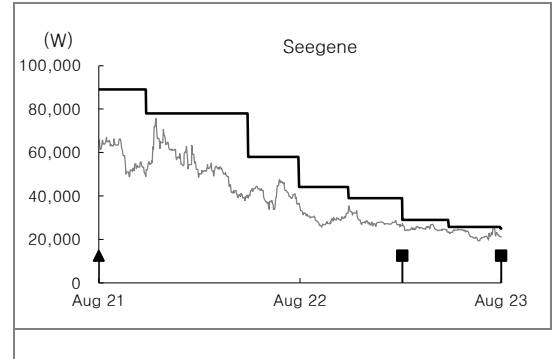
	2022	2023F	2024F	2025F
P/E (x)	7.8	-	26.7	12.2
P/CF (x)	3.6	32.2	12.9	8.0
P/B (x)	1.1	0.9	0.9	0.9
EV/EBITDA (x)	4.2	23.8	8.0	4.6
EPS (W)	3,488	-18	795	1,738
CFPS (W)	7,618	659	1,639	2,664
BPS (W)	24,104	23,046	23,130	24,156
DPS (W)	800	800	800	800
Dividend payout ratio (%)	22.2	-3,918.8	90.1	41.2
Dividend yield (%)	2.9	3.8	3.8	3.8
Revenue growth (%)	-37.7	-58.5	11.5	20.4
EBITDA growth (%)	-63.8	-88.4	205.7	59.1
OP growth (%)	-70.5	-	-	152.4
EPS growth (%)	-66.1	-	-	118.5
AR turnover (x)	3.8	3.5	3.7	3.6
Inventory turnover (x)	4.6	2.3	2.2	2.1
AP turnover (x)	10.2	6.1	4.6	3.9
ROA (%)	12.7	-0.1	3.2	6.8
ROE (%)	16.3	-0.1	4.0	8.5
ROIC (%)	23.4	-3.6	5.4	12.9
Debt-to-equity ratio (%)	20.9	21.0	24.0	25.7
Current ratio (%)	530.3	430.2	400.3	412.4
Net debt-to-equity ratio (%)	-31.6	-38.9	-36.6	-40.8
Interest coverage ratio (x)	39.1	-5.8	8.4	20.3

Appendix 1

Important disclosures and disclaimers

Two-year rating and TP history

Company	Date	Rating	TP (W)
Seegene (096530)	08/17/23	Trading Buy	25,000
	05/15/23	Trading Buy	25,800
	02/20/23	Trading Buy	29,000
	11/14/22	Buy	39,000
	08/16/22	Buy	44,100
	05/16/22	Buy	58,000
	11/12/21	Buy	78,000
	08/17/21	Buy	89,000



Stock ratings

Buy	Expected 12-month performance: +20% or greater
Trading Buy	Expected 12-month performance: +10% to +20%
Hold	Expected 12-month performance: -10% to +10%
Sell	Expected 12-month performance: -10% or worse

Sector ratings

Overweight	Expected to outperform the market over 12 months
Neutral	Expected to perform in line with the market over 12 months
Underweight	Expected to underperform the market over 12 months

Rating and TP history: Share price (—), TP (—), Not Rated (■), Buy (▲), Trading Buy (■), Hold (●), Sell (◆)

* Our investment rating is a guide to the expected return of the stock over the next 12 months.

* Outside of the official ratings of Mirae Asset Securities Co., Ltd., analysts may call trading opportunities should technical or short-term material developments arise.

* The TP was determined by the research analyst through valuation methods discussed in this report, in part based on estimates of future earnings.

* TP achievement may be impeded by risks related to the subject securities and companies, as well as general market and economic conditions.

Ratings distribution and investment banking services

	Buy	Trading Buy	Hold	Sell
Ratings distribution	89.09%	7.88%	2.42%	0.61%
Investment banking services	100%	0%	0%	0%

* Based on recommendations in the last 12-months (as of June 30, 2023)

Disclosures

As of the publication date, Mirae Asset Securities Co., Ltd. and/or its affiliates do not have any special interest with the subject company and do not own 1% or more of the subject company's shares outstanding.

Analyst certification

The research analysts who prepared this report (the "Analysts") are registered with the Korea Financial Investment Association and are subject to Korean securities regulations. They are neither registered as research analysts in any other jurisdiction nor subject to the laws or regulations thereof. Each Analyst responsible for the preparation of this report certifies that (i) all views expressed in this report accurately reflect the personal views of the Analyst about any and all of the issuers and securities named in this report and (ii) no part of the compensation of the Analyst was, is, or will be directly or indirectly related to the specific recommendations or views contained in this report. Mirae Asset Securities Co., Ltd. ("Mirae Asset Securities") policy prohibits its Analysts and members of their households from owning securities of any company in the Analyst's area of coverage, and the Analysts do not serve as an officer, director, or advisory board member of the subject companies. Except as otherwise specified herein, the Analysts have not received any compensation or any other benefits from the subject companies in the past 12 months and have not been promised the same in connection with this report. Like all employees of Mirae Asset Securities, the Analysts receive compensation that is determined by overall firm profitability, which includes revenues from, among other business units, the institutional equities, investment banking, proprietary trading, and private client divisions. At the time of publication of this report, the Analysts do not know or have reason to know of any actual, material conflict of interest of the Analyst or Mirae Asset Securities except as otherwise stated herein.

Disclaimers

This report was prepared by Mirae Asset Securities, a broker-dealer registered in the Republic of Korea and a member of the Korea Exchange. Information and opinions contained herein have been compiled in good faith and from sources believed to be reliable, but such information has not been independently verified and Mirae Asset Securities makes no guarantee, representation or warranty, express or implied, as to the fairness, accuracy, completeness, or correctness of the information and opinions contained herein or of any translation into English from the Korean language. In case of an English translation of a report prepared in the Korean language, the original Korean language report may have been made available to investors in advance of this report.

The intended recipients of this report are sophisticated institutional investors who have substantial knowledge of the local business environment, its common practices, laws, and accounting principles, and no person whose receipt or use of this report would violate any laws or regulations or subject Mirae Asset Securities or any of its affiliates to registration or licensing requirements in any jurisdiction shall receive or make any use hereof.

This report is for general information purposes only and is not and shall not be construed as an offer or a solicitation of an offer to effect transactions in any securities or other financial instruments. The report does not constitute investment advice to any person, and such person shall not be treated as a client of Mirae Asset Securities by virtue of receiving this report. This report does not take into account the particular investment objectives, financial situations, or needs of individual clients. The report is not to be relied upon in substitution for the exercise of independent judgment. Information and opinions contained herein are as of the date hereof and are subject to change without notice. The price and value of the investments referred to in this report and the income from them may depreciate or appreciate, and investors may incur losses on investments. Past performance is not a guide to future performance. Future returns are not guaranteed, and a loss of original capital may occur. Mirae Asset Securities, its affiliates, and their directors, officers, employees, and agents

do not accept any liability for any loss arising out of the use hereof.

Mirae Asset Securities may have issued other reports that are inconsistent with, and reach different conclusions from, the opinions presented in this report. The reports may reflect different assumptions, views, and analytical methods of the analysts who prepared them. Mirae Asset Securities may make investment decisions that are inconsistent with the opinions and views expressed in this research report. Mirae Asset Securities, its affiliates, and their directors, officers, employees, and agents may have long or short positions in any of the subject securities at any time and may make a purchase or sale, or offer to make a purchase or sale, of any such securities or other financial instruments from time to time in the open market or otherwise, in each case either as principals or agents. Mirae Asset Securities and its affiliates may have had, or may be expecting to enter into, business relationships with the subject companies to provide investment banking, market-making, or other financial services as are permitted under applicable laws and regulations.

No part of this document may be copied or reproduced in any manner or form or redistributed or published, in whole or in part, without the prior written consent of Mirae Asset Securities. For further information regarding company-specific information as it pertains to the representations and disclosures in this Appendix 1, please contact compliance@miraeasset.us.com or +1 (212) 407-1000.

Distribution

United Kingdom: This report is being distributed by Mirae Asset Securities (UK) Ltd. in the United Kingdom only to (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the "Order"), and (ii) high net worth companies and other persons to whom it may lawfully be communicated, falling within Article 49(2)(A) to (E) of the Order (all such persons together being referred to as "Relevant Persons"). This report is directed only at Relevant Persons. Any person who is not a Relevant Person should not act or rely on this report or any of its contents.

United States: Mirae Asset Securities is not a registered broker-dealer in the United States and, therefore, is not subject to U.S. rules regarding the preparation of research reports and the independence of research analysts. This report is distributed in the U.S. by Mirae Asset Securities (USA) Inc., a member of FINRA/SIPC, to "major U.S. institutional investors" in reliance on the exemption from registration provided by Rule 15a-6(b)(4) under the U.S. Securities Exchange Act of 1934, as amended. All U.S. persons that receive this document by their acceptance hereof represent and warrant that they are a major U.S. institutional investor and have not received this report under any express or implied understanding that they will direct commission income to Mirae Asset Securities or its affiliates. Any U.S. recipient of this document wishing to effect a transaction in any securities discussed herein should contact and place orders with Mirae Asset Securities (USA) Inc. Mirae Asset Securities (USA) Inc. accepts responsibility for the contents of this report in the U.S., subject to the terms hereof, to the extent that it is delivered to a U.S. person other than a major U.S. institutional investor. Under no circumstances should any recipient of this research report effect any transaction to buy or sell securities or related financial instruments through Mirae Asset Securities. The securities described in this report may not have been registered under the U.S. Securities Act of 1933, as amended, and, in such case, may not be offered or sold in the U.S. or to U.S. persons absent registration or an applicable exemption from the registration requirements.

Hong Kong: This report is distributed in Hong Kong by Mirae Asset Securities (HK) Limited, which is regulated by the Hong Kong Securities and Futures Commission. The contents of this report have not been reviewed by any regulatory authority in Hong Kong. This report is for distribution only to professional investors within the meaning of Part I of Schedule 1 to the Securities and Futures Ordinance of Hong Kong (Cap. 571, Laws of Hong Kong) and any rules made thereunder and may not be redistributed in whole or in part in Hong Kong to any person.

India: This report is being distributed by Mirae Asset Capital Markets (India) Private Limited ("MACM") in India to the customers based in India and is personal information only for those authorised recipient(s). MACM is inter alia a Securities and Exchange Board of India ("SEBI") registered Research Analyst in India and is not registered outside India. MACM and Mirae Asset, Korea are group entities. MACM makes no guarantee, representation or warranty, express or implied, as to the fairness, accuracy, completeness or correctness of the information and opinions contained herein. The user assumes the entire risk of any use made of this information. This report has been provided for assistance only and is not intended to be and must not alone be taken as the basis for an investment decision. Recipient must read the entire Appendix 1 to the report carefully for Important Disclosures & Disclaimers.

All other jurisdictions: Customers in all other countries who wish to effect a transaction in any securities referenced in this report should contact Mirae Asset Securities or its affiliates only if distribution to or use by such customer of this report would not violate applicable laws and regulations and not subject Mirae Asset Securities and its affiliates to any registration or licensing requirement within such jurisdiction.

Mirae Asset Securities International Network

Mirae Asset Securities Co., Ltd. (Seoul)

One-Asia Equity Sales Team
Mirae Asset Center 1 Building
26 Eulji-ro 5-gil, Jung-gu, Seoul 04539
Korea

Tel: 82-2-3774-2124

Mirae Asset Securities (USA) Inc.

810 Seventh Avenue, 37th Floor
New York, NY 10019
USA

Tel: 1-212-407-1000

Mirae Asset Securities (Singapore) Pte. Ltd.

6 Battery Road, #11-01
Singapore 049909
Republic of Singapore

Tel: 65-6671-9845

Mirae Asset Investment Advisory (Beijing) Co., Ltd

2401B, 24th Floor, East Tower, Twin Towers
B12 Jianguomenwai Avenue, Chaoyang District
Beijing 100022
China

Tel: 86-10-6567-9699

Ho Chi Minh Representative Office

7F, Saigon Royal Building
91 Pasteur St.
District 1, Ben Nghe Ward, Ho Chi Minh City
Vietnam

Tel: 84-8-3910-7715

Mirae Asset Securities (HK) Ltd.

Units 8501, 8507-8508, 85/F
International Commerce Centre
1 Austin Road West
Kowloon
Hong Kong

Tel: 852-2845-6332

Mirae Asset Wealth Management (Brazil) CCTVM

Rua Funchal, 418, 18th Floor, E-Tower Building
Vila Olimpia
Sao Paulo - SP
04551-060
Brazil

Tel: 55-11-2789-2100

Mirae Asset Securities (Vietnam) LLC

7F, Saigon Royal Building
91 Pasteur St.
District 1, Ben Nghe Ward, Ho Chi Minh City
Vietnam

Tel: 84-8-3911-0633 (ext.110)

Beijing Representative Office

2401A, 24th Floor, East Tower, Twin Towers
B12 Jianguomenwai Avenue, Chaoyang District
Beijing 100022
China

Tel: 86-10-6567-9699 (ext. 3300)

Mirae Asset Capital Markets (India) Pvt Ltd

1st Floor, Tower 4, Equinox Business Park,
LBS Marg, Off BKC, Kurla (West), Mumbai - 400 070
India

Tel: 91-22-62661300 / 48821300

Mirae Asset Securities (UK) Ltd.

41st Floor, Tower 42
25 Old Broad Street,
London EC2N 1HQ
United Kingdom

Tel: 44-20-7982-8000

PT. Mirae Asset Sekuritas Indonesia

District 8, Treasury Tower Building Lt. 50
Sudirman Central Business District
Jl. Jend. Sudirman, Kav. 52-54
Jakarta Selatan 12190
Indonesia

Tel: 62-21-5088-7000

Mirae Asset Securities Mongolia UTsk LLC

#406, Blue Sky Tower, Peace Avenue 17
1 Khoroov, Sukhbaatar District
Ulaanbaatar 14240
Mongolia

Tel: 976-7011-0806

Shanghai Representative Office

38T31, 38F, Shanghai World Financial Center
100 Century Avenue, Pudong New Area
Shanghai 200120
China

Tel: 86-21-5013-6392
