

**Technology**

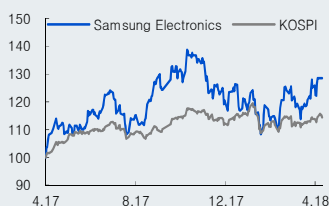
Initiation Report  
May 16, 2018

<b>(Initiate)</b>	<b>Buy</b>
<b>Target Price (12M, W)</b>	<b>73,000</b>
Share Price (05/03/18, W)	53,000
Expected Return	38%

OP (18F, Wbn)	67,916
Consensus OP (18F, Wbn)	65,891
EPS Growth (18F, %)	36.7
Market EPS Growth (18F, %)	16.3
P/E (18F, x)	7.7
Market P/E (18F, x)	9.5
KOSPI	2,487.25

Market Cap (Wbn)	340,224
Shares Outstanding (mn)	7,323
Free Float (%)	72.8
Foreign Ownership (%)	52.1
Beta (12M)	1.68
52-Week Low	44,620
52-Week High	57,220

(%)	1M	6M	12M
Absolute	10.1	-6.0	18.0
Relative	8.2	-3.3	5.3



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# Samsung Electronics

(005930 KS)

## A new beginning

### Trading to resume on May 4<sup>th</sup> after 50:1 split; uncertainties to subside

Following its 50:1 stock split (base price of W53,000), Samsung Electronics (SEC) will list its shares on May 4th. We believe the stock split will make the stock more accessible to retail investors, while a lower share of foreign ownership will help reduce governance risks. At a time when drastic changes in the ownership structure are nearly impossible, we believe the stock split was SEC's best option. As stock supply and demand becomes more balanced, we expect uncertainties to subside.

### Semiconductors to continue to drive robust earnings; OP forecast at W67.9tr in 2018, W68.9tr in 2019

For 2018, we forecast that SEC's operating profit will grow to W67.9tr (+26.6%; OP margin of 27.4%). Despite fears of a decline in semiconductor prices, we believe such risks are low, as we think that, from a strategic standpoint, SEC needs to maximize profits. The consequences of reckless capacity expansion by the industry are well known by now; moreover, lowering prices does not mean new competition will be less likely to enter the market.

For the semiconductor division, we look for operating profit of W51tr (+44.8%) in 2018 and W50.3tr (-1.3%) in 2019. For the IT & mobile communications (IM) division, we forecast operating profit of W12.3tr (-18.9%) in 2018 and W12.8tr (+4.1%) in 2019. Despite the sluggish smartphone market, we expect solid IM earnings, as the company should benefit from scale effects as the world's no. 1 smartphone maker. A key variable will be the release of foldable smartphones, which we believe will underscore the company's hardware competitiveness.

SEC continues to increase its dividend payments, backed by its strong cash flow generation; we estimate 2018 dividend yield at 2.7%. Another positive is the company's quarterly dividend payments; for 1Q18, SEC declared a dividend of W17,700 per share. We believe dividends will provide downside protection to share prices, while also appealing to retail investors.

### Initiate coverage with Buy and TP of W73,000

We initiate our coverage on SEC with a Buy rating and target price of W73,000 (W3,650,000 pre-split). We derived our target price by applying the 2018 multiples of global competitors to our 12-month forward EBITDA estimates of each business division. In valuing investment assets, we used the April 30<sup>th</sup> closing price for listed companies and a 50% discount to end-2017 book value for non-listed companies.

We estimate SEC's total value at W593tr, or W3,658,912 per common share when excluding preferred shares. Applying the 50:1 stock split, we arrived at a target price of W73,000. Our target price corresponds to a 12-month forward P/E of 9.5x (EPS of 2,807) and P/B of 1.9x (BPS of W39,226). Our 2018 ROE forecast is 23.4%.

We believe SEC is poised for a re-rating, supported by robust earnings and waning uncertainties. In our view, there is no reason for the stock to be undervalued.

FY (Dec.)	12/15	12/16	12/17	12/18F	12/19F	12/20F
Revenue (Wbn)	200,653	201,867	239,575	248,041	255,289	262,749
OP (Wbn)	26,413	29,241	53,645	67,916	68,894	70,838
OP margin (%)	13.2	14.5	22.4	27.4	27.0	27.0
NP (Wbn)	18,695	22,416	41,345	54,287	57,399	53,755
EPS (W)	2,198	2,735	5,421	7,410	7,838	7,341
ROE (%)	11.2	12.5	21.0	23.4	20.5	16.5
P/E (x)	11.5	13.2	9.4	7.7	7.5	7.5
P/B (x)	1.1	1.4	1.7	1.4	1.2	1.1
Dividend yield (%)	1.7	1.6	1.7	2.8	2.8	2.9

Note: All figures are based on consolidated K-IFRS; NP refers to net profit attributable to controlling interests  
Source: Company data, Mirae Asset Daewoo Research estimates

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# I. Investment strategy and valuation

## Investment strategy

### 1. Robust earnings and decreasing uncertainty to lead to re-rating

We believe robust earnings and decreasing uncertainty will positively affect SEC’s share performance.

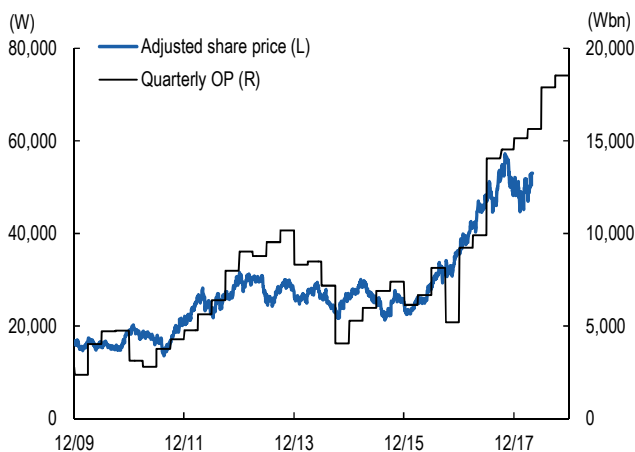
1) For 2018, we forecast that SEC’s operating profit will grow to W67.9tr (+26.6%; OP margin of 27.4%). While there are fears of a decline in semiconductor prices, we believe such risks are low, as we think SEC is in a state where, strategically, it needs to maximize profits. The risks of engaging in reckless capacity expansion are already well known by the industry; moreover, lowering prices does not reduce the likelihood of new competition entering the market.

2) Following its 50:1 stock split (base price of W53,000), Samsung Electronics (SEC) will list its shares on May 4th. We believe the stock split will make the stock more accessible to retail investors, while a lower share of foreign ownership will help reduce governance risks. At a time when drastic changes in the ownership structure are almost impossible, we believe the stock split was SEC’s best option. As stock supply and demand becomes more balanced, we expect uncertainties to subside.

3) The company is continuing to increase its dividend payments, backed by its strong cash flow generation. We estimate 2018 dividend yield at 2.7%. Also positive is SEC’s quarterly dividend payments. For 1Q18, the company declared a dividend of W17,700 per share. We believe dividends will provide downside protection to share prices and also appeal to retail investors.

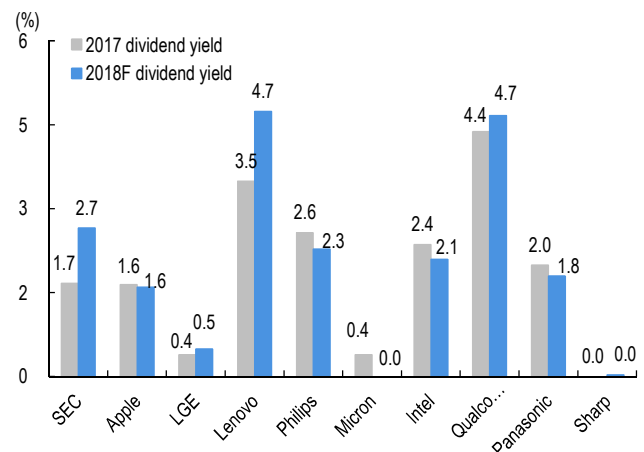
We believe that SEC is poised for a re-rating, supported by robust earnings and waning uncertainties. In our view, there is no reason for the stock to be undervalued.

Figure 1. Quarterly OP and share price trends



Source: WISEfn, Mirae Asset Daewoo Research

Figure 2. Competitors’ dividend yield ratio



Source: Bloomberg, Mirae Asset Daewoo Research

## Valuation

### 2. 12-month forward target price

We initiate our coverage on SEC with a Buy rating and target price of W73,000 (W3,650,000 pre-split). We derived our target price by applying the 2018 multiples of global competitors to our 12-month forward EBITDA estimates of each business division. In valuing investment assets, we used the April 30th closing price for listed companies and a 50% discount to end-2017 book value for non-listed companies.

We estimate SEC's total value at W593tr, or W3,658,912 per common share when excluding preferred shares. Applying the 50:1 stock split, we arrived at a target price of W73,000.

Our target price corresponds to a 12-month forward P/E of 9.5x (EPS of 140,385) and P/B of 1.9x (BPS of W1,961,293). Our 2018 ROE forecast is 23.4%.

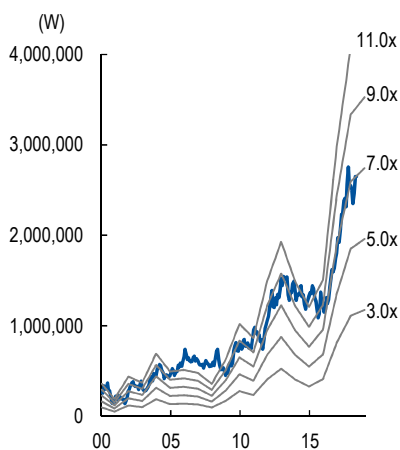
**Table 1. SEC's target price calculation**

(Wbn, x, '000, W)

	12M FWD EBITDA	Target EV/EBITDA	EV	% of total EV	Notes
CE	1,893	5.7	10,788	2%	Global home appliance producers' multiple
IM	15,348	6.4	98,225	17%	Global handset multiple
Semiconductor	66,476	4.5	299,141	50%	Global semiconductor multiple
Display	8,758	5.8	50,798	9%	Global display multiple
Operating value ①	90,582	4.9	448,164	76%	
Investment asset value ②			36,532	6%	50% discount to market value
Net cash ③			108,475	18%	2018F
Equity value (① + ② + ③)			593,171	100%	
Pref. shares value			54,215		
EV (ex. pref. share value)			538,955		
# of shares ('000 shares)			147,299		
Fair price (W)			3,658,912		
Target price (W)			3,650,000		50:1 stock split
			<b>73,000</b>		
Current price (W)			53,000		Post-stock-split base price
Upside (%)			37.7%		

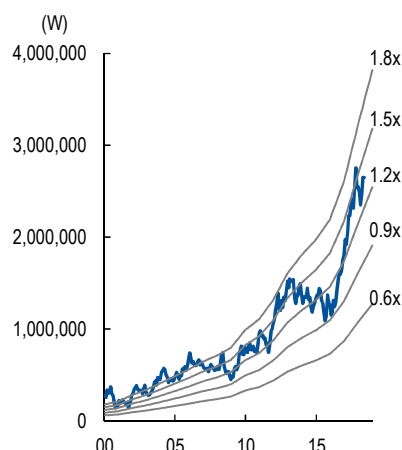
Source: Mirae Asset Daewoo Research

**Figure 3. P/E band (x)**



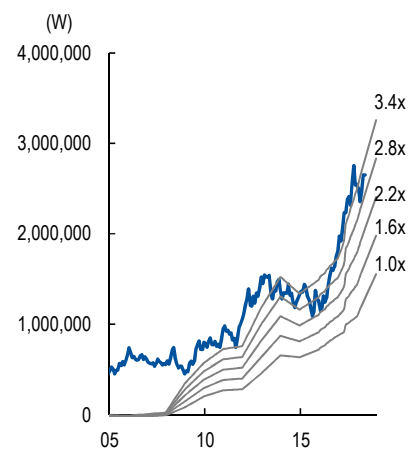
Source: Mirae Asset Daewoo Research

**Figure 4. P/B band (x)**



Source: Mirae Asset Daewoo Research

**Figure 5. EV/EBITDA band (x)**



Source: Mirae Asset Daewoo Research

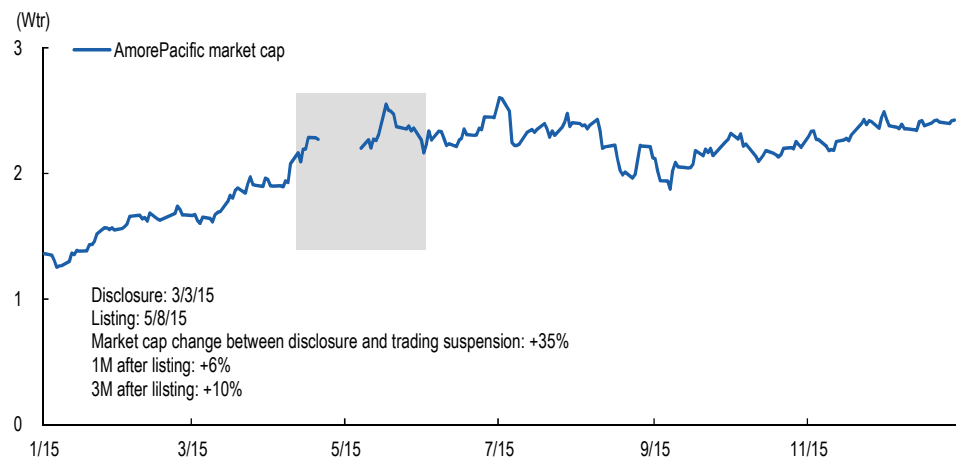
### 3. Expected impact of stock split

In indicating the performance of SEC shares after a stock split, SK Telecom (017670 KS) and AmorePacific (090430 KS) should provide meaningful case studies. Both companies carried out stock splits when their share prices stood at over W1mn per share.

SK Telecom conducted a 10:1 stock split in April 2000, lowering the face value from W5,000 to W500. During the period between announcement and trading suspension, market cap expanded 12%. Share price gained 22% for one month after re-listing. AmorePacific also carried out a 10:1 stock split in May 2015 (face value: W5,000 → W500). From announcement to suspension of trading, market cap increased 35%. In the first month after re-listing, the share price advanced 6%.

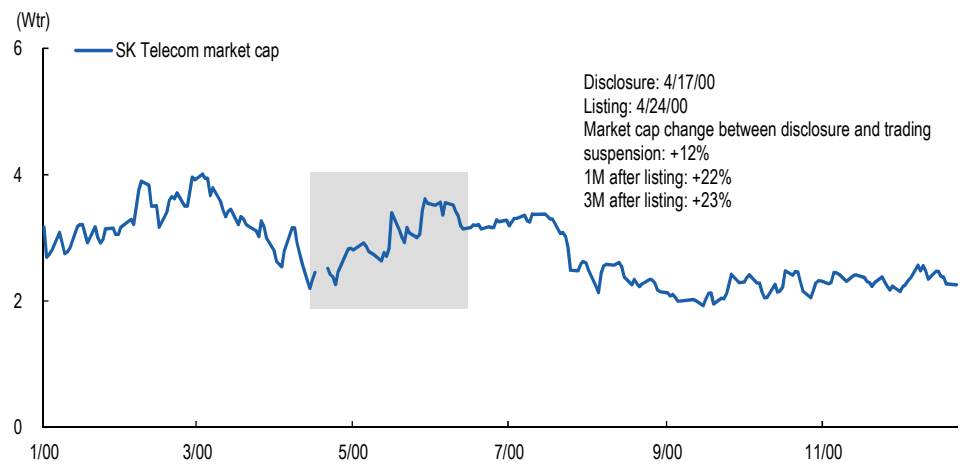
Earnings should still be the key factor in determining SEC's share performance going forward. However, a stock split could stimulate trading by lowering the entry barrier for new investors (see Table 80). During the period of trading suspension for SEC shares, the KOSPI edged up 0.5%, while the KOSDAQ declined by 1.7%.

**Figure 6. SK Telecom's pre/post-stock-split share performance**



Source: Mirae Asset Daewoo Research

**Figure 7. AmorePacific's pre/post-stock-split share performance**



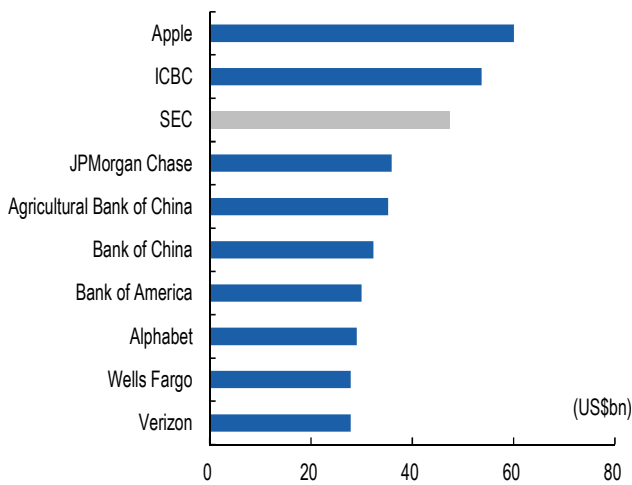
Source: Mirae Asset Daewoo Research

#### 4. World-class earnings power

Based on data provided by FactSet, in 2017, SEC reported the world's third largest operating profit and fourth largest net profit. At present, only two or three companies globally make more profits than SEC. In the manufacturing space, SEC is the world's second largest company in terms of operating profit, after Apple.

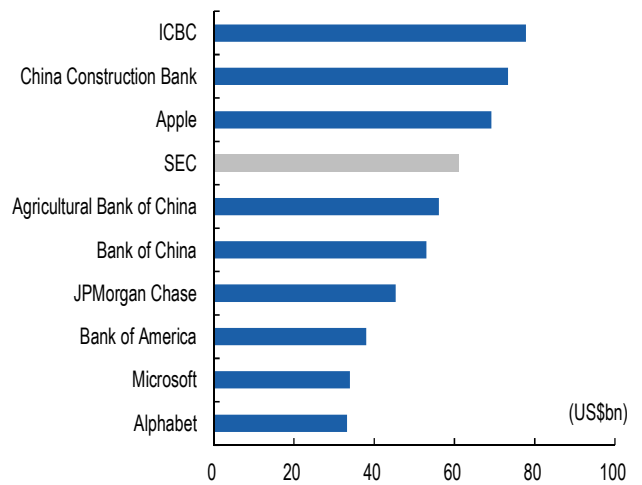
For 2018, SEC is expected to rank fourth in terms of operating profit, and third in net profit. Among manufacturing firms, SEC should continue to rank second, after Apple, in terms of both operating profit and net profit.

**Figure 8. World's 10 largest companies by operating profit (2017)**



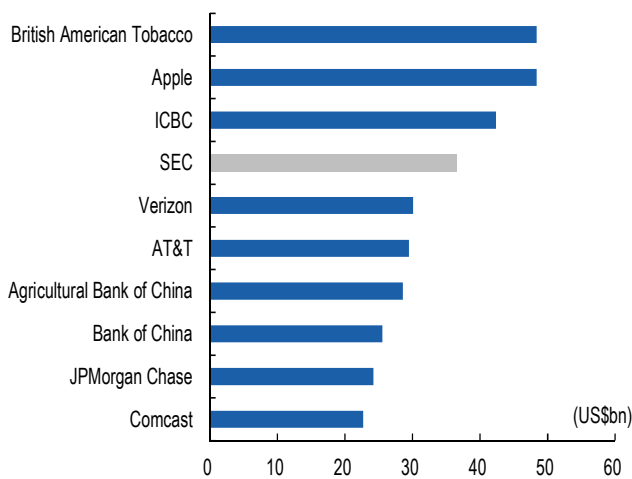
Source: FactSet, Mirae Asset Daewoo Research

**Figure 9. World's 10 largest companies by operating profit (2018F)**



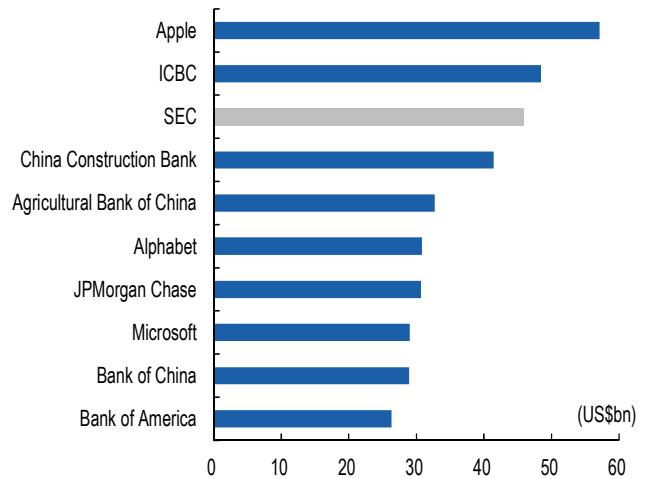
Source: FactSet, Mirae Asset Daewoo Research

**Figure 10. 10 most profitable companies in the world (2017)**



Source: FactSet, Mirae Asset Daewoo Research

**Figure 11. 10 most profitable companies in the world (2018F)**



Source: FactSet, Mirae Asset Daewoo Research

## 5. Peer valuation

### 1) Domestic large-cap IT plays

**Table 2. Earnings indicators**

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
LGE	-8.6	0.0	16,528	65,353	70,228	73,883	4,073	4,959	5,445	6.2	7.1	7.4	2,809	3,391	3,838
LGD	-8.9	-25.6	8,391	24,341	27,334	27,312	126	905	1,294	0.5	3.3	4.7	100	603	820
Samsung SDI	-8.3	2.2	12,584	8,370	9,474	11,412	497	705	2,266	5.9	7.4	19.9	722	980	2,305
SK Hynix	2.0	14.8	60,351	41,574	42,815	43,324	21,883	21,283	18,051	52.6	49.7	41.7	17,052	16,633	13,724
SEMCO	14.1	16.3	8,777	8,101	9,161	10,686	703	813	974	8.7	8.9	9.1	460	517	594
LG Innotek	0.0	-3.1	2,923	8,098	8,309	8,653	235	389	416	2.9	4.7	4.8	128	241	255
Hanwha Techwin	-18.7	-29.3	1,226	4,283	4,598	4,936	69	137	156	1.6	3.0	3.2	40	95	-41
Average	-2.4	-1.7								13.2	14.0	14.8			

Source: Bloomberg, Mirae Asset Daewoo Research

**Table 3. Share price indicators**

(x, %)

Company	ROE			P/E			P/B			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
LGE	19.3	19.3	18.2	6.6	5.4	4.8	1.2	1.0	0.8	3.0	3.0	2.9
LGD	0.7	4.2	5.2	83.7	13.9	10.2	0.6	0.6	0.5	2.7	2.2	1.8
Samsung SDI	6.3	8.0	14.8	17.9	13.2	5.5	1.1	1.0	0.8	11.4	9.2	4.0
SK Hynix	40.5	28.6	20.8	3.6	3.7	4.3	1.2	0.9	0.8	2.1	2.1	2.1
SEMCO	10.3	10.6	11.1	20.0	17.8	15.5	1.9	1.7	1.6	7.1	6.1	5.6
LG Innotek	6.4	11.0	10.5	21.5	11.5	0.8	1.3	1.2	1.1	5.3	4.2	3.9
Hanwha Techwin	1.9	4.2	-1.8	31.2	13.2	-	0.6	0.5	0.6	7.3	6.2	6.8
Average	12.2	12.3	11.2	26.4	11.2	6.8	1.1	1.0	0.9	5.6	4.7	3.9

Source: Bloomberg, Mirae Asset Daewoo Research

## 2) Global consumer electronics players

Table 4. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
LGE	-8.6	0.0	16,528	65,353	70,228	73,883	4,073	4,959	5,445	6.2	7.1	7.4	2,809	3,391	3,838
Philips	13.0	10.1	42,791	23,483	24,575	25,688	2,838	3,201	3,677	12.1	13.0	14.3	1,664	2,034	2,500
Electrolux	-11.9	-16.9	8,723	15,302	15,674	15,932	901	997	1,066	5.9	6.4	6.7	627	724	791
Whirlpool	3.6	-12.4	11,876	23,420	23,914	24,689	1,671	1,833	1,940	7.1	7.7	7.9	1,013	1,254	1,380
Panasonic	6.0	-2.2	38,562	78,740	83,059	87,011	3,541	4,266	4,837	4.5	5.1	5.6	2,038	2,449	2,858
Sony	-1.7	-7.3	63,056	85,010	87,160	91,729	7,343	7,908	8,562	8.6	9.1	9.3	4,793	5,073	5,281
Hitachi	12.4	-2.2	40,917	93,321	95,799	97,727	7,389	7,957	8,794	7.9	8.3	9.0	3,955	4,347	4,911
Average	2.7	-2.5								10.0	10.6	11.0			

Note: The fiscal year ends on March 31<sup>st</sup> for Panasonic, Sony, and Hitachi

Source: Bloomberg, Mirae Asset Daewoo Research

Table 5. Share price indicators

(x, %)

Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
LGE	19.3	19.3	18.2	6.6	5.4	4.8	1.2	1.0	0.8	3.0	3.0	2.9
Philips	12.3	13.9	15.2	21.8	18.4	16.3	2.6	2.5	2.3	12.3	11.0	9.6
Electrolux	23.8	23.8	22.4	12.2	11.1	10.4	2.9	2.5	2.2	6.5	6.0	5.6
Whirlpool	23.4	29.2	25.6	10.0	8.9	8.0	2.7	2.5	2.3	7.4	6.9	6.4
Panasonic	12.8	13.9	14.5	18.3	15.1	13.0	2.2	2.0	1.8	6.8	5.8	5.3
Sony	16.0	14.6	13.6	13.3	12.6	12.0	2.0	1.7	1.6	5.1	4.8	4.5
Hitachi	11.5	11.3	11.5	10.5	9.7	8.3	1.2	1.0	1.0	4.7	4.6	4.2
Average	17.0	18.0	17.3	13.3	11.6	10.4	2.1	1.9	1.7	6.6	6.0	5.5

Note: The fiscal year ends on March 31<sup>st</sup> for Panasonic, Sony, and Hitachi

Source: Bloomberg, Mirae Asset Daewoo Research

## 3) Global handset makers

Table 6. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
LGE	-8.6	0.0	16,528	65,353	70,228	73,883	4,073	4,959	5,445	6.2	7.1	7.4	2,809	3,391	3,838
APPLE	1.5	5.4	899,371	280,236	291,002	297,419	75,097	77,136	79,563	26.8	26.5	26.8	62,147	66,758	67,898
Lenovo	-5.2	-11.8	6,258	47,991	49,730	51,074	428	785	968	0.9	1.6	1.9	-164	551	700
ZTE	1.6	8.6	20,862	19,706	21,762	24,813	874	1,073	1,583	4.4	4.9	6.4	862	1,004	1,306
HTC	-13.2	-17.3	1,733	2,249	2,616	4,431	-180	-102	-	-8.0	-3.9	-	766	-85	170
Average	-2.5	-0.7								9.6	10.7	14.0			

Note: The fiscal year ends on September 30<sup>th</sup> for Apple and March 31<sup>st</sup> for Lenovo

Source: Bloomberg, Mirae Asset Daewoo Research

Table 7. Share price indicators

(x, %)

Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
LGE	19.3	19.3	18.2	6.6	5.4	4.8	1.2	1.0	0.8	3.0	3.0	2.9
Apple	45.5	51.7	61.8	14.9	13.1	12.0	6.5	6.1	5.3	8.5	8.2	8.0
Lenovo	-1.6	14.8	17.5	-	8.5	7.3	1.6	1.5	1.1	7.1	5.2	4.8
ZTE	12.3	12.6	14.1	0.0	22.3	17.3	3.1	2.7	2.4	13.9	12.2	9.8
HTC	32.1	-12.5	-	-	-	-	0.8	0.8	-	-	-	-
Average	21.5	17.2	27.9	7.2	12.3	10.4	2.6	2.4	2.4	8.2	7.2	6.3

Note: The fiscal year ends on September 30th for Apple; February 28(9) for BlackBerry; and March 31st for Lenovo

Source: Bloomberg, Mirae Asset Daewoo Research

## 4) Global display makers

Table 8. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
LGD	-8.9	-25.6	8,391	24,341	27,334	27,312	126	905	1,294	0.5	3.3	4.7	100	603	820
Panasonic	6.0	-2.2	38,562	78,740	83,059	87,011	3,541	4,266	4,837	4.5	5.1	5.6	2,038	2,449	2,858
Toshiba	-4.3	-8.8	18,649	38,826	37,792	37,972	297	988	1,131	0.8	2.6	3.0	5,265	5,695	1,545
Sharp	-3.1	-19.7	15,316	25,224	26,081	30,767	1,016	1,145	1,576	4.0	4.4	5.1	717	814	1,198
Japan Display	-20.4	-40.2	1,183	7,124	7,654	7,579	-560	25	117	-7.9	0.3	1.5	-2,284	-138	-3
AU Optronics	-10.2	-8.5	4,308	10,828	10,101	9,541	313	-158	-242	2.9	-1.6	-2.5	297	-90	-116
Innolux	-16.0	-19.3	3,988	10,833	10,544	-	419	-131	-	3.9	-1.2	-	336	-36	-
Average	-6.3	-12.6								4.7	5.3	6.6			

Note: The fiscal year ends on March 31<sup>st</sup> for Panasonic, Toshiba, Sharp, and Japan Display

Source: Bloomberg, Mirae Asset Daewoo Research

Table 9. Share price indicators

(x, %)

Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
LGD	0.7	4.2	5.2	83.7	13.9	10.2	0.6	0.6	0.5	2.7	2.2	1.8
Panasonic	12.8	13.9	14.5	18.3	15.1	13.0	2.2	2.0	1.8	6.8	5.8	5.3
Toshiba	-	37.1	7.5	3.4	7.2	12.4	3.5	0.9	0.9	18.8	15.7	16.2
Sharp	17.3	17.4	25.7	25.5	22.4	16.7	3.8	3.3	-	10.2	9.2	7.5
Japan Display	-102.2	-17.0	-6.6	-	-	-	0.9	1.0	1.1	7.4	2.9	2.9
AU Optronics	3.4	-1.5	-1.7	14.3	-	-	0.6	0.6	0.6	2.8	3.4	3.6
Innolux	3.3	-0.4	-	12.4	173.4	-	0.4	0.4	-	1.6	2.0	-
Average	-6.5	9.1	9.0	23.5	39.6	11.4	1.6	1.2	1.0	6.7	5.5	5.7

Note: The fiscal year ends on March 31<sup>st</sup> for Panasonic, Toshiba, Sharp, and Japan Display

Source: Bloomberg, Mirae Asset Daewoo Research

## 5) Global memory chipmakers

Table 10. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
SK Hynix	2.0	14.8	60,351	41,574	42,815	43,324	21,883	21,283	18,051	52.6	49.7	41.7	17,052	16,633	13,724
Micron	-6.5	14.6	58,385	31,392	32,577	32,087	15,149	15,027	13,690	48.3	46.1	42.7	13,305	12,892	13,665
Intel	9.0	15.6	267,385	71,903	73,924	77,997	22,703	23,901	26,112	31.6	32.3	33.5	18,672	18,706	19,819
WDC	-11.3	-6.4	25,545	22,013	22,790	23,502	5,785	5,401	5,101	26.3	23.7	21.7	648	2,807	2,573
Nanya	0.0	15.2	9,957	3,150	3,464	3,488	1,427	1,457	1,200	45.3	42.1	34.4	1,341	1,475	1,516
Average	0.4	10.8								38.6	37.0	33.6			

Source: Bloomberg, Mirae Asset Daewoo Research

Table 11. Share price indicators

(x, %)

Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
SK Hynix	40.5	28.6	20.8	3.6	3.7	4.3	1.2	0.9	0.8	2.1	2.1	2.1
Micron	52.6	29.2	17.2	4.3	4.6	5.5	1.8	1.3	1.0	2.9	3.0	3.5
Intel	11.9	22.0	20.4	14.0	13.3	12.4	3.3	2.8	2.5	9.2	8.5	8.2
WDC	38.3	29.8	22.7	5.5	5.9	6.2	2.0	1.7	1.5	3.9	4.6	5.3
Nanya	25.8	24.0	19.1	7.4	6.7	6.7	1.8	1.6	1.4	4.6	4.5	4.8
Average	33.8	26.7	20.0	6.9	6.8	7.0	2.0	1.7	1.5	4.5	4.5	4.8

Source: Bloomberg, Mirae Asset Daewoo Research

## 6) Global non-memory chipmakers

Table 12. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
Intel	9.0	15.6	267,385	71,903	73,924	77,997	22,703	23,901	26,112	31.6	32.3	33.5	18,672	18,706	19,819
Qualcomm	-5.6	-23.1	81,067	23,801	25,251	26,424	5,563	6,774	7,690	23.4	26.8	29.1	-4,393	4,739	4,568
Texas Instruments	2.7	-4.0	109,371	17,239	17,977	18,865	7,253	7,602	8,189	42.1	42.3	43.4	5,842	6,425	6,837
Broadcom	1.2	-2.2	101,813	22,299	23,327	24,517	10,746	11,408	12,256	48.2	48.9	50.0	9,137	5,256	6,626
MediaTek	-1.6	8.7	18,928	9,073	10,185	11,299	735	1,136	1,380	8.1	11.2	12.2	919	1,199	1,356
NVIDIA	2.8	-2.7	148,350	13,216	15,123	18,069	5,289	6,041	7,740	40.0	39.9	42.8	4,190	4,789	5,055
AMD	16.8	-10.6	11,605	7,159	7,623	7,657	714	879	1,148	10.0	11.5	15.0	411	599	758
Average	4.3	-0.9								28.8	30.1	31.7			

Source: Bloomberg, Mirae Asset Daewoo Research

Table 13. Share price indicators

(x, %)

Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
Intel	11.9	22.0	20.4	14.0	13.3	12.4	3.3	2.8	2.5	9.2	8.5	8.2
Qualcomm	28.8	19.9	20.2	15.6	14.2	13.1	3.2	3.2	3.3	13.1	7.0	4.6
Texas Instruments	50.5	53.5	53.4	18.8	17.1	16.3	9.4	8.8	8.2	13.4	12.8	11.8
Broadcom	35.3	27.4	31.0	11.8	11.2	10.8	3.7	3.9	3.4	10.3	9.5	9.3
MediaTek	9.6	11.9	12.5	21.0	16.2	14.0	1.9	1.8	1.7	14.9	10.4	9.1
NVIDIA	43.8	34.9	28.8	32.7	28.4	24.4	12.3	9.2	7.1	26.7	23.2	20.3
AMD	53.1	39.5	31.8	25.1	19.1	17.4	11.1	7.2	5.2	13.4	11.1	-
Average	33.3	29.9	28.3	19.8	17.1	15.5	6.4	5.3	4.5	14.4	11.8	10.5

Source: Bloomberg, Mirae Asset Daewoo Research

## 7) Global automotive electronics makers

Table 14. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
Continental	-1.6	-5.3	56,937	60,447	64,092	67,456	6,485	7,144	7,705	10.7	11.1	11.4	4,340	4,833	5,183
Magna	9.0	12.8	22,845	43,494	45,809	47,913	3,203	3,306	3,207	7.4	7.2	6.7	2,554	2,699	3,093
Lear	3.3	0.8	13,391	23,665	24,777	26,054	1,960	2,035	1,958	8.3	8.2	7.5	1,371	1,422	1,439
Denso	-0.5	-17.4	44,479	52,646	55,035	57,078	4,137	4,525	4,584	7.9	8.2	8.0	3,185	3,492	3,526
Valeo	3.4	-9.7	17,161	25,961	28,313	30,804	2,093	2,341	2,506	8.1	8.3	8.1	1,271	1,543	1,754
Faurecia	3.2	-5.1	12,088	24,047	25,539	27,158	1,667	1,808	1,993	6.9	7.1	7.3	974	1,090	1,231
BorgWarner	-0.6	-10.9	10,973	11,614	12,289	12,856	1,457	1,548	1,616	12.5	12.6	12.6	981	1,050	1,146
Average	3.2	-3.0								11.1	11.3	11.2			

Source: Bloomberg, Mirae Asset Daewoo Research

Table 15. Share price indicators

(x, %)

Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
Continental	19.2	18.6	17.5	13.1	11.8	11.0	2.4	2.1	1.8	6.4	5.9	5.6
Magna	20.5	21.3	22.1	8.8	8.0	7.0	1.7	1.5	1.2	5.7	5.5	5.1
Lear	28.5	26.2	18.6	9.6	8.8	8.3	2.9	2.4	3.4	5.8	5.6	5.4
Denso	8.9	9.3	10.1	13.7	12.5	12.4	1.2	1.1	1.1	6.3	5.8	5.5
Valeo	20.2	20.3	19.9	13.0	11.2	9.8	2.6	2.2	1.9	6.0	5.4	4.8
Faurecia	20.4	19.5	18.1	12.6	11.3	10.4	2.5	2.1	1.8	4.9	4.6	4.2
BorgWarner	22.2	20.7	17.5	11.0	10.2	9.4	2.3	2.0	1.7	6.7	6.3	6.0
Average	20.0	19.4	17.7	11.7	10.6	9.8	2.2	1.9	1.9	6.0	5.6	5.2

Source: Bloomberg, Mirae Asset Daewoo Research

## 8) Global medtech companies

Table 16. Earnings indicators

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	9.2	11.1	340,224	248,041	247,244	246,449	67,916	68,894	68,555	27.4	27.9	27.8	54,287	57,405	52,099
GE	7.1	-10.2	131,232	132,826	135,570	143,329	15,517	16,392	18,263	11.7	12.1	12.7	7,116	8,648	10,590
Siemens Healthineers	-1.2	-	42,583	17,347	17,970	18,643	2,851	3,185	3,474	16.4	17.7	18.6	1,597	1,988	2,187
Philips	12.1	6.7	42,721	23,483	24,573	25,688	2,838	3,201	3,677	12.1	13.0	14.3	1,664	2,034	2,500
Canon	-2.2	-14.0	49,310	41,803	41,900	42,144	4,037	4,118	4,175	9.7	9.8	9.9	2,737	2,789	2,862
Konica Minolta	4.0	-9.1	4,642	10,119	10,453	10,696	471	503	557	4.7	4.8	5.2	308	328	365
Hitachi	12.4	-2.2	40,929	93,321	95,799	97,727	7,389	7,957	8,794	7.9	8.3	9.0	3,955	4,347	4,911
Average	5.9	-2.9								12.8	13.4	13.9			

Source: Bloomberg, Mirae Asset Daewoo Research

Table 17. Share price indicators

(x, %)

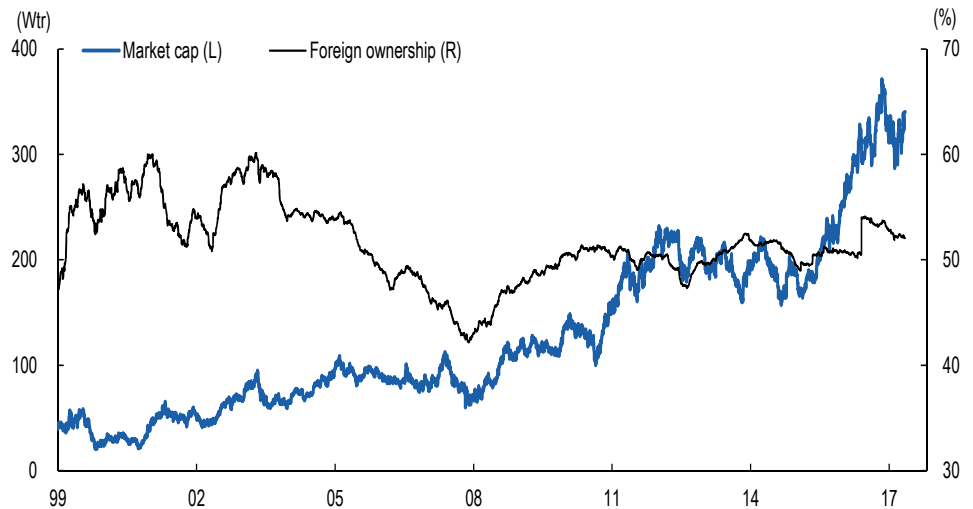
Company	ROE			PER			PBR			EV/EBITDA		
	18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	23.4	20.5	16.0	7.2	6.8	7.4	1.5	1.2	1.1	3.1	2.5	2.1
GE	12.6	11.7	14.6	14.8	13.3	11.7	2.6	-	-	12.6	11.5	10.3
Siemens Healthineers	28.7	21.8	20.1	21.6	19.5	17.8	4.0	3.7	3.3	14.3	12.9	12.0
Philips	12.3	13.9	15.2	21.8	18.4	16.3	2.6	2.5	2.3	12.3	11.0	9.6
Canon	9.5	9.3	9.3	14.8	14.5	14.1	1.4	1.3	1.3	7.9	8.0	7.9
Konica Minolta	5.9	6.2	6.5	15.1	14.1	12.7	0.9	0.8	0.8	6.4	6.2	5.9
Hitachi	11.5	11.3	11.5	10.5	9.7	8.3	1.2	1.0	1.0	4.7	4.6	4.2
Average	13.4	12.3	12.9	16.4	14.9	13.5	2.1	1.9	1.7	9.7	9.0	8.3

Source: Bloomberg, Mirae Asset Daewoo Research

### 6. Stock supply and demand (foreign investors and institutional investors)

Prior to the four-day suspension in trading, resulting from a stock split, foreign investors collectively held 66,834,177 shares of SEC, or 52.06% of the firm's total issued shares. Foreign ownership of SEC, which had remained at the 60% level in the 2000s, dropped to the low-40% range during the 2008 global financial crisis. Although the firm's share price moved higher in 2011 and 2017 (backed by robust smartphone and semiconductor earnings, respectively), its foreign ownership has remained at around 50% since 2011. Domestic institutional investors have been selling the shares since early 2016, which we attribute to concerns over semiconductor earnings stability.

**Figure 12. SEC's market cap and foreign ownership trends**



Source: Mirae Asset Daewoo Research

**Figure 13. SEC share performance (daily)**



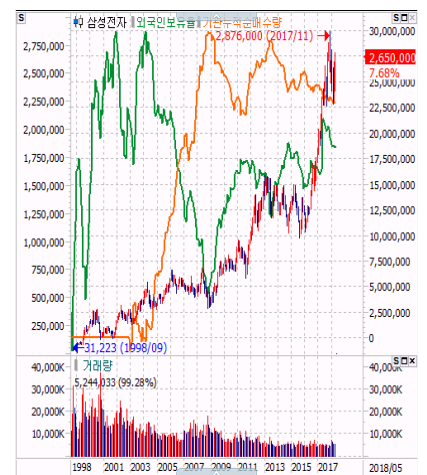
Source: Mirae Asset Daewoo Research

**Figure 14. SEC share performance (weekly)**



Source: Mirae Asset Daewoo Research

**Figure 15. SEC share performance (monthly)**



Source: Mirae Asset Daewoo Research

## II. Corporate history

### History

#### 7. Foundation and history

Founded by Lee Byung-chul in March 1938, Samsung started out as a small trading company, dealing mainly in groceries and clothing. In 1969, Lee began its consumer electronics business by establishing Samsung Electronics Industry. After listing the shares in June 1975, the firm changed its name to Samsung Electronics (SEC) in February 1984.

The firm began to produce PCS handsets in September 1997 and established Samsung Mobile Display in January 2009. In January 2018, it announced a 50:1 stock split, lowering the face value of its shares to W100 from W5,000.

#### 8. Change in business

In 1970, SEC began to produce white goods and audio/video (AV) devices through the establishment of Samsung NEC. Then, the firm expanded into the semiconductor business through the acquisition of Korea Semiconductor in 1974, and acquired the Gumi-based Hanguk Jeonja Tongsin in 1980. In the 1980s, the firm made significant strides in the semiconductor business, following the so-called "Tokyo Declaration" by Chairman Lee (February 1983).

Meanwhile, SEC pulled out of the printer (sold in February 2017) and camera businesses. For the camera business, in April 2010, the firm merged with Samsung Digital Imaging, which had been spun off from Samsung Techwin's optoelectronics division. At present, key businesses include Consumer Electronics (CE), IT and Mobile Communications (IM), Device Solutions (DS), and Harman (acquired in June 2017).

#### 9. Stock split and treasury shares/GDRs

As of end-2017, the total number of issued shares of SEC is 179,502,764 (common shares: 26,510,843, preferred shares: 23,893,427). Treasury shares include 9,410,125 shares of common stock and 1,720,171 shares of preferred stock. As of end-2017, the firm cumulatively canceled 26,510,843 shares of common stock and 5,642,847 shares of preferred stock. It retired an additional 712,000 shares of common stock and 178,000 shares of preferred stock on February 5<sup>th</sup> 2018, reducing the number of issued shares to 128,386,494 for common stock and 18,072,580 for preferred stock.

SEC's global depository receipts (GDRs) are traded on the London Stock Exchange (common shares worth US\$20.9bn; SMSN LI Equity, price: US\$1,171.00; no. of outstanding shares: 17,850,000) and the Luxemburg Stock Exchange (preferred shares worth US\$6.57bn; SMSD LI Equity; price: US\$955; no. of outstanding shares: 6.88mn)

On January 31 2018, SEC announced a 50:1 stock split, lowering the face value of its shares to W100 from W5,000. Following the stock split, the number of issued common shares and preferred shares jumped to 6,419,324,700, and 903,629,000, respectively. New shares are scheduled to be listed on May 4<sup>th</sup>.

**Table 18. SEC's stock split**

		Before stock split	After stock split
	Face value (W)	5,000	100
1. Stock split detail	No. of issued Common stock	128,386,494	6,419,324,700
	shares Preferred stock	18,072,580	903,629,000
2. Schedule	General shareholders' meeting	2018-03-23	
	Existing share submission	Start date	2018-03-26
		Close date	2018-05-02
	Suspension of trading	2018-04-30, 05-02, 05-03 (Three business days)	
	Registry closure	Start date	2018-05-03
	Close date	2018-05-10	
	Listing of new shares	2018-05-04	
3. Objective	Expansion of outstanding shares		
4. BOD's resolution	2018-01-31		

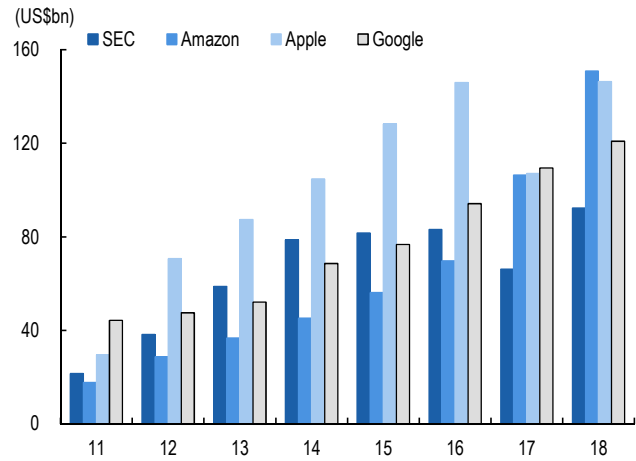
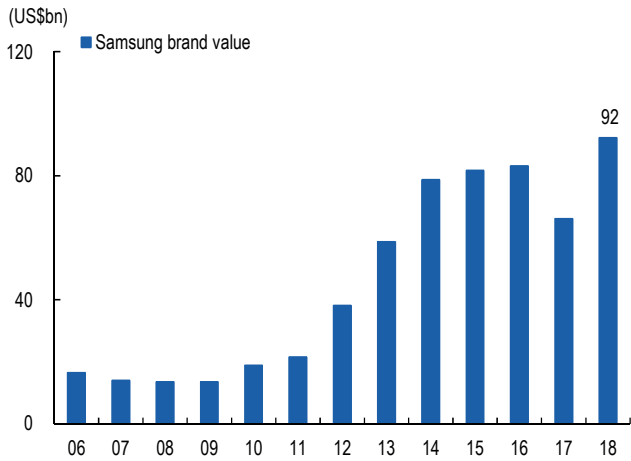
Source: Company materials, Mirae Asset Daewoo Research

Current status

10. SEC's brand value

According to Brand Finance, SEC's brand value is estimated at US\$92.3bn in 2018, 5.8 times higher than the level in 2008. In comparison, those of Amazon (AMZN US/CP: US\$1,609.08), Apple (AAPL US/CP: US\$190.04), Google (GOOGL US/CP: US\$1,105.47), and Facebook (FB US/CP: US\$180.53) stand at US\$150.8bn, US\$146.3bn, US\$120.9bn, and US\$89.7bn. SEC stood 6<sup>th</sup> in brand value, ranked by Interbrand, in 2017.

Figure 16. SEC's brand value | Figure 17. Brand value comparison of major firms



Source Brand Finance, Mirae Asset Daewoo Research

Source Brand Finance, Mirae Asset Daewoo Research

Figure 18. World's top 100 brands

01 Apple -3% 184,154 \$m	02 Google +8% 141,703 \$m	03 Microsoft +10% 79,959 \$m	04 Coca-Cola -8% 69,733 \$m	05 Amazon +29% 64,796 \$m	06 Samsung +8% 60,249 \$m	07 Toyota -6% 59,291 \$m	08 Facebook +48% 46,166 \$m	09 Mercedes +10% 47,020 \$m	10 IBM -11% 46,029 \$m	11 GE -3% 44,208 \$m	12 McDonald's +2% 41,933 \$m	13 Bosch 0% 41,921 \$m
14 Disney +5% 40,772 \$m	15 Intel +7% 36,450 \$m	16 Cisco +3% 31,330 \$m	17 Oracle +3% 27,466 \$m	18 Nike +8% 27,021 \$m	19 Louis Vuitton -4% 22,919 \$m	20 Honda +3% 22,696 \$m	21 SAP +8% 20,836 \$m	22 Pepsi +1% 20,491 \$m	23 A.M. -10% 20,438 \$m	24 ZARA +11% 18,473 \$m	25 KFC +4% 18,472 \$m	26 Gillette -9% 18,200 \$m
27 Walmart -3% 17,787 \$m	28 Pampers +2% 16,416 \$m	29 UPS +7% 16,217 \$m	30 J.P. Morgan +1% 16,215 \$m	31 FedEx +2% 16,215 \$m	32 Wendy's +11% 15,843 \$m	33 Ford +1% 15,204 \$m	34 eBay +1% 15,199 \$m	35 Hyundai +5% 15,199 \$m	36 Nescafe +1% 15,071 \$m	37 Accenture +2% 15,071 \$m	38 Audi +2% 15,069 \$m	39 Sealed Air +4% 14,934 \$m
40 VW +1% 13,522 \$m	41 UnitedHealth +2% 13,219 \$m	42 Aflac +5% 11,073 \$m	43 Kellogg -6% 10,972 \$m	44 Bank of America +16% 10,864 \$m	45 L'Oréal -1% 10,874 \$m	46 Citi +3% 10,559 \$m	47 HSBC +1% 10,534 \$m	48 Allianz +6% 10,529 \$m	49 Siemens +6% 9,942 \$m	50 Gucci +6% 9,942 \$m	51 Canon +2% 9,939 \$m	52 Canon -12% 9,796 \$m
53 HP -8% 9,341 \$m	54 DePuy +1% 9,222 \$m	55 Adidas +17% 9,000 \$m	56 Altria +19% 8,999 \$m	57 International Flavors +9% 8,247 \$m	58 3M +9% 8,247 \$m	59 Nestle 0% 8,205 \$m	60 Starbucks +16% 8,178 \$m	61 Sony +2% 8,174 \$m	62 Coca-Cola -1% 8,206 \$m	63 Morgan Stanley +14% 8,206 \$m	64 Visa +1% 7,347 \$m	65 Cartier -2% 7,347 \$m
66 Tencent +4% 7,100 \$m	67 LEGO +5% 7,024 \$m	68 Wendy's -8% 6,702 \$m	69 Kia +6% 6,661 \$m	70 Huawei +14% 6,679 \$m	71 Alibaba +11% 6,350 \$m	72 FedEx +12% 6,255 \$m	73 Land Rover +7% 6,095 \$m	74 Schaeffler +4% 6,041 \$m	75 Panasonic -6% 5,983 \$m	76 Zynga 0% 5,715 \$m	77 Caterpillar +3% 5,671 \$m	78 Netflix New 5,592 \$m
79 PepsiCo -9% 5,411 \$m	80 Paycom +12% 5,408 \$m	81 Tiffany & Co -6% 5,398 \$m	82 BlackBerry -3% 5,322 \$m	83 Lightbulb +7% 5,315 \$m	84 Bluebird +1% 5,281 \$m	85 Greenland +7% 5,281 \$m	86 Hugoboss -4% 5,114 \$m	87 Mitsubishi +3% 5,114 \$m	88 New 4,976 \$m	89 Daimler -6% 4,840 \$m	90 Greenland -6% 4,840 \$m	91 Shell +8% 4,800 \$m
92 Greenland -1% 4,783 \$m	93 Optima +6% 4,776 \$m	94 Prada -14% 4,716 \$m	95 Dior -7% 4,587 \$m	96 Ariston +2% 4,405 \$m	97 Santitas -1% 4,388 \$m	98 Tesla 0% 4,309 \$m	99 Hugoboss -3% 4,306 \$m	100 Lotus -1% 4,304 \$m				

Source: Interbrand, Mirae Asset Daewoo Research

Figure 19. History of Samsung logo changes



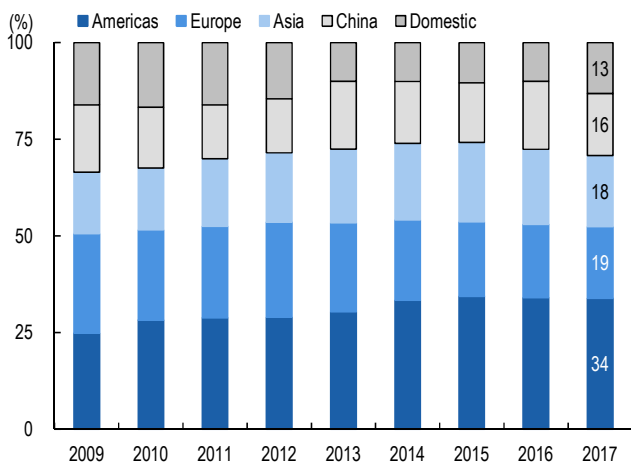
Source: Mirae Asset Daewoo Research

### 11. Regional revenue breakdown and five largest customers

In 2017, SEC posted consolidated revenue of W239.56tr, excluding related party transactions. By region, the Americas took up the lion's share of revenue (W81tr, 33.8%), followed by Europe (W44.4tr, 18.5%), Asia (W44.2tr, 18.5%), China (W38.3tr, 16%), and Korea (W31.5tr, 13.2%).

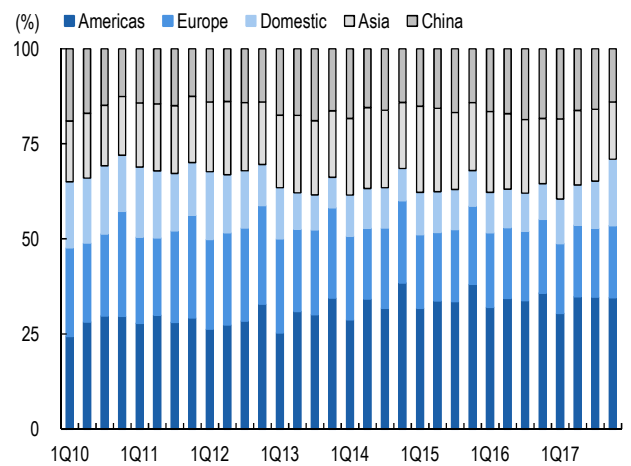
In 2009, the revenue contribution of the Americas stood at 24.8%, similar to that of Europe (25.8%). The revenue contribution of the Americas climbed to around 30%, thanks to smartphone-related sales growth, in 2012, but that of Europe dropped to less than 20% in 2015, and has remained flat at this level since then.

**Figure 20. SEC's regional revenue breakdown (annual)**



Source: Company data, Mirae Asset Daewoo Research

**Figure 21. SEC's regional revenue breakdown (quarterly)**



Source: Company data, Mirae Asset Daewoo Research

In 2017, SEC's five largest customers are Apple, Best Buy (BBY US/CP: US\$77.78), Deutsche Telekom (DTE GR/CP: €14.27), Sprint (S US/CP: US\$5.16), and Verizon (VZ US/CP: US\$48.62). Apple purchases semiconductor and display products from SEC, while Best Buy is the US' largest home appliance retailer. The other customers are telcos that buy smartphones.

Of note, the combined revenue contribution of the five largest customers has remained at 10-15%, pointing to customer diversification, which we believe is positive, in terms of profitability and earnings stability.

**Table 19. SEC's five largest customers**

	2010	2011	2012	2013	2014	2015	2016	2017
Company 1	Apple	Apple	Apple	Apple	Apple	Apple	Apple	Apple
Company 2	Best Buy	Best Buy	Best Buy	Best Buy	Deutsche Telekom	Best Buy	Best Buy	Best Buy
Company 3	Dell	Dell	Deutsche Telekom	China Mobile	Ingram Micro	Deutsche Telekom	Deutsche Telekom	Deutsche Telekom
Company 4	HP	HP	Sony	Deutsche Telekom	Sprint	Softbank	Sprint	Sprint
Company 5	Sony	Sony	Sprint	Sprint	Verizon	Verizon	Verizon	Verizon
Revenue contribution	15	13	13	12	13	14	13	14

Note: In alphabetical order

Source: Company data, Mirae Asset Daewoo Research

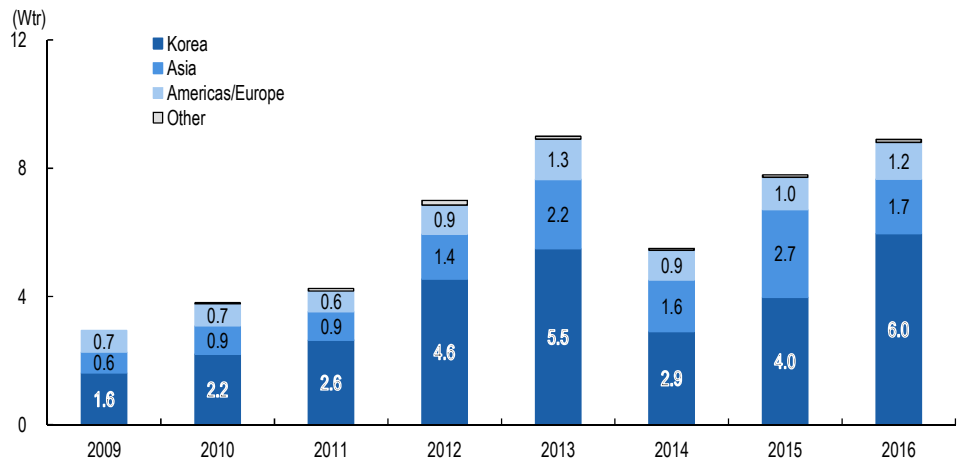
### 12. Corporate tax payment by region

SEC pays a variety of taxes. In 2016, the company paid W8.9tr in tax, similar to the level in 2013, when it made its historic-high tax payment, due to robust smartphone earnings. By region, the company paid W6tr in Korea, W1.7tr in Asia, and W1.2tr in Americas/Europe during the year.

In 2017, consolidated corporate tax payment hit a record high of W14tr, due to the company's historic-high earnings stemming from the solid semiconductor division. Corporate tax payment, which had stood at around W3tr until 2011, climbed to W7.9tr in 2013, amid solid smartphone sales, but dropped to W4.5tr in 2014. However, fueled by the recovery in smartphone sales, the corporate tax payment steadily rose to W6.9tr in 2015, W8tr in 2016, and 14tr in 2017.

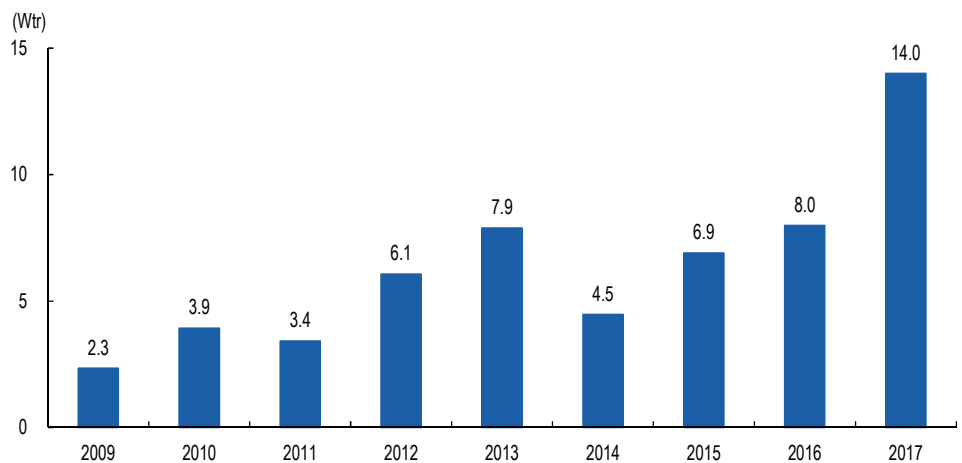
Unconsolidated corporate tax payment reached W7.7tr in 2017 (versus the National Tax Service's total corporate tax revenue of W59.2tr).

**Figure 22. Tax payment by region**



Source: Company data, Mirae Asset Daewoo Research

**Figure 23. Consolidated corporate tax payment trend**



Source: Company data, Mirae Asset Daewoo Research

**13. Dividend & cash reserves**

SEC is enhancing shareholder returns. Total dividends increased from W3tr in 2014 to W3.1tr in 2015, W4tr in 2016, and W5.8tr in 2017. When SEC's share repurchase programs are factored in, total dividend payment came in at W5.4tr in 2014, W7.3tr in 2015, W11.1tr in 2015, and W15tr in 2017. SEC changed its dividend payout from a six-month to a quarterly basis beginning 1Q17. SEC paid a quarterly dividend of W7,000 during 1Q17 and 3Q17, and a year-end dividend of W21,550 in 2017.

Cash reserves saw a continued rise from W11.2tr in 2011 to W73tr during 2017. Although cash reserves declined to W64.8tr at end-2017, as a result of an aggressive shareholder return policy, they increased to W70.2tr in 1Q18.

**Table 20. Shareholder returns**

(Wbn, W)

	2014	2015	2016	2017
Total dividend	3,000.0	3,068.7	3,991.9	5,826.3
DPS	20,000	21,000	28,500	42,550
Dividend payout ratio	13.0%	16.4%	17.8%	14.1%
Dividend yield	1.5%	1.6%	1.6%	1.7%
Share repurchase	2,445.9	4,252.8	7,139.3	9,220.9
Total shareholder returns	5,445.9	7,321.6	11,131.2	15,047.2

Note: Quarterly dividend payment from 2007 (W7,000 in 1Q17 through 3Q17, W17,700 in 1Q18)

Source: Mirae Asset Daewoo Research

**Table 21. Shareholder return policy for 2018-2020**

**Shareholder return policy for 2018-2020**

□ Basic direction: To provide shareholders with a more predictable return profile

Annual dividends will increase.

SEC announced that it would increase its annual dividends by 20% YoY in 2017 and 100% YoY in 2018. The 2019 and 2020 dividends will be kept at the same level as 2018.

Future M&A investments will not be deducted from free cash flow (FCF)

- To prevent the draining of financial resources (for shareholder return) resulting from large-scale M&A and improve dividend predictability

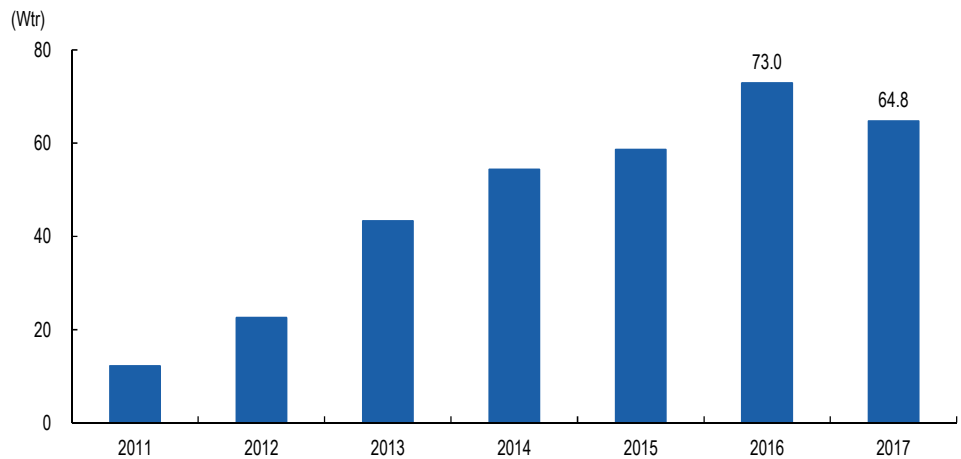
SEC plans to allocate 50% of free cash flow (FCF) for shareholder returns over a three-year period, rather than the one-year period previously stated

- To prevent fluctuations in annual shareholder return resulting from changes in FCF

※ After dividend payouts, any remaining portion of the 50% of FCF available for shareholder returns will be used either for additional cash dividends or share buybacks as deemed appropriate.

Source: Company data, Mirae Asset Daewoo Research

**Figure 24. Cash reserve trend**



Source: Company data, Mirae Asset Daewoo Research

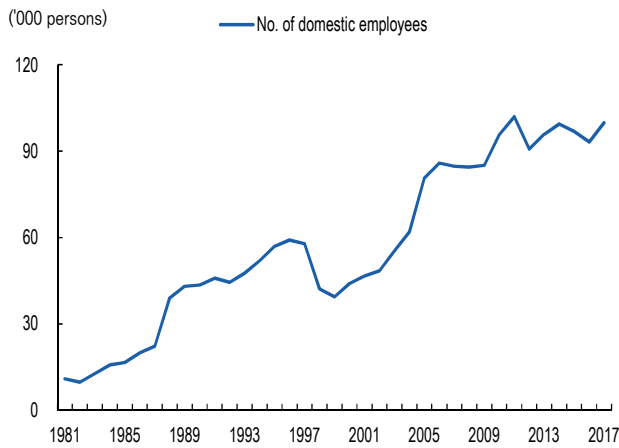
### 14. Number of employees

At end-2017, SEC employed 100,000 people domestically. The number of SEC's domestic employees has continued to increase from the 11,000 people in 1981, despite a temporary decline during the 1997 Asian Financial Crisis. The number of domestic employees has ranged from 90,000 to 100,000 since 2005. At end-2017, the DS division had the largest headcount, with 49,000 employees, followed by IM (28,000), CE (13,000), and others (10,000).

SEC employs approximately 300,000 people globally (309,000 people, as of 2016). By region, Asia's share of the workforce is rapidly increasing. SEC's workforce broke down to Asia excl.-China and Korea (43.5%), Korea (30.2%), China (12%), Americas (8.4%), Europe (4.7%), the Middle East and CIS (0.9%), and Africa (0.3%), as of 2016. Asia's share stood at 13.8% in 2010.

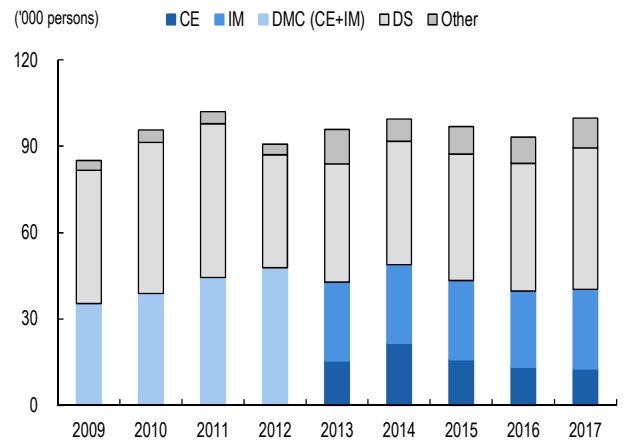
China's share of the workforce had increased through 2013, and Asia's share has been surging since then, driven by the relocation of production bases to Southeastern Asian countries, such as Vietnam.

**Figure 25. Number of employees in Korea**



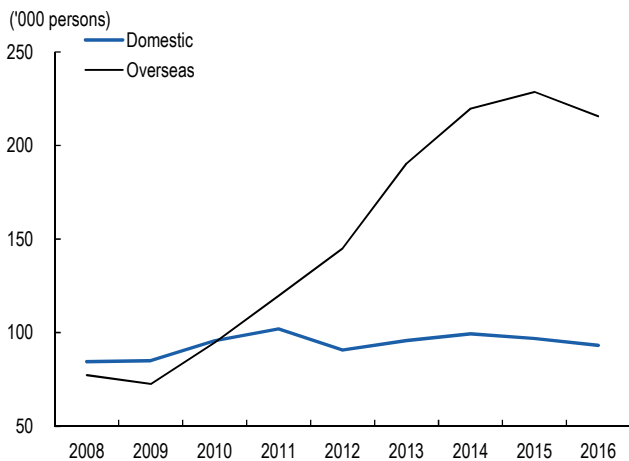
Source: Company data, Mirae Asset Daewoo Research

**Figure 26. Employee breakdown by region**



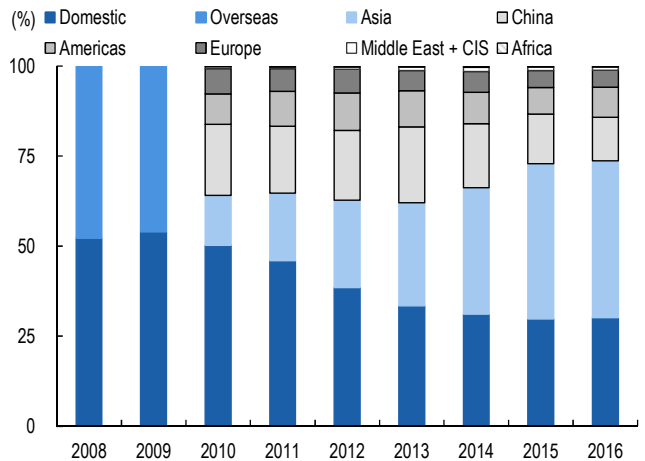
Source: Company data, Mirae Asset Daewoo Research

**Figure 27. Number of employees worldwide**



Source: Company data, Mirae Asset Daewoo Research

**Figure 28. Employee breakdown by region**

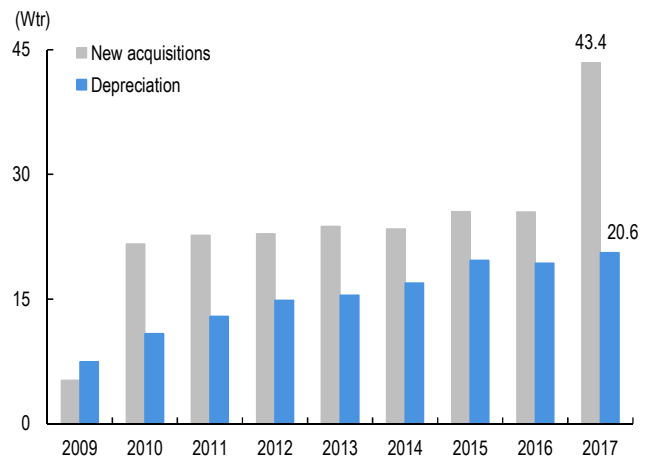
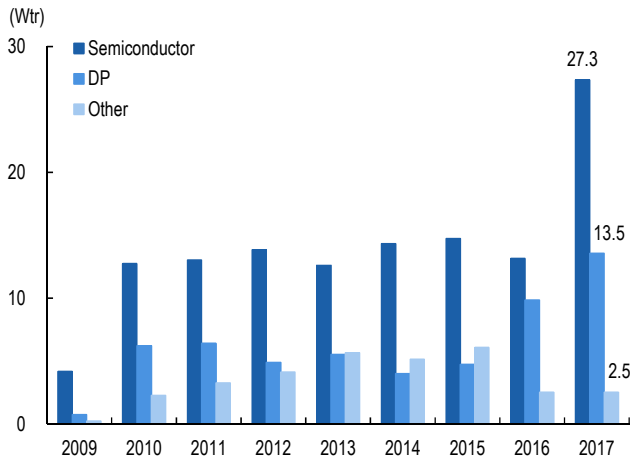


Source: Company data, Mirae Asset Daewoo Research

### 15. CAPEX & depreciation expenses

SEC invested W43.4tr in new facilities and equipment in 2017, which broke down to the semiconductor division (W27.3tr), DP (W13.5tr), and others (W2.5tr). As a result of capex, annual depreciation expenses came in at W20.6tr. SEC's annual capex ranged from W20tr to W25tr since 2010, and annual depreciation expenses have increased from the W10tr level (in 2010). SEC made aggressive investments in OLED in 2016 and NAND in 2017.

**Figure 29. Capex by division** **Figure 30. New production facilities and equipment & depreciation expenses**



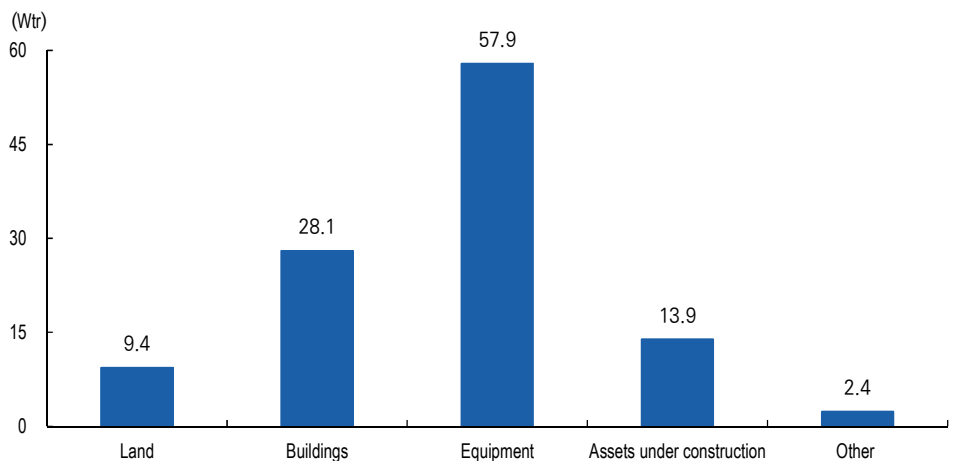
Source: Company data, Mirae Asset Daewoo Research

Source: Company data, Mirae Asset Daewoo Research

### 16. Production facility & equipment

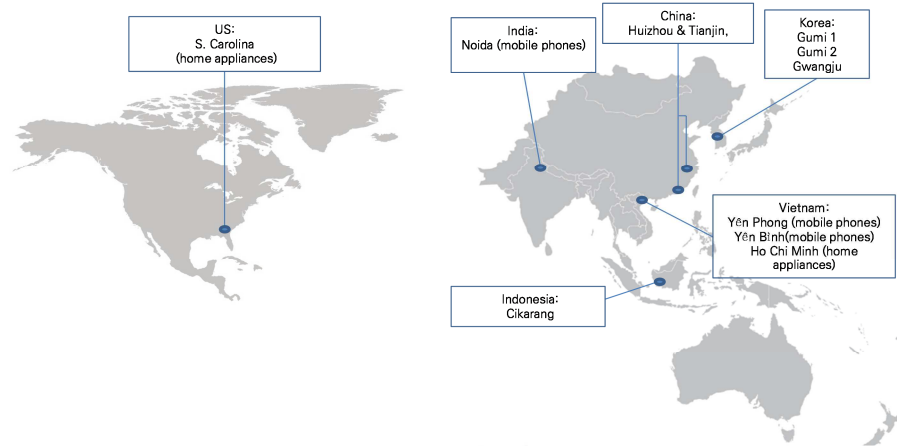
At end-2017, SEC's production facilities were booked at W111.7tr, including machinery equipment (W57.9tr), buildings and fixtures (W28.1tr), and assets under construction (W13.9tr). Currently, SEC's headquarters and R&D center are located in Suwon and Yangjae, respectively. SEC's key production facilities are located as follows (See Figure 63-65).

**Figure 31. Book value of SEC's production facilities and equipment (end-2017)**



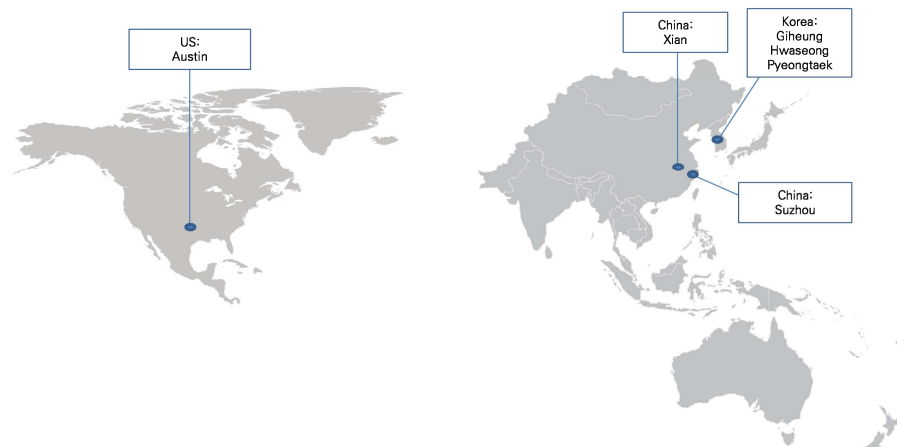
Source: Company data, Mirae Asset Daewoo Research

**Figure 32. Key mobile devices/home appliance production facilities**



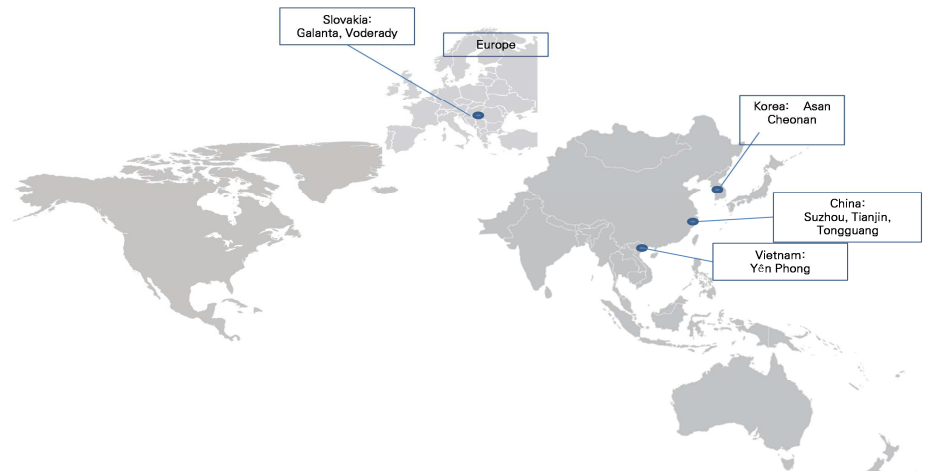
Source: Company data, Mirae Asset Daewoo Research

**Figure 33. Key semiconductor production facilities**



Source: Company data, Mirae Asset Daewoo Research

**Figure 34. Key display panel production facilities**



Source: Company data, Mirae Asset Daewoo Research

**Figure 35. SEC's headquarters & Suwon office**



Source: Company data, Mirae Asset Daewoo Research

**Figure 36. SEC R&D campus**



Source: Company data, Mirae Asset Daewoo Research

**Figure 37. SEC's Gumi plant (smartphones)**



Source: Company data, Mirae Asset Daewoo Research

**Figure 38. SEC's Hwaseong plant (semiconductors)**



Source: Company data, Mirae Asset Daewoo Research

**Figure 39. Samsung Display Asan (Tangjeong) plant (display)**



Source: Company data, Mirae Asset Daewoo Research

**Figure 40. SEC's Gwangju plant (HA)**



Source: Company data, Mirae Asset Daewoo Research

**17. Key production subsidiaries**

SEC’s key consolidated production subsidiaries in Korea include Samsung Display (a display panel manufacturer, a 84.8% stake), SU Materials (a PI varnish joint venture with Japan’s Ube Industries, 50%), STECO (an LCD driver IC packaging joint venture with Japan’s Toray Industries, 70%), SEMES (a semiconductor/display equipment manufacturer, 91.5%), and Samsung Medison (an x-ray equipment manufacturer, 68.5%).

SEC has also subsidiaries across the world—the Americas, Europe, Middle East, Africa, China and other Asian countries. The firm is expanding its key production bases beyond China to include Vietnam. SEC acquired Dacor, a premium home appliance manufacturer, in 2016. Most overseas production subsidiaries are wholly owned by SEC.

**Table 22. SEC’s key consolidated production subsidiaries (%)**

Area	Subsidiaries	Business	Equity stakes
Korea	Samsung Display	Manufacture and sale of display panels	84.8
	SU Materials	Manufacture of display components	50.0
	STECO	Manufacture of semiconductor components	70.0
	SEMES	Manufacture of semiconductor/FPD	91.5
	Samsung Medison	Medical devices	68.5
Americas	Samsung International (SII)	Manufacture of TV/monitors	100.0
	Samsung Austin Semiconductor (SAS)	Manufacture of semiconductor	100.0
	Samsung Electronics Digital Appliance Mexico (SEDAM)	Manufacture of electronic devices	99.9
	Dacor	Manufacture and sale of home appliances	100.0
Europe/CIS	Samsung Electronics Slovakia (SESK)	Manufacture of TV/monitors	100.0
	Samsung Electronics Poland Manufacturing (SEPM)	Manufacture of home appliances	100.0
	Samsung Electronics Rus Kaluga (SERK)	Manufacture of TV	100.0
Middle East & Africa	Samsung Electronics Egypt (SEEG)	Manufacture and sale of electronic devices	100.0
	Samsung Electronics South Africa Production (SSAP)	Manufacture of TV/monitors	100.0
Asia (ex-China)	Samsung Electronics (M)(SEMA)	Manufacture of home appliances	100.0
	Samsung India Electronics (SIEL)	Manufacture and sale of electronic devices	100.0
	Samsung Electronics Indonesia (SEIN)	Manufacture and sale of electronic devices	100.0
	Thai Samsung Electronics (TSE)	Manufacture and sale of electronic devices	91.8
	Samsung Electronics Vietnam (SEV)	Manufacture of electronic devices	100.0
	Samsung Electronics Vietnam THAINGUYEN (SEVT)	Manufacture and sale of communication equipment	100.0
	Samsung Medison India (SMIN)	Medical devices	100.0
	Samsung Display Vietnam (SDV)	Manufacture of display panels	100.0
	Samsung Electronics HCMC CE Complex (SEHC)	Manufacture and sale of electronic devices	100.0
China	Samsung Display Dongguan (SDD)	Manufacture of display panels	100.0
	Samsung Display Tianjin (SDT)	Manufacture of display panels	95.0
	Suzhou Samsung Electronics (SSEC)	Manufacture of home appliances	88.3
	Samsung Suzhou Electronics Export (SSEC-E)	Manufacture of home appliances	100.0
	Samsung Electronics Suzhou Semiconductor (SESS)	Toll processing of semiconductor	100.0
	Samsung Electronics Huizhou (SEHZ)	Manufacture of electronic devices	99.9
	Tianjin Samsung Electronics (TSEC)	Manufacture of TV/monitors	91.2
	Tianjin Samsung Telecom Technology (TSTC)	Manufacture of communication equipment	90.0
	Samsung Electronics Suzhou Computer (SESC)	Manufacture of electronic devices	100.0
	Samsung Suzhou Module (SSM)	Toll processing of displays	100.0
	Samsung Suzhou LCD (SSL)	Manufacture of display panels	60.0
	Shenzhen Samsung Electronics Telecommunication	Manufacture of communication equipment	95.0
	Samsung (China) Semiconductor (SCS)	Manufacture of semiconductors	100.0
	Tianjin Samsung LED (TSLED)	Manufacture of LED	100.0

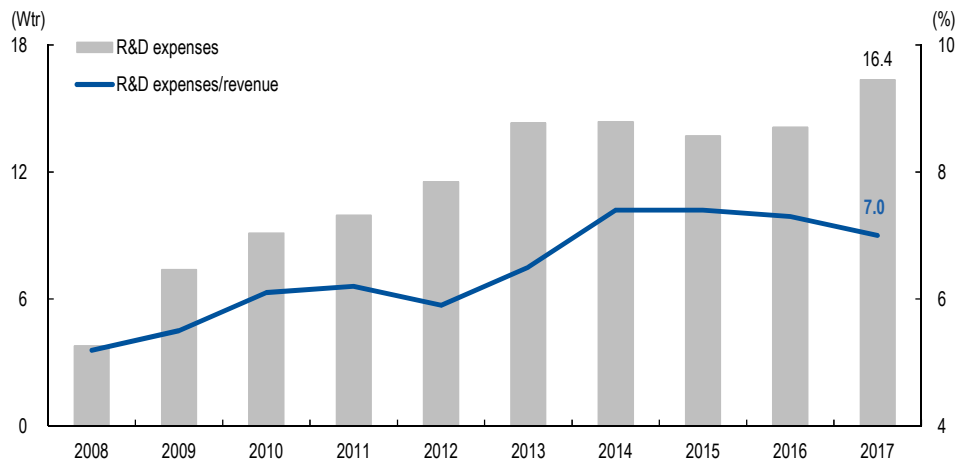
Source: Company data, Mirae Asset Daewoo Research

**18. R&D spend & organization**

SEC’s annual R&D spend stood at W16.4tr in 2017, accounting for 7% of the total revenue. The firm has spent W14tr on R&D every year since 2013. According to SEC, the R&D organization comprises divisional R&D teams responsible for developing technologies marketable in the next couple of years, research centers responsible for promising technologies with a three- to five-year time horizon, and Samsung Advanced Institute of Technology, which develops core enabling technologies for future growth engines.

SEC is operating R&D operations globally including the US (SRA), Russia (SRR), Israel (SRIL, SIRC), India (SRI-Bangalore, SRI-Delhi), Japan (SRJ), and China (SSCR, SRC-Beijing, SRC-Nanjing, SRC-Tianjin, SRC-Guangzhou, and SRC-Shenzhen).

**Figure 41. Annual R&D spend and % of total revenue**



Source: Company data, Mirae Asset Daewoo Research

**19. Value of SEC’s equity investments**

SEC has equity investments in various companies, including affiliates (e.g., Samsung SDI, Samsung SDS, and Samsung Electro-Mechanics) and other group companies (e.g., Samsung Heavy Industries, Hotel Shilla, and Cheil Worldwide). The value of SEC’s stakes in these listed companies stands at W20.5tr, based on market capitalization as of April 30, 2018.

SEC also has stakes in unlisted subsidiaries, such as Samsung Display and Samsung Medison, to take part in management and secure an overseas foothold. SEC’s stakes in these unlisted subsidiaries were booked at W52.6tr at end-2017.






## 20. Design

SEC has expanded investments in design since early 1990s, placing a greater focus on design management. SEC, which started with two designers, now has 900. For most products, design reviews take place every two years, with the first year devoted to trend analysis and strategy planning and the second year devoted to the introduction of new designs.

SEC has won 210 awards from various international design competitions since 2006. Samsung received eight IDEA 2009 awards, becoming the most awarded company, and won the most awards at the 2010 iF Design Award.

SEC has seven Global Design Centers, located in Seoul, Tokyo, Beijing, Delhi, London, San Francisco, and Sao Paulo. SEC operates an independent design organization, the Seoul R&D Campus, which opened in 2015.

**Figure 42. List of awards earned by SEC**

<p>AC9000K (360CST)</p> <p>GOOD DESIGN</p> 	<p>Active Wash Series (WA8700K / DV8700K)</p> <p>IF</p> 	<p>AF9500M UX</p> <p>IF</p> 	<p>Airsight</p> <p>IF</p> 
<p>AKG Earphone (EO-IG955)</p> <p>GOOD DESIGN</p> 	<p>Ambient Light</p> <p>IDEA-GOOD DESIGN</p> 	<p>ArtPC PULSE</p> <p>IF</p> 	<p>ATMOS Soundbar Series</p> <p>IF</p> 
<p>AX3300</p> <p>IDEA-IF</p> 	<p>AX6900</p> <p>IDEA</p> 	<p>Black Caviar Series</p> <p>IDEA-IF</p> 	<p>C35 / C40 Series</p> <p>IF</p> 
<p>CH711 Monitor</p> <p>IDEA</p> 	<p>Chrome Book</p> <p>IF</p> 	<p>Chromebook Pro Plus</p> <p>IDEA-GOOD DESIGN</p> 	<p>Curved Gaming Monitor CFG70</p> <p>IF</p> 
<p>Curved Gaming Monitor CHG70</p> <p>IDEA-GOOD DESIGN</p> 	<p>Curved Gaming Monitor CHG90</p> <p>IDEA-GOOD DESIGN</p> 	<p>Curved Monitor CF791</p> <p>IF</p> 	<p>Dex Station (EE-MG950)</p> <p>GOOD DESIGN</p> 
<p>Digital Signage (Interactive Smart Display)</p> <p>IF</p> 	<p>Dishwasher Dacor Modernist Luxury Built-in</p> <p>GOOD DESIGN</p> 	<p>Eclipse</p> <p>IF</p> 	<p>External SSD Concept</p> <p>IDEA</p> 
<p>Family Hub RB38K7998S4</p> <p>IF</p> 	<p>Fast Charging Wireless Charger Stand</p> <p>IDEA</p> 	<p>FlexWash™ + FlexDry™</p> <p>IDEA-GOOD DESIGN</p> 	<p>Galaxy A Series 2016</p> <p>IF</p> 

Source: Mirae Asset Daewoo Research

### III. Business overview and current direction

#### Ownership structure

##### 21. Ownership breakdown and governance structure

SEC's largest shareholders are Lee Kun-hee and affiliated parties, who together hold a 20.11% stake (as of end-2017). Shareholders who hold more than 5% with voting rights include the National Pension Service (NPS; 12,369,186 shares, 9.58% stake) and Samsung Life (032830 KS/Buy/TP: W155,000/CP: W114,000; 11,089,529 shares, 8.59%).

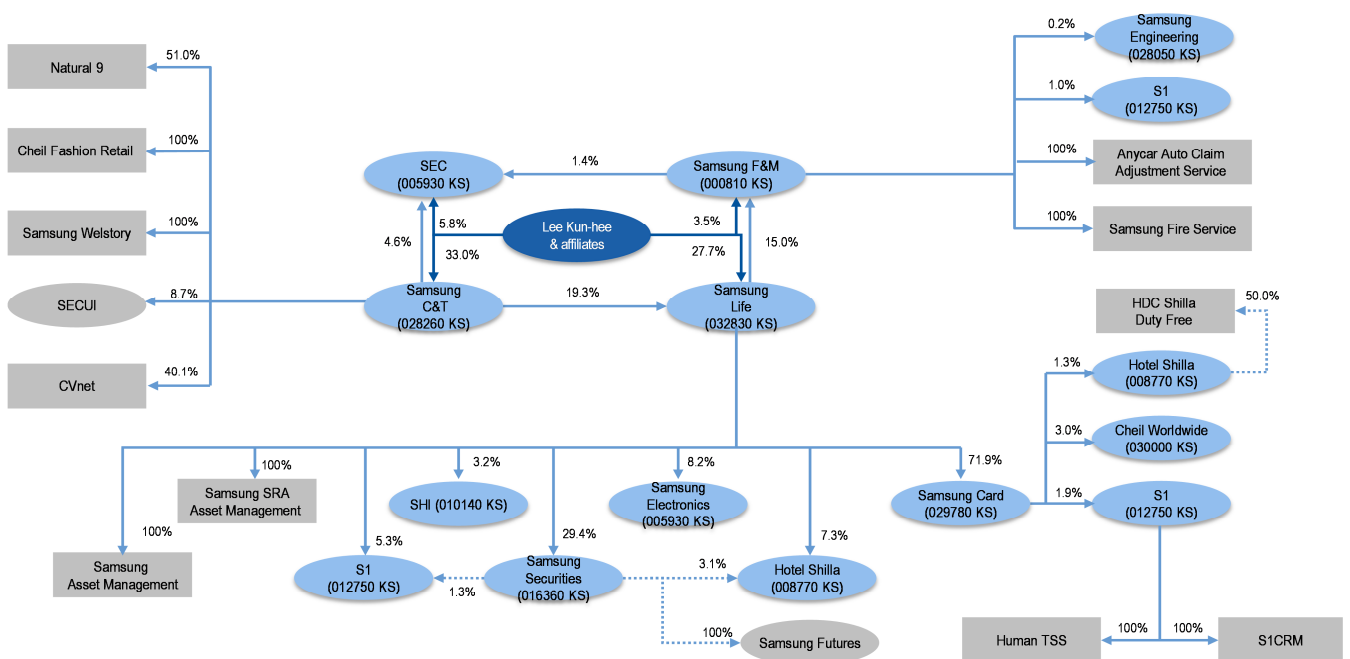
Table 23. Largest shareholders: Lee Kun-hee and affiliated parties

(shares, %)

Name	Note	Type of stock	No. of shares and ownership			
			Beginning of 2017		End-2017	
			Shares	Stake	Shares	Stake
Lee Kun-hee	Chairman	Common	4,985,464	3.54	4,985,464	3.86
Lee Kun-hee	Chairman	Preferred	12,398	0.06	12,398	0.07
Samsung C&T	Affiliate	Common	5,976,362	4.25	5,976,362	4.63
Samsung Foundation	Affiliate	Common	89,683	0.06	89,683	0.07
Samsung Foundation of Culture	Affiliate	Common	37,615	0.03	37,615	0.03
Hong Ra-hee	Affiliate	Common	1,083,072	0.77	1,083,072	0.84
Lee Jae-yong	Affiliate	Common	840,403	0.6	840,403	0.65
Samsung Life	Affiliate	Common	10,622,814	7.55	10,622,814	8.23
Samsung Life	Affiliate	Preferred	879	0	879	0
Samsung Life (special account)	Affiliate	Common	467,320	0.33	466,715	0.36
Samsung Life (special account)	Affiliate	Preferred	51,614	0.25	30,778	0.17
Samsung F&M	Affiliate	Common	1,856,370	1.32	1,856,370	1.44
Kwon Oh-hyun	Affiliate	Common	1,300	0	500	0
Total		Common	25,960,403	18.45	25,958,998	20.11
		Preferred	64,891	0.32	44,055	0.24

Source: Company data, Mirae Asset Daewoo Research

Figure 43. Samsung Group corporate structure



Source: Mirae Asset Daewoo Research

## 22. Key subsidiaries

Pursuant to the general shareholders' meeting on March 23, 2018, SEC's board of directors consists of 11 members, including five insiders (Lee Jae-yong, Lee Sang-hoon, Kim Gi-nam, Kim Hyun-seok, and Koh Dong-jin) and six outsiders (Lee In-ho, Song Kwang-soo, Kim Sun-uk, Bahk Jae-wan, Park Byung-gook, and Kim Jeong-hun). The board has six committees overseeing management, audits, independent director recommendations, related-party transactions, compensation, and governance.

SEC's four divisions are: Consumer Electronics (CE), IT & Mobile Communications (IM), Device Solutions (DS), and Harman. Key subsidiaries include Samsung Display (W50.7tr) and Samsung Electronics America (W26.3tr) in terms of total assets.

**Table 24. Top 10 consolidated subsidiaries by assets**

Company	Assets	Liabilities	Shareholders' equity
Samsung Display	50.7	12.2	38.5
Samsung Electronics America (SEA)	26.3	9.0	17.3
Harman and consolidated subsidiaries	14.7	5.4	9.3
Samsung (China) Investment (SCIC)	13.4	11.3	2.1
Samsung Display Vietnam (SDV)	10.5	9.5	1.0
Samsung Semiconductor (SSI)	10.1	5.4	4.7
Samsung Electronics Vietnam Thai Nguyen (SEVT)	10.0	2.3	7.7
Samsung Electronics Vietnam (SEV)	9.6	1.9	7.7
Samsung Electronics Europe Holdings (SEEH)	9.5	7.2	2.2
Samsung (China) Semiconductor (SCS)	8.1	1.5	6.6

Source: Mirae Asset Daewoo Research



**Business structure**

**23. Key business areas**

SEC operates four major business divisions: CE (home appliances), IM (smartphones), DS (displays and semiconductors), and Harman. The CE division produces TVs, monitors, air conditioners, and refrigerators, while the IM division manufactures mobile phones, communication systems, and computers.

The DS division manufactures components such as DRAM, NAND flash, and mobile APs in the semiconductor segment, and TFT-LCD and OLED display panels in the display (DP) segment.

Harman (acquired in 2017) is responsible for head units, infotainment, telematics, and speakers.

**Table 25. Business divisions**

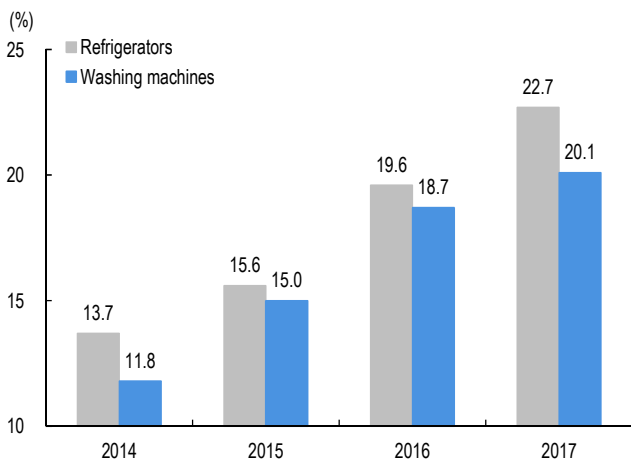
Division		Key products
CE		TVs, monitors, refrigerators, washing machines, air conditioners, medical devices, etc.
IM		Handheld products, network systems, computers
DS	Semiconductors	DRAM, NAND flash, mobile APs, etc.
	DP	TFT-LCDs, OLEDs etc.
Harman		Head units, infotainment, telematics, speakers

Source: Company data, Mirae Asset Daewoo Research

**24. Performance in key markets**

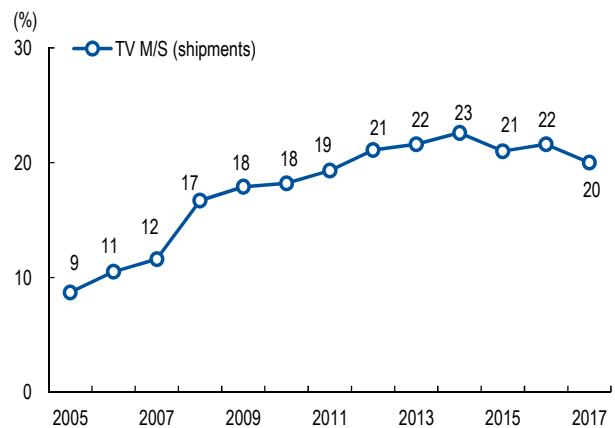
As of end-2017, SEC holds the largest market shares in key product categories, such as: TVs (20.0%); handsets and smartphones (19.5% and 20.4%, respectively, by shipments); DRAM (45.3%); NAND (42.8%); and SSDs (40.5%)

**Figure 45. North American refrigerator and washing machine M/S**



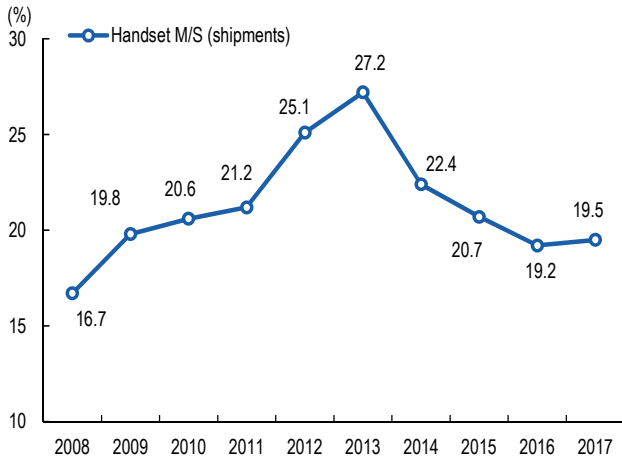
Source: TraQline, media reports, Mirae Asset Daewoo Research

**Figure 46. Global TV M/S**



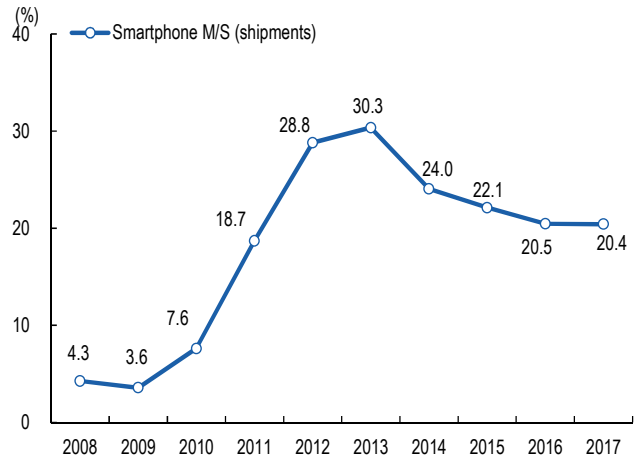
Source: IDC, Mirae Asset Daewoo Research

**Figure 47. Global handset M/S**



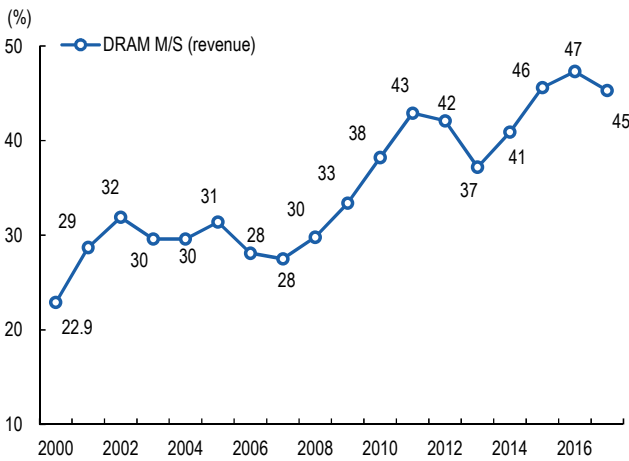
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 48. Global smartphone M/S**



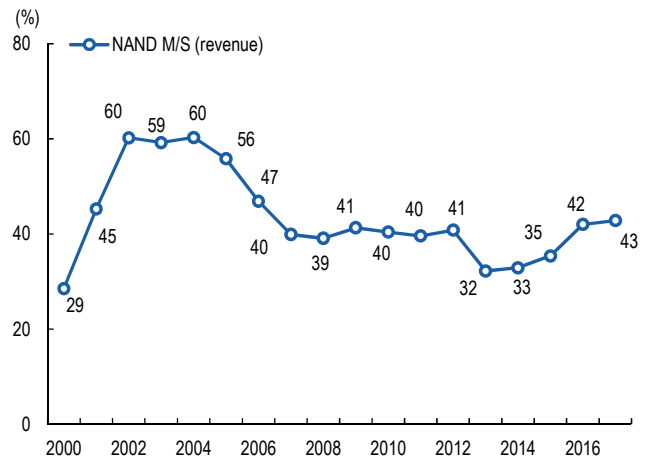
Source: Gartner, Mirae Asset Daewoo Research

**Figure 49. Global DRAM M/S**



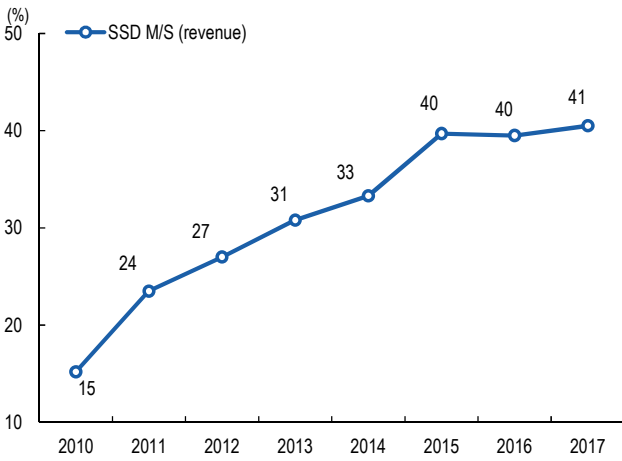
Source: Gartner, Mirae Asset Daewoo Research

**Figure 50. Global NAND M/S**



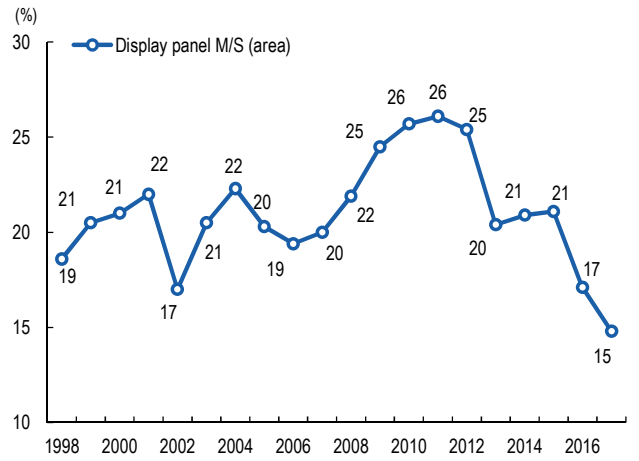
Source: Gartner, Mirae Asset Daewoo Research

**Figure 51. Global SSD M/S**



Source: Gartner, Mirae Asset Daewoo Research

**Figure 52. Global display M/S**



Source: IDC, Mirae Asset Daewoo Research

## Consumer Electronics division

The CE division kicked off SEC's growth story. The company began to manufacture black-and-white TVs in November 1972 and expanded to refrigerators in March 1974 and washing machines in December 1974. The CE division was SEC's core business division until the launch of semiconductor production.

SEC's CE division can now be broken down into the following sub-businesses: visual display (VD; TVs, monitors, etc.), home appliances (refrigerators, laundry machines, etc.), and medical devices (medtech; digital X-rays, mobile CT scanners, in-vitro diagnostics, etc.).

### 25. Earnings outlook

For 2018, we expect the CE division to post revenue of W43.8tr (-2.9% YoY) and operating profit of W1.8tr (+11.1% YoY). All in all, we expect the business to disappoint due to a lower-than-expected revenue mix of high-end products such as OLEDs.

We expect SEC to yield a lower home appliance OP margin than LG Electronics (LGE; 066570 KS/Buy/TP: W149,000/CP: W97,700; 10% margin). However, it is notable that SEC is investing in B2B and distribution networks (e.g., Dacor acquisition), which is likely to pay off from a long-term perspective.

However, compared with LGE, we think SEC's weaker efforts to create new markets—such as OLED TVs, drying machines, and cordless vacuum cleaners—are worrisome.

**Table 26. CE earnings and forecasts**

	1Q17	2Q17	3Q17	4Q17	1Q18P	2Q18F	3Q18F	4Q18F	(Wbn, %)		
									2017	2018F	2019F
Revenue	10,456	10,920	11,032	12,723	9,740	10,665	11,132	12,283	45,130	43,819	43,366
TV	5,237	5,155	5,492	7,217	4,806	5,019	5,373	6,710	23,101	21,908	21,042
Monitors/other	1,339	1,126	697	1,147	1,034	1,065	958	1,150	4,309	4,206	4,099
Appliances/other	3,880	4,640	4,842	4,359	3,900	4,582	4,800	4,423	17,720	17,705	18,225
Revenue mix											
TV	50.1	47.2	49.8	56.7	49.3	47.1	48.3	54.6	51.2	50.0	48.5
Monitor/other	6.8	10.3	6.3	9.0	10.6	10.0	8.6	9.4	9.5	9.6	9.5
Appliances/other	37.1	42.5	43.9	34.3	40.0	43.0	43.1	36.0	39.3	40.4	42.0
Operating profit	280	452	583	515	786	439	346	35	1,647	1,830	1,606
OP margin	2.7	4.1	5.3	4.0	8.1	4.1	3.1	0.3	3.6	4.2	3.7

Source: Company data, Mirae Asset Daewoo Research

### 1) Visual Display business

#### 26. Overview

The VD division manufactures LCD TVs and monitors, with TVs estimated to account for 80% of revenue. SEC entered the TV business in 1970, behind its rival LGE. However, SEC managed to assume first place in the domestic market with the successful release of its Econo TV models in 1975. SEC released PDP TVs in the early 2000s, gradually catching up with market-leading Japanese players.

SEC began pursuing global market expansion in earnest in 2006, introducing the Bordeaux LCD TV at a time when: 1) CRT TVs based on analog technology accounted for 80% of total TV sales; and 2) Sony (6758 JP/CP: JPY5,177) and Sharp (6753 JP/CP: JPY3,225) dominated the market with superior brand power and sound quality. Based on its innovative design, the Bordeaux TV recorded more than 2mn sales in the eight months following its release.

SEC's TV market share more than doubled from 11.3% in 2005 to 23.7% in 4Q09 as the company consolidated its technology lead over rivals. Along with LGE, the company drove the expansion of the LCD TV market, loosening the grips of PDP-oriented Japanese peers. SEC has commanded the largest share of the TV market for 13 straight years.

Figure 53. SEC Bordeaux TV (price: ₩2.2mn)

Figure 54. Sony Bravia PDP TV (price: ₩1.9mn)

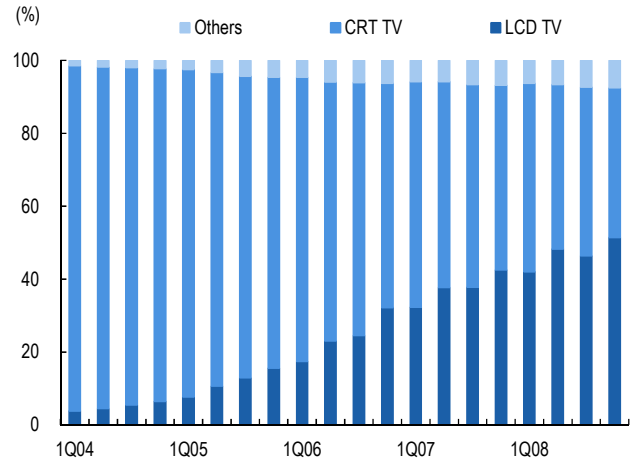
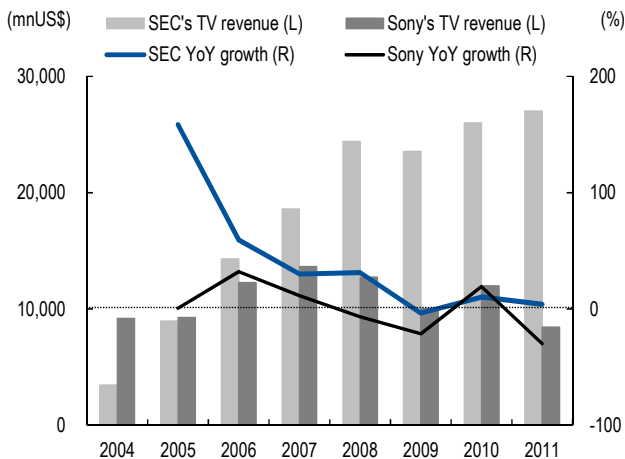


Source: Press materials Mirae Asset Daewoo Research

Source: Press materials, Mirae Asset Daewoo Research

Figure 55. Revenue trend comparison: SEC vs. Sony

Figure 56. TV M/S by technology in the mid-2000s



Source: Company data, Mirae Asset Daewoo Research

Source: IHS, Mirae Asset Daewoo Research

27. Key products

Figure 57. 65" curved UHD TV



Source: Press materials, Mirae Asset Daewoo Research

Figure 58. Frame TV



Source: Press materials, Mirae Asset Daewoo Research

Figure 59. QLED TV



Source: Press materials, Mirae Asset Daewoo Research

Figure 60. The Wall



Source: Press materials, Mirae Asset Daewoo Research

Figure 61. Super ultra-wide monitor



Source: Press materials, Mirae Asset Daewoo Research

Figure 62. Cinema LED



Source: Press materials, Mirae Asset Daewoo Research

### 28. Market growth

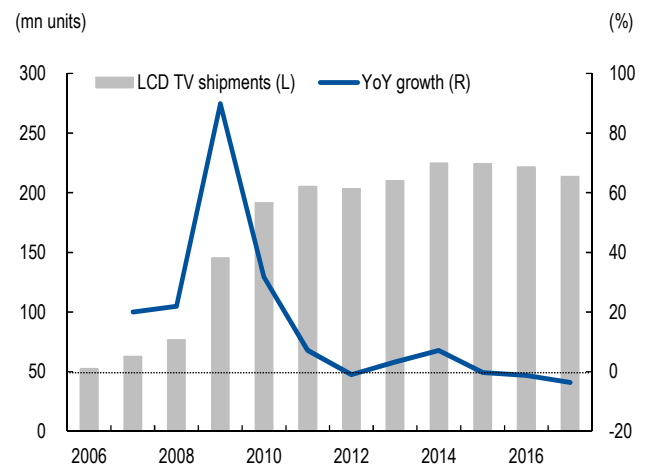
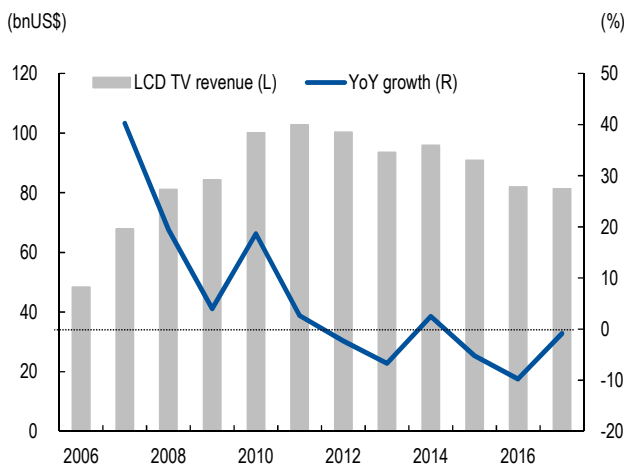
LCD TV market growth is slowing. Growth in LCD TV shipments has slowed since 2010, turning negative in 2015 amid China's domestic consumption slowdown. In 2017, global LCD TV shipments contracted 3.6% YoY to 214mn units. We are unlikely to see a resumption of robust growth in the global LCD TV market, in light of already-high LCD penetration (99.2%). A continued increase in TV shipments in some emerging countries, such as India, should not be enough to offset sluggish demand in developed countries.

In the high-end segment, competition with OLED TVs is intensifying. In the market for US\$1,500+ TVs, the market share of OLED TVs has been on the rise since 1H17. Amid aggressive market expansion by OLED TV producers, LCD players are rapidly shifting toward large-sized TVs, cutting prices for 75"+ TVs and scaling down the mix of low/mid-priced TVs.

In our view, the biggest hurdle for market expansion is the fact that set makers have no strategy for creating fresh demand other than price cuts. Meanwhile, the home appliance market has been achieving growth in both prices and sales by introducing innovative products. In our view, TV makers need to make unprecedented attempts to generate demand, including efforts to focus on connectivity with AI (e.g., the Google Assistant introduced at the CES 2018, etc.) and differentiation in form factor (e.g., rollable screens, etc.).

**Figure 63. LCD TV market trend (revenue)**

**Figure 64. LCD TV market trend (shipments)**

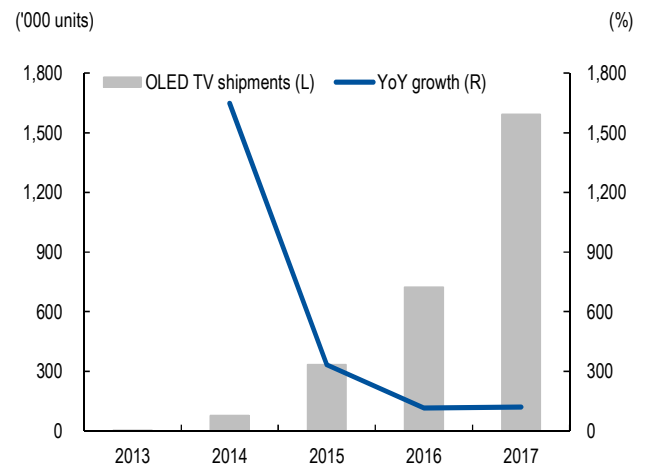
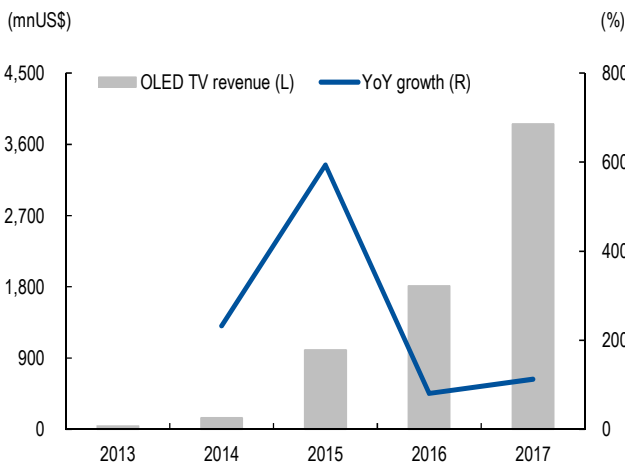


Source: IHS, Mirae Asset Daewoo Research

Source: IHS, Mirae Asset Daewoo Research

**Figure 65. OLED TV market trend (revenue)**

**Figure 66. OLED TV market trend (shipments)**



Source: IHS, Mirae Asset Daewoo Research

Source: IHS, Mirae Asset Daewoo Research

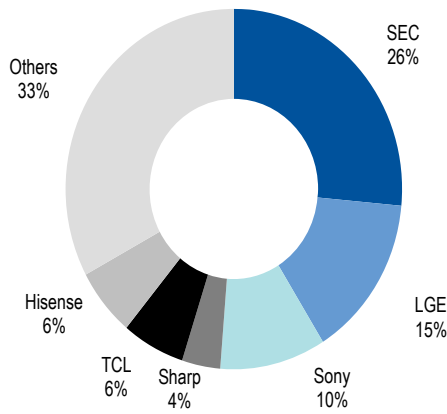
### 29. Competitive landscape

In 2017, SEC's global TV market share in terms of shipments stood at 20%. Based on revenue, its market share came in higher, at 26%, thanks to its large mix of high-end products. The company has maintained its leadership in the global TV market for 13 consecutive years.

However, the company has seen a decline in market share in the high-end segment (price of US\$1,500 or higher) since 1H17. In 1Q17, SEC accounted for just 11% of the high-end TV market. Meanwhile, LGE and Sony have been steadily expanding their presence in the high-end segment on the back of strong OLED TV line-ups.

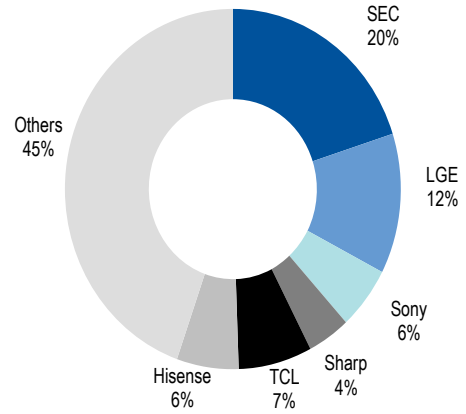
By region, SEC holds a strong grip on North America (market share of 28%), Europe (28%), and South America (32%). However, it is struggling in China, with a modest market share of 3%, due to the strong influence of local players, like Hisense (600060 SH/CP: RMB13.91), Skyworth (751 HK/CP: HK\$ 3.55), and TCL (000100 SH/CP: RMB3.30).

Figure 67. Global TV market breakdown in 2017 (revenue)



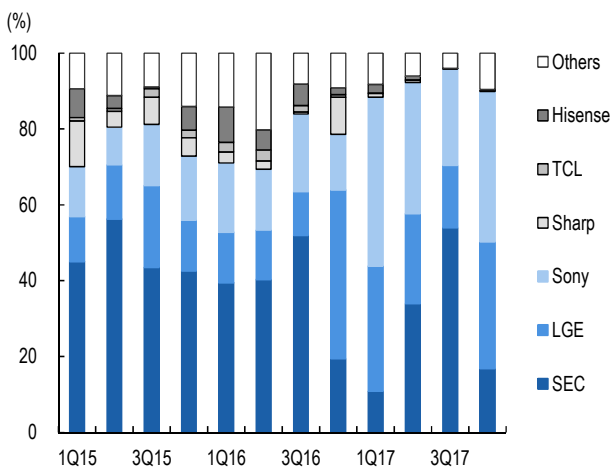
Source: IHS, Mirae Asset Daewoo Research

Figure 68. Global TV market breakdown in 2017 (shipments)



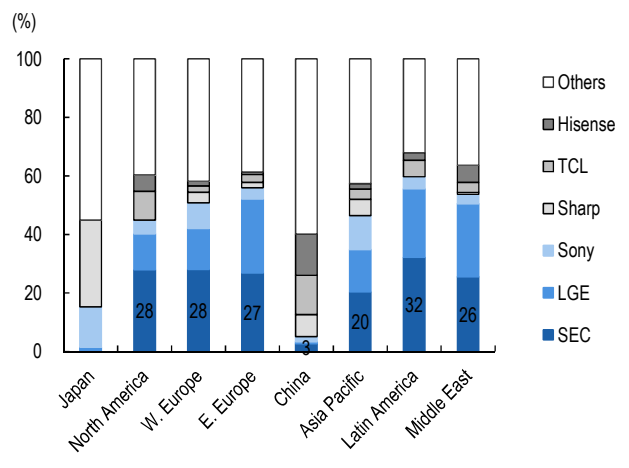
Source: IHS, Mirae Asset Daewoo Research

Figure 69. High-end TV segment breakdown



Source: Industry data, Mirae Asset Daewoo Research

Figure 70. TV market breakdown by region (2017)



Source: IHS, Mirae Asset Daewoo Research

### 30. Outlook and strategy

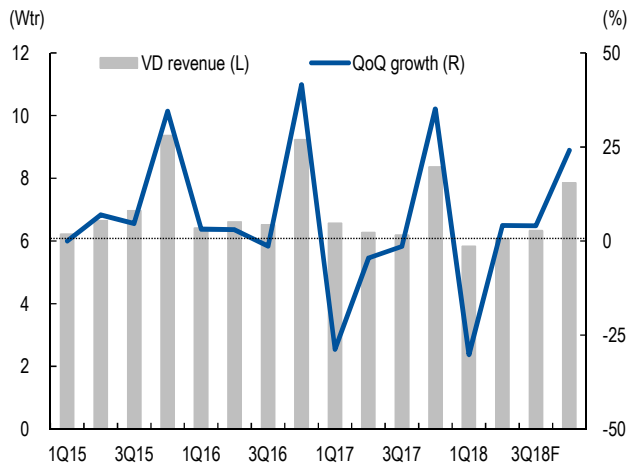
For 2018, we forecast the VD business's revenue to slip 4.7% YoY to W26.1tr. For LCD TVs, shipments are projected to decline 6.6% YoY to 40.08mn units. While sales volume should decline QoQ, ASP is forecast to rise 5.4% YoY, thanks an increased mix of high-end products. Despite declining revenue, the business's OP margin should improve YoY, thanks to the recent sharp decline in LCD panel prices.

In terms of technology, the unit has a two-track strategy (OLED and MicroLED) of pushing QD materials-based TVs in the B2C segment and MicroLED-based products in the B2B segment.

At present, QLED TV manufacturing is based on QD Enhancement Film (QDEF) technology. However, going forward, next-generation production is likely to shift to QD-OLED (QDCF + OLED), and then toward QD deposition or printing. The firm is expected to remove BLUs and color filters from TV manufacturing with the aim of enhancing competitiveness in the high-end TV (e.g., rollable TV) market.

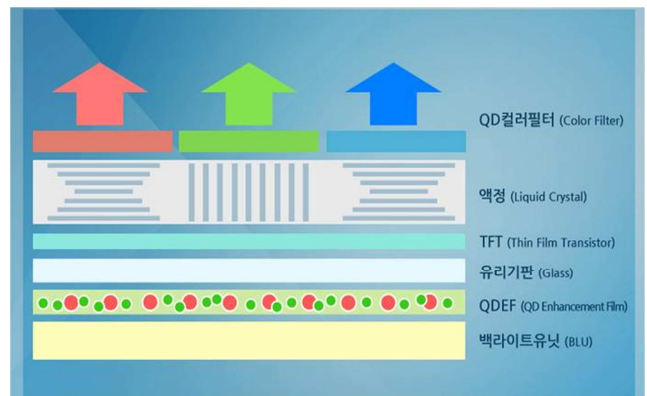
MicroLEDs are optimized for use in large-screen TVs. However, they are unlikely to be used in home TVs for the time being, due to: 1) the sizable costs of high-resolution LED chips; and 2) difficulties in streamlining the transmission process. Meanwhile, we expect MicroLED TVs to be released in 2H18 or beyond, targeting B2C customers (who have lower price sensitivity).

Figure 71. VD revenue



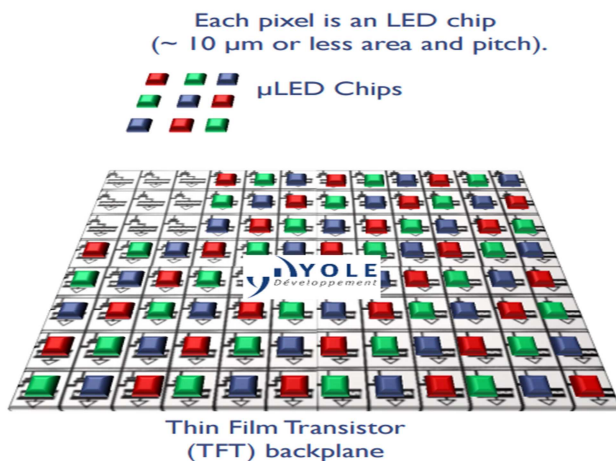
Source: Mirae Asset Daewoo Research

Figure 72. QLED structure (QDEF)



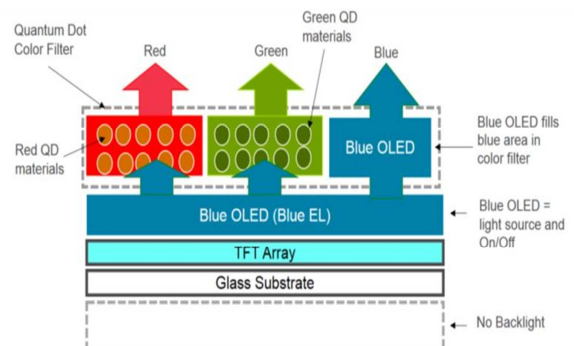
Source: Company materials, Mirae Asset Daewoo Research

Figure 73. MicroLED structure



Source: Yole, Mirae Asset Daewoo Research

Figure 74. QD-OLED structure



Source: Company materials, Mirae Asset Daewoo Research

## 2) Home appliance business

### 31. Overview

Traditionally, home appliances have been divided into two categories: white (e.g., refrigerators, washing machines) and brown (e.g., TVs) goods. They can also be classified into major appliances (e.g., refrigerators, washers, air conditioners) and small appliances (e.g., rice cookers, hair dryers). SEC's home appliance business is divided into kitchen appliances (e.g., refrigerators, ovens/microwaves) and other home appliances (e.g., air conditioners, washers, dryers).

Major domestic rivals include LGE, Dayou Winia (071460 KS/CP: W3,875; kimchi refrigerators), and Coway (021240 KS/Buy/TP: W125,000/CP: W91,000; air purifiers), while overseas rivals include Whirlpool (WHR US/CP: US\$155.97), Electrolux (ELUX-B ST/CP: SEK227.40), and Haier (600690 SH/CP: RMB17.99).

### 32. Key products

- ① Kitchen appliances: Refrigerators, kimchi refrigerators, ovens/microwaves, cooktops, built-ins

Figure 75. Refrigerator



Source: Company materials, Mirae Asset Daewoo Research

Figure 76. Kimchi refrigerator



Source: Company materials, Mirae Asset Daewoo Research

Figure 77. Oven/microwave



Source: Company materials, Mirae Asset Daewoo Research

Figure 78. Electric cooktop



Source: Company materials, Mirae Asset Daewoo Research

② Other home appliances: Air conditioners, washers, dryers, vacuums, air purifiers, humidifiers, and small appliances

**Figure 79. Air conditioner** **Figure 80. Air conditioning system**



Source: Company materials, Mirae Asset Daewoo Research

Source: Company materials, Mirae Asset Daewoo Research

**Figure 81. Washer/dryer** **Figure 82. Vacuum**



Source: Company materials, Mirae Asset Daewoo Research

Source: Company materials, Mirae Asset Daewoo Research

**Figure 83. Air purifier (Cube)** **Figure 84. Digital door lock**



Source: Company materials, Mirae Asset Daewoo Research

Source: Company materials, Mirae Asset Daewoo Research

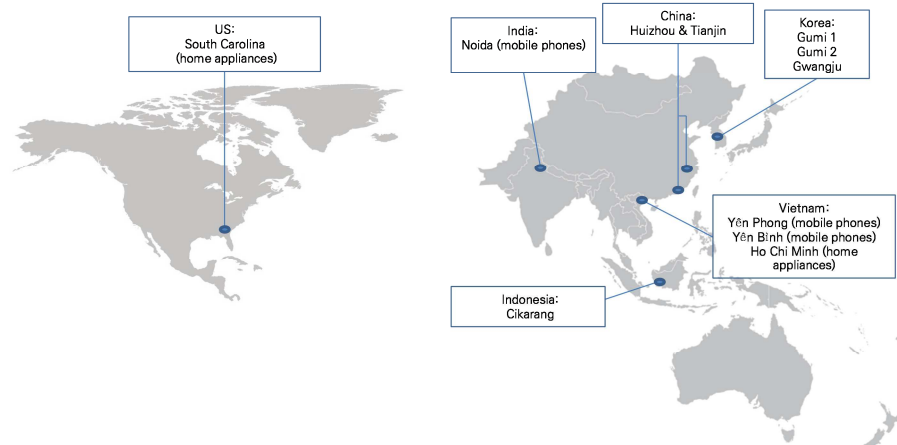
**33. Production facilities (capacity)**

In Korea, Samsung Gwangju Electronics engages in the production of high-end home appliances for the domestic market (rather than for export). Notably, the subsidiary has been increasing its proportion of overseas production, due to growing labor costs in Korea.

SEC's Vietnamese plant in Saigon Hi-Tech Park (SHTP), which came online in 2017, also produces major appliances, such as TVs, air conditioners, and refrigerators. Going forward, SEC is likely to expand its Vietnamese operations based on partnerships with component suppliers, such as Intops (049070 KQ/CP: W9,080).

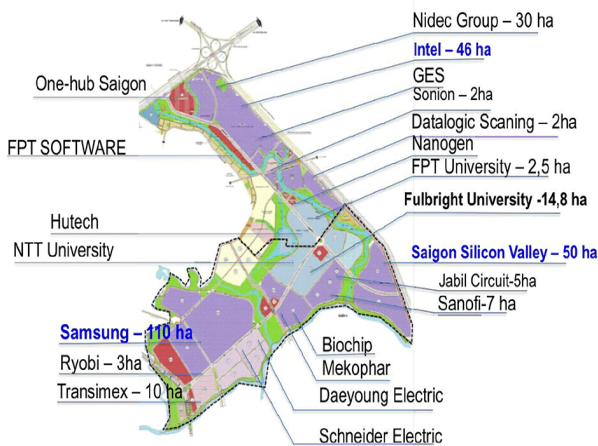
SEC has also been ramping up its US operations. In 2017, it decided to invest roughly US\$380mn to establish a new home appliance-manufacturing plant in Newberry County, South Carolina (which will hire 950 employees). In particular, the washer production line, which is slated to become operational in 2018, should help the firm proactively address US demand and minimize any adverse impact from safeguard measures.

**Figure 85. SEC's key home appliance-manufacturing plants**



Source: Company materials, Mirae Asset Daewoo Research

**Figure 86. Major firms operating in Vietnam's SHTP**



Source: Press materials, Mirae Asset Daewoo Research

**Figure 87. Factory site in Newberry, South Carolina**



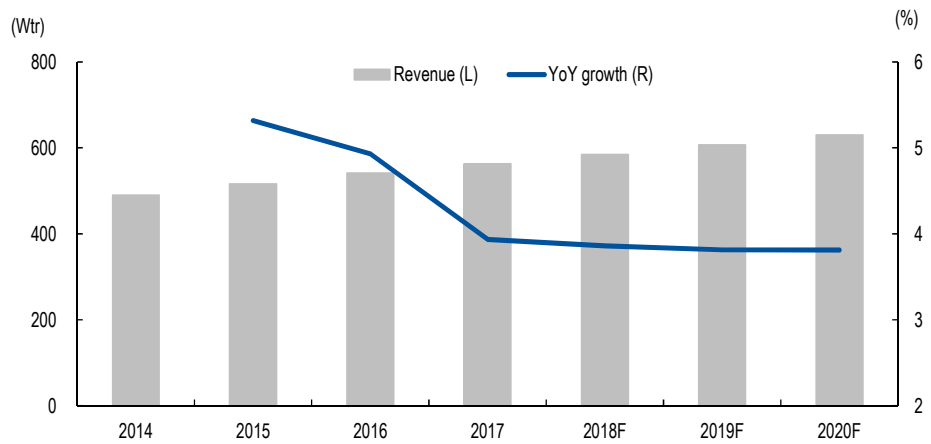
Source: Company materials, Mirae Asset Daewoo Research

### 34. Market growth

In 2017, we estimate that the global home appliance market grew 3.9% YoY to W563tr. The home appliance market has low growth potential as it is relatively mature. In particular, refrigerators and washing machines have displayed high penetration for some time.

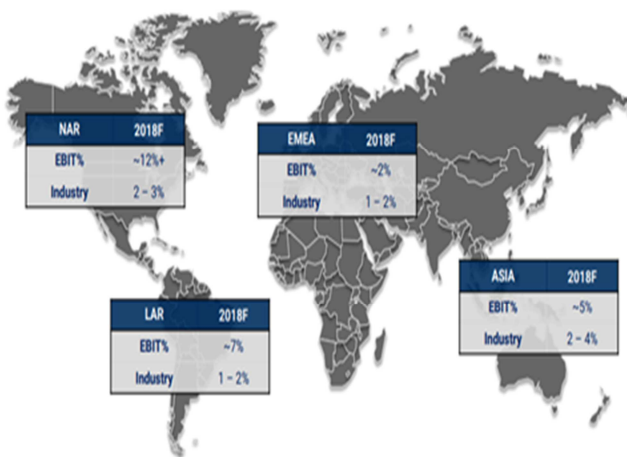
In Korea, washing machines were first produced by Goldstar (now LGE) in 1969. In addition, SEC also advanced into the washing machine market in 1974. The home appliance market, which had been dominated by SEC and LGE over the past three decades, is currently seeing intense competition amid the emergence of Chinese makers.

**Figure 88. Global home appliance revenue and growth**



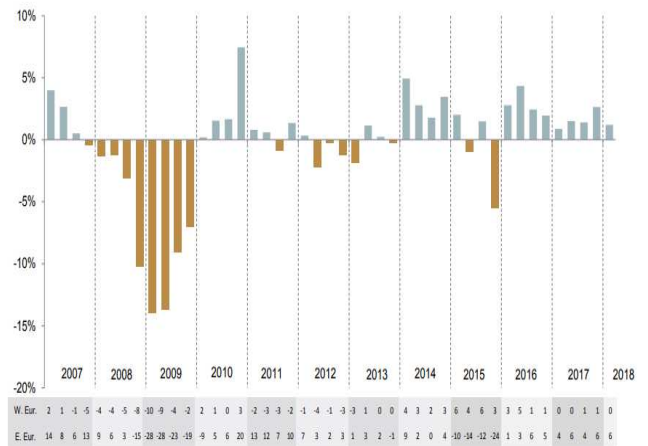
Source Industry data, Mirae Asset Daewoo Research

**Figure 89. Whirlpool's 2018 guidance by region**



Source Whirlpool

**Figure 90. Electrolux's European sales volume growth (YoY)**



Source Electrolux, Mirae Asset Daewoo Research

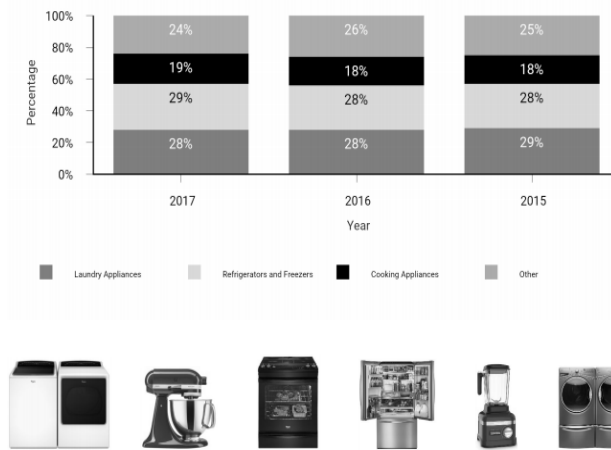
### 35. Competitive landscape

The home appliance market is dominated by different players in different regions. Due to environment/lifestyle idiosyncrasies, a company that has a better understanding of a region generally performs better in that market, as evidenced by Whirlpool in North America, Electrolux in Europe, and Haier in China.

Regional dominance in the home appliance market is becoming more prominent amid slowing market growth, as less competitive makers have been increasingly acquired by dominant players. Haier recently purchased the home appliance units of Sanyo (1614 TT/CP: NT\$22.80) and GE (GE US/CP: US\$14.71), while Midea (000333 SH/CP: RMB54.81) bought Toshiba's (6502 JP/CP: JPY300) home appliance unit. In addition, Midea has secured management control of an Italian air conditioner maker and Kuka Systems (KU2 GR/CP: EUR93.4), a German industrial robotics producer.

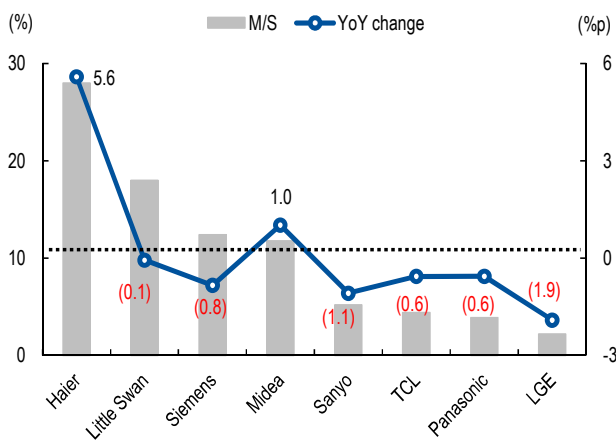
Meanwhile, SEC acquired Dacor, a US premium home appliance maker, in 2017.

**Figure 91. Whirlpool's revenue breakdown by product**



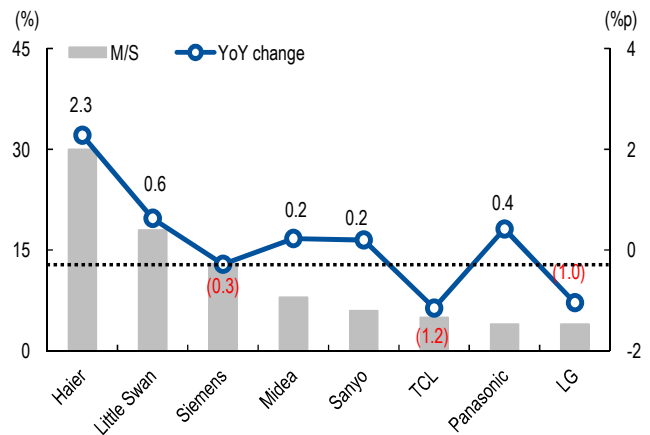
Source Whirlpool, Mirae Asset Daewoo Research

**Figure 92. Chinese washing machine M/S breakdown (online) in 2017**



Source Haier, Mirae Asset Daewoo Research

**Figure 93. Chinese washing machine M/S breakdown (offline) in 2017**



Source Haier, Mirae Asset Daewoo Research

### 36. Outlook and strategy

The home appliance market has recently been driven by premium products, new concepts, and super-connectivity. Prices of conventional white goods are steadily climbing, thanks to higher durability and enhanced features stemming from technological advances. Of note, sales of high-end products are expanding. We expect differentiation between high- and low-end products to persist for the time being.

Furthermore, launches of new, non-traditional products based on new concepts are on the rise. One such product is LGE's Styler clothing care system. In addition, the air purifier market is expanding amid rising fine particulate matter levels, while demand for water purifiers and massage chairs is also climbing. We also note that home appliances are increasingly being connected to one another via smartphones.

We believe that the ongoing market changes are positive for SEC. Furthermore, the electronics giant will likely find new opportunities in the US premium market for built-ins, given its recent acquisition of Dacor. The home appliance business is important for SEC, in light of synergies with the company's other businesses, including semiconductors, displays, and IoT. The key issue now is profitability, as SEC's home appliance unit displays lower margins than that of LGE.

**Figure 94. SEC acquired Dacor**



Source Dacor, Mirae Asset Daewoo Research

**Figure 95. Dacor's products**



Source Dacor, Mirae Asset Daewoo Research

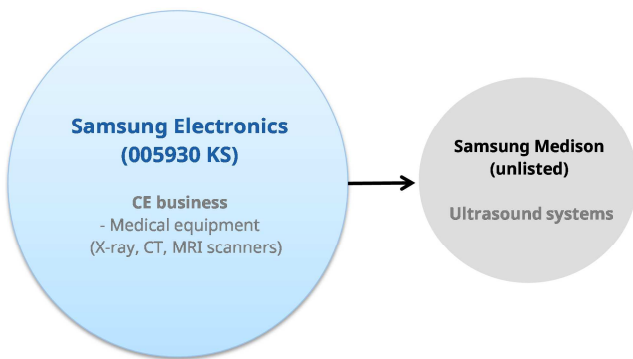
### 3) Medical device business

#### 37. Overview

The global medtech market holds strong growth potential amid population aging, increasing public interest in preventive medicine, and hospitals' profitability improvement efforts. However, the market has high barriers to entry, as the business requires numerous advanced technologies in a wide array of areas (e.g., medicine, electronics, chemicals, mechanical engineering), as well as a high level of corporate stability.

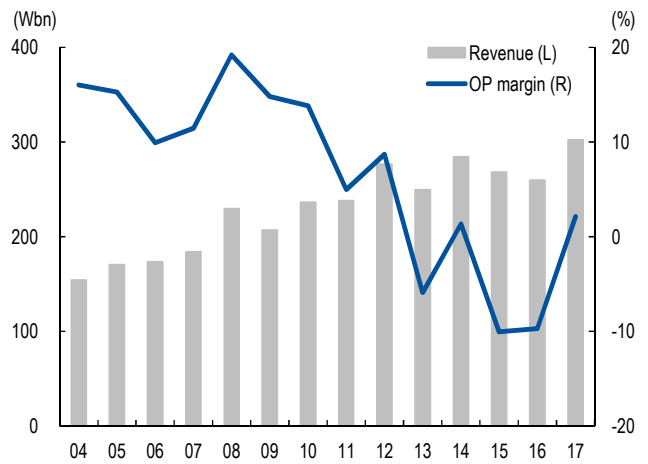
SEC launched its medical device business in 2009 and acquired the ultrasound system maker Medison in 2011. In 2015, the business received approval from the Ministry of Food and Drug Safety (MFDS) for its new X-ray and CT equipment. Currently, the company concentrates on diagnostic imaging equipment, including X-ray, CT, and MRI equipment.

Figure 96. SEC's medical equipment business



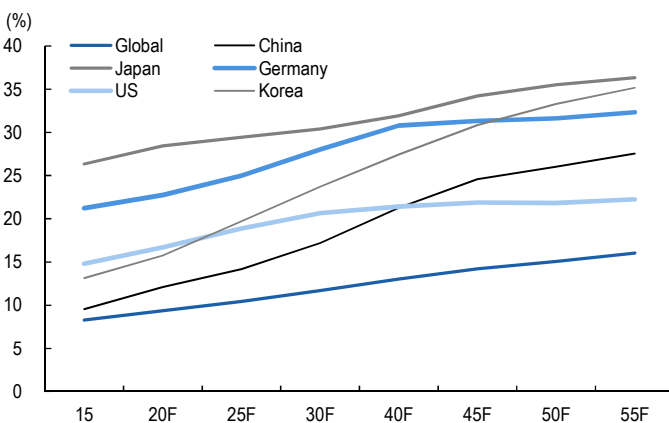
Source: SEC, Mirae Asset Daewoo Research

Figure 97. Samsung Medison's earnings



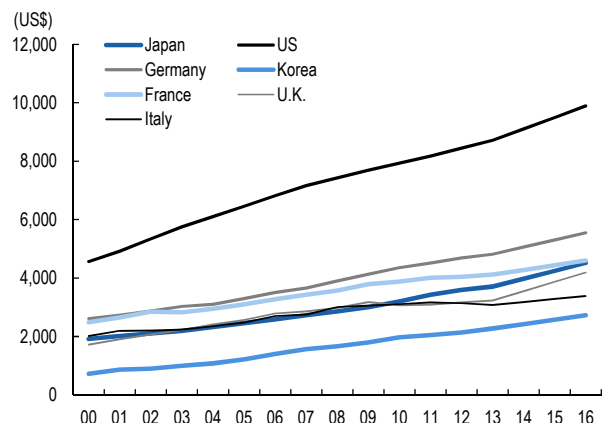
Source: Samsung Medison, Mirae Asset Daewoo Research

Figure 98. Population aged 65 or over in major countries



Source: UN, Mirae Asset Daewoo Research

Figure 99. Global per-capita health expenditure



Source: OECD, Mirae Asset Daewoo Research

### 38. Key products and production facilities

SEC's medical device unit focuses on large-sized diagnostic imaging equipment, selling digital X-ray, mobile CT, and in-vitro diagnostics systems to medical institutions worldwide. Of note, in 2016, the company introduced the GM85, a premium mobile digital X-ray system that is 40% lighter and boasts a longer battery life than rival products. The HS60/HS50 (mid/high-end ultrasound systems) and the PT10V (portable veterinary clinical chemistry analyzer) have also gained attention.

In April 2017, the company unveiled an upgraded version of the WS80A Elite, a women's healthcare ultrasound system, and the HS40, an ultrasound system targeting the mass market. Of note, the HS40 device won the International Forum Design Award in the product design category in 2017.

SEC's medical device unit and Samsung Medison are increasing cooperation to expand business areas and product portfolios, jointly introducing the RS85, an ultrasound diagnostic system. In April 2018, both SEC's healthcare unit and Samsung Medison moved to Samsung C&T's headquarters in Pangyo to boost synergy.

Figure 100. GM85 mobile X-ray system



Source: Samsung Medison, Mirae Asset Daewoo Research

Figure 101. HS50 ultrasound system HS50



Source: Samsung Medison, Mirae Asset Daewoo Research

The healthcare business does not need large-scale production facilities, but requires strong relationships with distributors and medical institutions (e.g., hospitals, clinics). Since being acquired by SEC, Samsung Medison has reported dismal earnings. Although the Samsung Group designated the business as one of its five major new growth drivers, Samsung Medison has for the most part failed to deliver notable results as the domestic medical equipment market is small in size and dominated by multinational players.

Still, we are seeing signs of change. Indeed, after recording losses since 2015, Samsung Medison finally turned a profit in 2017, recording an OP margin of W6.5bn on revenue of W302.6bn.

Starting with Ray (digital X-ray system supplier) in 2010, SEC went on a healthcare company acquisition streak that included purchases of Medison and Nexus (US-based diagnostic services provider in 2011). However, we have not seen any additional M&A deals since the acquisition of NeuroLogica, a US CT system supplier, in 2013.

### 39. Market growth

In 2017, the global medical device (medtech) market is expected to reach US\$355.1bn, equivalent to around 30% of the global pharmaceutical market (US\$12.1tr). The US, Japanese, and German markets will likely account for 59.2% of the global MedTech market. Players based in these regions mainly export cutting-edge surgical, diagnostic, and treatment equipment to global markets, leveraging their long-standing business operations and superior technology. The Korean market accounts for a mere 1.7% of the global market.

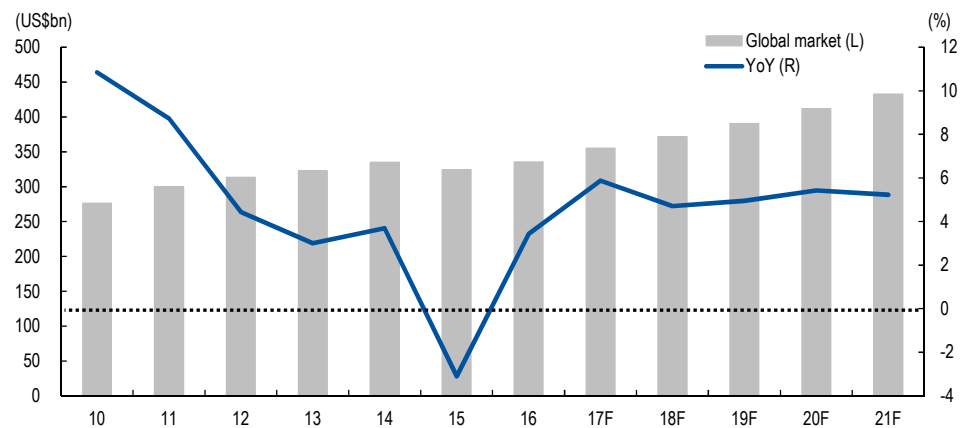
The global medtech market expanded at a CAGR of only 2.2% in 2011-16. In 2016-21, however, we expect the market to grow at a CAGR of 5.2%, thanks to: 1) population aging; and 2) launches of advanced medical devices, resulting from convergence between IT and biotech. Market expansion will likely be driven by emerging markets, including Asia-Pacific (6.4%) and the Middle East/Africa (8.7%).

**Table 27. MedTech market and M/S by region**

Region	2016		2021F		CAGR (%)
	Market size (US\$bn)	Share (%)	Market size (US\$bn)	Share (%)	
North/South America	163.4	48.7	212.0	49.0	5.3
Asia-Pacific	70.2	20.9	95.7	22.1	6.4
Western Europe	79.3	23.6	94.5	21.8	3.6
Central/Eastern Europe	14.2	4.2	18.1	4.2	5.0
Middle East/Africa	8.3	2.5	12.6	2.9	8.7

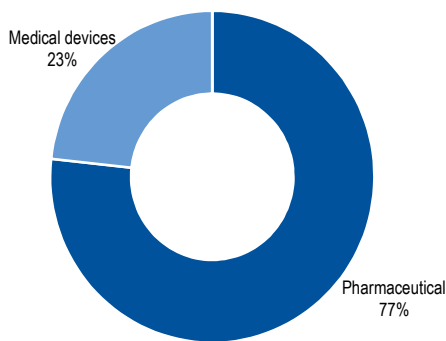
Source: KHIDI, BMI Espicom, Mirae Asset Daewoo Research

**Figure 102. Global medtech sector market trend**



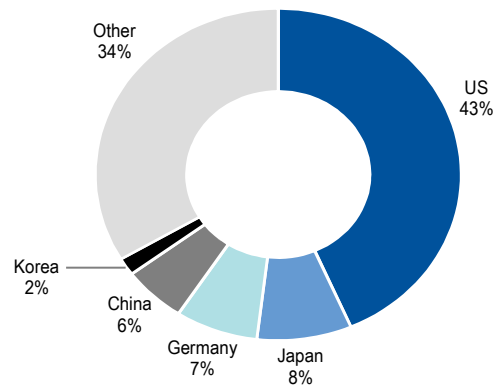
Source: KHIDI, BMI Espicom, Mirae Asset Daewoo Research

**Figure 103. Proportion of medtech in healthcare market**



Source: KISTEP, Mirae Asset Daewoo Research

**Figure 104. Global medtech M/S by country**



Source: KHIDI, Mirae Asset Daewoo Research

### 1) Major countries

The US is the leader of the global medtech market. In 2016, the US medtech market reached US\$145.9bn (43.5%), while its exports and imports accounted for 19.5% and 17.9% of global exports and imports, respectively. We believe that actual export market share is higher than 19.5%, factoring in shipments from US makers' overseas operations (e.g., in Ireland and Mexico) back to the US. In 2016-21, the US market is expected to grow at a CAGR of 5.2% to US\$187.6bn, aided by the world's highest per-capita medical spending (US\$9,024) and the aging of the baby-boom generation.

In our view, the Chinese market has the greatest growth potential. The market, which grew at a CAGR of 13% in 2011-16, is expected to expand at a CAGR of 9.6% to US\$29.7bn in 2016-21. Notably, the Chinese government has been making efforts to foster the healthcare industry. The government recently designated the medtech sector as one of the country's 10 core industries under China Manufacturing 2025 and expanded private sector medical services, via the Healthcare Service Plan 2015-20.

**Table 28. US medtech market by product**

(US\$bn)

	10	11	12	13	14	15	16	17F	18F	19F	20F	21F	CAGR (%)
Medical supplies	10.3	11.9	12.3	12.7	13.4	14.1	15.0	16.1	17.0	17.9	18.8	19.8	5.7
Diagnostic imaging	33.1	35.3	36.8	37.9	39.6	40.9	43.0	45.2	47.0	49.0	51.0	53.1	4.3
Dental devices	6.7	7.3	7.6	8.3	8.9	9.3	10.0	10.7	11.3	11.9	12.6	13.2	5.9
Orthopedics/prosthetics	13.3	13.3	13.8	14.4	14.8	15.7	16.4	17.2	17.9	18.7	19.5	20.3	4.3
Patient aids	13.9	13.3	13.6	14.5	15.6	15.6	16.4	17.3	18.1	19.0	19.8	20.7	4.7
Other	32.1	35.3	35.9	38.2	40.5	42.2	45.1	48.4	51.3	54.2	57.3	60.4	6.0
Total	109.4	116.4	119.8	125.8	132.6	137.8	146.0	154.8	162.6	170.7	179.1	187.6	5.2

Source: BMI Espicom, Mirae Asset Daewoo Research

**Table 29. Chinese medtech market by product**

(US\$bn)

	10	11	12	13	14	15	16	17F	18F	19F	20F	21F	CAGR (%)
Medical supplies	1.5	1.9	2.3	2.7	3.0	3.1	3.2	3.5	3.8	4.1	4.5	4.9	8.9
Diagnostic imaging	3.9	5.0	5.7	6.3	6.3	6.2	6.6	7.2	8.0	8.5	9.1	10.0	8.7
Dental devices	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9	0.9	1.1	1.2	1.3	11.8
Orthopedics/prosthetics	0.5	0.6	0.8	1.1	1.4	1.5	1.7	1.8	2.0	2.2	2.5	2.8	10.8
Patient aids	1.5	1.7	2.0	2.5	2.4	2.4	2.6	2.8	3.1	3.4	3.7	4.1	9.7
Other	1.8	2.2	2.7	3.0	3.4	3.7	4.0	4.4	4.7	5.3	5.9	6.6	10.7
Total	9.4	11.9	14.1	16.1	17.2	17.8	18.8	20.5	22.5	24.6	27.0	29.7	9.6

Source: BMI Espicom, Mirae Asset Daewoo Research

## 2) Major categories

The medtech market has more than 2,000 product categories. Of note, the top 15 categories, including in-vitro diagnostics, cardiovascular, in-vivo diagnostics (or diagnostic imaging), orthopedics, ophthalmology, plastic surgery, endoscopy, dental, and wound treatment devices/tools, account for 85% of the overall market.

We expect that the in-vitro diagnostic devices segment, the largest product category, will expand from US\$48.4bn (13% of the overall market) in 2015 to US\$70.8bn in 2022. The second-ranked cardiovascular device segment will likely grow at a CAGR of 5.8% from US\$42.1bn in 2015 to US\$62.3bn in 2022.

The third-largest category, the in-vivo diagnostic device segment (estimated at US\$38.9bn in 2015), is likely to grow at a CAGR of only 3.7%, but could deliver additional growth, should the telemedicine market flourish.

**Table 30. Medtech market outlook by product category**

(US\$bn, %)

Ranking	Area	Market size			MS		
		15	22F	CAGR	15	22F	Rate of change (%p)
1	In-vitro diagnostics	48.4	70.8	5.6	13.0	13.4	0.3
2	Cardiovascular	42.1	62.3	5.8	11.3	11.8	0.4
3	Diagnostic imaging	38.9	50.3	3.7	10.5	9.5	-1.0
4	Orthopedics	34	44.1	3.8	9.2	8.3	-0.8
5	Ophthalmology	24.9	37.1	5.9	6.7	7.0	0.3
6	Plastic surgery	20.2	28.1	4.8	5.4	5.3	-0.1
7	Endoscopy	16.4	26	6.8	4.4	4.9	0.5
8	Drug delivery	17.6	24.5	4.8	4.7	4.6	-0.1
9	Dental	12.4	18.3	5.7	3.3	3.5	0.1
10	Wound management	12.4	17	4.6	3.3	3.2	-0.1
11	Diabetic care	11	16.2	5.7	3.0	3.1	0.1
12	Nephrology	10.6	15.4	5.5	2.9	2.9	0.0
13	Medical supply	10.3	14.4	4.9	2.8	2.7	-0.1
14	Healthcare IT	7.8	11.3	5.4	2.1	2.1	0.0
15	Neurology	6.7	11.1	7.5	1.8	2.1	0.3
Subtotal		313.7	446.9	5.2	84.6	84.4	-0.2
Other		57.3	82.9	5.4	15.4	15.6	0.2
Total		371	529.8	5.2	100.0	100.0	0.0

Source: Evaluate, Mirae Asset Daewoo Research

### **3) Five characteristics of the medtech industry**

The key industry characteristics can be summarized as follows:

First, the market has high entry barriers and low price elasticity. Hospitals, the industry's main customers, tend to prefer well-established brands with proven track records. In other words, brand reputation has a strong influence.

Second, success in the industry is closely tied to government policies. The medical equipment sector is tightly regulated by the government, which aims to ensure safety in manufacturing, clinical trials, and distribution (as well as the protection of intellectual property). It should be noted that licensing rules differ significantly by country. For example, it generally takes just over seven months to obtain licensing from the US Food and Drug Administration (FDA) and about 13 months from China.

Third, a wide variety of items are produced in small quantities. There are about 2,100 different types of medical equipment on the market, most of which are produced in quantities smaller than 100,000 units.

Fourth, it is essential for medical equipment makers to spend continuously on R&D. The industry is capital- and technology-intensive, with development periods usually ranging between three and five years. Furthermore, because each individual product typically has a small market and short life cycle, constant R&D investment is a must.

Fifth, convergence with IT and biotechnology is underway.

### 40. Competitive landscape

#### 1) Global medtech market overview

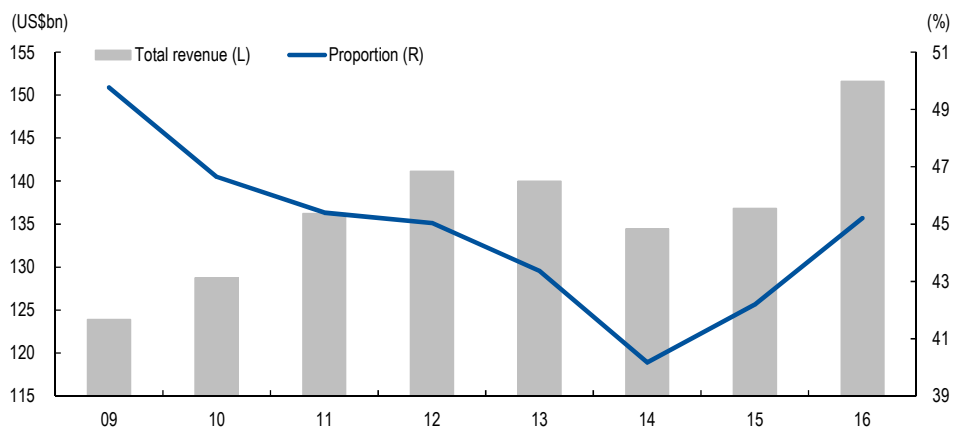
The global medtech market is characterized by an oligopolistic environment, stemming from high barriers to entry, with the combined revenue of the top 10 firms accounting for 41-50% of the total. Furthermore, in the five largest market segments, the top 15 firms generate 70-99% of total revenue. In most market segments, global firms' dominance stems from their long R&D cycles, ability to meet government regulations, and superior brand power.

In particular, global firms have strong presences in high-end diagnostic/treatment devices, including ultrasound devices, CT scanners, and MRI machines. GE Healthcare, Siemens Healthineers (SHL GR/CP: EUR33.53), and Philips (PHIA NA/CP: EUR35.15) focus on in-vivo and in-vitro diagnostic devices, while Johnson & Johnson (JNJ US/CP: US\$127.24), Medtronic (MDT US/CP: US\$85.56), and Baxter (BAX US/CP: US\$70.52) are strong in orthopedic and cardiovascular devices.

Of note, R&D investments are also being driven by global firms, with the top 20 firms accounting for 60% of the total medtech investments. Top-tier firms have dominated the market, based on their long-standing business operations and superior technology; they have also engaged in massive investments, leading to high entry barriers.

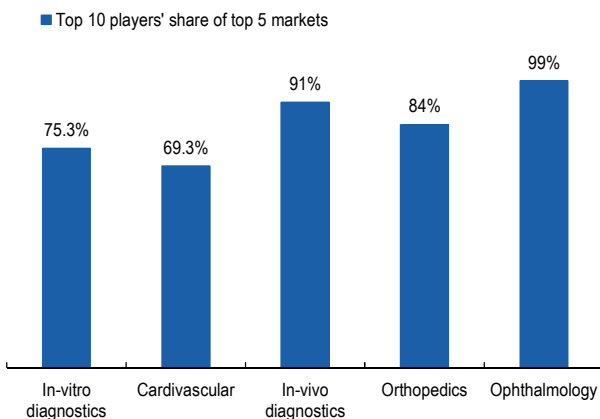
Most Korean medtech firms are latecomers to the global market. They focus on niche markets, estimated at around ₩500bn-1tr, to avoid direct competition with global firms. They tend to penetrate markets by offering copycat products at lower prices and then try to raise ASP via technological improvements.

**Figure 105. Combined revenue of global top 10 firms**



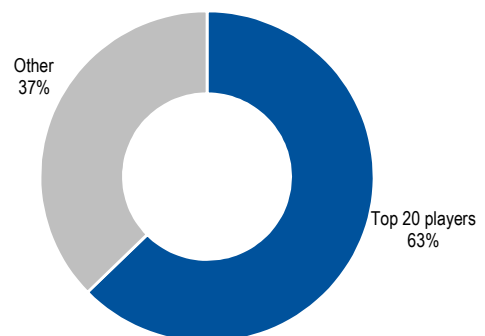
Source: Company data, Mirae Asset Daewoo Research

**Figure 106. Global top 10 firms' share of top five segments**



Source: Evaluate, Mirae Asset Daewoo Research

**Figure 107. 17. Top 20 firms account for the majority of R&D investments**



Source: Evaluate, Mirae Asset Daewoo Research

**Table 31. In-vitro diagnostics revenue rankings**

(US\$m, %)

Ranking	Company	Market size			M/S		
		15	22F	CAGR	15	22F	Change (%p)
1	Roche	9,026	12,800	5.1	18.6	18.1	-0.6
2	Abbott Laboratories	4,646	6,590	5.1	9.6	9.3	-0.3
3	Danaher	4,633	5,823	3.3	9.6	8.2	-1.3
4	Siemens	4,855	5,762	2.5	10.0	8.1	-1.9
5	Thermo Fisher Scientific	3,017	3,854	3.6	6.2	5.4	-0.8
6	Sysmex	1,940	3,835	10.2	4.0	5.4	1.4
7	BD	2,690	3,392	3.4	5.6	4.8	-0.8
8	Alere	2,238	2,822	3.4	4.6	4.0	-0.6
9	bioMerieux	1,722	2,716	6.7	3.6	3.8	0.3
10	Ortho-Clinical Diagnostics	1,700	1,997	2.3	3.5	2.8	-0.7
Subtotal		36,467	49,591	4.5	75.3	70.0	-5.3
Other		11,957	21,234	8.6	24.7	30.0	5.3
Total		48,424	70,825	5.6	100.0	100.0	0.0

Source: Evaluate, Mirae Asset Daewoo Research

**Table 32. Cardiovascular device revenue rankings**

(US\$m, %)

Ranking	Company	Market size			M/S		
		15	22F	CAGR	15	22F	Change (%p)
1	Medtronic	10,218	14,107	4.7	24.3	22.6	-1.6
2	Boston Scientific	4,977	7,068	5.1	11.8	11.3	-0.5
3	St. Jude Medical	5,066	6,869	4.4	12.0	11.0	9.7
4	Edwards Lifesciences	2,494	4,599	9.1	5.9	7.4	1.5
5	Terumo	1,936	3,189	7.4	4.6	5.1	0.5
6	Abbott Laboratories	2,688	3,065	1.9	6.4	4.9	-1.5
7	Johnson & Johnson	2,036	2,500	3.0	4.8	4.0	-0.8
8	W.L. Gore & Associates	1,725	2,121	3.0	4.1	3.4	-0.7
9	Asahi Kasei	1,171	1,984	7.8	2.8	3.2	0.4
10	Getinge	1,373	1,724	3.3	3.3	2.8	-0.5
Subtotal		29,184	47,226	7.1	69.3	75.8	6.5
Other		12,941	15,071	2.2	30.7	24.2	-6.5
Total		42,125	62,297	5.7	100.0	100.0	0.0

Source: Evaluate, Mirae Asset Daewoo Research

**Table 33. Diagnostic imaging market revenue rankings**

(US\$m, %)

Ranking	Company	Market size			M/S		
		15	22F	CAGR	15	22F	Change (%p)
1	Siemens	9,995	11,880	2.5	20.6	16.8	-3.9
2	GE	8,115	10,210	3.3	16.8	14.4	-2.3
3	Philips	7,198	9,129	3.5	14.9	12.9	-2.0
4	Toshiba	3,641	5,647	6.5	7.5	8.0	0.5
5	Fujifilm	2,198	3,256	5.8	4.5	4.6	0.1
6	Carestream	1,357	1,786	4.0	2.8	2.5	-0.3
7	Hitachi	1,032	1,383	4.3	2.1	2.0	-0.2
8	Konica Minolta	749	1,142	6.2	1.5	1.6	0.1
9	Shimadzu	539	800	5.8	1.1	1.1	0.0
10	Varian Medical Systems	611	740	2.8	1.3	1.0	-0.2
Subtotal		35,435	45,973	3.8	73.2	64.9	-8.3
Other		3,443	4,314	3.3	7.1	6.1	-1.0
Total		38,878	50,287	3.7	80.3	71.0	-9.3

Source: Evaluate, Mirae Asset Daewoo Research

## 2) Diagnostic imaging

The market for diagnostic imaging equipment accounts for 10.5%, or US\$38.9bn, of the global medical equipment industry, making it the third-largest segment behind in-vitro diagnostics and cardiovascular equipment.

As with other medical equipment markets, the market for diagnostic imaging has several sub-markets, with the four largest (ultrasound, MRI, X-ray, and CT) accounting for 75%. Global leaders are usually competitive in all four types of equipment, but Siemens is slightly ahead of peers in MRI and CT scanners, GE in ultrasound and MRI scanners, and Philips in X-ray and ultrasonic equipment. Korean companies tend to focus more on ultrasonic and X-ray equipment, as technological entry barriers are higher for MRI and CT equipment.

Meanwhile, the top 10 companies hold an oligopoly over the market for in-vitro diagnostics, with their combined market share exceeding 91%. Entry barriers remain high, with the top three, i.e., Siemens, GE Healthcare, and Philips, controlling 52% of the market. With market shares unlikely to see notable changes by 2022, penetration remains difficult for latecomers.

High price tags (MRI W1.0-1.5bn, CT W0.5-1.0bn, X-ray W0.2-0.3bn), technological advancements, clinical data, reference, distribution networks, and relationships with hospitals all add to the strengths of global leaders.

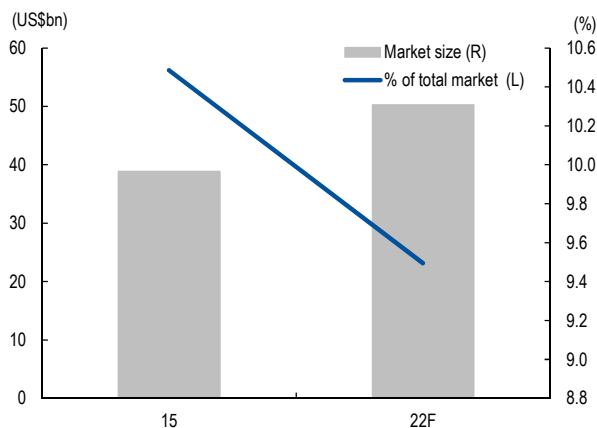
**Table 34. Diagnostic imaging market revenue rankings**

(US\$m, %)

Ranking	Company	Market size			M/S		
		15	22F	CAGR	15	22F	Change (%p)
1	Siemens	9,995	11,880	2.5	25.7	23.6	-2.1
2	GE	8,115	10,210	3.3	20.9	20.3	-0.6
3	Philips	7,198	9,129	3.5	18.5	18.2	-0.4
4	Toshiba	3,641	5,647	6.5	9.4	11.2	1.9
5	Fujifilm	2,198	3,256	5.8	5.7	6.5	0.8
6	Carestream	1,357	1,786	4.0	3.5	3.6	0.1
7	Hitachi	1,032	1,383	4.3	2.7	2.8	0.1
8	Konica Minolta	749	1,142	6.2	1.9	2.3	0.3
9	Shimadzu	539	800	5.8	1.4	1.6	0.2
10	Varian Medical Systems	611	740	2.8	1.6	1.5	-0.1
Subtotal		35,435	45,973	3.8	91.1	91.4	0.3
Other		3,443	4,314	3.3	8.9	8.6	-0.3
Total		38,878	50,287	3.7	100.0	100.0	0.0

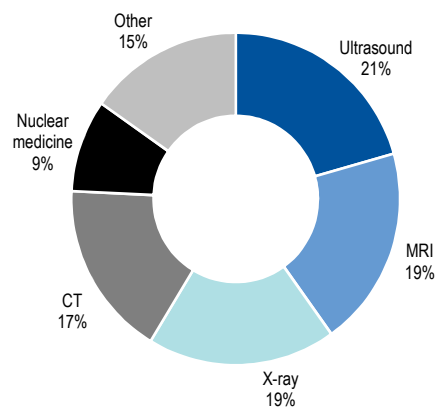
Source: Evaluate, Mirae Asset Daewoo Research

**Figure 108. Contribution of in-vivo diagnostics to total diagnostics market**



Source: Evaluate, Mirae Asset Daewoo Research

**Figure 109. Breakdown of in-vivo diagnostics market**



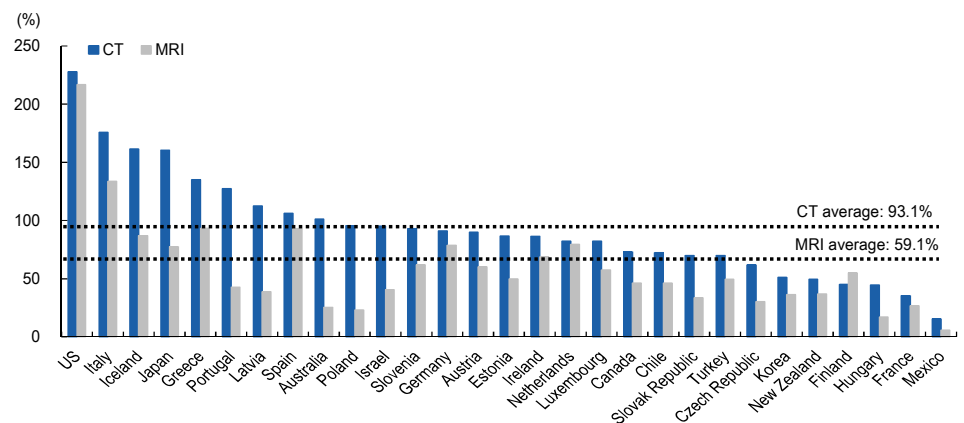
Source: Industry data, KIAT, Mirae Asset Daewoo Research

From 2015 to 2022, we expect the diagnostic imaging (in-vivo diagnostics) device market to grow at a CAGR of 3.7% to US\$50.3bn (vs. overall market growth of 5.2%). Although the diagnostic imaging market will likely continue to rank third in the medtech sector, its market share will likely decline from 10.5% to 9.5%.

The relatively weak growth of the diagnostic imaging device market is attributable to: 1) the saturation of the developed country-led diagnostic device market; and 2) the medical paradigm shift from diagnosis/treatment to prevention. At end-2015, the ratio of CT scanners to hospitals in OECD countries stood at 93.1%, while the ratio of MRI scanners stood at 59.1%. Given that large-sized diagnostic equipment cannot be installed in small/mid-sized hospitals, we think the ratios for large (general) hospitals are significantly higher than those levels.

Given that CT and MRI scanners have high unit prices (around W500mn-W1bn and W1-1.5bn, respectively), we do not think that their penetration rates in emerging markets will rise rapidly. We thus see limited upside to growth in the diagnostic equipment market, except with regard to X-ray equipment (priced at around W200-300mn), which still has some room to run (thanks to the market for retrofit X-ray kits that convert film-based X-ray systems to digital radiography). Therefore, diagnostic device makers are striving to expand into emerging markets via M&As and launches of smaller and low-end products.

**Figure 110. Ratio of CT/MRI scanners to hospitals by country**



Source OECD, Mirae Asset Daewoo Research

**Table 35. Medtech market outlook by product category**

(US\$bn, %)

Ranking	Area	Market size			M/S		
		15	22F	CAGR	15	22F	Change (%p)
1	In-vitro diagnostics	48.4	70.8	5.6	13.0	13.4	0.3
2	Cardiovascular	42.1	62.3	5.8	11.3	11.8	0.4
3	Diagnostic imaging	38.9	50.3	3.7	10.5	9.5	-1.0
4	Orthopedics	34	44.1	3.8	9.2	8.3	-0.8
5	Ophthalmology	24.9	37.1	5.9	6.7	7.0	0.3
6	Plastic surgery	20.2	28.1	4.8	5.4	5.3	-0.1
7	Endoscopy	16.4	26	6.8	4.4	4.9	0.5
8	Drug delivery	17.6	24.5	4.8	4.7	4.6	-0.1
9	Dental	12.4	18.3	5.7	3.3	3.5	0.1
10	Wound management	12.4	17	4.6	3.3	3.2	-0.1
11	Diabetic care	11	16.2	5.7	3.0	3.1	0.1
12	Nephrology	10.6	15.4	5.5	2.9	2.9	0.0
13	Medical supply	10.3	14.4	4.9	2.8	2.7	-0.1
14	Healthcare IT	7.8	11.3	5.4	2.1	2.1	0.0
15	Neurology	6.7	11.1	7.5	1.8	2.1	0.3
Subtotal		313.7	446.9	5.2	84.6	84.4	-0.2
Other		57.3	82.9	5.4	15.4	15.6	0.2
Total		371	529.8	5.2	100.0	100.0	0.0

Source: Evaluate, Mirae Asset Daewoo Research

**Figure 111. X-ray machine**



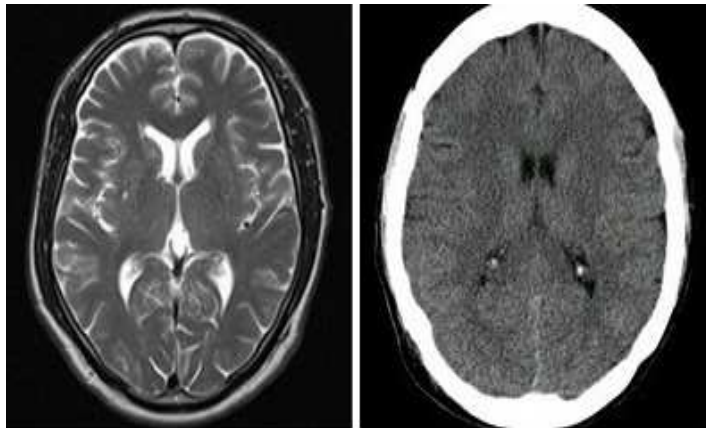
Source Press materials, Mirae Asset Daewoo Research

**Figure 112. Ultrasound machine**



Source: Siemens, Mirae Asset Daewoo Research

**Figure 113. Comparison of MRI and CT images**



Source: Jain Medical Center, Mirae Asset Daewoo Research

### 41. Outlook and strategy

Expectations for the medtech industry are mounting amid population aging and the development of preventive medicine, but significant investment requirements render market entry difficult. In our view, this is the main reason why SEC's medical device business growth is falling below expectations. Given that the medtech market is currently dominated by electronics makers, including Siemens and GE, we believe SEC also has the potential to fare better in the market. In addition, SEC can benefit from synergies arising from the group's Samsung BioLogics-oriented biotech growth strategy.

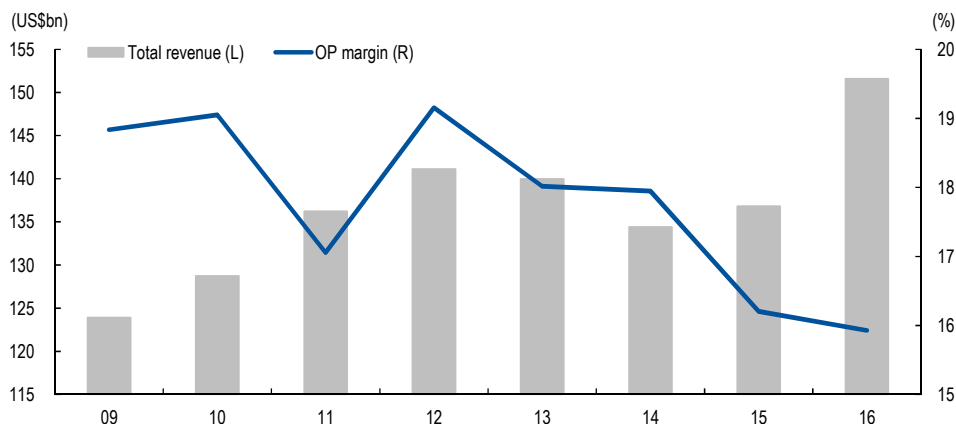
We believe that, going forward, SEC needs to seek steady medtech investments and M&As. In the global medtech market, the annual average number and value of M&A deals stand at more than 100 and US\$40bn, respectively.

**Table 36. Major M&As of medtech industry** (US\$m)

Date	Acquiring firm	Acquired firm	Size
1/4/17	Abbott Laboratories	St. Jude Medical	29,986
2/17/15	Philips	Volcano	1,172
1/24/15	Medtronic	Covidien	46,212
12/11/14	Danaher	Nobel Biocare	2,196
9/6/13	Baxter	Gambro	4,001

Source: Company data, Mirae Asset Daewoo Research

**Figure 114. Combined revenue and OP margin of top 10 global firms**



Source: Company data, Mirae Asset Daewoo Research

**Table 37. Revenue of top 10 global medtech firms**

Company name	10	11	12	13	14	15	16	CAGR
Medtronic	15.4	15.5	16.2	16.6	17.0	20.3	28.8	11.0
Johnson & Johnson	24.6	25.8	27.4	28.5	27.5	25.1	25.1	0.3
Siemens Healthineers	16.7	17.4	17.7	15.7	15.9	14.8	15.0	-1.7
GE Healthcare	12.3	12.5	13.6	12.0	11.7	12.9	13.5	1.6
Danaher	4.1	6.6	8.5	9.0	9.4	10.9	13.2	21.4
Roche Diagnostics	10.0	11.0	11.0	11.3	11.8	11.2	11.7	2.5
Philips Healthcare	11.4	12.3	12.8	12.7	12.1	11.4	11.9	0.7
BD	7.4	7.6	7.7	8.1	8.4	10.3	10.9	6.7
Baxter	12.8	13.9	14.2	15.0	10.7	10.0	10.2	-3.8
Stryker	7.3	8.3	8.7	9.0	9.7	9.9	11.3	7.5
Abbott Laboratories	9.7	9.9	9.8	8.5	10.1	9.7	10.0	0.5
Covidien	8.4	9.6	9.9	10.2	10.7			
<b>Total</b>	<b>129</b>	<b>136</b>	<b>141</b>	<b>140</b>	<b>134</b>	<b>137</b>	<b>152</b>	<b>2.8</b>
Global market	276	300	313	323	335	324	335	3.3
M/S	46.6	45.4	45.0	43.4	40.2	42.2	45.2	-

Source: Bloomberg, company data, Mirae Asset Daewoo Research

**IM division**

**42. Earnings outlook**

For 2018, we expect the IM division to post revenue of W103.8tr (-2.7% YoY) and operating profit of W12.3tr (+4.0% YoY).

**Table 38. IM earnings and forecasts**

(Wbn, %)

	1Q17	2Q17	3Q17	4Q17	1Q18F	2Q18F	3Q18F	4Q18F	2017	2018F	2019F
<b>Revenue</b>	23,498	30,011	27,691	25,467	26,819	24,979	24,984	26,972	106,668	103,754	106,610
Smartphone	19,550	24,484	21,845	22,491	22,553	20,583	20,833	23,003	88,370	86,972	90,796
Feature phone	446	429	429	371	374	360	335	324	1,675	1,393	1,232
Tablet PC/other	2,254	3,799	4,145	1,325	2,616	2,754	2,538	2,367	11,523	10,275	9,467
Networks	1,248	1,300	1,273	1,280	1,275	1,282	1,278	1,279	5,101	5,113	5,115
<b>Revenue contribution</b>											
Smartphone	83.2	81.6	78.9	88.3	84.1	82.4	83.4	85.3	82.8	83.8	85.2
Feature phone	1.9	1.4	1.5	1.5	1.4	1.4	1.3	1.2	1.6	1.3	1.2
Tablet PC/other	9.6	12.7	15.0	5.2	9.8	11.0	10.2	8.8	10.8	9.9	8.9
Networks	5.3	4.3	4.6	5.0	4.8	5.1	5.1	4.7	4.8	4.9	4.8
<b>Operating profit</b>	2,065	4,057	3,290	2,415	3,770	2,942	2,649	2,937	11,827	12,298	12,798
OP margin	8.8	13.5	11.9	9.5	14.1	11.8	10.6	10.9	11.1	11.9	12.0

Source: Company data, Mirae Asset Daewoo Research

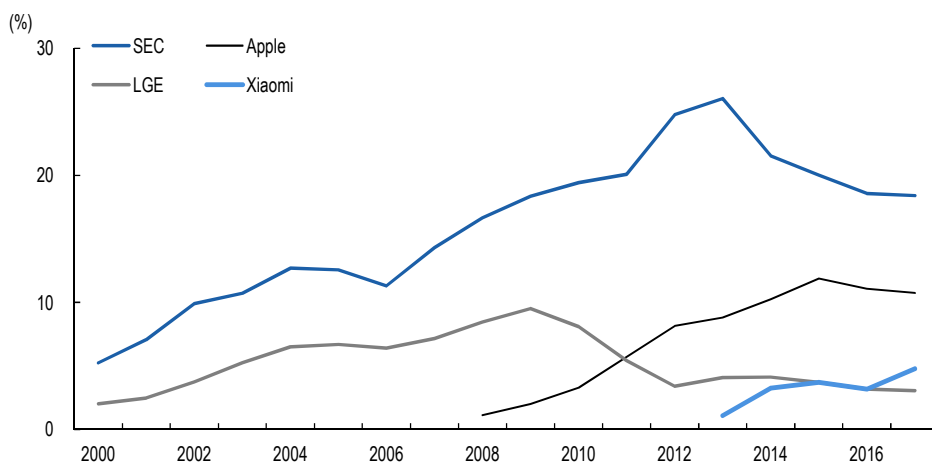
**1) Wireless business**

The wireless business unit produces smartphones. In September 1997, SEC rolled out the first personal communications service (PCS) handset in Korea under the Anycall brand. At present, the Galaxy series is the company's flagship smartphone brand.

**43. Overview**

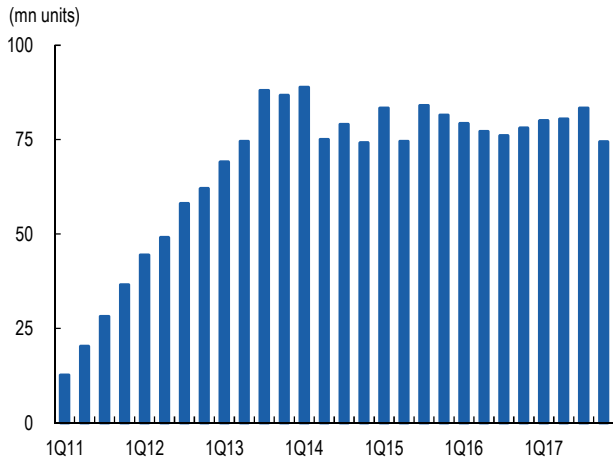
As of 2017, the global smartphone market is estimated at US\$417.4bn (W447tr), greater than the TV (US\$91.9bn) and PC (US\$109bn) markets. Notably, SEC remains in first place in terms of smartphone shipments. In 2017, IM revenue accounted for 40.9% of total revenue.

**Figure 115. SEC's handset M/S trends**



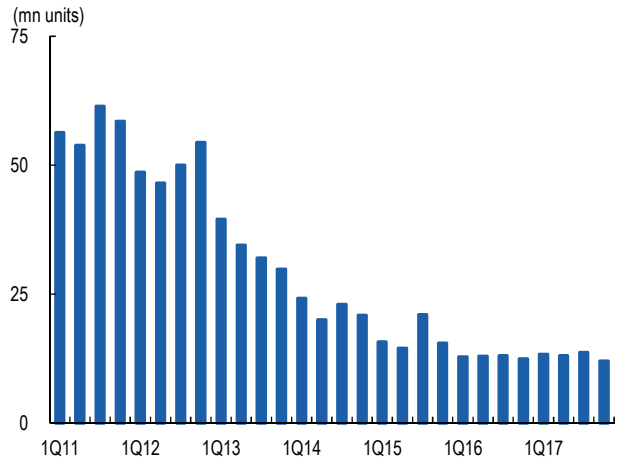
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 116. SEC's global smartphone shipments**



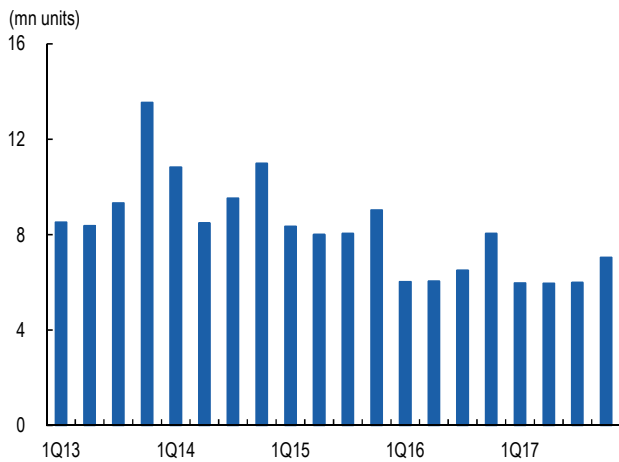
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 117. SEC's global feature phone shipments**



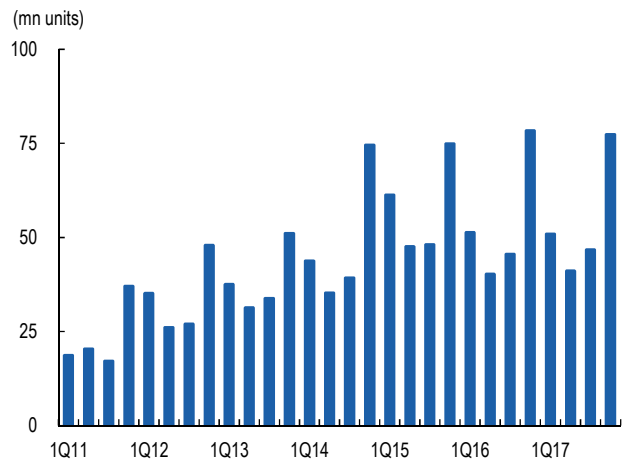
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 118. SEC's global tablet PC shipments**



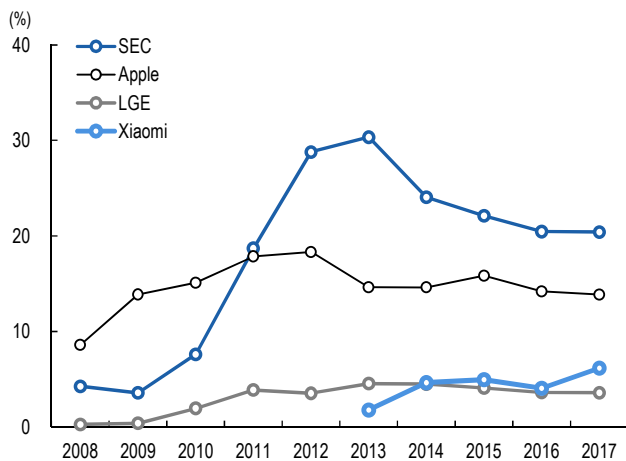
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 119. Apple's global smartphone shipments**



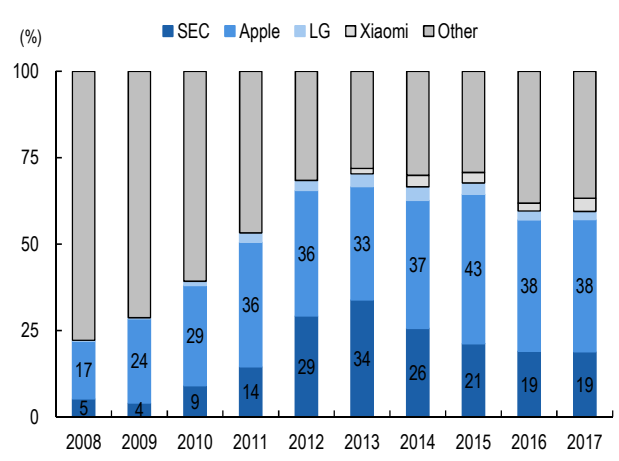
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 120. Global smartphone M/S (shipments)**



Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 121. Global smartphone M/S (revenue)**



Source: Counterpoint, Mirae Asset Daewoo Research

#### 44. Key products

SEC has adopted a strategy of launching different high-end models in 1H (Galaxy S) and 2H (Galaxy Note). In 1H18, the company released the Galaxy S9 and Galaxy S9+. Despite the failure of the Galaxy Note 7 due to battery issues in 2H16, the company successfully rolled out the Galaxy Note 8 in 2H17. The company also offers the mid-end Galaxy A series and low-end Galaxy J series.

Figure 122. Galaxy S9



Source: Company materials, Mirae Asset Daewoo Research

Figure 123. SEC's Bixby



Source: Company materials, Mirae Asset Daewoo Research

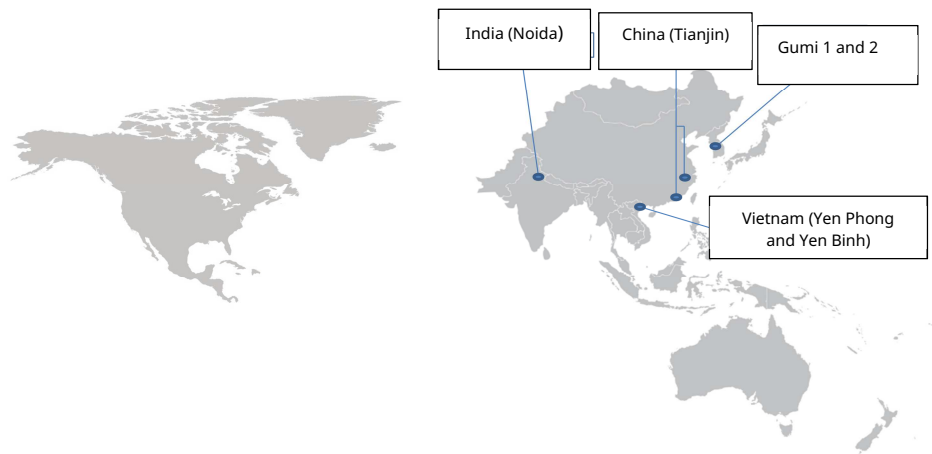
**45. Production facilities**

In the past, SEC produced most of its mobile phones at its factory in Gumi, Korea (annual capacity of 100mn units). However, the company has relocated much of its production to Tianjin and Huizhou, China, in order to reduce labor costs and better respond to the consumer market.

However, with Chinese labor costs also climbing amid the emergence of Chinese smartphone manufacturers, SEC is moving major production facilities to Vietnam. The company currently has two Vietnamese plants with a combined annual capacity of 200mn units (50% of SEC’s total production).

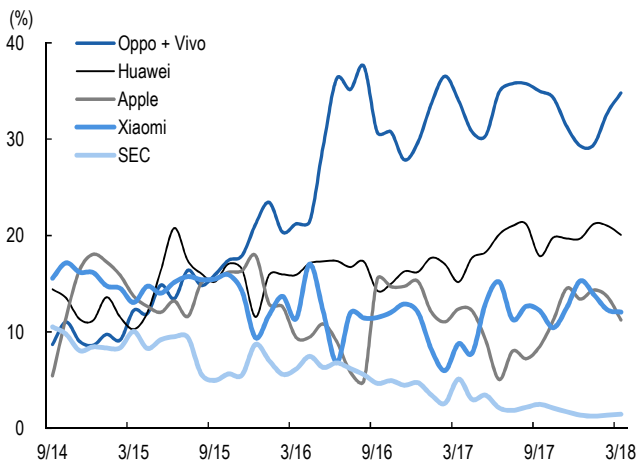
Of note, SEC has recently been expanding its capacity in India to gain the upper hand in the Indian smartphone market. In China, SEC’s smartphone market share has fallen to the single digits. In our view, the company is unlikely to recover Chinese market share soon. As the Indian market is growing rapidly, we believe the company’s capacity ramp-ups in the country are positive and necessary.

**Figure 124. SEC’s smartphone production facilities**



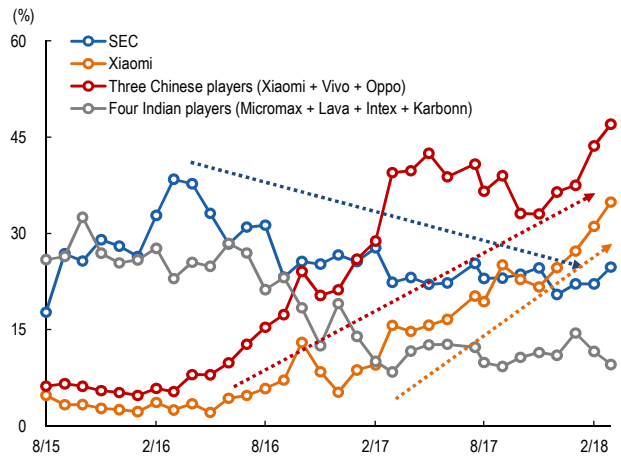
Source: Company materials, Mirae Asset Daewoo Research

**Figure 125. Chinese smartphone M/S trends**



Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 126. Indian smartphone M/S trends**



Source: Counterpoint, Mirae Asset Daewoo Research

### 46. Market growth

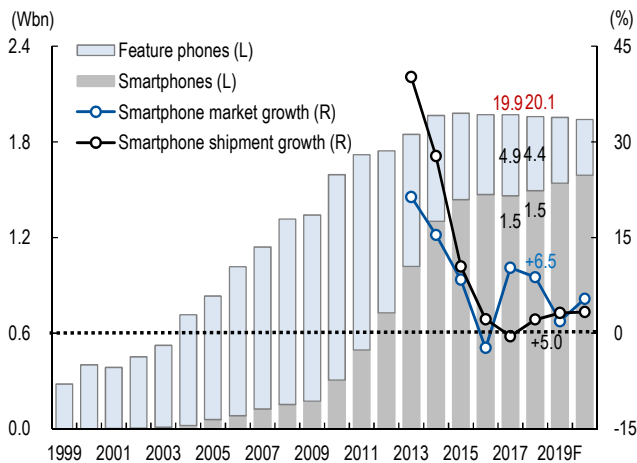
The smartphone market has begun maturing, with its growth remaining in the single digits since 2016. At present, the smartphone market displays the following characteristics:

1) Increasing dominance by top-tier firms: Demand for high-end smartphones remains stagnant at around 200mn units. The value-added, high-end market is controlled by SEC and Apple, which have both pursued price hikes amid slowing volume growth. Of note, the sluggish sales performance of the iPhone X has recently been raising concerns over the efficacy of price hike strategies.

2) Differentiation among Chinese makers: In the low- to mid-end market, entries by new Chinese players have increased amid market growth. Recently, however, this market is being restructured down to a small number of competitive players, including Oppo, Vivo, and Xiaomi.

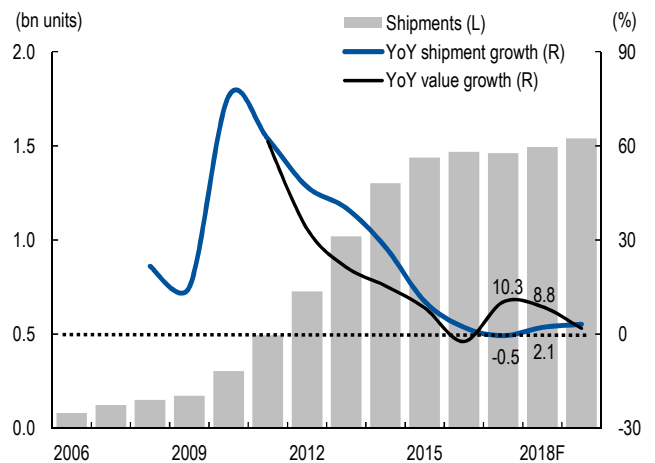
3) Accessory market growth: Smartphone makers are striving to increase accessory sales to partially offset slowdown in the smartphone market and bolster customer loyalty. However, only the Apple Watch and iPod have found meaningful success so far.

Figure 127. Annual smartphone market growth



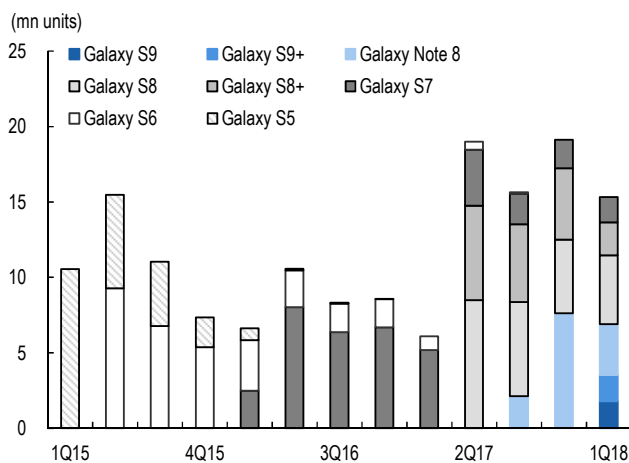
Source: IDC, Mirae Asset Daewoo Research

Figure 128. Annual smartphone shipments



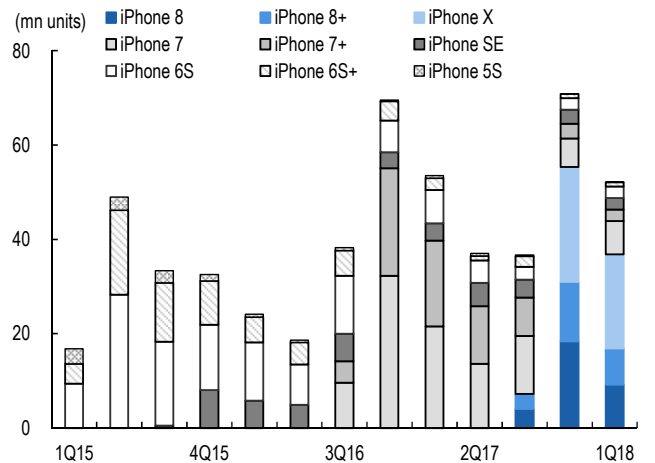
Source: IDC, Mirae Asset Daewoo Research

Figure 129. SEC's smartphone shipments by model



Source: Counterpoint, Mirae Asset Daewoo Research

Figure 130. Apple's smartphone shipments by model



Source: Counterpoint, Mirae Asset Daewoo Research

### 47. Competitive landscape

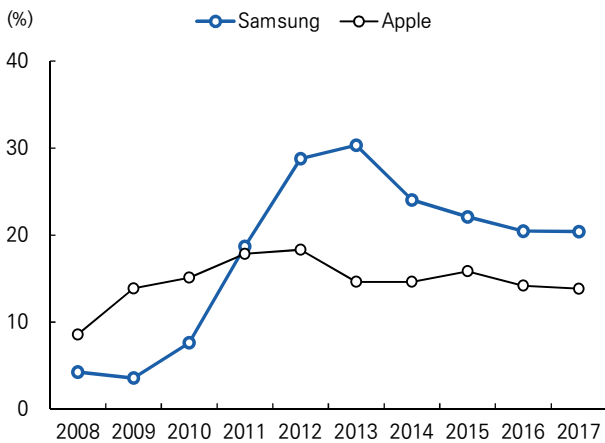
Since 2016, SEC and Apple have maintained market shares (by shipments) in the low-20% range and high teens, respectively. These levels are typical for the top two players in a mature market.

In the US, the largest smartphone market in terms of value, Apple and SEC are competing for the top spot, followed by LGE. Meanwhile, ZTE, once the fourth-largest player in the US, is banned from signing export/import contracts with US firms until March 13, 2025. In our view, SEC and LGE stand to benefit from the ban if it remains intact.

China, the biggest market in terms of shipments, is largely dominated by Chinese players. As the market slows down, Chinese players will likely step up their global outreach efforts.

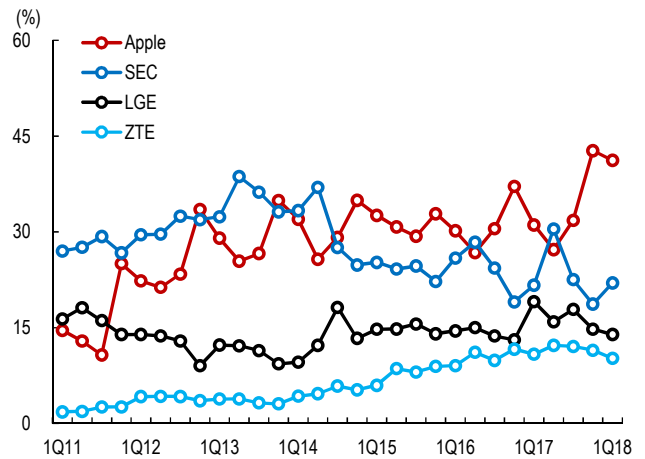
Meanwhile, India is the fastest growing market. Currently, SEC claims the largest market share (20%). However, the country is one of the markets where Chinese firms, namely Xiaomi, are most aggressively expanding their footholds. In our view, SEC's ability to maintain 20%-level global smartphone market share depends on its performance in India.

**Figure 131. SEC's and Apple's global smartphone M/S trends**



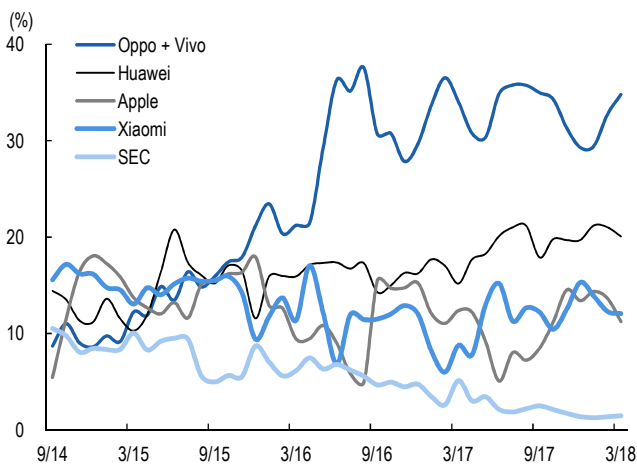
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 132. US smartphone M/S trends**



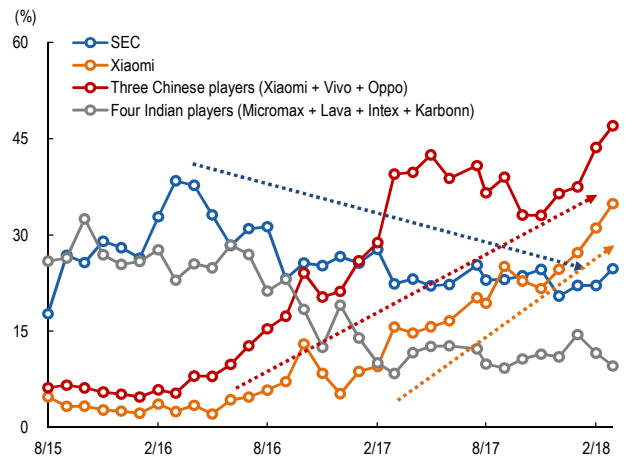
Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 133. Chinese smartphone M/S trends**



Source: Counterpoint, Mirae Asset Daewoo Research

**Figure 134. Indian smartphone M/S trends**



Source: Counterpoint, Mirae Asset Daewoo Research

#### 48. Outlook and strategy

In the past, SEC's smartphone OP margin has reached as high as 20%. However, we believe that level was abnormally high. Going forward, the company's smartphone OP margin is projected to stabilize at around 10-15%. We note that, in its heyday, Nokia (NOKIA FH/CP: EUR5.35) was able to achieve strong profitability despite a product mix oriented toward low-end products, on the back of scale effects. As the current global leader in terms of shipments, SEC will likely maintain stable profitability based on economies of scale.

In order for SEC to maintain a market share of at least 20%, the company needs to improve its hardware competitiveness. Indeed, we believe that strong brand value in the high-end segment (stemming from adoption cutting-edge hardware) could have a spillover effect to prices of low/mid-end products. As seen in the lackluster market response to the iPhone X, predictable changes to existing hardware cannot generate strong demand. Accordingly, we believe SEC should introduce a foldable smartphone ahead of competitors. Meanwhile, we see some Chinese players leading innovation in the global market, with Huawei introducing the world's first smartphone with a triple-camera system. SEC's aggressive expansion of its smartphone business should also provide a boost to upstream segments like semiconductors and displays.

Figure 135. iPhone X failing to meet expectations



Source: Apple, Mirae Asset Daewoo Research

Figure 136. Huawei's P20 Pro triple-camera phone

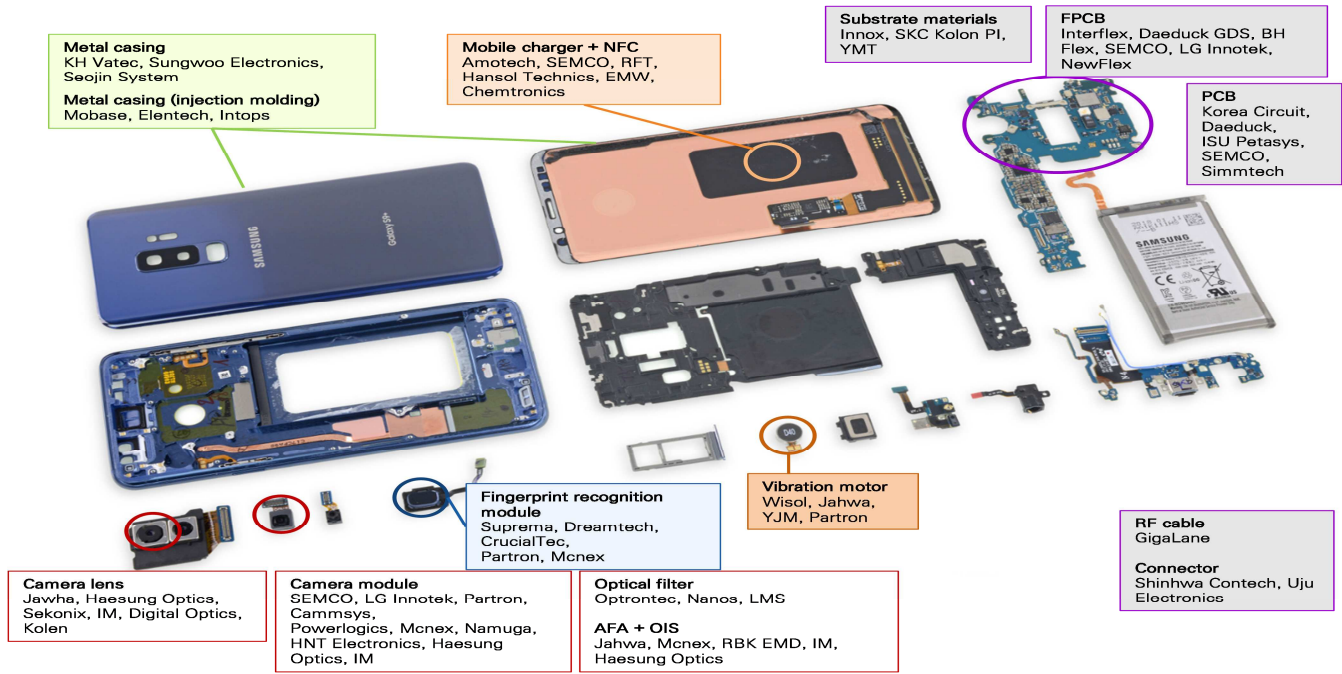


Source: Huawei, Mirae Asset Daewoo Research

### 49. Key parts suppliers

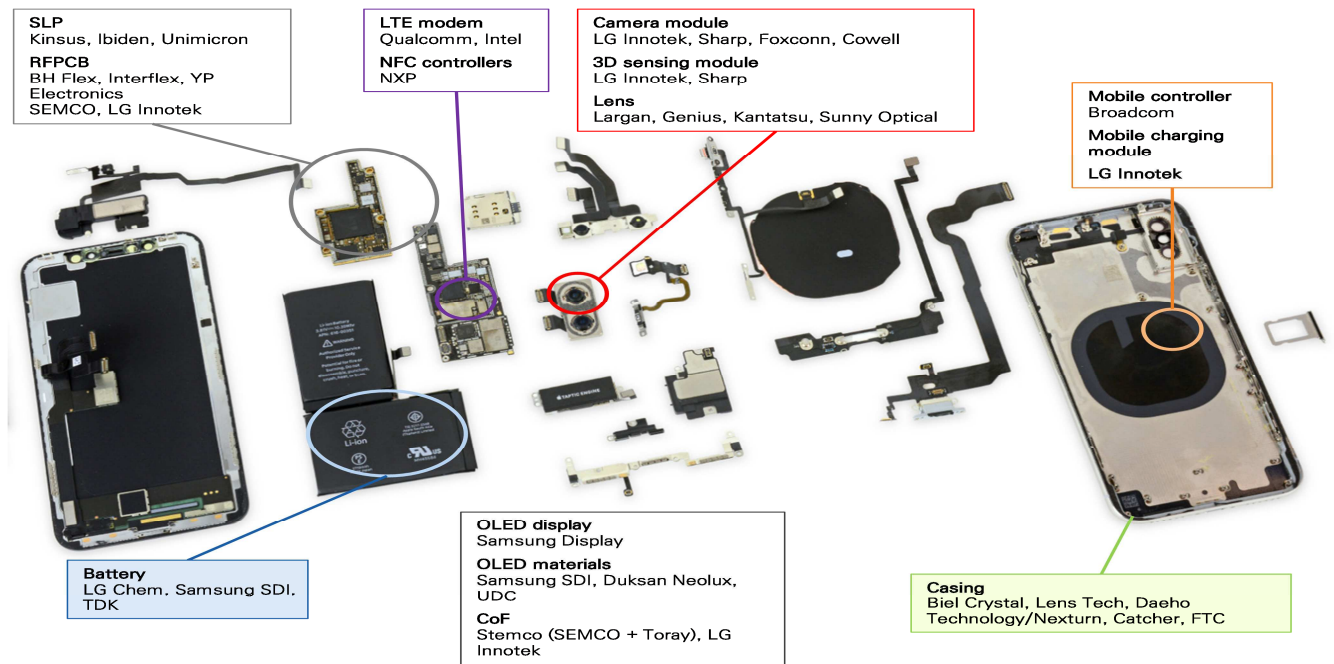
Generally speaking, global smartphone parts suppliers are divided into SEC- and Apple-focused players. The handful of companies that cater to both smartphone giants are mostly based in Japan.

Figure 137. Key Galaxy S9 parts suppliers



Source: iFixit, Mirae Asset Daewoo Research

Figure 138. Key iPhone X parts suppliers



Source: iFixit, Mirae Asset Daewoo Research

## 2) Networks business

### 50. Business overview

SEC's networks business engages in the production of mobile network equipment. Although SEC's WiBro technology failed to become the global mobile WiMAX standard, the company has established itself as a major global telecom equipment player by successfully developing LTE equipment.

SEC recorded the largest network equipment market shares in Korea and India in 2016. By commercializing cutting-edge technologies in cooperation with the three major domestic telcos, the company has been able to expand its presence in the global market. Indeed, in 2015, SEC accounted for 44.1% of the Indian LTE equipment, equivalent to 13% of the global market. Based on its robust positioning in Korea and India, the company is now preparing for the commercialization of 5G equipment.

### 51. Key products

Key products include radio units, small cells (small mobile base stations), enterprise wireless local area network (LAN) controllers, and core network equipment.

Figure 139. Radio unit



Source: Company materials, Mirae Asset Daewoo Research

Figure 140. Small cell



Source: Company materials, Mirae Asset Daewoo Research

Figure 141. Enterprise wireless LAN controller



Source: Company materials, Mirae Asset Daewoo Research

Figure 142. Core network equipment



Source: Company materials, Mirae Asset Daewoo Research

### 52. Production facilities

The networks business does not require large-scale production facilities, as it is primarily engaged in parts assembly.

Once large-scale network investments (e.g., 2G→3G, 3G→4G) are completed, telcos tend to place a higher priority on ensuring stable network operations than on equipment purchases. As such, network equipment providers should see revenue volatility rise according to telcos' investment cycles, making it difficult for them to maintain large-scale production capacity.

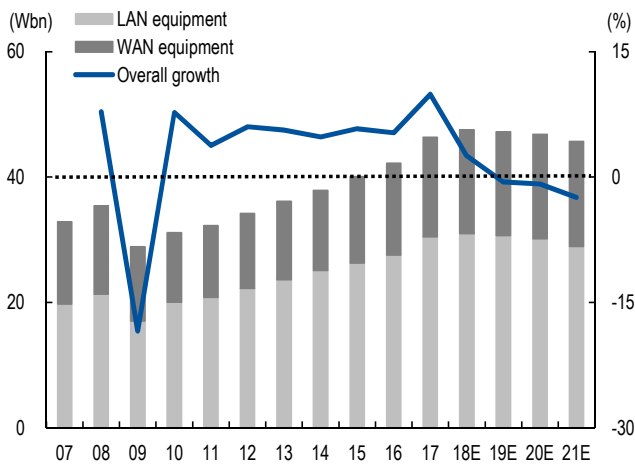
### 53. Market growth

In the early 2000s, telecom investments displayed marked growth. The launch of the iPhone (in 2007) in particular boosted mobile internet usage, thus sharply driving up mobile data traffic. Reportedly, in Korea alone, the shift to 4G led to investments in equipment and relevant infrastructure of over W20tr. Moreover, preparations for the introduction of 5G have already begun amid growing investments in future growth drivers such as autonomous driving and IoT.

Indeed, global telcos, including Korean players, have begun investments in 5G networks, with domestic telco KT (030200 KS/Buy/TP: W35,000/CP: W27,250) showcasing the world's first 5G pilot services at the 2018 PyeongChang Winter Olympics. In other major countries, such as the US, Japan, and China, telcos are also pushing ahead with 5G deployment.

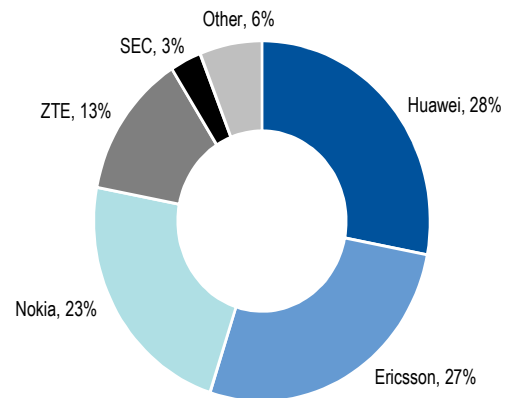
For the networks business, maintaining good relations with telcos is as important as technology. In addition, the business has national security implications. For core network equipment products, the market is currently controlled by only a few suppliers, which we believe will reap most of the benefits from 5G deployment.

**Figure 143. LAN and WAN equipment markets**



Source: Gartner, Mirae Asset Daewoo Research

**Figure 144. Mobile telecom equipment M/S breakdown in 2017**

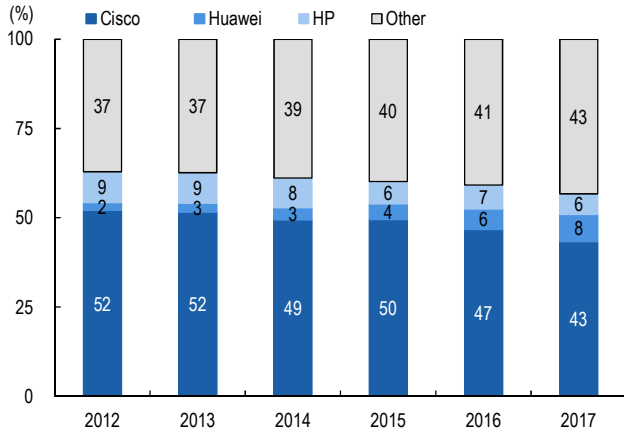


Source: IHS, Mirae Asset Daewoo Research

### 54. Competitive landscape

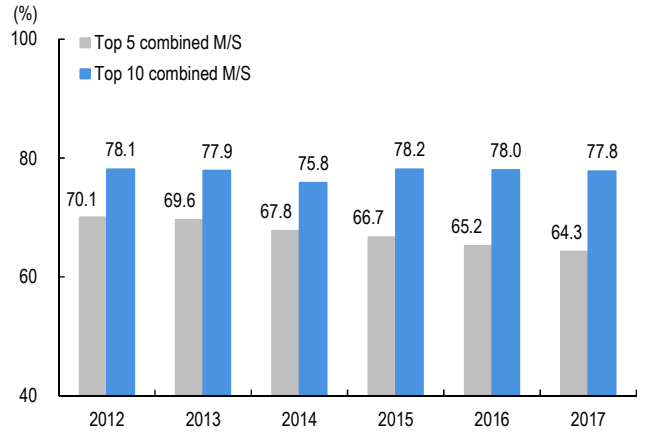
Cisco (CSCO US/CP: US\$45.93) and Huawei are the dominant players in the fixed-line networks market. Meanwhile, Nokia, Ericsson (ERICB SS/CP: EUR68.28), and Huawei are taking the lead in the mobile networks market.

**Figure 145. Global fixed-line network M/S breakdown**



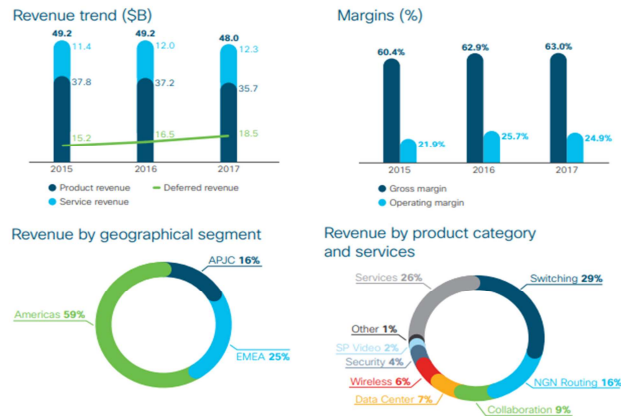
Source: Gartner, Mirae Asset Daewoo Research

**Figure 146. M/S of top five and top 10 players**



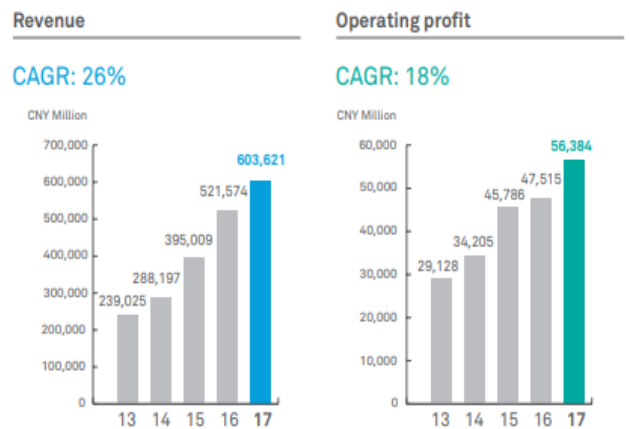
Source: Gartner, Mirae Asset Daewoo Research

**Figure 147. Cisco's earnings**



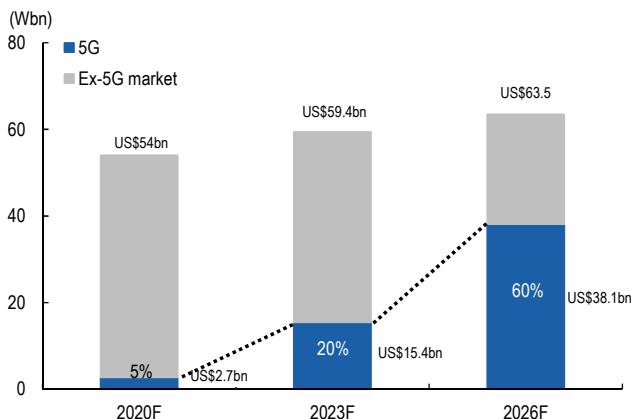
Source: Cisco

**Figure 148. Huawei's earnings**



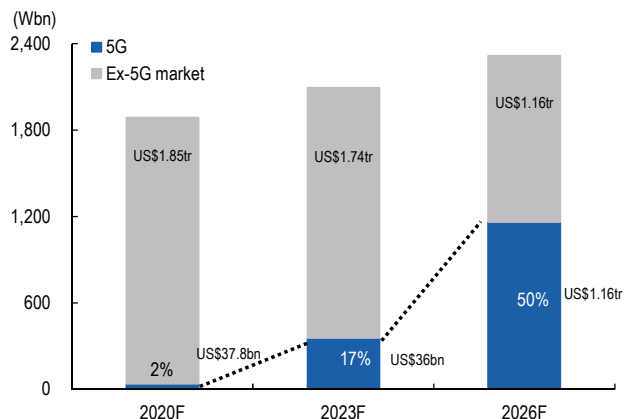
Source: Huawei

**Figure 149. Domestic 5G market forecasts**



Source: ETRI, Mirae Asset Daewoo Research

**Figure 150. Overseas 5G market forecasts**



Source: ETRI, Mirae Asset Daewoo Research

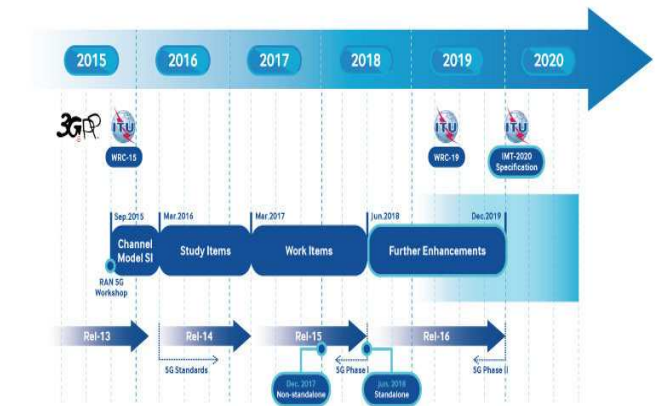
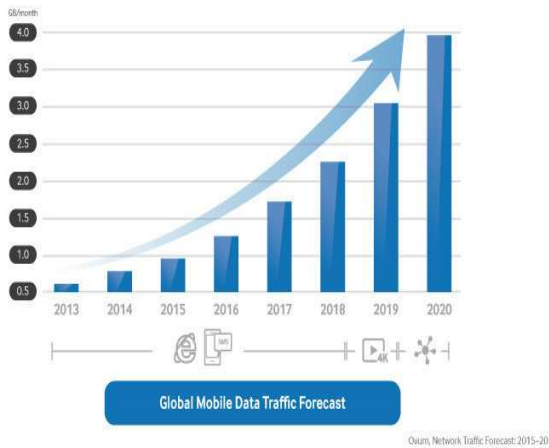
### 55. Outlook and strategy

Although the network equipment business is not SEC's flagship, it is a pivotal piece of the puzzle due to its synergies with the smartphone unit. Notably, Huawei started out as a telecom network provider, but has recently been gaining prominence in the smartphone market by leveraging its network technologies.

The 5G market should present new opportunities to SEC, which has already secured advanced technologies related to network equipment systems, smartphones, and chipsets. For 5G, which uses super-high frequency bands, utilization of smaller and lighter base stations is integral. Compared with 4G, 5G supports a 20-fold increase in download speeds, much lower latency, and a tenfold increase in concurrent users.

SEC has been making aggressive forays into the niche network equipment (e.g., IoT network products) market. Indeed, network equipment manufactured by SEC (based on low-power, wide-area technology) is being used to support SK Telecom's (017670 KS/Buy/TP: W280,000/CP: W224,500) LoRa IoT network. As SK Telecom plans to invest nearly W100bn to establish a nationwide LoRa network (and relevant ecosystem), we think SEC will need to continue its efforts to develop relevant technologies.

**Figure 151. Global mobile data traffic growth** **Figure 152. SEC's 5G road map**



Source: Company materials, Mirae Asset Daewoo Research

Source: Company materials, Mirae Asset Daewoo Research

**Device Solutions division**

**1) Semiconductor business**

**56. Earnings outlook**

For 2018, we project SEC's semiconductor revenue at W90.9tr (+22% YoY) and operating profit at W51.0tr (+45% YoY). While DRAM prices remain steady, increasing server demand is expected to boost revenue. OP margin is anticipated to improve 10.4%p YoY to 70.7% thanks to cost reductions from the stabilization of the 1Xnm process and adoption of the 1Ynm process.

NAND shipments are expected to grow 47% YoY on the back of larger mixes of 64/72-layer 3D NAND chips. However, ASP is forecast to decline 10% due to increased sales of high-density products like enterprise SSDs. For 2018, we project NAND revenue at W27.3tr (+18% YoY) and operating profit at W14.3tr (+27% YoY).

**Table 39. Semiconductor earnings and forecasts**

(Wbn, %)

	1Q17	2Q17	3Q17	4Q17	1Q18	2Q18F	3Q18F	4Q18F	17F	18F	19F
<b>Revenue</b>	<b>15,660</b>	<b>17,580</b>	<b>19,910</b>	<b>21,110</b>	<b>20,780</b>	<b>21,778</b>	<b>23,511</b>	<b>24,859</b>	<b>74,260</b>	<b>90,928</b>	<b>98,304</b>
DRAM	7,498	8,568	10,108	11,171	11,267	12,425	13,107	13,826	37,344	50,625	50,707
NAND	4,978	5,373	6,177	6,630	5,923	6,279	7,281	7,865	23,159	27,347	34,599
System LSI/other	3,184	3,640	3,625	3,309	3,590	3,074	3,123	3,169	13,757	12,956	12,997
<b>OP</b>	<b>6,311</b>	<b>8,029</b>	<b>9,963</b>	<b>10,903</b>	<b>11,545</b>	<b>12,185</b>	<b>13,448</b>	<b>13,789</b>	<b>35,206</b>	<b>50,967</b>	<b>50,297</b>
DRAM	4,088	5,083	6,266	7,094	7,457	8,889	9,568	9,900	22,531	35,813	35,229
NAND	1,932	2,366	3,263	3,670	3,253	3,354	3,795	3,882	11,231	14,284	14,775
System LSI	291	580	433	139	836	-59	85	7	1,444	869	294
<b>OP margin</b>	<b>40.3%</b>	<b>45.7%</b>	<b>50.0%</b>	<b>51.6%</b>	<b>55.6%</b>	<b>56.0%</b>	<b>57.2%</b>	<b>55.5%</b>	<b>47.4%</b>	<b>56.1%</b>	<b>51.2%</b>
DRAM	54.5%	59.3%	62.0%	63.5%	66.2%	71.5%	73.0%	71.6%	60.3%	70.7%	69.5%
NAND	38.8%	44.0%	52.8%	55.3%	54.9%	53.4%	52.1%	49.4%	48.5%	52.2%	42.7%
System LSI	9.1%	15.9%	12.0%	4.2%	23.3%	-1.9%	2.7%	0.2%	10.5%	6.7%	2.3%
<b>QoQ/YoY</b>											
<b>Revenue</b>	<b>5%</b>	<b>12%</b>	<b>13%</b>	<b>6%</b>	<b>-2%</b>	<b>5%</b>	<b>8%</b>	<b>6%</b>	<b>45%</b>	<b>22%</b>	<b>8%</b>
DRAM	8%	14%	18%	11%	1%	10%	5%	5%	62%	36%	0%
NAND	-11%	8%	15%	7%	-11%	6%	16%	8%	27%	18%	27%
System LSI	40%	14%	0%	-9%	9%	-14%	2%	1%	40%	-6%	0%
<b>OP</b>	<b>28%</b>	<b>27%</b>	<b>24%</b>	<b>9%</b>	<b>6%</b>	<b>6%</b>	<b>10%</b>	<b>3%</b>	<b>159%</b>	<b>45%</b>	<b>-1%</b>
DRAM	14%	24%	23%	13%	5%	19%	8%	3%	109%	59%	-2%
NAND	-10%	22%	38%	12%	-11%	3%	13%	2%	100%	27%	3%
System LSI	흑전	99%	-25%	-68%	502%	RR	TTB	-92%	TTB	-40%	-66%

Source: Company data, Mirae Asset Daewoo Research

**Table 40. Semiconductor shipments**

(Wbn, %)

	1Q17	2Q17	3Q17	4Q17	1Q18	2Q18F	3Q18F	4Q18F	17F	18F	19F
<b>DRAM (1Gb eq.)</b>											
Shipments (mn)	9,670	10,153	11,067	11,399	11,171	12,113	12,719	13,355	26,353	31,457	32,921
Bit growth	-11%	5%	9%	3%	-2%	8%	5%	5%	25%	19%	5%
ASP (US\$)	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
QoQ growth	21%	11%	8%	10%	6%	1%	0%	0%	48%	19%	-4%
<b>NAND (16Gb eq.)</b>											
Shipments (mn)	7,719	8,491	9,740	10,714	10,714	12,000	14,280	15,993	9,710	14,277	19,664
Bit growth	-11%	10%	15%	10%	0%	12%	19%	12%	15%	47%	38%
ASP (US\$)	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.7	0.6	0.6
QoQ growth	0%	0%	0%	0%	-8%	-6%	-3%	-4%	33%	-10%	-10%
US\$/W	1,153	1,130	1,132	1,105	1,073	1,080	1,085	1,090	1,130	1,082	1,090

Source: Company data, Mirae Asset Daewoo Research

### 1. Memory

#### 57. Overview

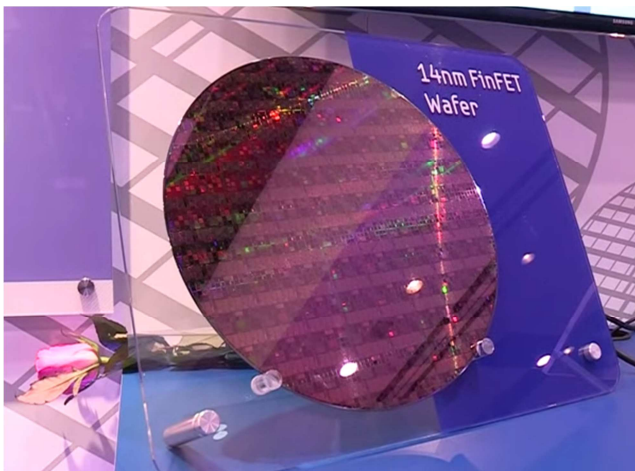
Semiconductor products can largely be divided into memory and system LSI (non-memory). And memory chips can be further into RAM (read/write memory) and ROM (read-only memory).

The global memory market is dominated by three players: SEC, SK Hynix (000660 KS/Buy/TP: W120,000/CP: W86,100), and Micron (MU US/CP: US\$51.82). In the past, more than 10 players operated in the market. However, many of them have collapsed or been acquired by major players amid industry consolidation.

Despite slowing growth of the global smartphone market, the memory chip market is expected to display steady growth on the back of the increasing density of storage devices, namely servers. In addition, the emergence of new markets, like IoT and automotive electronics, should sharply boost demand going forward.

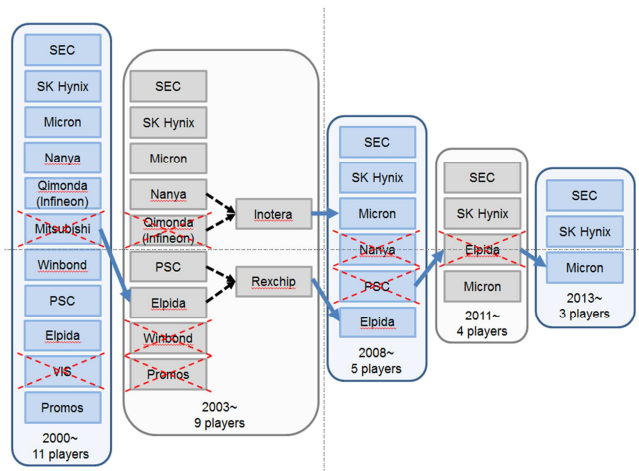
In the DRAM segment, supply shortages remain intact due to growing demand for server-use chips and delays to suppliers' process migrations. In the NAND segment, demand is growing steadily thanks to increasing use of SSDs and higher NAND content in new mobile device models.

Figure 153. SEC's 14nm FinFET wafer



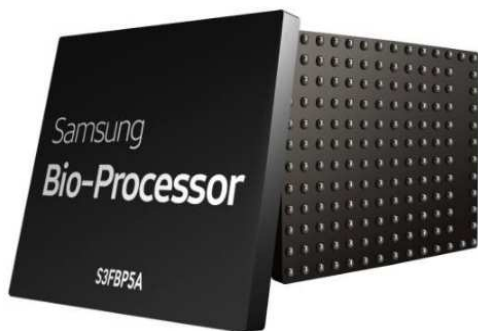
Source: Press materials

Figure 154. Global DRAM market restructuring



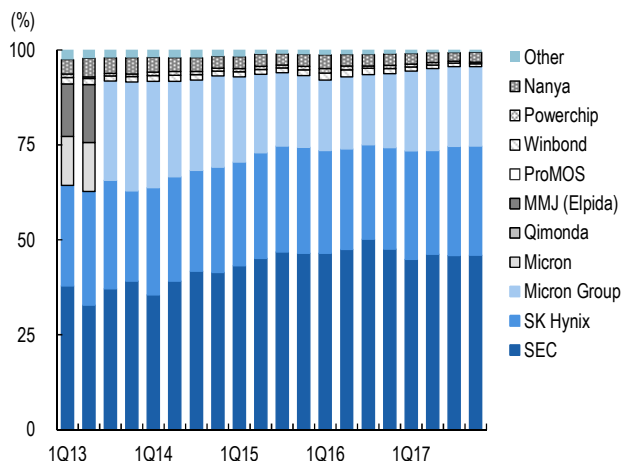
Source: Mirae Asset Daewoo Research

Figure 155. SEC's IoT-use semiconductor



Source: Press materials

Figure 156. Global DRAM market breakdown



Source: DRAMeXchange, Mirae Asset Daewoo Research

58. Key products

Figure 157. 10nm 8Gb DRAM



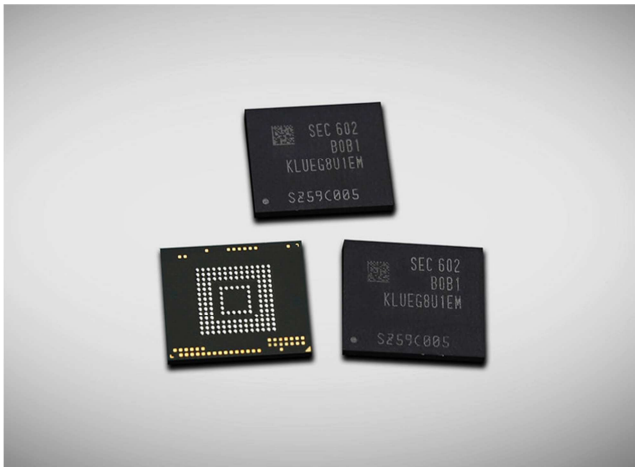
Source: Company materials

Figure 158. NVMe SSD 970



Source: Company materials

Figure 159. UFS



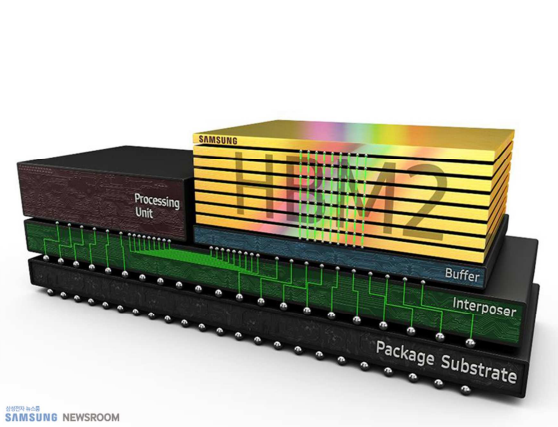
Source: Company materials

Figure 160. LPDDR4 DRAM



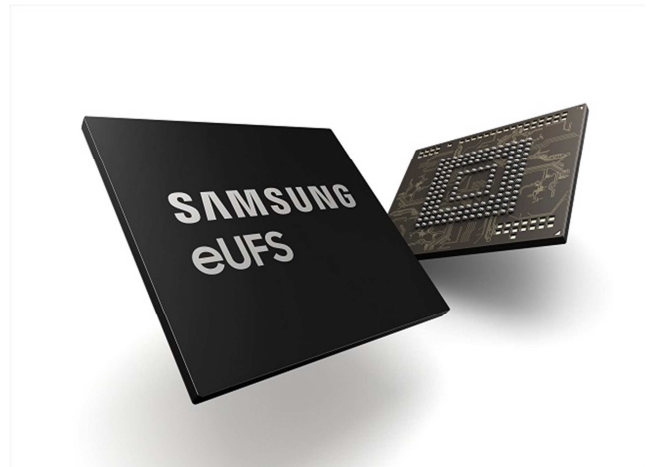
Source: Company materials

Figure 161. 8GB HBM2 DRAM



Source: Company materials

Figure 162. Automobile-use eUFS



Source: Company materials

**59. Production facilities**

**- DRAM**

SEC's DRAM production lines are located in Hwaseong (Lines 11, 13, 15, 16, and 17) and Pyeongtaek (P1 or Line 18). Line 11 is scheduled to be converted to CMOS image sensor (CIS) production this year. Meanwhile, Line 16, which was initially designed for 2D NAND, will be turned into a DRAM line to pick up the slack from Line 11's CIS conversion. P1 capacity is estimated at 130,000wpm (30,000wpm for the second floor of the West Building and 100,000wpm for the East Building).

**- NAND**

SEC has built NAND production lines in Hwaseong (Lines 12 and 16), Pyeongtaek (P1), and Xi'an (China). The company relocated Line 16-2 to Pyeongtaek. The first floor of P1 is dedicated to 3D NAND (100,000/month), while DRAM capacity on the West Building's second floor is projected at 70,000wpm).

**Table 41. DRAM capacity trend and outlook (annual)** (12" eq., '000 wafers)

Line	Location	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018F	2019F
Line 11	Hwaseong	572	575	576	569	550	549	519	491	431	131	-
Line 12	Hwaseong	582	572	575	570	-	-	-	-	-	-	-
Line 13	Hwaseong	1,392	1,706	1,715	1,715	1,649	1,616	1,578	1,457	1,415	1,264	1,194
Line 15	Hwaseong	1,158	1,463	1,724	1,701	2,183	2,136	2,093	1,954	1,822	1,660	1,587
Line 16	Hwaseong	-	-	-	-	54	333	83	-	79	318	309
Line 17	Hwaseong	-	-	-	-	-	-	157	603	865	1,001	970
P1	Pyeongtaek	-	-	-	-	-	-	-	-	-	616	1,410
<b>Total</b>		<b>3,704</b>	<b>4,314</b>	<b>4,589</b>	<b>4,554</b>	<b>4,437</b>	<b>4,634</b>	<b>4,431</b>	<b>4,505</b>	<b>4,612</b>	<b>4,991</b>	<b>5,470</b>

Source: IHS Markit, Mirae Asset Daewoo Research

**Table 42. DRAM capacity trend and outlook (quarterly)** (12" eq., '000 wafers)

Line	Location	1Q17	2Q17	3Q17	4Q17	1Q18F	2Q18F	3Q18F	4Q18F	1Q19F	2Q19F	3Q19F	4Q19F
Line 11	Hwaseong	120	119	108	84	60	36	24	12	-	-	-	-
Line 12	Hwaseong	-	-	-	-	-	-	-	-	-	-	-	-
Line 13	Hwaseong	357	353	353	351	331	307	310	316	305	298	297	294
Line 15	Hwaseong	458	456	456	452	431	406	408	415	400	396	396	396
Line 16	Hwaseong	-	-	34	45	79	79	79	81	78	77	77	77
Line 17	Hwaseong	183	205	228	249	249	248	250	254	244	242	242	242
P1	Pyeongtaek	-	-	-	-	68	113	182	254	289	330	374	418
<b>Total</b>		<b>1,119</b>	<b>1,133</b>	<b>1,180</b>	<b>1,181</b>	<b>1,218</b>	<b>1,188</b>	<b>1,253</b>	<b>1,331</b>	<b>1,316</b>	<b>1,343</b>	<b>1,386</b>	<b>1,426</b>

Source: IHS Markit, Mirae Asset Daewoo Research

**Table 43. NAND capacity trend and outlook (quarterly)** (12" eq., '000 wafers)

Line	Location	1Q17	2Q17	3Q17	4Q17	1Q18F	2Q18F	3Q18F	4Q18F	1Q19F	2Q19F	3Q19F	4Q19F
Line12	Hwaseong	360	360	360	336	285	279	270	261	240	240	225	210
Line16	Hwaseong	654	630	600	585	546	525	510	480	420	405	390	360
Xian	Xian, China	315	315	300	294	270	270	285	300	300	330	360	405
Line17	Hwaseong	9	30	75	105	90	120	120	120	90	60	45	30
P1	Pyeongtaek	-	15	60	105	150	195	225	270	315	360	405	405
<b>Total</b>		<b>1,338</b>	<b>1,350</b>	<b>1,395</b>	<b>1,425</b>	<b>1,341</b>	<b>1,389</b>	<b>1,410</b>	<b>1,431</b>	<b>1,365</b>	<b>1,395</b>	<b>1,425</b>	<b>1,410</b>

Source: IHS Markit, Mirae Asset Daewoo Research

### 60. Market growth

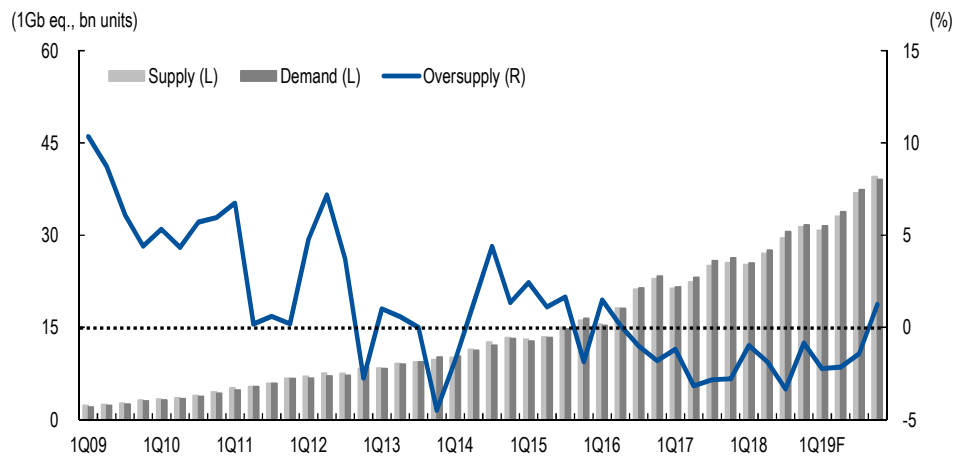
#### - DRAM: Server DRAM demand is surging amid limited supply growth.

**Supply:** In 2018, DRAM supply growth will hinge on tech migration. SEC is currently struggling with migration to the 1Ynm process, while SK Hynix and Micron are having difficulties switching to 1Xnm. Although DRAM makers' capex will likely continue, their bit growth relative to investments should be lower than historical levels. Of note, all three major DRAM makers have guided their 2018 bit growth at around 20%.

**Demand:** For 2018, we expect global DRAM demand to increase 21% YoY, with server DRAM demand expected to grow 39.7% YoY. Notably, DRAM demand from high-end servers is forecast to increase 52.4% YoY, fueled by AI and machine learning. Recently, the number of DRAM modules that a CPU can accommodate has been increasing. The mobile DRAM segment is growing at a tepid pace, but still accounts for the largest share of DRAM demand (32.8%).

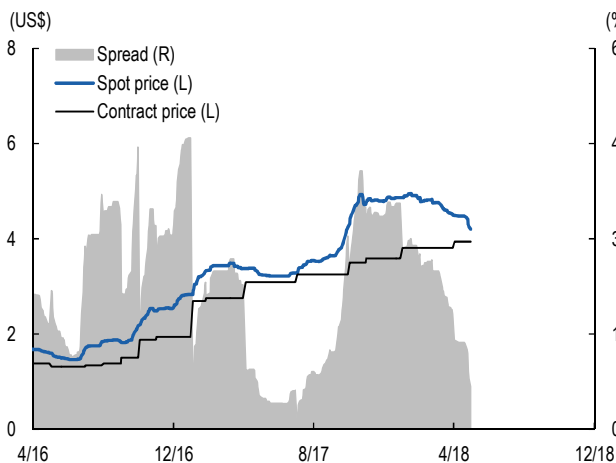
**Prices:** The DRAM market is facing structural changes in the IT industry following the completion of restructuring triggered by price competition. The rise of AI and machine learning technologies is sharply pushing up DRAM demand. In the currently oligopolistic DRAM market, any growth in server DRAM demand leads to higher prices. Amid sufficient demand, prices will be dictated by supply going forward.

**Figure 163. DRAM supply/demand**



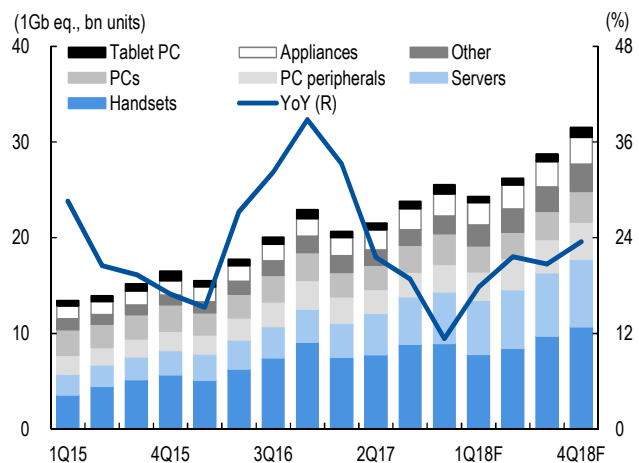
Source: Gartner, Mirae Asset Daewoo Research

**Figure 164. DDR4 4Gb 2133/2400 MHz price**



Source: DRAMeXchange, Mirae Asset Daewoo Research

**Figure 165. DRAM demand by application**



Source: Gartner, Mirae Asset Daewoo Research

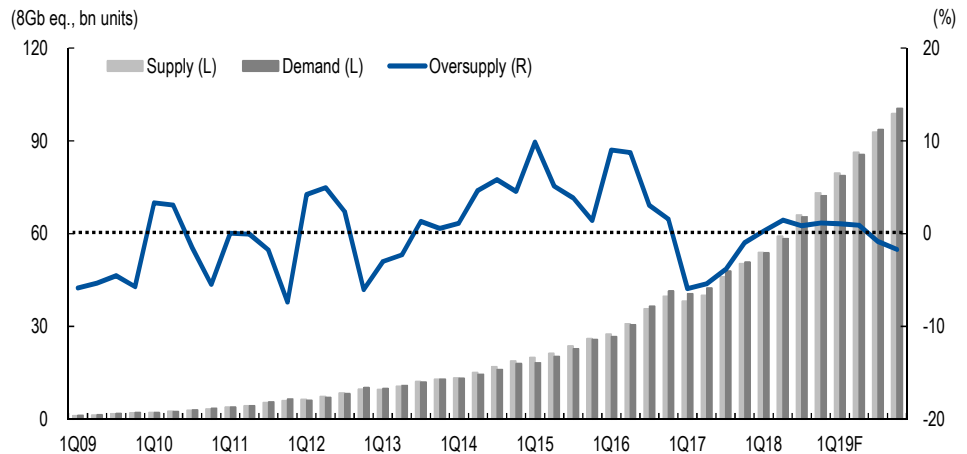
**- NAND: Robust demand growth is offsetting supply growth amid layer count increase**

**Supply:** For 2018, we expect global NAND supply to increase 44.5% YoY. Wafer input is expected to decline 0.7% YoY, while bits per wafer are expected to grow 45.5% YoY. Although wafer capacity is bound to fall due to the conversion of 2D NAND capacity to 3D NAND or DRAM (due to DRAM capacity shortages), we still expect bit growth, thanks to an increase in layer count. With migration to 64-layer/72-layer 3D NAND already well underway for major NAND chipmakers, we expect the share of 3D NAND chips with at least 64 layers to exceed 67% by end-2018.

**Demand:** In 2018, global NAND demand (in bit terms) is projected to expand 36.1% YoY. Enterprise SSDs are anticipated to drive up overall NAND demand. Indeed, enterprise SSDs will likely become the only NAND application to record over 50% shipment growth in both 2018 and 2019. We also forecast that demand for enterprise SSDs will increase on the back of declining NAND prices.

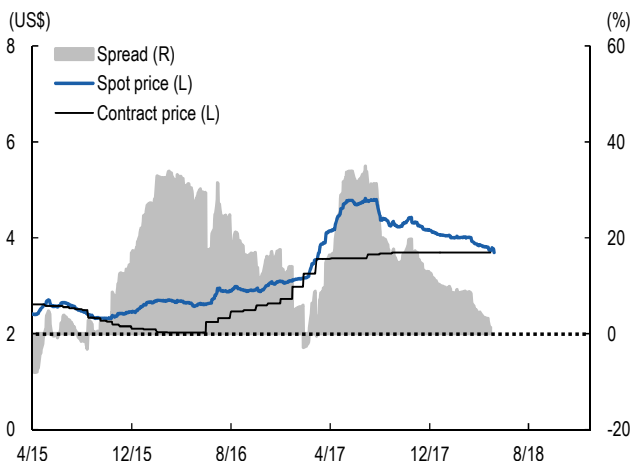
**Prices:** Compared with DRAM, NAND has been facing greater downward pressure on prices, due to: 1) its more rapid migration to advanced processes, thanks to its relatively simple structure; 2) the fact that 3D stacking allows for a sharp reduction in unit prices; 3) the availability of lower-cost alternatives (e.g., HDDs); and 4) fiercer market competition (while the DRAM market is dominated by a few players). However, for NAND, sustained declines in prices tend to stimulate demand.

**Figure 166. NAND supply/demand dynamics**



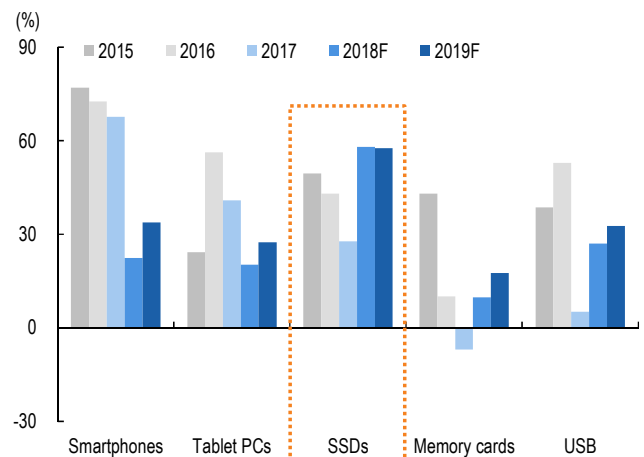
Source: Gartner, Mirae Asset Daewoo Research

**Figure 167. 64Gb (8Gb x 8) MLC prices**



Source: DRAMeXchange, Mirae Asset Daewoo Research

**Figure 168. NAND demand growth outlook by application**



Source: Industry data, Mirae Asset Daewoo Research

### 61. Competitive landscape

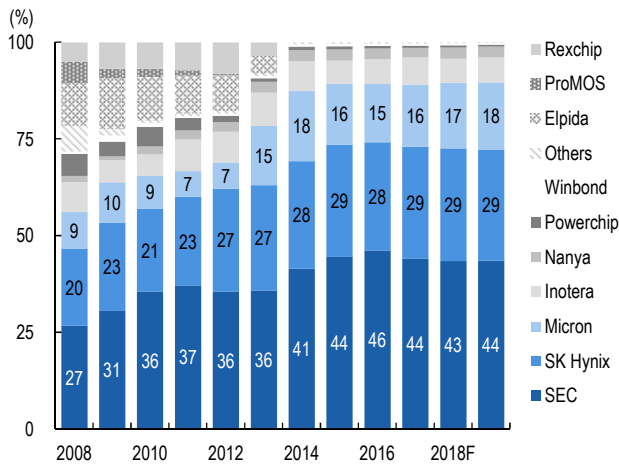
#### - DRAM: SEC is far ahead of its two major rivals in terms of market share

While there were more than 10 DRAM chipmakers back in 2008, the market has since been reorganized around SEC, SK Hynix and Micron. Following the completion of industry restructuring in 2013, SEC has seen marked improvement in its ability to defend margins. Even when prices trended downward amid a market slump back in 2016, the firm's profitability remained almost intact.

Since 2017, SEC has been reporting record margins supported by a server DRAM market upswing and favorable supply/demand conditions, with the industry's average OP margin nearing 50%. SEC boasted the largest market share (in shipment terms) in 2017, and its share is forecast to reach 43% in 2018. Notably, the firm sits in the top spot in all product categories. Based on 2017 revenue, we estimate the firm garnered a market share of 53% in mobile DRAM; 47% in server DRAM; and 45% in graphics DRAM.

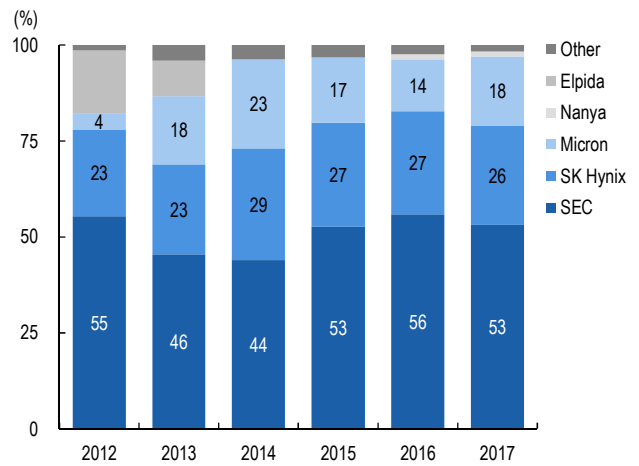
SEC has been maintaining an industry-high OP margin, aided by the highest rate of process migration in its peer group. The firm is expected to begin its migration to the 1Ynm process in 2H18, while SK Hynix and Micron are focusing on shifting to 1Xnm.

Figure 169. DRAM M/S breakdown (shipments)



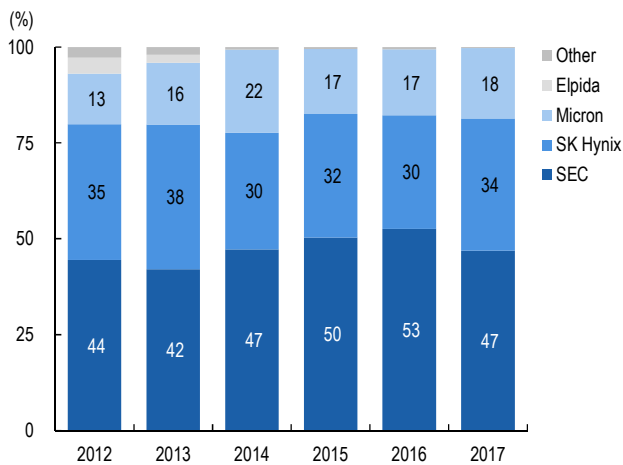
Source: IHS Markit, Mirae Asset Daewoo Research

Figure 170. Mobile DRAM M/S breakdown (revenue)



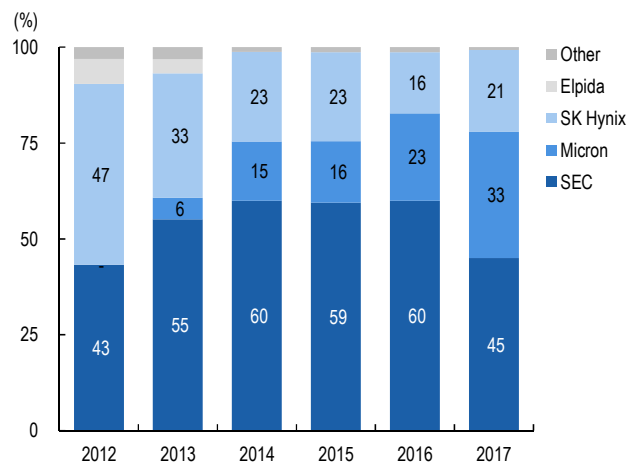
Source: IHS Markit, Mirae Asset Daewoo Research

Figure 171. Server DRAM M/S breakdown (revenue)



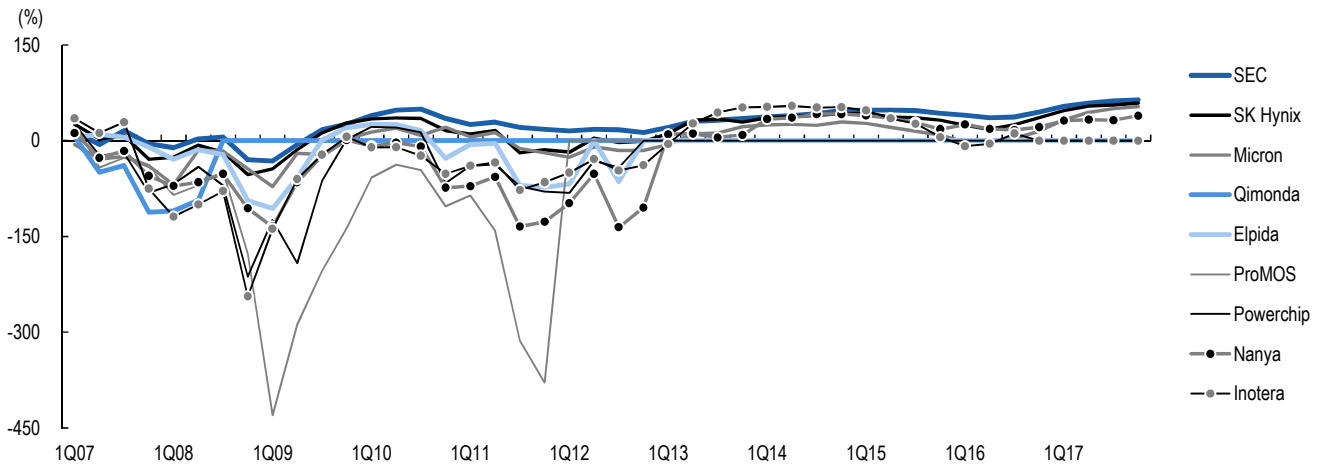
Source: IHS Markit, Mirae Asset Daewoo Research

Figure 172. Graphics DRAM M/S breakdown (revenue)



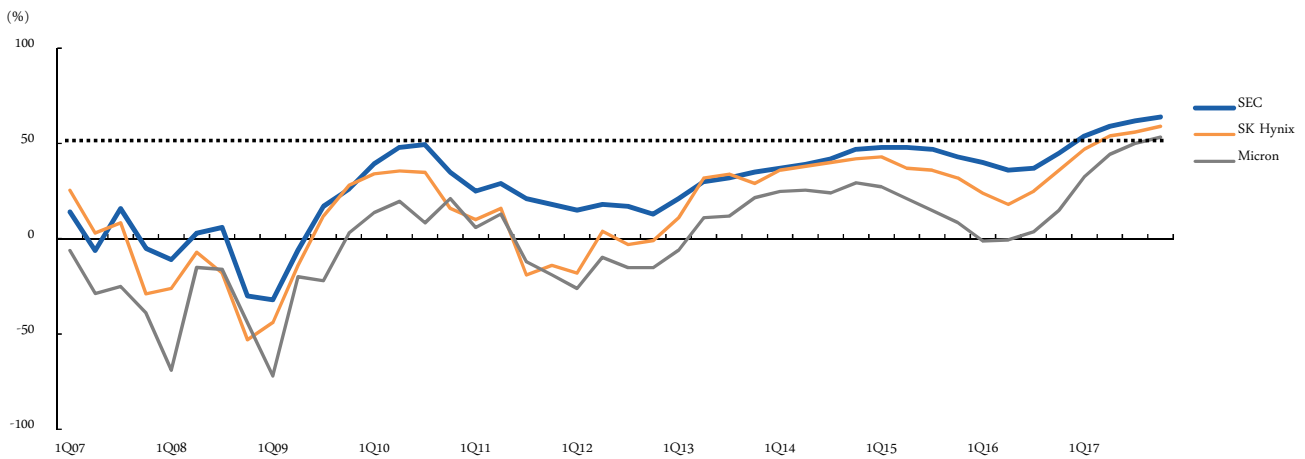
Source: IHS Markit, Mirae Asset Daewoo Research

**Figure 173. OP margins of DRAM chipmakers**



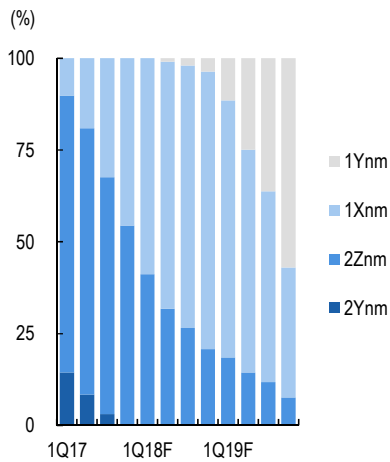
Source: DRAMeXchange, Mirae Asset Daewoo Research

**Figure 174. Top three DRAM chipmakers' OP margins**



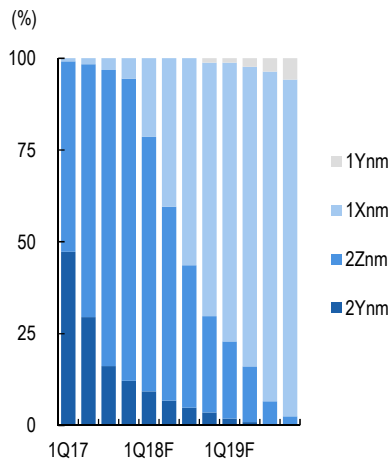
Source: DRAMeXchange, Mirae Asset Daewoo Research

**Figure 175. SEC's process migration**



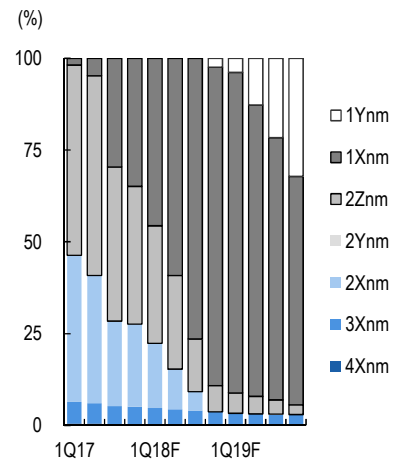
Source: IHS Markit, Mirae Asset Daewoo Research

**Figure 176. SK Hynix's process migration**



Source: IHS Markit, Mirae Asset Daewoo Research

**Figure 177. Micron's process migration**



Source: IHS Markit, Mirae Asset Daewoo Research

**- NAND: SEC is increasing market share through supply growth**

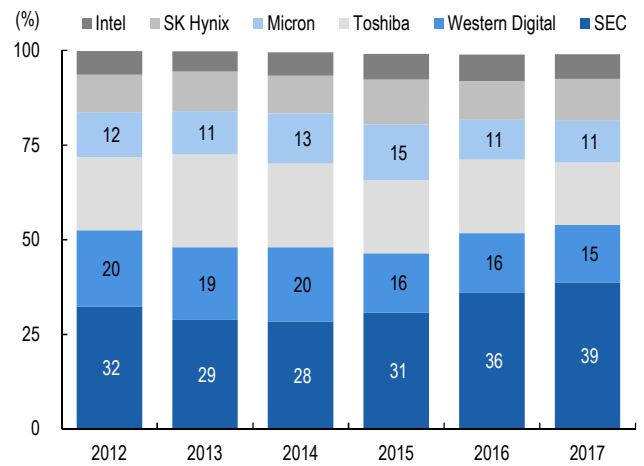
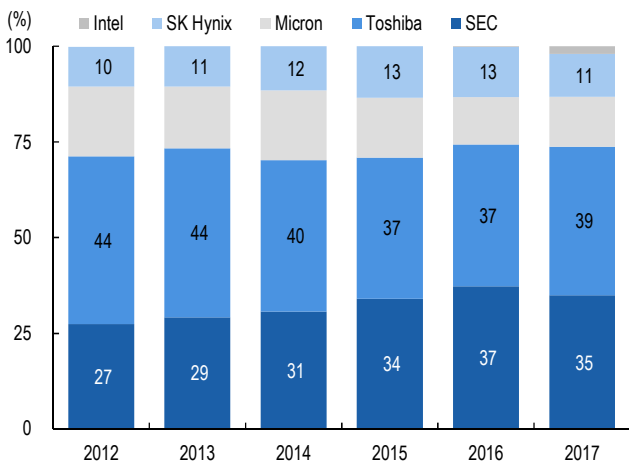
In the NAND market, SEC has been widening its market share gaps with rivals, after having gained the upper hand in the race for 3D NAND conversion. Still, we note that mid-tier players, such as SK Hynix and Micron, have been delivering relatively strong margins since 2017.

NAND chipmakers have been aggressively expanding capex, with NAND investments exceeding DRAM investments in 2017. NAND capex should remain on the uptrend through 2018. Moreover, we expect NAND to come under greater price-cutting pressure than DRAM, in light of ongoing competition to increase 3D NAND layer count and market entries by Chinese players. However, we believe that growing demand for both enterprise SSDs and high-capacity mobile NAND should help limit the extent of price declines going forward.

SEC is the world's second-largest NAND chipmaker (after Toshiba) in terms of shipment-based market share, but holds the largest market share in revenue terms. While SEC's NAND business is expected to maintain its strong earnings power going forward, rivals will need to improve their competitiveness in 3D NAND and further expand their customer base in order to narrow their profitability gaps with SEC.

**Figure 178. NAND M/S breakdown (shipments)**

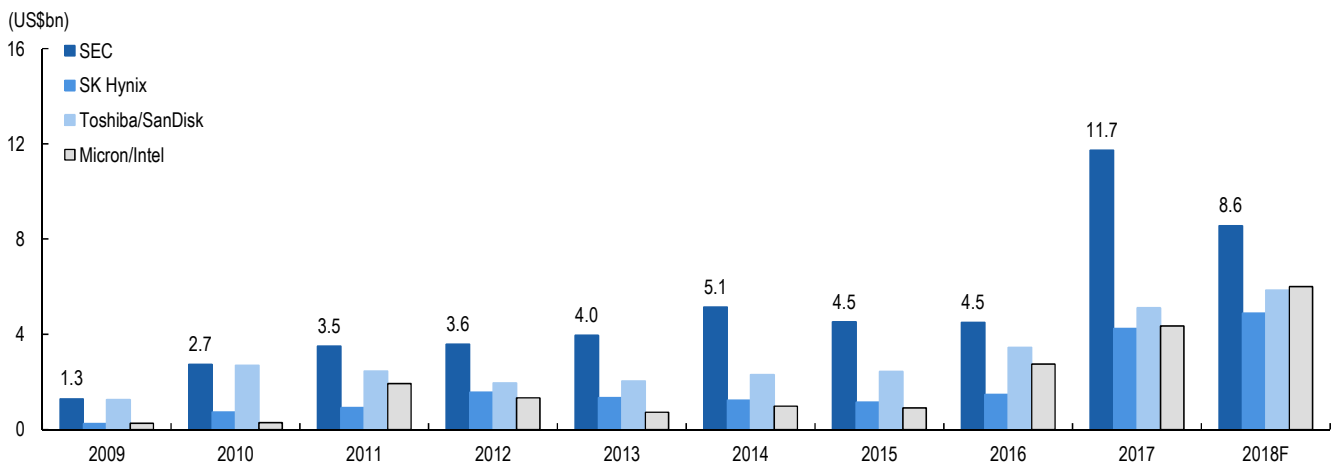
**Figure 179. NAND M/S breakdown (revenue)**



Source: Gartner, Mirae Asset Daewoo Research

Source: Gartner, Mirae Asset Daewoo Research

**Figure 180. NAND chipmakers' annual capex**



Source: Gartner, Mirae Asset Daewoo Research

## 62. Outlook and strategy

For DRAM, we expect SEC to focus on maximizing profitability via efficient capex deployment (amid limited shipment growth arising from tech migration difficulties). We note that in addition to process migration, chip-stacking can be used to increase DRAM density. Going forward, top-tier DRAM makers, including SEC, will likely increase chip density by adopting through-silicon via (TSV).

NAND prices have remained solid, despite concerns over: 1) oversupply arising from steady capex; and 2) the potential entries of Chinese makers. The reasons behind robust prices are different for 2D and 3D NAND. For 2D NAND, supply shortages arising from the conversion of existing facilities to 3D facilities are keeping prices high. For 3D NAND, supply has been tight due to rising demand from SSDs.

Although 2D NAND is currently in limited supply, we could see a price decline in the event of a fall in demand. For 3D NAND, however, we expect price decreases to drive demand growth, leading to higher revenue.

## 2. System LSI

### 63. Overview

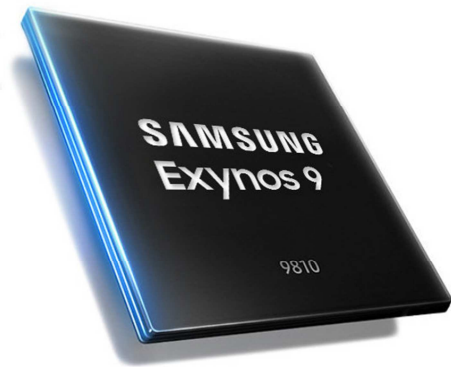
The system LSI business unit designs semiconductor chips, including mobile APs, display driver ICs, CIS, and TV-use systems on chip (SoC). In 2014, SEC launched an ISOCELL-based 16MP mobile image sensor, and released a camera-use APS-C sensor using the 65nm BSI process for the first time.

In 2016, SEC built a full SoC lineup ranging from a low-end model to the high-end Exynos 8 Octa on the 14nm process. In addition, the company mass-produced a wearable AP via the world's first application of 2G 14nm FinFET.

In 2017, SEC launched a new premium mobile SoC, the Exynos 9, by integrating a high-performance LTE modem based on 10nm FinFET and installed it in Galaxy S9 series smartphones. Going forward, SEC plans to bolster its system semiconductor design capabilities by adding field programmable gate arrays (FPGAs), 5G modems, and next-generation image sensors to its existing system LSI business portfolio.

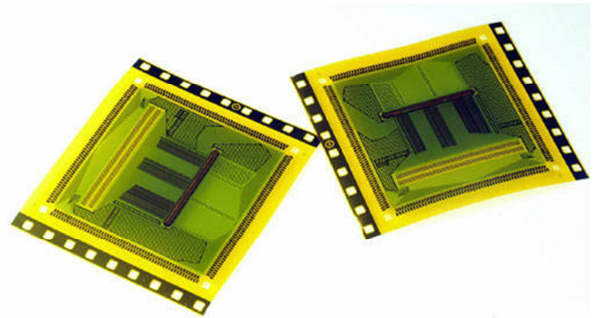
### 64. Key products

Figure 181. SEC's Exynos 9



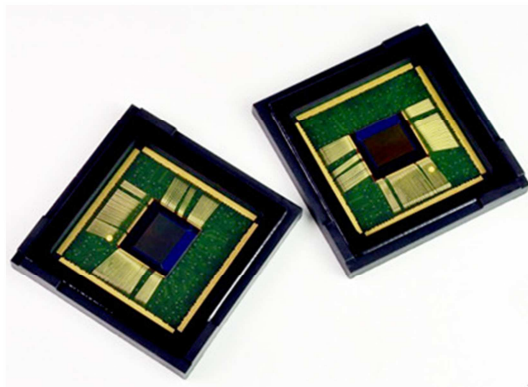
Source: Company materials

Figure 182. SEC's display driver ICs



Source: Company materials

Figure 183. SEC's CIS



Source: Company materials

Figure 184. SEC's ISOCELL-based image sensor



Source: Company materials

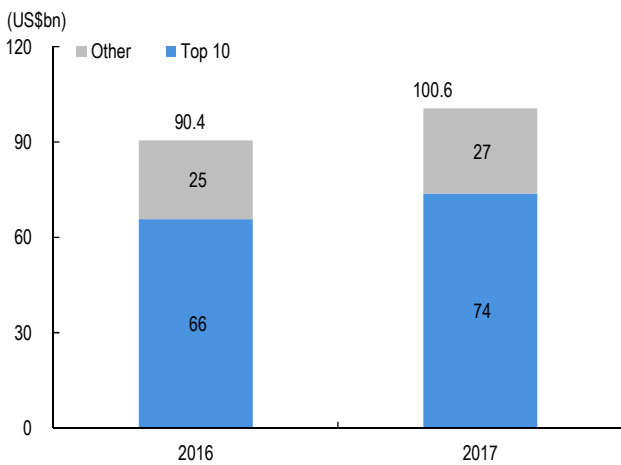
### 65. Market growth

In 2017, global fabless revenue grew 11.3% YoY to US\$100.6bn, with the combined revenue of the top 10 makers (which control more than 70% of the market) expanding 12% YoY to US\$73.7bn. The fabless market is being driven by Nvidia (NVDA US/CP: US\$254.53) and Qualcomm (QCOM US/CP: US\$55.23), while Chinese makers are displaying rapid growth.

In our view, the size of the overall fabless market is not a particularly meaningful metric, given large differences in fabless firms' flagship business areas. For example, Nvidia engages mainly in designing GPUs, while Qualcomm and Broadcom (AVGO US/CP: US\$242.50) specialize in mobile APs and network-use system chips. SEC's system LSI unit designs mobile APs, display driver ICs, and CIS, meeting the needs of its affiliates.

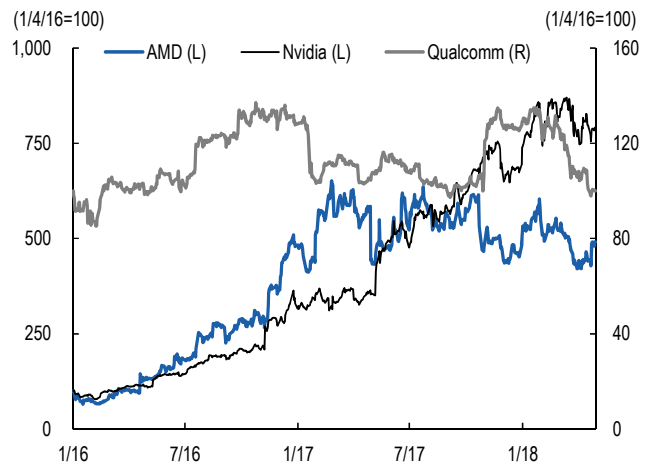
The fabless market is directly affected by application expansion. With the growth of the smartphone market, fabless AP design companies, such as Qualcomm and Broadcom, saw their fortunes improve. Recently, with the AI and machine learning markets expanding markedly, GPU design companies, such as Nvidia and AMD (AMD US/CP: US\$11.95), are delivering robust growth. Of note, surging demand for cryptocurrency mining equipment is boosting the GPU market.

**Figure 185. Global fabless revenue**



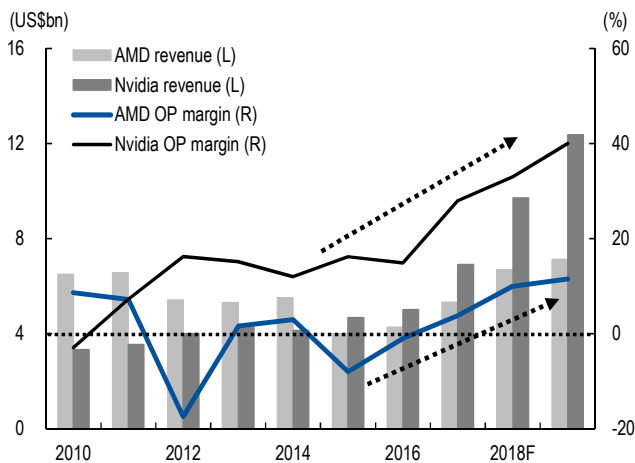
Source: IC Insights, Mirae Asset Daewoo Research

**Figure 186. Market caps of three major fabless firms**



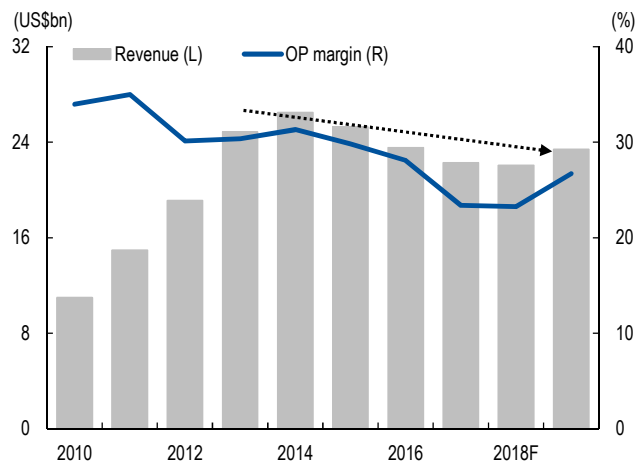
Source: Bloomberg, Mirae Asset Daewoo Research

**Figure 187. Revenues and OP margins of AMD and Nvidia**



Source: Bloomberg, Mirae Asset Daewoo Research

**Figure 188. Revenue and OP margin of Qualcomm**



Source: Bloomberg, Mirae Asset Daewoo Research

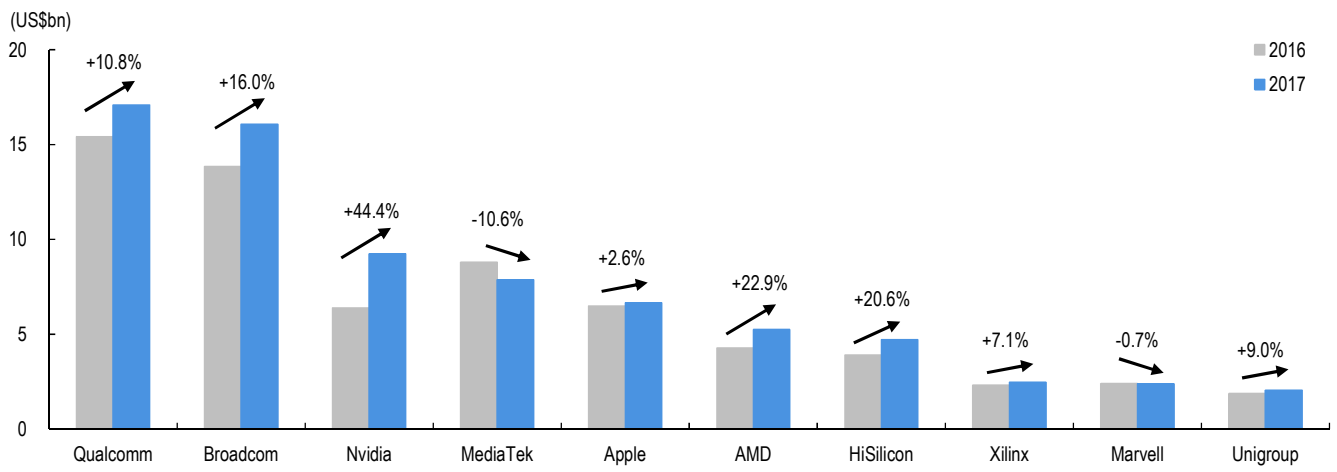
### 66. Competitive landscape

In the fabless market, Chinese companies are showing rapid growth. There was only one Chinese company (HiSilicon) among the global top 50 fabless companies in 2009, and Chinese companies' fabless market share stood at around 5% in 2010. However, backed by aggressive government support, Chinese companies' fabless market share has climbed to 11%, beating that of Japanese firms.

SEC has designated the system LSI business a next-generation growth driver and made heavy investments in the foundry and fabless (LSI) businesses, as system chips should become as important as memory chips in key Fourth Industrial Revolution technologies such as IoT, AI, and autonomous driving.

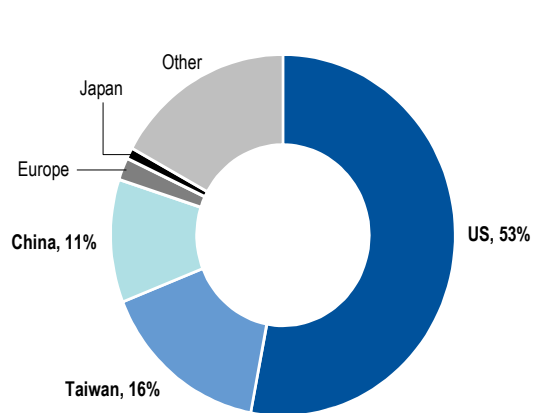
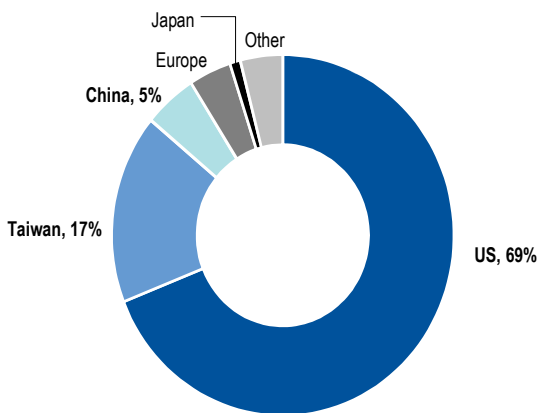
SEC's fabless revenue comes mainly from the Exynos AP used in the Galaxy series. However, SEC is currently mounting marketing campaigns aimed at Chinese smartphone makers to diversify its fabless customers. The company has the advantage of engaging in package negotiations involving APs, OLED displays, and memory.

**Figure 189. Top 10 fabless companies' annual revenue trends**



Source: Gartner, Mirae Asset Daewoo Research

**Figure 190. Fabless M/S by country (2010)**      **Figure 191. Fabless M/S by country (2017)**



Source: Gartner, Mirae Asset Daewoo Research

Source: Gartner, Mirae Asset Daewoo Research

### 3. Foundry

#### 67. Overview

Foundries manufacture and supply semiconductors designed by others on a contract basis. SEC started its foundry business in 2005 but separated its foundry operations from the system LSI division in May 2017 to enhance competitiveness.

SEC used to manufacture APs for Apple and Qualcomm (Snapdragon), but the company lost its Apple business to TSMC. Notably, SEC's foundry division serves fabless customers via its 8" wafer fab facility. The foundry division recently expanded its product lineup beyond embedded flash memory (eFlash), power management ICs (PMICs), digital display interfaces (DDIs), and CIS to include RF/IoT and fingerprint sensors.

#### 68. Key products

Figure 192. Nvidia GPU Titan



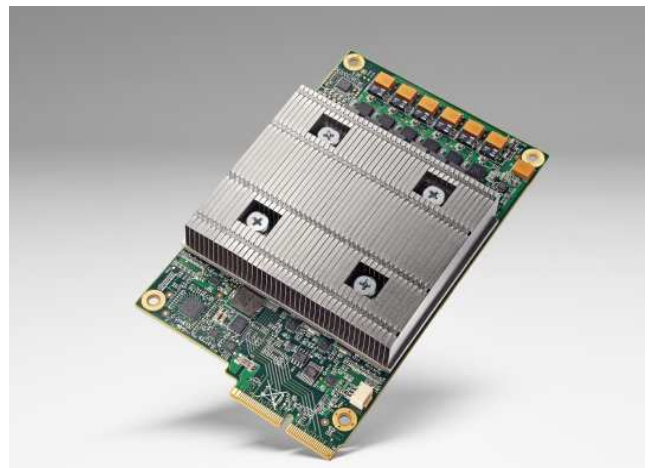
Source: Press materials

Figure 193. Qualcomm Snapdragon



Source: Press materials

Figure 194. Google TPU



Source: Press materials

### 69. Production facilities

SEC separated its foundry operation from the system LSI unit in May 2017 with the goal of becoming the no. 2 foundry player. The company has been investing aggressively in its foundry business, including US\$1bn investments in a facility in Austin, Texas (completed June 2017) and an additional US\$1.5bn scheduled to be deployed through 2020.

The firm's non-memory fabs are mostly located in Giheung, Korea and Austin. At present, SEC's foundry capacity stands at 1,540,000wpm (8" standard).

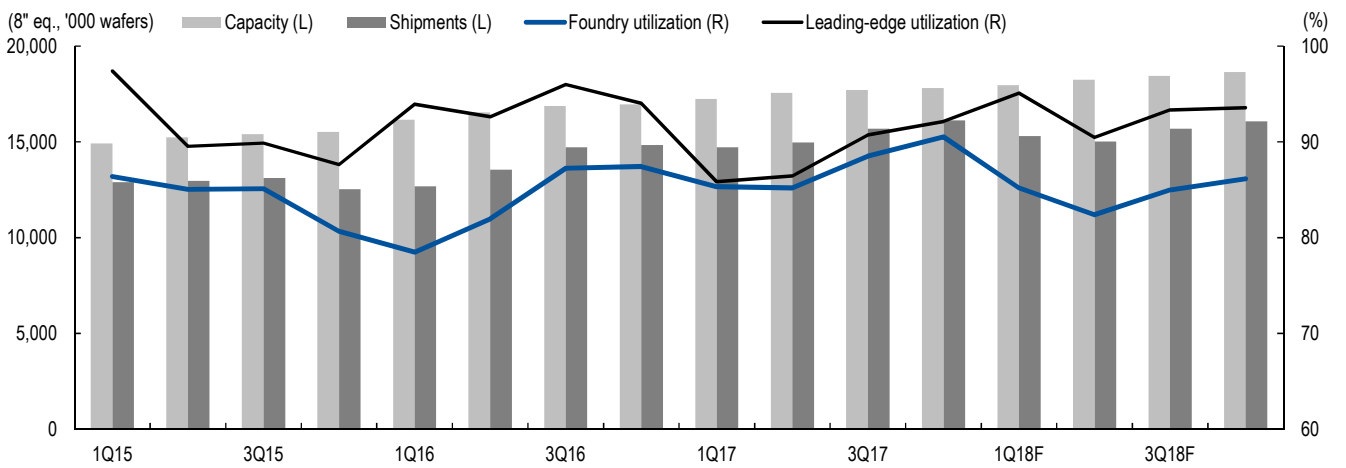
The overall utilization rate for global foundries ranges from the mid- to high-80% levels. Foundries with advanced technologies are running at more than 90% capacity utilization rates, which suggests growing demand for sophisticated logic chips.

**Table 44. SEC's non-memory fabs**

Fab	Location	Process	Wafer size	Wafer capacity	8" wafer capacity	Notes
Line 5	Giheung	0.13-micron CMOS	8"	35,000wpm	35,000wpm	
Line 7	Giheung	0.045-micron CSI/LSI logic	8"	35,000wpm	35,000wpm	
Line 6	Giheung	0.045-micron CSI/LSI logic	8"	50,000wpm	50,000wpm	
Line 8	Giheung	0.045-micron CSI/LSI logic	8"	45,000wpm	45,000wpm	
Line 9	Giheung	0.09-micron CSI/LSI logic	8"	100,000wpm	100,000wpm	
Line 11	Hwaseong	0.065-micron CIS	8"	100,000wpm	100,000wpm	
Line 14	Giheung	0.045 -micron logic	300mm	130,000wpm	292,500wpm	
S-1	Giheung	0.22, 0.14, 0.10-micron logic	300mm	45,000wpm	101,250wpm	Opened in 2009; logic, foundry
S-1B	Giheung	0.22, 0.14, 0.10-micron logic	300mm	45,000wpm	101,250wpm	Logic, foundry
S2 phase I	Austin	0.032, 0.028, 0.014-micron Logic	300mm	75,000wpm	168,750wpm	Logic, foundry
S2 phase II	Austin	0.045, 0.028, 0.014 micron Logic	300mm	45,000wpm	101,250wpm	APs
S3	Hwaseong	0.022 - 0.007-micron logic	300mm	80,000wpm	180,000wpm	
S4	Hwaseong	0.010 - 0.005-micron logic	300mm	100,000wpm	225,000wpm	

Source: Gartner, Mirae Asset Daewoo Research

**Figure 195. Global foundries' utilization**



Source: Gartner, Mirae Asset Daewoo Research

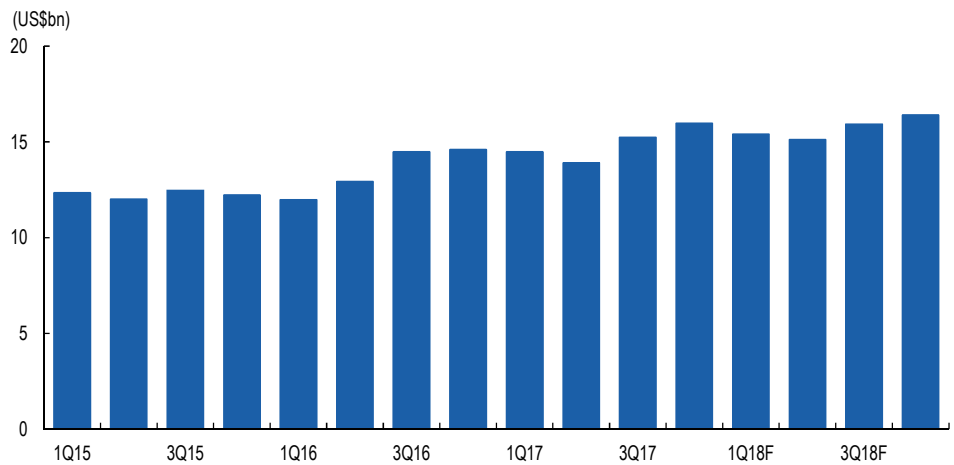
### 70. Market growth

The global foundry market expanded 8% YoY to US\$62.3bn in 2017. Taiwan's TSMC (2330 TT/CP: NT\$233.00), which controls the largest share of the foundry market, posted revenue of US\$32.2bn (+9% YoY), far above the closest competitor, which recorded revenue of US\$6.1bn (+10% YoY).

SEC's foundry revenue stood at US\$4.6bn (+4% YoY). SEC is no. 4 in the foundry market in terms of revenue, but it was the first to introduce 10nm process technology. From 2H18 onwards, SEC is set to begin production on the 7nm process using extreme ultraviolet lithography (EUV). As an integrated device manufacturer, SEC is well-positioned to determine the timing of EUV introduction, taking into consideration both memory and non-memory market conditions.

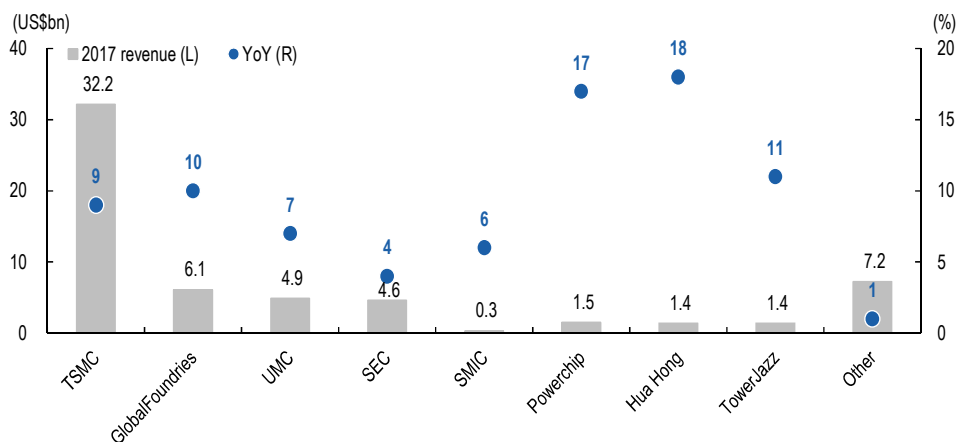
One of the key trends in the semiconductor market is direct semiconductor design. Facebook is hiring chip designers, joining other tech companies such as Google, Amazon, and Tesla (TSLA US/CP: US\$301.06). We believe this trend should benefit existing foundries, which manufacture semiconductors designed by others.

**Figure 196. Foundry market size and outlook**



Source: Gartner, Mirae Asset Daewoo Research

**Figure 197. Global semiconductor foundries' revenue and growth in 2017**



Source: Bloomberg, Mirae Asset Daewoo Research

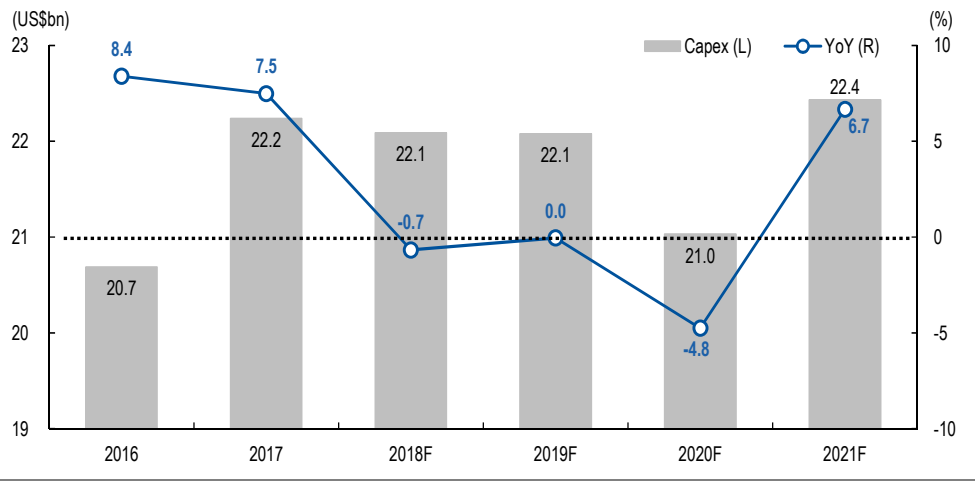
### 71. Competitive landscape

Success in the foundry business hinges on maintaining competitiveness of process technologies through continuous investments. We estimate global foundry capex to reach US\$22.1bn in 2018, on par with the 2017 level. The scale of capex investments varies among market players. TSMC's annual capex should remain largely unchanged YoY at US\$10.4bn in 2018, accounting for 47.1% of total foundry capex.

TSMC is an aggressive investor in facilities. In 2Q17, the company began deploying capex of US\$3bn to build an advanced wafer manufacturing facility and a semiconductor design center in Pukou District, Nanjing—the largest Taiwanese investment in mainland China in history. TSMC plans to make the A12, iPhone's AP, on the 7nm process in 2018 and begin deploying 5nm in 1H19. We believe the company is also considering building a 3nm FinFET line.

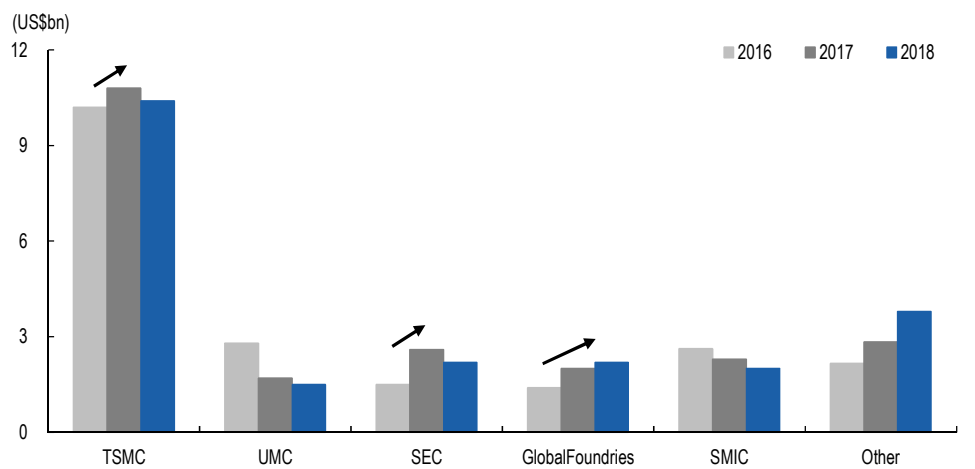
SEC's foundry capex is estimated to reach US\$2.2bn in 2018, accounting for 10% of total foundry capex. We believe that this level of investment is significant given the Korean giant's foundry market share of 7.7%.

**Figure 198. Foundry capex**



Source: Gartner, Mirae Asset Daewoo Research

**Figure 199. Capex by foundry player**



Source: Gartner, Mirae Asset Daewoo Research

## 72. Outlook and strategy

### 1) 7nm foundry process

We expect TSMC and SEC to deploy 7nm foundry processes within 2018, with other top players likely to follow suit from 2019. We believe SEC and TSMC will dominate the high-end foundry segment for the time being.

### 2) Multi-project wafer (MPW) service

SEC's foundry division is expected to shift its growth strategy from mass production of limited items (focused on major customers) to small batch production. The company's MPW service combines different IC designs onto a single wafer, providing a cost-efficient way for small/mid-sized fabless companies to produce prototypes. We expect SEC to use its 8" wafer fab to manufacture MPWs.

### 3) ASICs for cryptocurrency mining

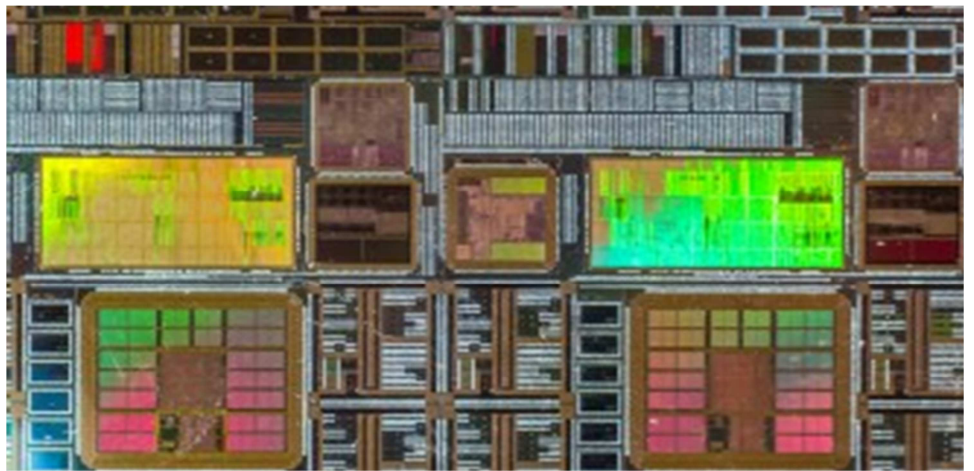
We expect SEC to leverage its cutting-edge process technologies (e.g., 14nm) and design infrastructure to meet growing demand from the expansion of the cryptocurrency mining market.

**Figure 200. Cryptocurrency mining rig**



Source: Press reports

**Figure 201. MPW**



Source: Press reports

## 2) Display Panel business

### 73. Earnings outlook

For 2018, we expect Samsung Display to post revenue of W35.1tr (+2.0% YoY) and operating profit of W3.2tr (-40.5% YoY). The YoY decline in operating profit should be attributable to: 1) LCD price declines; and 2) lackluster iPhone X sales. We expect Samsung Display to fare better in 2H18 than in 1H18.

#### - LCD

We expect LCD earnings to decline YoY, hurt by continued LCD price cuts, especially in the 65" segment, with Chinese panel manufacturers such as BOE (000725 CH/CP: RMB4.50) starting up new 10.5G lines. We believe LCD panel prices are unlikely to drop as sharply in 3Q18 as in 1H18, supported by seasonally strong demand. We project operating profit to stabilize in the near term, driven by volume growth and margin improvement. However, LCD panel prices are likely to renew a downward trend in 4Q17, with the end of peak-demand season.

Table 45. Samsung Display earnings and forecasts

(Wbn, %)

	1Q17	2Q17	3Q17	4Q17	1Q18P	2Q18F	3Q18F	4Q18F	2016	2017	2018F
<b>Revenue</b>	<b>7,287</b>	<b>7,710</b>	<b>8,280</b>	<b>11,183</b>	<b>7,540</b>	<b>7,319</b>	<b>9,751</b>	<b>10,530</b>	<b>26,816</b>	<b>34,460</b>	<b>35,140</b>
LCD	2,772	2,912	2,481	2,346	1,959	1,902	2,149	2,141	12,169	10,511	8,151
Notebook	190	141	134	45	0	0	0	0	827	509	0
Monitor	350	374	367	351	332	324	337	352	1,579	1,442	1,344
TV	2,075	2,293	1,882	1,850	1,493	1,485	1,722	1,695	8,497	8,100	6,396
Others	158	104	98	98	135	92	89	95	1,266	459	411
OLED	4,515	4,798	5,799	8,837	5,581	5,417	7,602	8,389	14,647	23,949	26,989
Mobile	4,515	4,798	5,799	8,837	5,581	5,417	7,602	8,389	14,647	23,949	26,989
<b>Revenue contribution</b>											
LCD	38.0	37.8	30.0	21.0	26.0	26.0	22.0	20.3	45.4	30.5	23.2
Notebook	2.6	1.8	1.6	0.4	0.0	0.0	0.0	0.0	3.1	1.5	0.0
Monitor	4.8	4.8	4.4	3.1	4.4	4.4	3.5	3.3	5.9	4.2	3.8
TV	28.5	29.7	22.7	16.5	19.8	20.3	17.7	16.1	31.7	23.5	18.2
Other	2.2	1.4	1.2	0.9	1.8	1.3	0.9	0.9	4.7	1.3	1.2
OLED	62.0	62.2	70.0	79.0	74.0	74.0	78.0	79.7	54.6	69.5	76.8
Mobile	62.0	62.2	70.0	79.0	74.0	74.0	78.0	79.7	54.6	69.5	76.8
<b>Operating profit</b>	<b>1,310</b>	<b>1,705</b>	<b>978</b>	<b>1,365</b>	<b>412</b>	<b>257</b>	<b>1,225</b>	<b>1,291</b>	<b>2,157</b>	<b>5,359</b>	<b>3,186</b>
LCD	521	617	400	108	38	51	138	99	-456	1,646	326
OLED	789	1,088	579	1,257	374	206	1,088	1,193	2,613	3,712	2,861
<b>OP margin</b>	<b>18.0</b>	<b>22.1</b>	<b>11.8</b>	<b>12.2</b>	<b>5.5</b>	<b>3.5</b>	<b>12.6</b>	<b>12.3</b>	<b>8.0</b>	<b>15.6</b>	<b>9.1</b>
LCD	18.8	21.2	16.1	4.6	1.9	2.7	6.4	4.6	-3.7	15.7	4.0
OLED	17.5	22.7	10.0	14.2	6.7	3.8	14.3	14.2	17.8	15.5	10.6
<b>Growth (QoQ/YoY)</b>											
Revenue	-1.6	5.8	7.4	35.1	-32.6	-2.9	33.2	8.0	-2.3	28.5	2.0
LCD	-27.9	5.0	-14.8	-5.5	-16.5	-2.9	13.0	-0.3	-21.4	-13.6	-22.4
Tablet PC	-13.8	-25.9	-4.8	-66.1					-51.8	-38.4	
Notebook	-18.6	6.9	-1.9	-4.3	-5.6	-2.3	4.0	4.3	-19.4	-8.7	-6.8
Monitor	-28.4	10.5	-17.9	-1.7	-19.3	-0.5	15.9	-1.6	350.2	-4.7	-21.0
TV	-46.3	-33.8	-5.7	0.0	36.9	-31.4	-3.2	5.8	-87.2	-63.7	-10.4
OLED	26.8	6.3	20.9	52.4	-36.8	-2.9	40.3	10.4	22.4	63.5	12.7
Mobile	26.8	6.3	20.9	52.4	-36.8	-2.9	40.3	10.4	22.4	63.5	12.7
Operating profit	1.1	30.1	-42.6	39.6	-69.8	-37.6	376.5	5.4	0.7	148.4	-40.5
LCD	-16.0	18.5	-35.3	-72.9	-65.0	33.7	171.6	-28.4	-143.5	-461.1	-80.2
OLED	16.9	37.8	-46.8	117.2	-70.2	-44.8	426.9	9.7	138.9	42.1	-22.9

Source: Company data, Mirae Asset Daewoo Research

**- OLED**

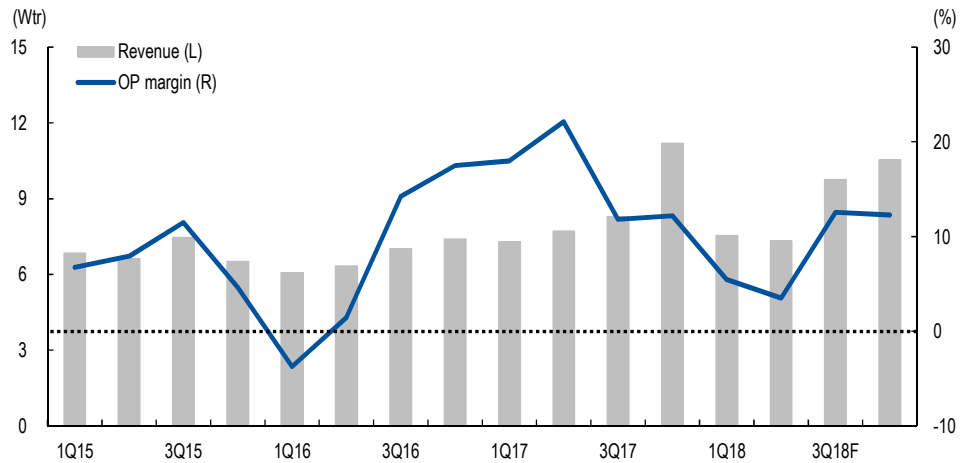
We expect OLED revenue and margins to improve in 2H18, supported by OLED panel shipments to North American customers for their new models. We estimate OLED revenue and operating profit to reach W27.0tr (+12.7% YoY) and W2.9tr (-22.9% YoY), respectively, in 2018.

We project that the OLED business’s utilization rate will decline to 50%, hurt by lackluster iPhone X sales. Notably, the A3 flexible OLED line dedicated to the iPhone is likely to run at as low as 40%. We expect the utilization rate of flexible OLED lines to recover to 80% in 2H18. We believe OLED earnings will improve HoH in 2H18, supported by shipments for a new iPhone model.

We believe utilization of the rigid OLED line has improved to 70%, marking a faster-than-expected recovery. The narrowing price gap with LTPS LCD has prompted smartphone manufacturers, especially in China, to adopt rigid OLED panels. In our view, OLED adoption is likely to continue as global smartphone manufacturers focus more on margin than volume.

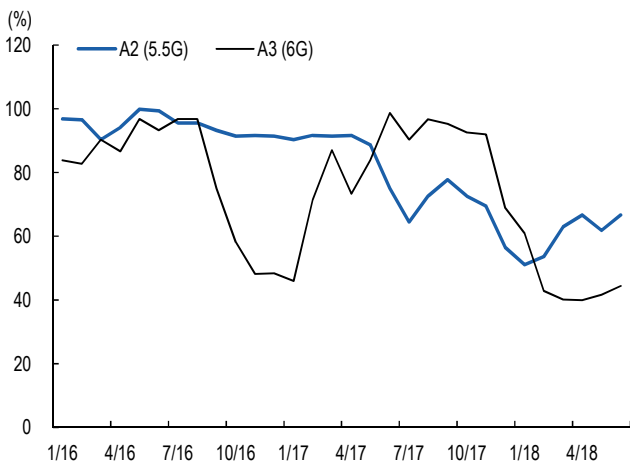
In our view, the keys to medium- and long-term OLED growth are foldable displays and QLED (including QD-OLED). We expect foldable smartphones to hit the market in 1H19. Meanwhile, Samsung Display is likely to continue developing QD materials for TV displays.

**Figure 202. Samsung Display's quarterly earnings**



Source: Company data, Mirae Asset Daewoo Research

**Figure 203. Samsung Display's OLED utilization**



Source: IHS, Mirae Asset Daewoo Research

**Figure 204. Foldable display**



Source: Press reports, Mirae Asset Daewoo Research

**74. Overview**

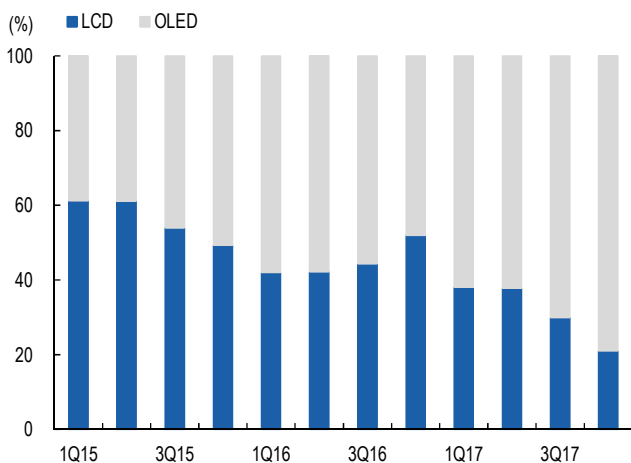
Samsung Display's businesses are divided into the LCD and OLED units, which account for 30.5% and 69.5%, respectively, of total revenue.

Samsung Display made steady LCD investments from the mid-1990s through 2015. However, since its investments in the Suzhou line in 2015, Samsung Display has suspended LCD capex. Furthermore, in 2016, the company halted the operation of its L7-1 (7G) line. The LCD unit produces panels for a variety of applications, including TVs, monitors, and laptops. In 2017, TV panels accounted for 77% of total LCD revenue. By customer, SEC accounts for the lion's share (37%) of shipments, followed by Sony (11%), TCL (8%; 000100 SH/CP: RMB3.28), and Konka (5%; 000016 SH/CP: RMB6.19).

Investments in the OLED unit started with the A1 line (4G) in 2005, and full-scale production began in 2009-10, aided by robust mobile demand. Currently, the unit runs four small/mid-sized OLED lines: A1 (4G), A2 (5.5G), A3 (6G), and A4 (converted from L7-1). Of note, infrastructure investments for A5 have been made to meet potential growth in flexible OLED demand stemming from increased penetration of foldable devices. In addition, R&D on TV-use QD-OLED is currently underway.

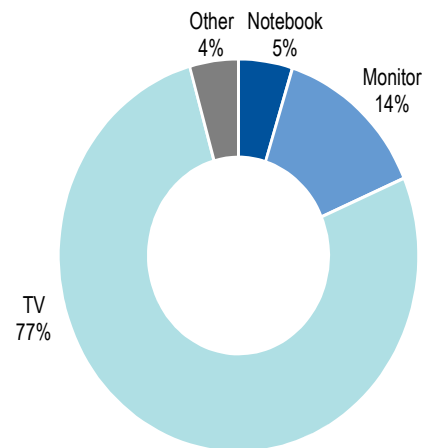
Most OLED applications are oriented toward small/mid-sized IT devices, including smartphones. Major OLED customers include SEC (IM division), Apple, and Chinese makers (including Oppo and Vivo).

**Figure 205. Revenue by unit**



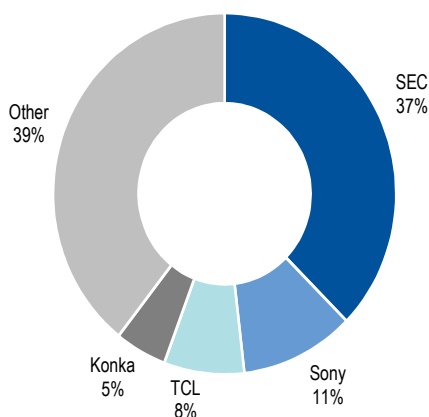
Source: Company data, Mirae Asset Daewoo Research

**Figure 206. LCD unit's revenue breakdown by application (2017)**



Source: Company data Mirae Asset Daewoo Research

**Figure 207. LCD TV panel shipments by customer (2017)**



Source: WitsView, Mirae Asset Daewoo Research

**Figure 208. Samsung Display's plant in Cheonan**



Source: Press materials, Mirae Asset Daewoo Research

75. Key products

Figure 209. SEC's QLED TV



Source: Press materials

Figure 210. SEC's Galaxy S9



Source: Press materials

Figure 211. Apple Watch



Source: Press materials

Figure 212. iPhone X



Source: Press materials

Figure 213. Galaxy A5 (low- to mid-end)



Source: Press materials

Figure 214. Digital cockpit (automotive)



Source: Press materials

## 76. Production facilities

### - LCD

Samsung Display operates 7G+ lines for the production of mid/large-sized LCD panels for LCD TVs and monitors in Tangjeong (Korea) and Suzhou (China). In line with the company's efforts to strategically exit from small/mid-sized LCDs, the L1 to L6 lines in Giheung and Cheonan have been suspended or converted to OLED lines. In 2016, LCD TV production line L7-1 (Tangjeong) was converted to OLED production.

### - OLED

Samsung Display operates the following OLED lines: (4G), A2 (5.5G), A3 (6G), and A4 (6G). As of 2018, we estimate OLED capacity stands at 55,000 sheets/month for A1, 181,000 sheets/month for A2, 135,000 sheets/month for A3, and 130,000 sheets/month for A4. To cope with potential demand growth, infrastructure investments for A5 were made in 2017. We believe that A5 will likely boast capacity in excess of 200,000 sheets/month.

**Table 46. Samsung Display's LCD capacity**

	2010	2011	2012	2013	2014	2015	2016	2017	2018F	2019F
<b>Input glass, '000 sheets/month</b>										
LCD (a-Si)										
Giheung L1 (2G, 370 x 470)										
Giheung L2 (3G, 550 x 650)	37	22								
Cheonan L3 (3G, 600 x 720)	95	95	34							
Cheonan L4 (4G, 730 x 920)	80	80	80	74						
Cheonan L5 (5G, 1100 x 1250)	206	215	214	195	180	140				
Cheonan L6 (5G, 1100 x 1300)	215	200	203	193	190	183	136	45		
Tangjeong L7-1 (7G, 1870 x 2200)	145	148	150	145	140	150	138			
Tangjeong L7-2 (7G, 1870 x 2200)	174	179	190	169	153	165	165	165	165	165
Tangjeong L8-1 (8G, 2200 x 2500)	175	194	195	195	194	195	195	195	195	195
Tangjeong L8-2 (8G, 2200 x 2500)	81	170	180	180	175	170	169	167	168	182
China Suzhou (8G, 2200 x 2500)				4	51	65	110	125	125	125
LCD (LTPS)										
Giheung L1 (2G, 370 x 470)										
Cheonan L4 (4G, 730 x 920)	25	25	25	23						
<b>Input area, km<sup>2</sup>/quarter</b>										
LCD (a-Si)	41,012	48,327	49,339	47,639	48,395	49,377	48,523	41,060	40,354	41,261
Giheung L1 (2G, 370 x 470)										
Giheung L2 (3G, 550 x 650)	159	92								
Cheonan L3 (3G, 600 x 720)	492	492	178							
Cheonan L4 (4G, 730 x 920)	645	645	645	594						
Cheonan L5 (5G, 1100 x 1250)	3,395	3,552	3,531	3,222	2,974	2,306				
Cheonan L6 (5G, 1100 x 1300)	3,689	3,432	3,475	3,303	3,260	3,140	2,338	772		
Tangjeong L7-1 (7G, 1870 x 2200)	7,158	7,282	7,405	7,158	6,912	7,405	6,788			
Tangjeong L7-2 (7G, 1870 x 2200)	8,578	8,825	9,355	8,331	7,529	8,146	8,146	8,146	8,146	8,146
Tangjeong L8-1 (8G, 2200 x 2500)	11,534	12,788	12,870	12,870	12,788	12,870	12,870	12,870	12,870	12,870
Tangjeong L8-2 (8G, 2200 x 2500)	5,363	11,220	11,880	11,880	11,550	11,220	11,121	11,022	11,088	11,996
China Suzhou (8G, 2200 x 2500)				281	3,383	4,290	7,260	8,250	8,250	8,250
LCD (LTPS)	201	201	201	181						
Giheung L1 (2G, 370 x 470)										
Cheonan L4 (4G, 730 x 920)	201	201	201	181						
<b>Total</b>	<b>41,214</b>	<b>48,528</b>	<b>49,540</b>	<b>47,820</b>	<b>48,395</b>	<b>49,377</b>	<b>48,523</b>	<b>41,060</b>	<b>40,354</b>	<b>41,261</b>

Source: Company data, Mirae Asset Daewoo Research

Table 47. Samsung Display's OLED capacity

	2011	2012	2013	2014	2015	2016	2017	2018F	2019F
<b>Input glass, '000 sheets/month</b>									
A1 (4G, 730 x 920)	53	53	53	51	53	55	55	55	58
A2 (5.5G, 1300 x 1500)	21	60	95	131	143	165	181	181	181
Phase 1	14	24	24	24	22	24	25	25	25
Phase 2	7	32	32	32	34	37	41	41	41
Phase 3		4	30	8	9	10	10	10	10
Phase 4			9	23	17	20	24	24	24
Phase 5				25	32	35	36	36	36
Phase 6				18	20	23	25	25	25
Phase 7				1	9	10	10	10	10
Phase 8					1	8	10	10	10
A3 (6G, 1500 x 1800)					11	19	83	135	135
Phase 1					11	15	15	15	15
Phase 2						4	15	15	15
Phase 3							14	15	15
Phase 4							13	15	15
Phase 5							9	15	15
Phase 6							7	15	15
Phase 7							5	15	15
Phase 8							4	15	15
Phase 9							2	15	15
A4 - L7-1 (6G, 1500 x 1800)								6	24
Phase 1								6	13
Phase 2									11
A5 (6G, 1500 x 1800)									3
Phase 1									3
TV		3	6	10	10	5			
<b>Input area, km<sup>2</sup>/quarter</b>									
Mobile	907	1,831	2,644	3,472	4,104	4,910	7,364	9,053	9,073
A1 (4G, 730 x 920)	427	427	427	411	423	443	443	443	463
A2 (5.5G, 1300 x 1500)	480	1,404	2,217	3,061	3,340	3,867	4,235	4,235	4,235
Phase 1	328	562	562	562	509	553	585	585	585
Phase 2	152	749	749	749	796	872	959	959	959
Phase 3		94	702	187	199	228	234	234	234
Phase 4			205	538	398	462	562	562	562
Phase 5				592	746	807	842	842	842
Phase 6				410	468	541	585	585	585
Phase 7				23	199	222	234	234	234
Phase 8				0	26	181	234	234	234
A3 (6G, 1500 x 1800)					340	599	2,685	4,374	4,374
Phase 1					340	486	486	486	486
Phase 2						113	486	486	486
Phase 3							446	486	486
Phase 4							405	486	486
Phase 5							300	486	486
Phase 6							211	486	486
Phase 7							162	486	486
Phase 8							126	486	486
Phase 9							65	486	486
A4 - L7-1 (6G, 1500 x 1800)								186	770
Phase 1								186	421
Phase 2									348
A5 (6G, 1500 x 1800)									81
Phase 1									81
TV		165	363	660	660	330			
Total	907	1,996	3,007	4,132	4,764	5,240	7,364	9,053	9,073

Source: Company data, Mirae Asset Daewoo Research

### 77. Market growth

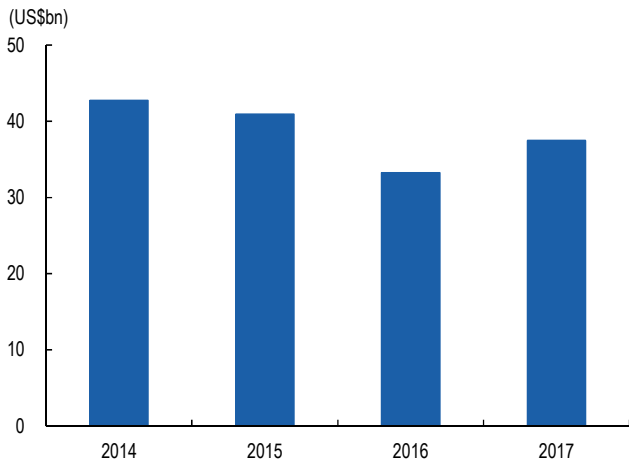
#### - LCD: Aggressive entries by Chinese makers; Domestic makers need an exit plan

**Demand:** Since 2010, LCD demand has been stagnant amid an absence of new major applications to complement LCD TVs. While the small/mid-sized LCD market has delivered steady volume expansion thanks to smartphone market expansion since early 2010, it will likely see only limited growth going forward, due to fiercer competition with OLED.

**Supply:** LCD supply has been steadily increasing, particularly from new Chinese players. Of note, LCD panel prices have been declining, as BOE, which grew on the back of the Chinese government’s support, has recently started operation of its 10.5G line. We expect a game of chicken to play out in earnest in the LCD market.

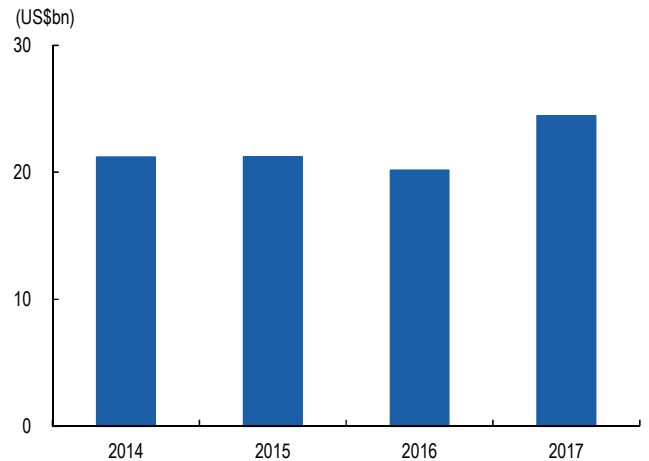
In our view, domestic panel makers, including Samsung Display, need to strategically exit the LCD market, as their LCD competitiveness should deteriorate sharply after Chinese makers’ 10G+ lines come online in 2019 and beyond. In 1Q18, Samsung Display and LGD posted OP margins of 5.5% and -1.7%, respectively, while BOE boasted an OP margin of 10.8%. The LCD industry’s power structure appears to be shifting to Chinese makers more rapidly than expected.

**Figure 215. LCD TV panel market**



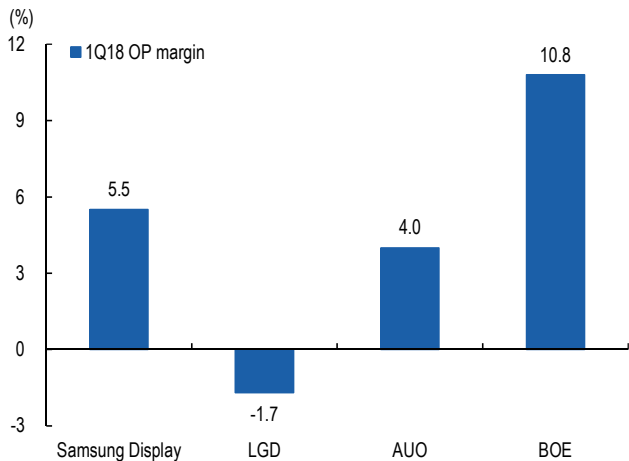
Source: IHS, Mirae Asset Daewoo Research

**Figure 216. Mobile LCD panel market**



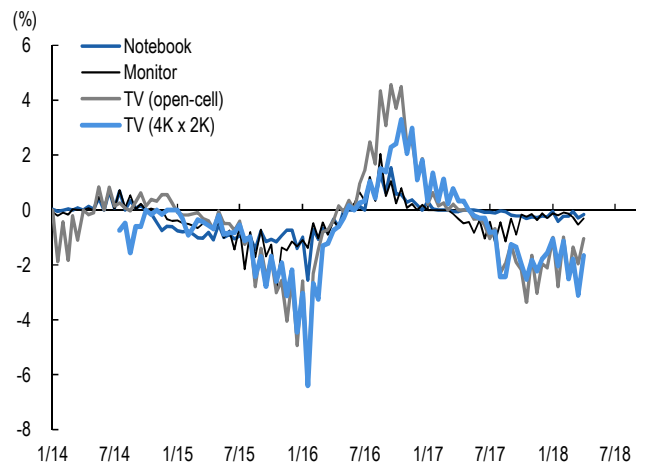
Source: IHS, Mirae Asset Daewoo Research

**Figure 217. Comparison of global panel makers’ 1Q18 OP margins**



Source: Company data, Mirae Asset Daewoo Research

**Figure 218. LCD panel price trends**



Source: WitsView, Mirae Asset Daewoo Research

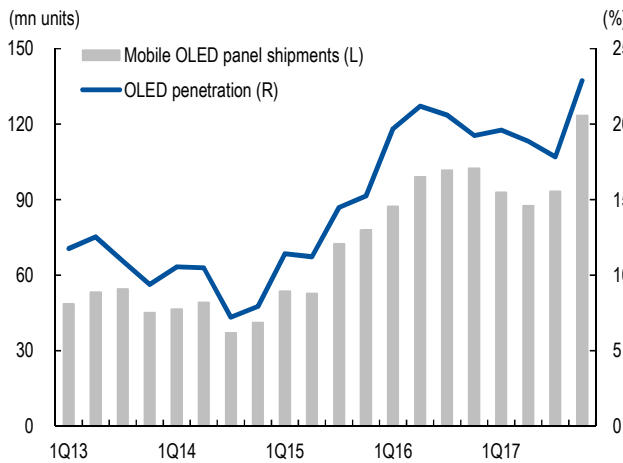
**- OLED: High growth potential**

Domestic panel makers are accelerating their shift to OLEDs, due to Chinese makers' aggressive entries into the LCD market. The OLED business has several advantages over LCDs, including a flexible form factor, a superior theoretical cost structure, and high entry barriers stemming from massive fixed costs.

The global small/mid-sized OLED market is estimated at W22tr (as of 2017). With the increasing adoption of OLEDs in smartphones, OLED penetration in the smartphone market climbed from 9.4% in 4Q13 to 23% in 4Q17. As smartphone makers will likely continue their price hike strategies amid limited volume growth, OLED adoption should expand in the smartphone market. In addition, we expect the foldable and rollable display markets to expand in the medium to long term. Of note, Samsung Display currently dominates the small/mid-sized OLED market.

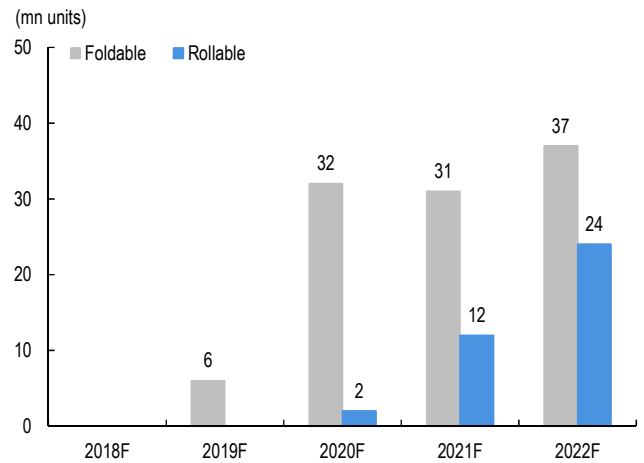
We are also positive on the large-sized OLED market. TV makers that produce OLED TVs, have seen sharp margin improvements since 1H17. Although the overall TV market has been stagnant, demand for high-margin OLED panels is increasing. In the medium to long term, OLED TV makers have the potential to develop rollable TVs that could drive changes in form factor. Currently, the large-sized OLED market is dominated by LGD. Samsung Display is developing QD-OLED panels that combine QD materials and OLED technology.

**Figure 219. OLED penetration in the smartphone market**



Source IHS, Mirae Asset Daewoo Research

**Figure 220. Foldable and rollable display shipment forecasts**



Source IHS, Mirae Asset Daewoo Research

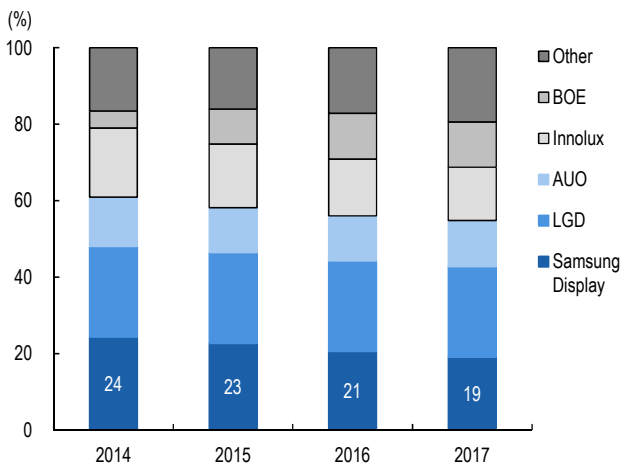
### 78. Competitive landscape

Samsung Display has been suffering steady losses in LCD panel market share (based on 6G+ and a-Si capacity), sliding from 24% in 2014 to 19% in 2017. The discontinuation of the L7-1 line (7G) is believed to be the major factor behind the market share losses. While, the company still sits in second place, it will likely suffer further loss shares in the medium to long term due to steady capacity expansion by Chinese players, namely BOE.

Meanwhile, Samsung Display is the dominant leader in mobile OLEDs, claiming 97% of the global market. Factoring out LG Display's (LGD) 4.5G line and other panel makers' pilot and R&D lines, the company has a virtual monopoly on the market.

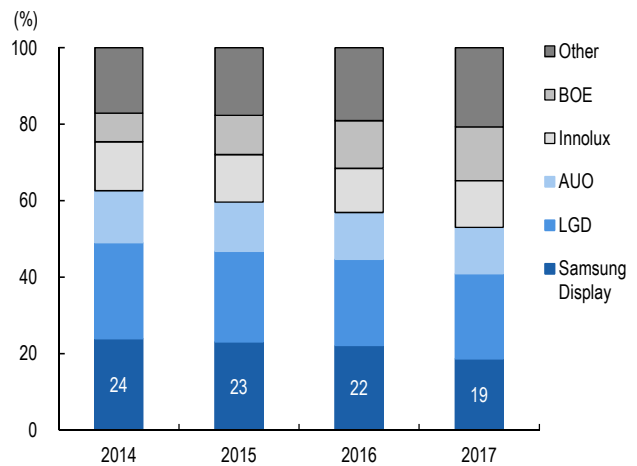
Amid continued growth in mobile OLED panel demand, competitors like LGD (034220 KS/Buy/TP: W36,000/CP: W23,300), BOE, GVO (GOV US/CP: US\$13.83), and CSOT have begun to invest in mobile OLED lines. For 2020, we project Samsung Display's market share (based on capacity) at 54.5%, with BOE and LGD accounting for 14.3% and 9.2%, respectively.

Figure 221. LCD TV panel M/S (shipment area)



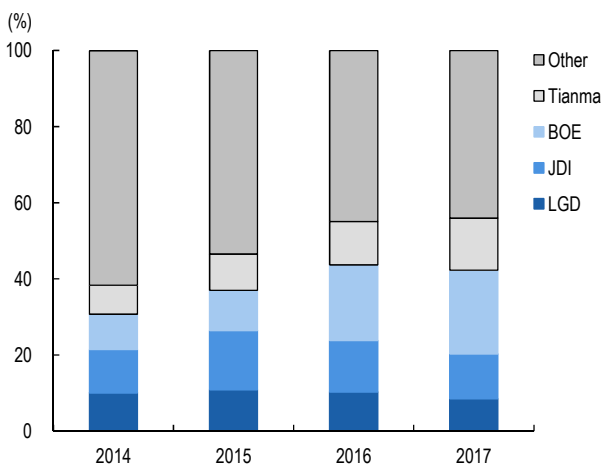
Source: IHS, Mirae Asset Daewoo Research

Figure 222. LCD M/S (capacity; 6G+ and a-Si)



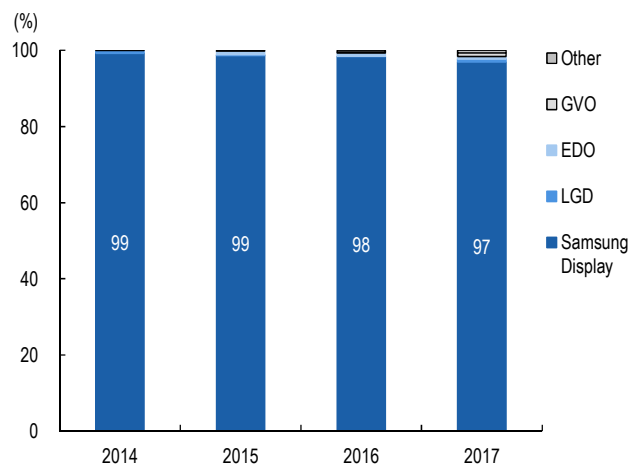
Source: IHS, Mirae Asset Daewoo Research

Figure 223. Mobile LCD panel M/S (shipment area)



Source: IHS, Mirae Asset Daewoo Research

Figure 224. Mobile OLED panel M/S (shipment area)

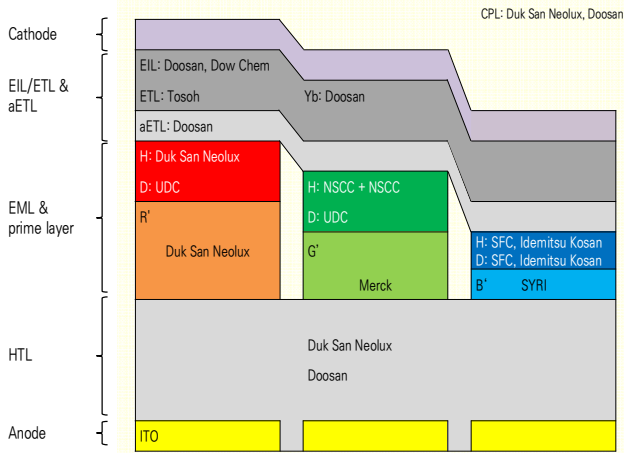


Source: IHS, Mirae Asset Daewoo Research

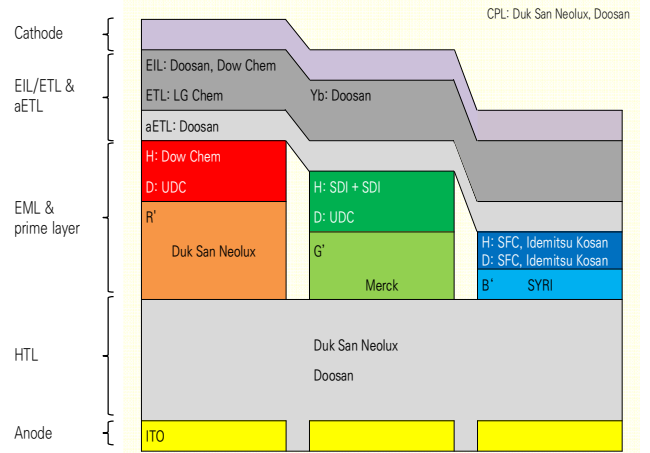
79. Panel structure overview

Figure 225. Galaxy-use panel structure (M8) and suppliers

Figure 226. iPhone X-use panel structure (LT2) and suppliers



Source: IHS



Source: IHS

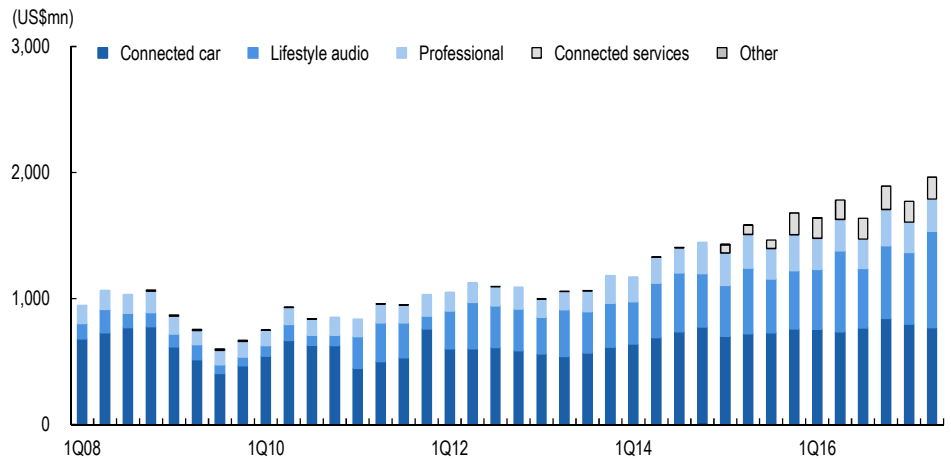
## Harman

### 80. Earnings outlook

In March 2017, SEC acquired Harman International Industries, a specialist in connected car and audio systems, for US\$112 per share (total equity value of approximately US\$8bn) in the largest overseas M&A deal in Korean history. The acquisition was made via Samsung Electronics America.

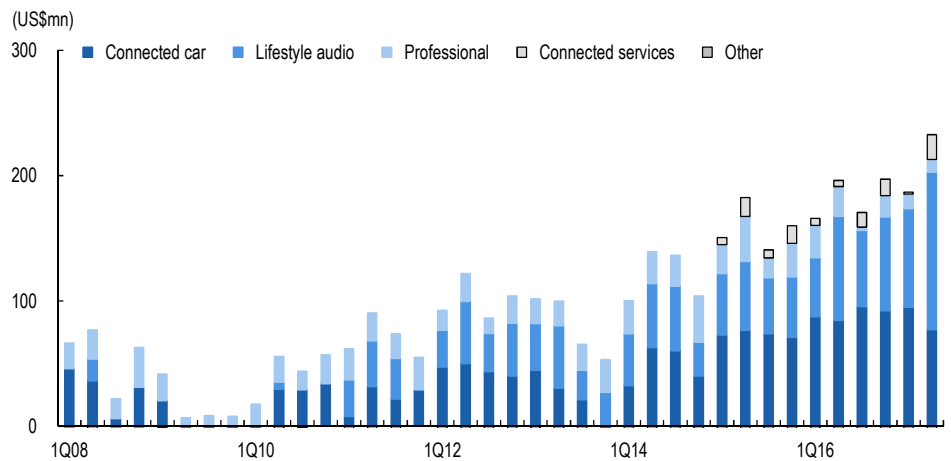
Before the acquisition, Harman had maintained robust earnings: OP margin of around 10% on quarterly revenue of around US\$2bn. In 1Q18, however, the company recorded revenue of W1.94tr and an operating loss of W4bn; in our view, these uncharacteristically weak earnings were attributable to disruptions caused by the acquisition process.

**Figure 227. Harman's quarterly revenue before acquisition**



Source: Harman, Mirae Asset Daewoo Research

**Figure 228. Harman's quarterly OP before acquisition**



Source: Harman, Mirae Asset Daewoo Research

### 81. Overview

In 2016, Harman was the no. 1 player in premium in-car infotainment systems and no. 2 in telematics with global market shares of 24% and 10%, respectively. SEC's acquisition of Harman should help the company make inroads into the autonomous car industry (leveraging advanced technologies in semiconductors, 5G, OLEDs, AI, and voice recognition).

Figure 229. Harman's logo after acquisition



Figure 230. Harman's major brands



Source: Harman, Mirae Asset Daewoo Research

Source: Harman, Mirae Asset Daewoo Research

Figure 231. Harman's major customers



Source: Harman, Mirae Asset Daewoo Research

### 82. Key businesses and products

Harman is a major player in an array of automotive electronics areas, including connected car technologies, in-vehicle infotainment, telematics, and security. During the 12 months prior to the acquisition, the company posted revenue of US\$7bn, operating profit of US\$0.7bn, and OP margin of 10%.

The company generates 65% of its revenue from automotive electronics. Of note, the connected car and car audio systems businesses hold a combined order backlog of around US\$24bn, about six times larger than their annual revenue.

The company has renowned audio systems brands under its umbrella, including JBL, Harman Kardon, Mark Levinson, and AKG. Furthermore, the company claims the lion's share (41%) of the high-end car audio systems market.

Figure 232. Harman's business: Connected car solutions



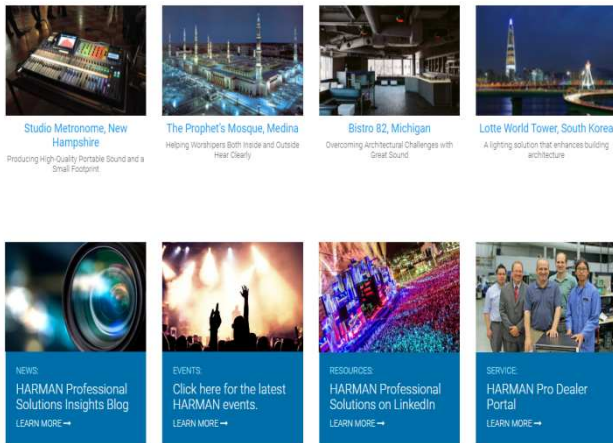
Source: Harman, Mirae Asset Daewoo Research

Figure 233. Harman's business: Lifestyle audio



Source: Harman, Mirae Asset Daewoo Research

Figure 234. Harman's businesses: Professional solutions



Source: Harman, Mirae Asset Daewoo Research

Figure 235. Harman's businesses: Connected services



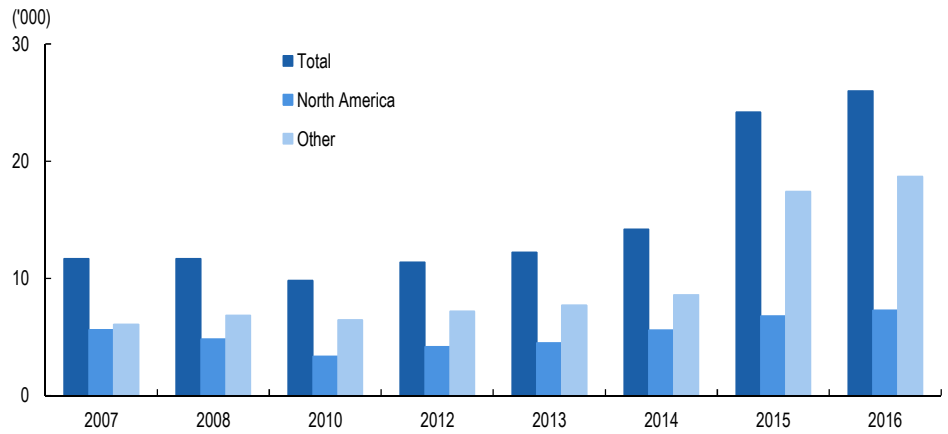
Source: Harman, Mirae Asset Daewoo Research

### 83. Head count and production facilities

Harman’s connected car (Novi, Michigan), professional solutions (Northridge, California), and connected services (Mountain View, California) businesses are based in the US, while its lifestyle audio business is based in Garching, Germany.

The company’s head count has been rising sharply since 2014, reaching 26,000 (7,300 in North America, and 18,700 in other regions). In particular, we have seen a significant increase in employees outside of North America since 2015.

**Figure 236. Harman head count**

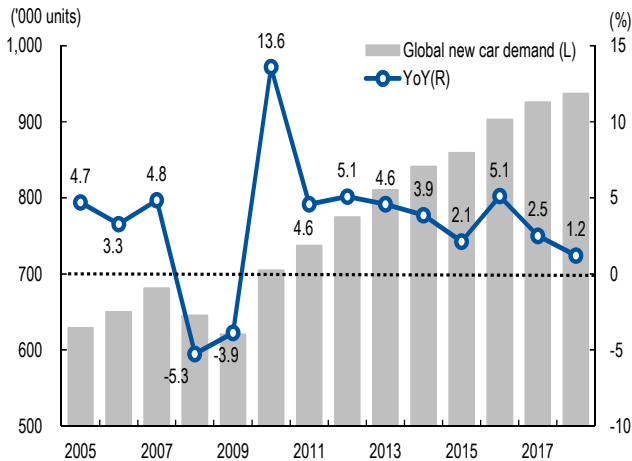


Source: Company data, Mirae Asset Daewoo Research

### 84. Market growth

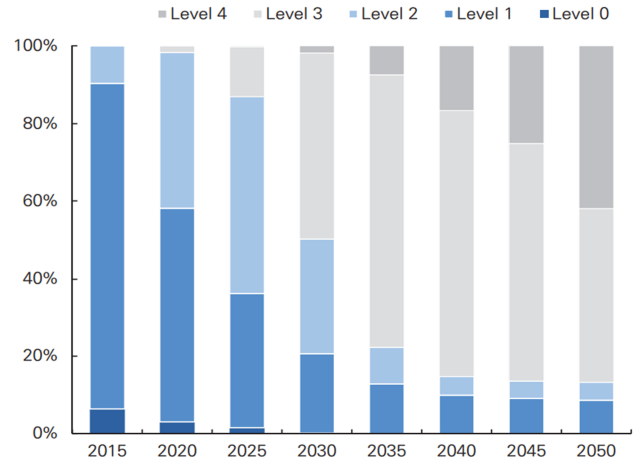
With the auto industry in the maturity stage, global auto shipments are forecast to grow just 1.2% YoY to 90mn units in 2018, following 2.5% growth in 2017. The automotive electronics market, on the other hand, has been expanding at an accelerated pace. In addition to this, increases in autonomous driving features and the proliferation of EVs are making Harman's future prospects bright.

**Figure 237. Global new vehicle demand growth to slow to 1% in 2018**



Source: IHS Automotive, GBIC, Mirae Asset Daewoo Research

**Figure 238. New vehicle sales breakdown by automation level**



Source: Strategy Analytics, Mirae Asset Daewoo Research

Amid growing demand for connectivity and entertainment solutions in the automobile space, automakers are increasingly working to develop autonomous driving features, car-sharing systems, and expanding EV lineups.

In the connected car segment, Harman is collaborating with Alpine (6816 JP/CP: JPY2,270), Aptiv (APT US/CP: US\$96.22), Continental (CON GR/CP: EUR222.60), Mitsubishi (7211 JP/CP: JPY869), and Panasonic (6752 JP/CP: JPY1,626). With regard to connectivity solutions, we expect the fierce competition between major players and new entrants to continue going forward, with automakers continuing to endeavor to develop the most advanced technologies in this area.

With conventional vehicles increasingly employing autonomous-driving features, we believe automobiles can almost be viewed as electronics. Although the W2,500tr automobile industry has already entered the maturity phase, we expect the automotive electronics market, on which SEC and Harman are focusing, to continue to grow going forward.

**85. Competitive landscape**

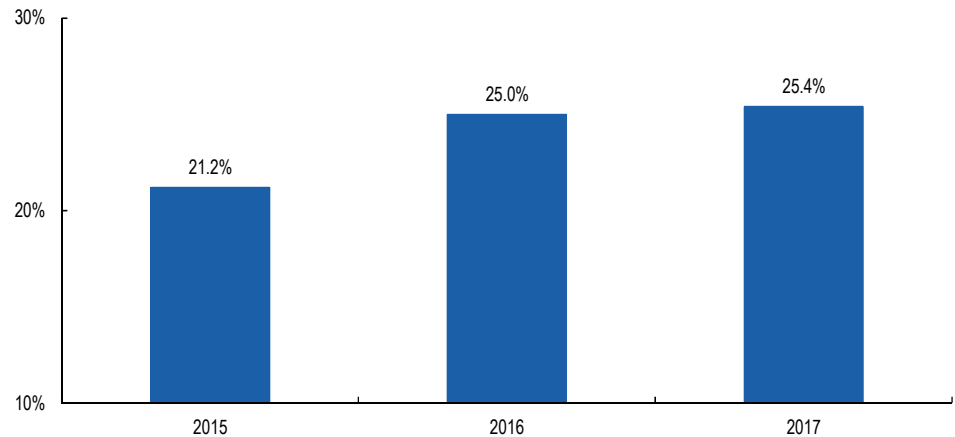
The growing adoption of electronic components in automobiles has led to intensified competition in the automotive electronics market. Not only conventional automakers, but also internet firms, such as Google, Baidu (BIDU US/CP: US\$269.91), NAVER (035420 KS/Buy/TP: W1,000,000/CP: W717,000), and Uber, have been developing autonomous vehicles. Telcos have also jumped on the bandwagon. We thus expect more competition between existing and new players in this area going forward.

In automotive audio systems, competition is intensifying among Bose, Pioneer, and Panasonic. With technological advances likely to continue, companies will likely strive to achieve differentiation by developing a variety of acoustic control solutions.

In high-end lifestyle audio systems, a segment dominated by top-tier players, key rivals include Beats, Bose, and Ultimate Ears. In the low- to mid-end market, entries by new Chinese players have increased. In the smart home solutions and smart speaker markets, which we think have already matured, existing players will also likely face growing threats from new entrants.

All in all, we expect competition between conventional and new players to continue for the time being in the automotive electronics market. And we believe SEC acquired Harman in order to better navigate the road ahead.

**Figure 239. Harman’s head unit M/S**



Source: Company data, Mirae Asset Daewoo Research

**Table 48. Earnings of global automotive electronics firms**

(Wbn, %)

Company	Share performance		Market cap	Revenue			Operating profit			OP margin			Net profit		
	-1M	-3M		18F	19F	20F	18F	19F	20F	18F	19F	20F	18F	19F	20F
SEC	-0.3	7.0	331,366	259,259	269,011	276,976	63,018	62,886	64,201	24.3	23.4	23.2	47,725	48,066	48,762
Continental	-0.9	-11.6	57,818	60,871	64,324	67,815	6,676	7,292	7,875	5.1	5.4	5.6	4,352	4,829	5,149
Magna	6.8	4.1	22,682	43,542	45,890	48,049	3,127	3,198	3,207	2.5	4.3	5.9	2,529	2,655	3,093
Lear	2.0	0.6	13,598	23,466	24,493	25,729	1,944	1,999	1,927	5.1	6.7	7.0	1,362	1,410	1,448
Denso	-0.3	-16.0	46,864	50,487	53,461	55,887	4,035	4,258	4,671	47.6	41.7	39.4	3,134	3,286	3,608
Valeo	-0.9	-15.6	17,426	26,447	28,792	31,348	2,125	2,379	2,526	8.0	8.9	9.2	1,309	1,579	1,760
Faurecia	5.6	-6.7	12,501	25,131	26,220	27,550	1,671	1,803	1,984	4.2	5.0	5.0	976	1,092	1,229
BorgWarner	5.9	-6.6	11,919	11,453	12,124	12,776	1,439	1,536	1,595	2.2	3.0	3.1	968	1,039	1,131
<b>Average</b>	<b>2.2</b>	<b>-5.6</b>								<b>12.4</b>	<b>12.3</b>	<b>12.3</b>			

Source: Bloomberg, Mirae Asset Daewoo Research

**86. Outlook and strategy**

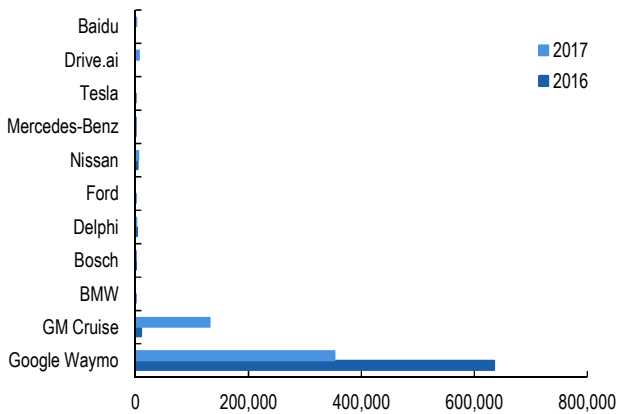
The global market for connected car solutions/automotive audio systems is projected to grow from US\$45bn in 2016 to nearly US\$100bn in 2025. SEC has been expanding into automotive electronics by leveraging its dominant position in the semiconductor, display and smartphone markets. And the acquisition of Harman has allowed the firm to add infotainment, telematics, and connected solutions to its product portfolio and access a broad new customer base.

Entry barriers are high for auto-related markets, due in large part to a heightened focus on safety. Nevertheless, SEC was able to smoothly enter the automotive electronics market through the Harman acquisition. We also expect Harman to enjoy synergies with affiliates such as SEMCO (MLCC, communication/camera module, PCB, etc.) and Samsung SDI (batteries).

We are also positive on Harman’s audio system technology, which has the potential to be used in SEC’s VR/wearable products, as well as its TVs and smartphones, to add value. SEC also plans to strengthen the partnership between its large display panel business and Harman’s arena/theater audio and lighting equipment business.

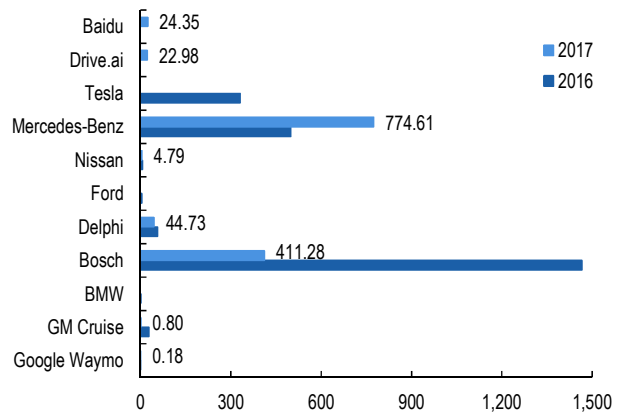
In light of the synergies arising from the Harman acquisition, we think SEC is highly likely to pursue additional M&As in the automotive electronics sector, as M&As should prove more effective than organic growth.

**Figure 240. Autonomous driving test miles in California: Google and GM lead the pack**



Source: California DMV, Mirae Asset Daewoo Research

**Figure 241. Google and GM taking the lead in software performance**



Notes: For 2016, data on Drive.ai and Baidu are unavailable; for 2017, data on BMW, Ford, and Tesla are unavailable.  
Source: California DMV, Mirae Asset Daewoo Research

Figure 242. SEMCO's automotive MLCC



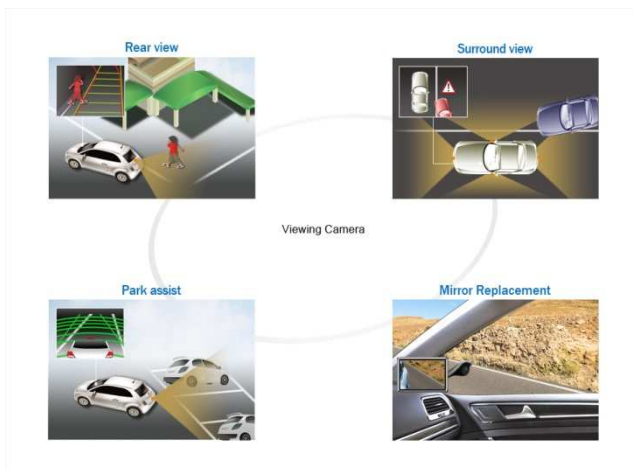
Source: Company materials, Mirae Asset Daewoo Research

Figure 243. SEMCO's automotive telecommunication modules



Source: Company materials, Mirae Asset Daewoo Research

Figure 244. SEMCO's automotive camera modules



Source: Company materials, Mirae Asset Daewoo Research

Figure 245. Samsung SDI's battery packs installed in BMW i3



Source: Company materials, Mirae Asset Daewoo Research

## IV. Future direction

### Earnings outlook

We expect SEC's operating profit to grow steadily from W53.6tr (+83.5% YoY) in 2017 to W67.9tr (+26.6% YoY) in 2018 and W68.9tr (+1.4% YoY) in 2019.

#### 87. Earnings outlook by division

We expect the semiconductor division to drive earnings improvement. OP margin at the division should improve from 47.4% in 2017 to 56.1% in 2018, fueled by rising semiconductor prices. Although semiconductor price hikes have recently slowed, supply/demand dynamics will likely improve in 2H18. In 2019, we estimate the division will post a solid OP margin of 51.2%.

#### 88. F/X and interest rate sensitivities

SEC's earnings are affected by F/X rates, as exports account for 90% of its total revenue. For 2018, we estimate that a W100 fall in the US dollar/won rate would drive down EPS by 1.8%. Based on financial statements as of end-2017, the impact of 5% changes in F/X rates on net foreign-currency-denominated financial assets can be seen in Table 59. SEC holds only modest amounts of financial products for F/X hedging purposes; the company prefers natural hedging techniques, including the purchasing of parts in foreign currency.

We also examined financial gains/losses on financial assets and liabilities based on a 1%p change in interest rates (Table 60). Given that SEC is expected to post an annual operating profit of more than W60tr, we believe that the impact on earnings of F/X or interest rate changes is minimal, which is positive in terms of earnings stability.

**Table 49. Impact of 5% changes in F/X rates on net foreign-currency-denominated financial assets**

	End-2017		End-2016	
	Rise	Fall	Rise	Fall
US\$	278.1	-278.1	222.1	-222.1
EUR	79.8	-79.8	138.1	-138.1
JPY	-100.1	100.1	-61.3	61.3
INR	78.0	-78.0	38.9	-38.9

Source: Company data, Mirae Asset Daewoo Research

**Table 50. financial gains/losses on financial assets and liabilities depending on a 1%p change in interest rates**

	End-2017		End-2016	
	Rise	Fall	Rise	Fall
Financial assets	49.1	-49.1	64.8	-64.8
Financial liabilities	-22.6	22.6	-9.1	9.1
Net effect	26.5	-26.5	55.7	-55.7

Source: Company data, Mirae Asset Daewoo Research

**Growth driver: M&A**

SEC is the global leader in the memory chip, TV, and smartphone markets. However, excluding semiconductors, profitability in those aforementioned businesses is declining, amid strengthening competition. Thus, the company needs to find new growth drivers.

**89. M&A history and organizations in charge**

In our view, M&As will likely serve as SEC’s major growth driver going forward. Since the 1950s, the Samsung Group has expanded its business portfolio by acquiring robust companies in various industries. The most noteworthy deal was the group’s acquisition of Korea Semiconductor in December 1974, which paved the way for its foray into the semiconductor space.

We believe now is the time for the group to actively search for M&A opportunities based on past M&A successes and massive cash holdings (net cash of W70.22tr, as of end-1Q18). The Samsung Group recently scored twin successes in its M&A attempts by acquiring LoopPay (which later became Samsung Pay) in February 2015 and Harman International in November 2016.

Samsung Strategy and Innovation Center (SSIC) and Samsung Next are in charge of group-wide efforts for overseas M&A deals.

**Table 51. Samsung Group’s major M&A deals**

Time	Company	Business	Remarks
1950s-1980s	Ankook Fire Insurance	Insurance	
	Dongbang Life Insurance	Insurance	
	Dongwha Department Store	Retail	
	Saehan Paper.	Paper	
	Korea Semiconductor	Semiconductor	
	Korea Telecom Corporation	Semiconductor	
	Sejong Credit Card	Credit card	
	Samsung Sanyo	Electronic parts	JV
	Samsung NEC	Electronic parts	JV
1990s	Kukje Securities	Securities	
	AST	Computer	
	HMS	Semiconductor	
	Korea Fertilizer	Fertilizer	
	Kazakhmys	Copper smelting	
	Union Optical	Semiconductor/optical equipment	

Source: Mirae Asset Daewoo Research

**Figure 246. SEC’s five strategic technology domains**



Source: SEC, Mirae Asset Daewoo Research

Under the umbrella of SSIC, the Samsung Catalyst Fund (SCF) and M&A Team are powerhouse M&A players. SCF, with offices in the US (Menlo Park, California), Israel (Tel Aviv), and the UK (London), has made possible over 40 global investment deals. The M&A Team took the lead in SEC’s acquisitions of Harman International and Artik (an open smart

IoT platform).

Currently, the Samsung Group is paying keen attention to the automotive electronics, digital healthcare, and business software areas. SSIC selected five strategic technology domains for SEC, including the IoT, cloud/data storage, privacy & security, smart machines, and smart healthcare.

Meanwhile, Samsung Next, formerly Open Innovation Center, is a venture capital firm establishing partnership with start-ups and carrying out incubation and investment in them to develop their ideas into products and businesses.

The start-ups acquired via Samsung Next include: LoopPay (a mobile payment solution provider), SmartThings (an IoT technology firm), and Viv (a next-generation AI platform provider).

**Table 52. SEC's major M&As and equity investments** (US\$mn)

Date	Type	Company	Technology/Business	Value
7/10/2017	Acquisition	Innoetics	Text-to-speech synthesis,	50.0
3/10/2017	Acquisition	Harman International	Connected car	8,645.6
11/15/2016	Acquisition	Newnet Communication Canada	Rich communication services (RCS)	-
10/05/2016	Acquisition	Viv Labs	AI platform	215.0
9/12/2016	Acquisition	Dacor (N. America)	Premium electronic appliances	-
7/21/2016	Equity investment	BYD	EV battery	480.0
7/3/2016	Acquisition	AdGear (Canada)	Digital ad	-
6/24/2016	Acquisition	Joyent (US)	Cloud service	170.0
3/3/2016	Acquisition	YESCO Electronics (US)	Commercial LED display	-
2/18/2015	Acquisition	LoopPay (US)	Mobile cloud payment solution	-
12/5/2014	Acquisition	Simpres (Brazil)	Managed print services (MPS)	-
11/2/2014	Acquisition	Proximal Data (US)	Server-use SSD caching software	-
9/2/2014	Acquisition	PrinterOn (Canada)	Mobile cloud solution	-
8/19/2014	Acquisition	Quietside (US)	Air conditioner distribution	-
8/15/2014	Acquisition	SmartThings	IoT platform	200.0
5/18/2014	Acquisition	Selby (US)	Video application service developer	-
10/4/2012	Acquisition	CSR's mobile unit (UK)	Chip maker	310.0
5/9/2012	Acquisition	mSpot (US)	Cloud content	50.0
3/10/2011	Equity investment	Medison	Medical equipment	262.3

Source: Mirae Asset Daewoo Research

**Figure 247. Major start-ups acquired by Samsung Next**



Source: Company materials, Mirae Asset Daewoo Research

Established in 1988, Samsung Research America (SRA) engages in the development of core technologies needed to enhance the competitiveness of SEC products. It pursues open innovation through partnerships with start-ups and academic institutions.

SRA's research labs include: 1) Mobile Payments and Security Lab, which focuses on developing Samsung KNOX (a more secure Android platform), Samsung Pay, etc.; 2) Digital Solution Lab, which specializes in display-related research; and 3) Computer Science and Innovation Center, which focuses on AI and convergence technologies.

#### **90. C-Lab**

SEC's proprietary start-up program also deserves attention. Since 2012, the firm has been operating the Creative Lab (C-Lab) program to cultivate a creative corporate culture and foster new business ideas.

C-Lab projects are divided into five phases: identification of new ideas; concept development; prototype development/verification; showcasing at global trade shows; and exit. Once a project is completed, the unit can either remain in the company or be spun off into a separate entity.

## Next-generation growth engines

SEC is a global company that delivers the world's second largest operating and net profits and holds over W70tr in net cash. However, the firm's flagship businesses show limited growth potential, with the smartphone market having already matured and TV/home appliances market displaying only modest growth. Against this backdrop, the firm is coming under growing pressure to find new growth drivers.

### 91. Global markets

With SEC's 2018 full-year revenue forecast at a whopping W248tr, we do not believe any small new market will appeal to the firm. Even if the firm claims the top spot in a new W10tr-worth of market, any impact on company-wide profit would be marginal. Fortunately, SEC's relatively new businesses, automobile and healthcare, seem to be doing well. While the automobile electronics market as a whole has been growing rapidly, the healthcare business (e.g., Samsung Biologics) is also faring well, in terms of production, by utilizing SEC's semiconductor process technology.

**Table 53. Market value for major industries**

(US\$bn, %)

	2014	2015	2016	2017F	2018F	2019F	2020F	CAGR
World GDP	72,825	74,680	76,346	78,348	80,650	83,120	85,702	2.75
US GDP	16,177	16,598	16,853	17,224	17,600	17,979	18,348	2.12
F&B	5,498	5,639	5,784	5,932	6,084	6,240	6,400	2.56
Automobiles	2,210	2,283	2,355	2,428	2,500	2,578	2,657	3.12
Healthcare	986	1,044	1,105	1,165	1,229	1,297	1,368	5.61
Construction	847	930	9,998	1,109	1,222	1,324	1,435	9.19
Cosmetics	460	490	523	557	594	633	675	6.60
Home appliances	458	482	506	526	546	567	589	4.28
Smartphones	393	425	404	417	431	438	443	2.04
PC	164	135	118	109	104	100	95	-8.67
TV	100	92	58	92	92	90	87	-2.25
Semiconductor	343	335	340	364	378	381	393	2.32
memory	80	79	71	75	83	80	80	-0.17
Non-memory	262	255	269	289	295	301	314	3.03
Display panels	117	113	101	97	92	87	83	-5.57
Large-size	75	69	56	48	41	35	30	-14.01
Small/mid-size	42	44	45	49	51	52	53	3.75

Source: Gartner, IHS, IMS, Global Insight, Statista, Mirae Asset Daewoo Research

In our view, the F&B market (worth over W6,000tr) is worthy of attention as a candidate for SEC's next growth driver. An aging population could lead to some changes in the F&B market, which we believe could present opportunities to new entrants. We will continue to identify those business areas with which SEC could potentially enjoy synergy.

**Table 54. SEC to expand revenue from five new businesses**

(W, persons)

	Investment target	Target revenue	Target head count
Solar cells	W6tr	W10tr	10,000
Automotive batteries	W5.4tr	W10.2tr	7,600
LED	W8.6tr	W17.8tr	17,000
Healthcare/biotech	W2.1tr	W1.8tr	710
Medtech	W1.2tr	W10tr	9,500

Source: Mirae Asset Daewoo Research

## V. Key issues and risk factors

### Issues with ownership structure

Despite its strong earnings stability, SEC shares have remained undervalued, due mainly to uncertainties surrounding its ownership structure. While issues with the ownership structure have been improving gradually, we think uncertainties remain high.

At present, Samsung Group holds a 19.9% stake in SEC (Samsung Life: 8.3%; Samsung C&T: 4.7%; Samsung F&M: 1.4%; the Group's controlling family/Samsung Life Public Welfare Foundation: 5.5%). However, under the Financial Industry Structural Improvement Act (FISIA) and Monopoly Regulation and Fair Trade Act (MRFTA), the actual voting power the group can exercise is restricted to 15%. In other words, the 6.4% voting power in excess of the 15% limit cannot be exercised by financial affiliates when the general shareholder meeting of relevant affiliated companies passes a resolution for important managerial control-related issues, including the appointment and dismissal of board members, revisions to articles of incorporation, and merger/business transfer.

**Table 55. SEC's major shareholders** (shares, Wbn)

Shareholder	No. of shares	Stake	Value	
<b>Controlling family (1)</b>	Lee Kun-hee	4,985,464	3.9	12,658
	Hong Ra-hee	1,083,072	0.8	2,750
	Lee Jae-yong	840,403	0.7	2,134
	Subtotal	6,908,939	5.4	17,542
<b>Affiliates (2)</b>	Samsung Life	10,622,814	8.3	26,971
	Samsung C&T	5,976,362	4.7	15,174
	Samsung F&M	1,856,370	1.4	4,713
	Samsung Welfare Foundation	89,683	0.1	228
	Samsung Foundation of Culture	37,615	0.0	96
	Subtotal	18,582,844	14.5	47,182
<b>(1) + (2)</b>	<b>25,491,783</b>	<b>19.9</b>	<b>64,724</b>	
Treasury shares	8,990,843	7.0	22,828	
<b>Total shares issued</b>	<b>128,386,494</b>	<b>100.0</b>	<b>325,973</b>	

Note: Based on April 30<sup>th</sup> closing price

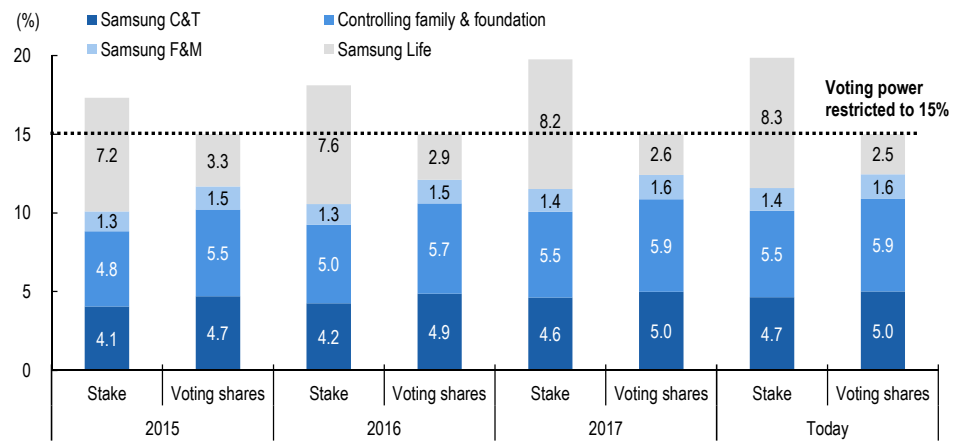
Source: DART, Mirae Asset Daewoo Research

**Table 56. Actual voting rights the group can exercise for SEC** (shares, %)

	Common shares		Voting interest	Actual voting rights (based on MRFTA)	Limitation on voting rights
	# of shares	Stake			
<b>Financial affiliates(1)</b>	<b>12,479,184</b>	<b>9.7</b>	<b>10.5</b>	<b>4.1</b>	<b>-6.4</b>
Samsung Life	10,622,814	8.3	8.9	2.5	-6.4
Samsung F&M	1,856,370	1.4	1.6	1.6	0.0
<b>Other affiliates(2)</b>	<b>13,012,599</b>	<b>10.1</b>	<b>10.9</b>	<b>10.9</b>	<b>0.0</b>
Samsung C&T	5,976,362	4.7	5.0	5.0	0.0
Lee Kun-hee	4,985,464	3.9	4.2	4.2	0.0
Hong Ra-hee	1,083,072	0.8	0.9	0.9	0.0
Lee Jae-yong	840,403	0.7	0.7	0.7	0.0
Samsung Welfare Foundation	89,683	0.1	0.1	0.1	0.0
Samsung Foundation of Culture	37,615	0.0	0.0	0.0	0.0
<b>(1)+(2)</b>	<b>25,491,783</b>	<b>19.9</b>	<b>21.4</b>	<b>15.0</b>	<b>-6.4</b>

Source: DART, Mirae Asset Daewoo Research

**Figure 248. Changes in stakes in voting rights to SEC**



Source: DART, Mirae Asset Daewoo Research

Under Article 24 of FISIA, a financial institution is required to obtain prior approval from the Financial Services Commission when it acquires shares of other companies above a certain limit. This is intended to prevent conglomerates from either increasing the number of affiliates by using their financial affiliates or strengthening their control on subsidiaries through equity ownership by their affiliates. For the affiliated financial institution that held the shares of another company in excess of the shareholding limit provided for in the provisions of Article 24 (1) at the time of the enforcement of FISIA in March 1997, the provisions of MRFTA shall apply.

Under Article 11 of MRFTA, neither financial nor insurance companies belonging to an enterprise group shall exercise their voting rights in stocks of domestic affiliated companies under their acquisition or ownership. However, this provision shall not apply to cases where the general meeting of shareholders of a relevant domestic affiliated company (limited to the listed corporation) passes a resolution for important issues. Even in such cases, the number of voting stocks from among the stocks of the affiliated company shall not exceed 15% of the gross number of stocks issued by the affiliated company, including the number of shares held by affiliated parties. This means that voting power in excess of the 15% limit cannot be exercised by financial affiliates.

**Table 57. Act on Structural Improvement of the Financial Industry: Stockholding limit by other companies**

	Details
<b>Article 24</b> <b>Stockholding limit by other companies</b>	Where a financial institution or another financial institution belonging to the enterprise group to which the former financial institution belongs (hereinafter referred to as "same affiliated financial institution") intends to perform any of the following acts, it shall obtain prior approval from the Financial Services Commission according to the standards determined by Presidential Decree. Provided, that this shall not apply where it obtains authorization, approval etc. under the Acts forming the basis for the establishment of the relevant financial institution:
	<ol style="list-style-type: none"> <li>1) Holding not less than 20/100 of the total number of issued voting stocks of another company;</li> <li>2) Holding not less than 20/100 of the total number of issued voting stocks of other companies; or</li> <li>3) Holding not less than 10/100 of the total number of issued voting stocks of other companies, and controlling the relevant company by any same affiliated financial institution or conglomerate to which the same affiliated financial institutions belong, as determined by presidential decree.</li> </ol>
	<p>Addenda (2007.1.26)</p> <p>Article 4 (Transition Measures concerning Restriction on Voting Right)</p> <p>Any same affiliated financial institution that holds the shares of other company in excess of the share-holding limit provided for in the provisions of each subparagraph of Article 24 (1) at the time of the enforcement of the Act on Merger and Business Conversion of Financial Institutions that is amended by Act No. 5257 shall be restricted from exercising its voting right on the shares of the other company, but its application shall be suspended for 2 years and the provisions of Article 11 of the Monopoly Regulation and Fair Trade Act shall apply thereto on the date on which 2 years lapse after the enforcement of this Act.</p>

Source: Office of Legislation, Mirae Asset Daewoo Research

**Table 58. MRFTA: Limitation of voting rights of financial companies**

	Details
<b>Article 11: Limitation of voting rights of financial companies or insurance Companies</b>	<p>Neither financial nor insurance companies which belong to an enterprise group subject to the limitations on mutual investment shall exercise its voting rights in stocks of domestic affiliated companies, under its acquisition or ownership, provided that the same shall not apply to cases falling under the following subparagraphs:</p> <ol style="list-style-type: none"> <li>1) Where the acquisition or ownership of stocks of the company is in order to carry on the financial business or insurance business;</li> <li>2) Where the acquisition or ownership of stocks of the company is obtained by approval pursuant to the Insurance Business Act in order to ensure efficient operation and management of the insurance assets;</li> <li>3) Where the general meeting of stockholders of a relevant domestic affiliated company (limited to the listed corporation) passes a resolution for matters falling under the following items. In such cases, the number of voting stocks from among stocks of the said affiliated company shall not exceed 15/100 of the gross number of stocks issued by the said affiliated company, including the number of stocks to be exercised 916 Ministry of Government Legislation by the persons other than those as stipulated by Presidential Decree, from among the specially-related persons with the said affiliated company: <ol style="list-style-type: none"> <li>(a) Appointment or dismissal of officers;</li> <li>(b) Alteration of the Articles of incorporation;</li> <li>(c) Merger of the said affiliated company with another company, or transfer of the whole or part of business to another company</li> </ol> </li> </ol>

Source: Mirae Asset Daewoo Research

**92. Sale of SEC shares by Samsung Life is unavoidable; market sale likely to be first step**

Samsung Life’s position as the largest shareholder of SEC within the group is unsustainable, given regulations regarding the separation of financial and non-financial activities and tighter international accounting standards on insurers. We believe that Samsung Life will unload its SEC stake in phases, and initially sell the shares on the market. Even if Samsung Life unloads its SEC shares on the market, the group’s voting interest in SEC would remain essentially unchanged.

While the combined holdings of Samsung Life (8.3%) and Samsung F&M (1.4%) in SEC currently stand at 9.7%, Article 24 of FISIA restricts the actual voting power they can exercise to 5%. As such, the 4.7% voting right in excess of the limit cannot be exercised. Currently, Samsung Group holds a 19.9% stake in SEC, which represents a 21.4% voting interest. However, under both FISIA and MRFTA, the actual voting power the group can exercise is restricted to 15%. In other words, the 6.4% voting power in excess of the 15% limit cannot be exercised by financial affiliates.

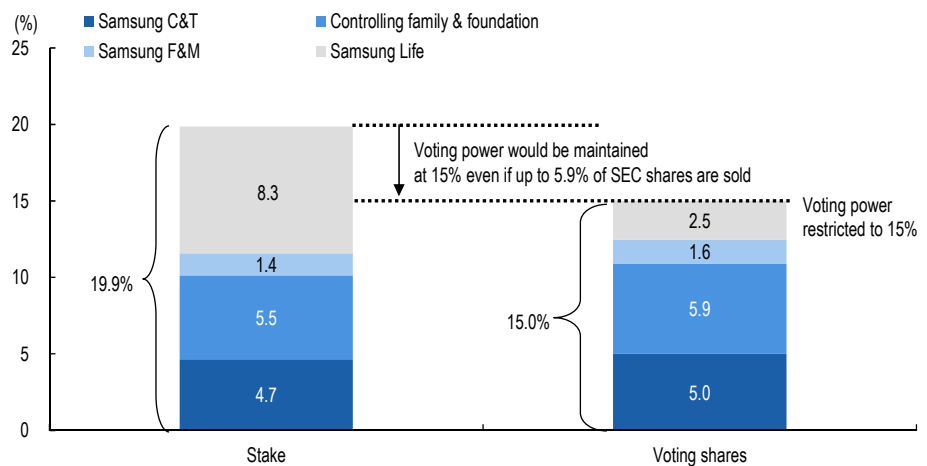
Therefore, even if Samsung Life unloads its SEC shares on the market, the group’s voting interest in SEC would remain essentially unchanged, provided that the SEC shares sold are within the stake (up to 5.9%) already subject to the voting control restrictions under the MRFTA.

**Table 59. Actual voting rights the group can exercise for SEC** (shares, %)

	Common shares		Voting interest	Actual voting rights (based on MRFTA)	Limitation on voting rights # of shares
	# of shares	Stake			
<b>Financial affiliates(1)</b>	<b>12,479,184</b>	<b>9.7</b>	<b>10.5</b>	<b>4.1</b>	<b>-6.4</b>
Samsung Life	10,622,814	8.3	8.9	2.5	-6.4
Samsung F&M	1,856,370	1.4	1.6	1.6	0.0
<b>Other affiliates(2)</b>	<b>13,012,599</b>	<b>10.1</b>	<b>10.9</b>	<b>10.9</b>	<b>0.0</b>
Samsung C&T	5,976,362	4.7	5.0	5.0	0.0
Lee Kun-hee	4,985,464	3.9	4.2	4.2	0.0
Hong Ra-hee	1,083,072	0.8	0.9	0.9	0.0
Lee Jae-yong	840,403	0.7	0.7	0.7	0.0
Samsung Welfare Foundation	89,683	0.1	0.1	0.1	0.0
Samsung Foundation of Culture	37,615	0.0	0.0	0.0	0.0
<b>(1)+(2)</b>	<b>25,491,783</b>	<b>19.9</b>	<b>21.4</b>	<b>15.0</b>	<b>-6.4</b>

Source: DART, Mirae Asset Daewoo Research

**Figure 249. Even if Samsung Life unloads its SEC shares, the group’s voting interest in SEC would remain unchanged**



Source: Mirae Asset Daewoo Research

**93. Revisions to FISIA and Insurance Business Act**

**1) Risk of potential FISIA violation, due to SEC’s share cancellation**

SEC’s cancellation of treasury shares should push up Samsung Group financial affiliates’ stake in the company. Under FISIA (Article 24), if the combined stake of financial affiliates in group subsidiaries exceeds 10%, they are subject to the FSC’s review of qualification as the largest shareholder. Currently, the combined stake of Samsung Life and Samsung F&M stands below 10% (8.27% for Samsung Life; 1.45% for Samsung F&M). However, if SEC completes its scheduled share cancellation in 2018, their combined stake would exceed the 10% threshold to reach 10.45%.

In light of the current government’s strict stance on the separation of financial and non-financial activities, Samsung Life is unlikely to win the FSC’s approval. The Fair Trade Commission (FTC) is now seeking to restrict the actual voting power of financial/insurance affiliates to 5%, in addition to the current regulation that mandates a 15% ceiling on the voting rights of controlling shareholders (including affiliated parties) that are exercised to defend their managerial control. The authorities’ move is based on criticism of corporate group financial subsidiaries’ overuse of their voting rights for the interests of owner families. However, such efforts by the FTC require cooperation from the National Assembly.

We expect Samsung Life or Samsung F&M to dispose of at least 0.45% of their combined stake in SEC ahead of the electronics giant’s share cancellation. Even if Samsung Life unloads its SEC shares on the market, the group’s voting interest in SEC would remain essentially unchanged, provided that the SEC shares sold are within the stake already subject to the voting control restrictions under the MRFTA (up to 5.9%).

**Table 60. Moon Jae-in government’s five-year economic agenda (July 19th, 2017)**

Details	
<b>Objective</b>	Economy better for everyone
<b>Strategy</b>	Fair economy with strong vitality
<b>Major tasks</b>	Prevention of corporate group controlling families’ abuse of power and improvement in corporate ownership structure (FTC) Stricter regulations on the separation of financial and non-financial capital, including prevention of controlling families’ strengthening of grip on groups via financial subsidiaries Stricter restrictions on voting rights of financial/insurance subsidiaries (2018); implementation of comprehensive supervision on financial groups starting in 2018

Source: National Planning Advisory Committee, Mirae Asset Daewoo Research

**Table 61. FTC’s briefing on policy roadmap (September 18th, 2017)**

Details	
Prevention of corporate groups’ abuse of economic influence	Stricter regulations on the separation of financial and non-financial capital Stricter restrictions on voting power of financial/insurance subsidiaries Creation of a ceiling on financial/insurance subsidiaries’ voting rights exercised to defend controlling families’ managerial control. e.g. 5% ceiling on voting rights of large corporate group’s financial/insurance subsidiaries

Source: FTC, Mirae Asset Daewoo Research

**Table 62. Prospective changes to financial affiliates’ SEC stake after treasury share cancellation**

(shares, %)

Before cancellation	No. of shares	Stake	Notes
Samsung Life	10,622,814	8.27	Based on 128,386,494 shares issued as of May 2018
Samsung F&M	1,856,370	1.45	
<b>Total</b>	<b>12,479,184</b>	<b>9.72</b>	
After cancellation	No. of shares	Stake	Notes
Samsung Life	10,622,814	8.90	Based on 119,395,651 shares issued assuming the cancellation of 8,990,843 shares in 2018
Samsung F&M	1,856,370	1.55	
<b>Total</b>	<b>12,479,184</b>	<b>10.45</b>	
<b>Financial affiliates’ stake exceeds 10% factoring in SEC’s treasury share cancellation plan</b>	539,619	0.45	Total value estimated at W1.53tr based on SEC’s May 2, 2018 closing price of W2,650,000

Source: Mirae Asset Daewoo Research

## 2) Proposed revision to Insurance Business Act

It is also worth keeping an eye on a proposed revision to the Insurance Business Act (put forth by the Minjoo Party's Lee Jong-gul and several other lawmakers) that would require insurance firms to adopt mark-to-market valuations for their equity and bond holdings. If the amendment is passed, Samsung Life would have to divest a significant portion of its stake in SEC.

Under the current Insurance Business Act, the share of equities/bonds issued by other companies in an insurer's total assets under management (AUM) or total equity capital is barred from exceeding certain thresholds. This rule is aimed at ensuring stable and effective asset management that would support the timely payment of claims to policyholders. Specifically, the aggregate amount of shares owned by large shareholders and bonds issued by subsidiaries prescribed under presidential decree shall not exceed 60% of the firm's total equity capital, or 3% of its total assets, whichever is less. The valuation criteria are not separately defined in the current Insurance Business Act. However, separate tables, outlined in the Regulation on Supervision of Insurance Business, stipulate mark-to-market valuations for total assets and equity capital, but acquisition price-based valuations for equity and bond investments.

**Table 63. Details of amendment to the Insurance Business Act**

	Details
<b>Revision</b>	Article 106 (methods and ratio of asset management) ① - ③ (not revised) <Newly inserted> ④ The sum of total assets, equity capital, bonds, and stocks used to calculate asset ratios shall be based on the values on financial statements prepared in accordance with Article 13 (accounting standard) of the Act on External Audit of Stock Companies.
<b>Supplementary provisions</b>	Article 2 (transitional measure concerning insurance companies that violate the rule regarding the asset management ratio) Notwithstanding Article 107 hereof, any insurance company that violates asset management rules stipulated in Article 106 hereof at the time when this Act enters into force shall bring such ratio into conformity within seven (7) years from the enforcement date. An insurance company shall establish an action plan to dispose of 20/100 or more of the sum of bonds or stocks held in excess of the asset ratio stipulated in Article 106 hereof every year and obtain approval from the Financial Services Commission within six (6) months from the enforcement of this Act. If any insurance company fails to implement the action plan based on paragraph ②, the Financial Services Commission may impose a fine not exceeding 20/100 of the sum of bonds or stocks held in violation of the plan. Article 65 (4) through (8) of the Banking Act shall apply mutatis mutandis to the imposition and collection of fines.

Source: Bill Information, Mirae Asset Daewoo Research

**Table 64. Application Standards on the Asset Management Ratios under the Regulation on Supervision of Insurance Business**

**<Appendix 11> Application Standards on the Asset Management Ratios (related to Article 5 to 10)**

1. Total assets and assets under separate accounts

Asset management ratios are calculated based on the values of total assets and assets under separate accounts as of the end of previous quarter.

3. Equity and bonds

In the event of applying Article 106 of the Act, as well as Articles 50 and 53 of the Decree, the values of equity and bonds are based on their acquisition costs.

Source: National Policy Committee, Mirae Asset Daewoo Research

**Table 65. Comments on amendment to the Insurance Business Act by FSC chairman**

Date	Details
Confirmation hearing on FSC chairman (July 17, 2017)	Regulatory changes would not be simple, given their subsequent impact. We will discuss ways to address concerns related to the amendment.
Parliamentary inspection (Oct. 16, 2017)	It is necessary to pursue legal amendment, rather than revisions to the Regulation on Supervision of Insurance Business. We should not offer benefits only to Samsung Group, and consider the group's governance issues. We are not negative on amendment to the Insurance Business Act.
FSC meeting (Apr. 20, 2018)	To recover confidence in the financial sector, we will speed up financial reform measures, including economic democratization. Issues related to financial firms' ownerships in large business group affiliates need to be addressed, considering the overall impact on various stake holders (including minority shareholders) and the stock market. However, it would not be desirable that financial firms just do nothing until legal amendment. Rather, financial firms should take voluntary measures even before legal amendment.

Source: Media reports, Mirae Asset Daewoo Research

Regarding insurers' equity and bond holdings, a switch from acquisition-cost-based to mark-to-market valuation can be implemented not only via revisions to the Insurance Business Act, but also by the FSC. Of note, the FSC chairman recently mentioned in a meeting that it would not be desirable for financial firms to do nothing until legal amendment, adding that they should take pre-emptive, voluntary measures even before it occurs. In our view, his remarks suggest that the government would prefer Samsung Group to voluntarily address its governance issue stemming from Samsung Life's stake in SEC.

We expect Samsung Group to announce plans to dispose of Samsung Life's stake in SEC, in light of: 1) the need to address uncertainties; 2) tightening asset management regulations on insurers; and 3) the need to protect SEC shareholder value and holders of Samsung Life's participating policies.

As of end-September 2017, Samsung Life's total assets and equity capital stand at W213.1tr and W26.8tr, respectively, which means the ceiling on the firm's affiliate stake holdings (60% of total equity capital or 3% of total assets, whichever is less) is around W6.4tr. Meanwhile, Samsung Life currently holds a total of 10,622,814 common shares in SEC, with a total acquisition cost of W563bn (per-share average acquisition cost of W53,000), versus a mark-to-market valuation of W28.2tr, based on the per-share price of roughly W2,650,000. Samsung Life is not in violation of the current asset management regulations on insurers, which are based on acquisition prices, not market prices. However, if the proposed revision to the Insurance Business Act is passed, the life insurer would be required to dispose of approximately 6.4% of SEC (worth nearly W22tr) within seven years of enforcement.

Furthermore, in light of the expected tightening of international accounting standards and supervisory regulations on insurers (e.g., the IFRS17 and Solvency II), Samsung Life could be forced to sell a significant portion of its affiliate stakes (e.g., SEC).

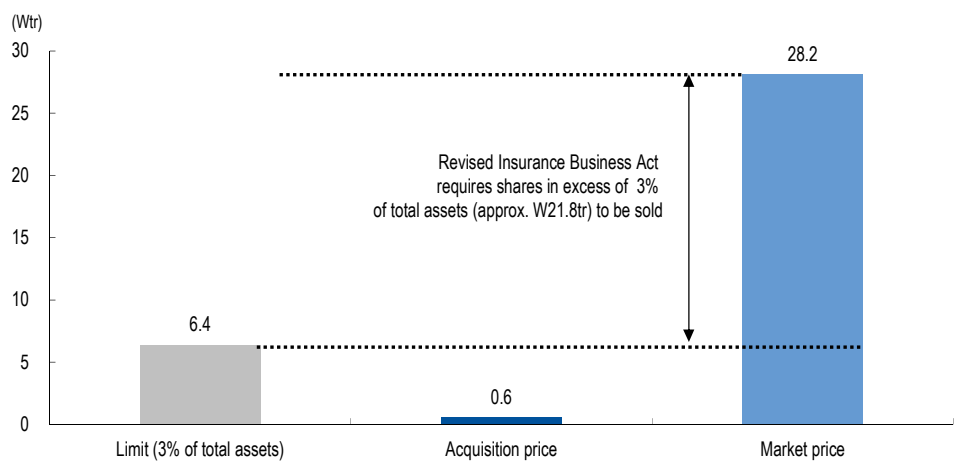
**Table 66. Samsung Life likely to dispose of its SEC stake if proposed Insurance Business Act revision is passed**

	Total assets	Total capital	Ceiling on affiliate stake holdings
<b>Samsung Life</b>	213.1	26.8	6.4
	No. of shares	Acquisition cost	Mark-to-market valuation
<b>Samsung Life's SEC stake</b>	10,622,814(8.3%)	0.6	28.2
	No. of divested shares	Divestment amount	Post-divestment stake
<b>Samsung Life's SEC stake after the passage of the revision (projected)</b>	8,210,766(6.4%)	21.8	1.9%

Note: As of end-2017 and based on April 30<sup>th</sup> closing price

Source: Mirae Asset Daewoo Research

**Figure 250. Ceiling on Samsung Life's affiliate stake holdings and its SEC stake value (based on acquisition prices vs. market prices)**



Note: As of end-2017 and based on April 30<sup>th</sup> closing price

Source: Mirae Asset Daewoo Research

**94. Corporate structure issue that deserves attention**

**1) Why Samsung C&T is unlikely to acquire SEC shares**

Despite being the de-facto holding company of Samsung Group, we think Samsung C&T at this point has little incentive to acquire additional shares in SEC. For starters, it would be difficult for Samsung C&T to fund such a purchase (a 1% SEC stake acquisition would cost W3.4tr). But even if Samsung C&T did increase its SEC stake, FISIA and MRFTA regulations would ultimately cap the group's maximum voting shares in SEC to 15%.

Furthermore, Samsung C&T needs to keep its holding ratio (combined value of subsidiary shares to total assets) at less than 50%. Under MRFTA, a rise in a firm's holding ratio above 50% would force its conversion into a holding company, requiring the firm to meet holding company conversion requirements within two years.

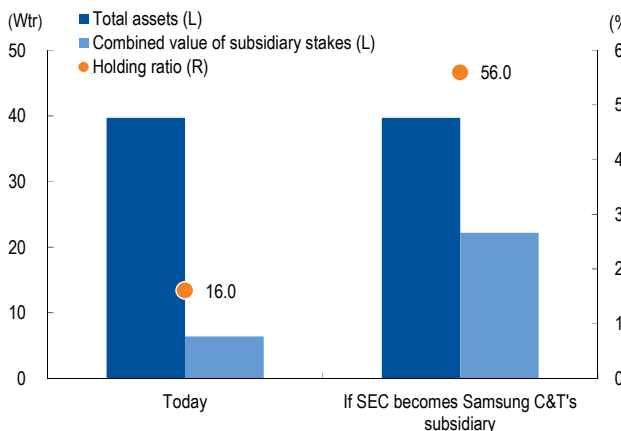
As of end-2017, C&T's holding ratio is calculated at 16%, based on its total parent-based assets (W39.7tr) and the value of the combined holdings of its subsidiaries, including Samsung Life (19.3%), Samsung Biologics (207940 KS/Buy/CP: W390,000; 43.4%), and Samsung Welstory (100%). The book value of the firm's stake in SEC (4.65%) is excluded from the calculation.

Meanwhile, if Samsung Life sells more than 1.8% of its SEC stake to Samsung C&T to brace for revisions to FISIA and MRFTA, making Samsung C&T the largest shareholder of the electronics firm within the group, Samsung C&T's SEC equity stake would have to be included in the calculation of the holding ratio. In such a scenario, Samsung C&T's holding ratio would exceed 56%, forcing the conversion to a holding company structure. If Samsung C&T is designated as the holding company, then it would face several issues, including the need to secure at least a 20% stake in SEC and to sell its Samsung Life stake (19.3%).

In all, we believe that Samsung Life is likely to unload only up to 5.9% of its SEC stake on the market. Even if the firm unloads its SEC shares on the market, the group's voting interest in SEC would remain essentially unchanged.

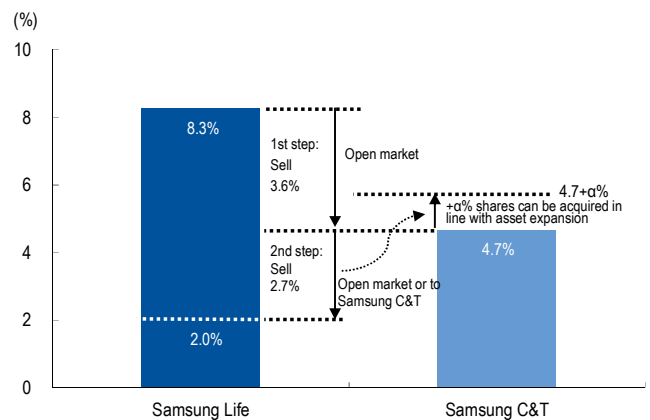
Assuming the revised insurance business bill is signed into law, it is only a matter of time before Samsung C&T becomes SEC's largest shareholder within the group. As such, as part of its efforts to keep its holding ratio below 50%, Samsung C&T is highly likely to increase its asset size through the expansion of its existing business and advance into new businesses. After expanding its asset size, the firm will likely seek to either maintain or increase its SEC stake by purchasing shares that Samsung Life will be forced to sell, due to regulatory issues.

**Figure 251. If Samsung C&T's holding ratio exceed 56%, the company will be forced to convert to holding company structure**



Note: As of end-2017, Source: Mirae Asset Daewoo Research

**Figure 252. Samsung Life considers divesting its SEC stake**



Source: Mirae Asset Daewoo Research

**2) Revisions to FSCMA**

10 lawmakers, including the Minjoo Party's Park Yong-jin, have proposed a bill to revise the Financial Investment Services and Capital Markets Act (FSCMA). If the bill is passed, SEC would be allowed to buy back its shares held by Samsung Life and immediately retire them in the event of revisions to the Insurance Business Act. Any revisions to the Insurance Business Act would require insurance firms to change the asset valuation scheme to the mark-to-market one from the previous acquisition cost-based one, which is believed to have allowed Samsung Life and Samsung F&M to acquire excessive amounts of SEC shares. If the revised Insurance Business Act bill enters into force, Samsung Life would have to unload its SEC shares. However, even in the event of revisions to the Insurance Business Act, the revised FSCMA bill, if passed into a law, would allow SEC to buy back shares from Samsung Life and immediately retire them, without causing an overhang.

Currently, listed companies can buy back their shares through the method specified in Article 341 of the Commercial Act or the cancellation/termination of a trust contract. However, in the event of the establishment (or revisions) of new laws/regulations forcing stake sales by certain shareholders, and thus large amounts of such shares ending up being released to the market, the company's share price could take a hit, causing losses to (especially minority) shareholders. The revised bill points to the problem that the company cannot buy back its shares even in such cases. It would address the problem by allowing a listed company to buy back its shares from a certain shareholder for inevitable cases (including legal requirement) and cancel them immediately.

Meanwhile, the Financial Services Commission raised concerns that the revised bill could violate the principle of shareholder equality by not guaranteeing equal opportunity to sell for all shareholders (equivalent to a dividend payout to a certain shareholder). Moreover, although all shareholders need to engage in decision-making on issues that could violate shareholders' rights, the existing Capital Markets Act authorizes the board of directors meeting to make decisions on share buyback. As such, there are concerns that minority shareholders may not be protected in the event of a company's share buyback decision possibly violating their rights.

We thus believe that the passage of the bill should be decided by comparing: 1) the need to ensure fair opportunities for all shareholders to sell in the event of a buyback, under the "equal treatment of shareholders" principle; and 2) the need to protect shareholders from a potential shock stemming from large shareholders' massive stake sale, due to legal issues. In our view, the likelihood of passage is low, given: 1) the limited applications of the bill; and 2) the purpose of share buybacks under the Commercial Act.

Meanwhile, even if the revised bill is passed, the possibility exists that Samsung Group would not adopt the method suggested by the bill in dealing with Samsung Life's stake in SEC.

**Table 67. Acceptable share buyback methods under the Commercial Act**

Commercial Act	Details
Article 341	① A company may acquire its own shares on its own name and account through the following methods. 1. Acquire on stock exchanges, for listed companies whose shares have market values 2. Acquire from all shareholders under equal terms and conditions in proportion to the number of shares held by each shareholder as determined by presidential decree

Source: Office of Legislation, Mirae Asset Daewoo Research

**Table 68. FSCMA revision bill**

	Details
	<b>Article 165, paragraph 3(1)</b>
Revised bill of FSCMA	In the event where the enactment or revision of this law or other laws and regulations force particular shareholders to sell their shares but they cannot find a buyer, companies shall buy back shares and cancel them immediately.
	[Addenda] This law will enter into force from the date of promulgation.

Source: Bill Information, Mirae Asset Daewoo Research

**3) Expected effects of SEC’s stock split from ownership structure perspective**

In January, SEC announced a 50:1 stock split, lowering the face value of its shares to W100 from W5,000. Trading in SEC shares is now being halted and will be resumed on May 4th. The company expects that the stock split will stimulate trading by making its shares more affordable to investors and increasing the shares’ liquidity, eventually improving its corporate value. The decision is also expected to help more investors to benefit from the company’s strengthening shareholder return policy (e.g., dividends, etc.).

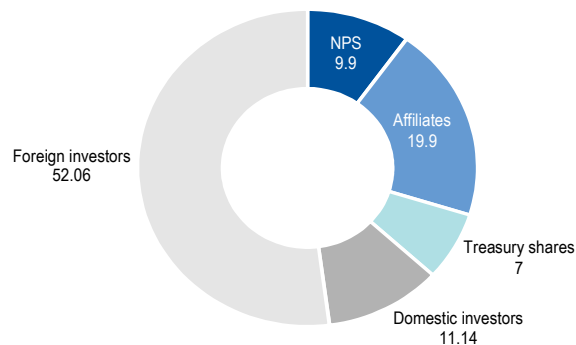
Meanwhile, from the perspective of ownership structure, SEC’s stock split could help Samsung Group solidify its grip on the company. As a stock split increases the number of shares, it brings down the entry barrier for retail investors. A greater number of investors means more distributed ownership, which should help Samsung Group defend its ownership in SEC with a relatively lower stake. Historically, foreign ownership in SEC has exceeded 50% on average. After the stock split, the percentage of domestic shareholders’ ownership could rise above 50%.

**Table 69. SEC’s stock split plan**

1. Stock split details		Before stock split	After stock split
	Face value	W5,000	W100
	# of shares issued	128,386,494	6,419,324,700
	Common shares		
	Shares with tiered voting rights	18,072,580	903,629,000
2. Schedule			
	General shareholders’ meeting	March 23rd, 2018	
	Suspension of trading	April 30th, May 2nd-3rd, 2018 (Three business days; the stock market is closed on May 1st)	
	Listing of new shares	May 4th, 2018	
3. Objective		Increase in the number of outstanding shares	
4. BOD’s resolution (stock split decision)		January 31st, 2018	

Source: DART, Mirae Asset Daewoo Research

**Figure 253. SEC’s ownership breakdown (%)**



Source: Mirae Asset Daewoo Research

**Table 70. Expected effects of stock split**

	Details
<b>Positive effect on share price and trading volume</b>	<ul style="list-style-type: none"> <li>As for high-priced shares (W500,000 or over based on face value of W5,000), shares with lower face value tend to show higher trading volume/turnover and greater transactions by retail investors</li> <li>Many foreign blue chips have seen increases in share prices and trading volume after stock splits</li> </ul>
<b>A boost to the stock market</b>	<ul style="list-style-type: none"> <li>The increase in trading volume on expectations for better share performance before and after stock splits could provide a boost to the overall stock market</li> </ul>
<b>Synergy with stronger dividend policy</b>	<ul style="list-style-type: none"> <li>A stock split could lower the entry barrier for retail investors. If combined with increased dividend payouts, the stock split could boost the income of retail investors.</li> <li>High-priced stocks often show higher shareholdings of foreign investors. Thus, a potential increase in dividends of the stocks could lead to the outflow of domestic capital. By making shares more affordable to domestic retail shareholders via stock splits, a potential outflow of domestic capital could be restrained.</li> </ul>

Source: Korea Exchange, Mirae Asset Daewoo Research

#### 4). Impact of SEC's strengthening of shareholder returns

SEC's move to enhance shareholder returns could improve group affiliates' cash flow (by increasing dividends) and solidify control of non-financial affiliates and affiliated parties in the company.

On the back of SEC's steady bolstering of shareholder returns from 2018 through 2020, group affiliates and affiliated parties should see a sharp increase (by 66.6%) in dividends from the company from W1.1tr in 2017 to W1.8tr in 2018. If accompanied by additional purchases and cancellations of treasury shares, group affiliates' stake in SEC and the voting rights of non-financial affiliated parties should increase.

##### \*SEC's shareholder return program for 2018-20 (unveiled on October 31, 2017)

- 1) Dividend payout expansion: After expanding its annual dividends by 20% in 2017, SEC will double its dividends in 2018 and maintain that same level in 2019-20.
  - 2) Future M&A investments will not be deducted from free cash flow (FCF): This policy change will increase the amount of capital available for return to shareholders and result in greater transparency and visibility.
  - 3) The minimum proportion of FCF allocated for shareholder returns will be set at 50% over the three-year period.
- ※ After dividend payouts, any remaining FCF portion available for shareholder returns will be used either for additional cash dividends or share buybacks.

**Table 71 SEC's annual dividend payouts**

	2016	2017	2019F	2020F
Annual dividend payout (Wtr)	3,992	5,826	8,453	8,453
<i>Growth (YoY)</i>	<i>30.1%</i>	<i>46.0%</i>	<i>45.1%</i>	<i>0%</i>
<b>DPS (W)</b>	<b>28,500</b>	<b>42,500</b>	<b>70,800</b>	<b>70,800</b>
<i>Growth (YoY)</i>	<i>35.7%</i>	<i>49.1%</i>	<i>66.6%</i>	<i>0%</i>

Source: DART, Mirae Asset Daewoo Research

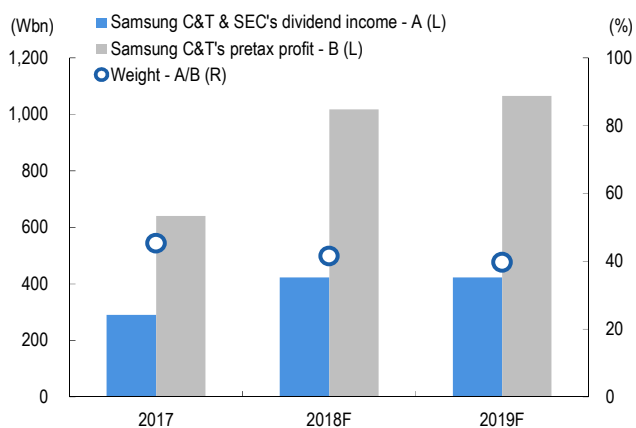
**Table 72. SEC's major shareholders and their dividend income**

(Wbn)

Major shareholders					Dividend income			
		No. of shares	Stake	Value	2016	2017	2018F	2019F
<b>Controlling family (1)</b>	Lee Kun-hee	4,985,464	3.88	13,211	142	212	353	353
	Hong Ra-hee	1,083,072	0.84	2,870	31	46	77	77
	Lee Jae-yong	840,403	0.65	2,227	24	36	60	60
	<b>Subtotal</b>	<b>6,908,939</b>	<b>5.38</b>	<b>18,309</b>	<b>197</b>	<b>294</b>	<b>489</b>	<b>489</b>
<b>Affiliates (2)</b>	Samsung Life	10,622,814	8.27	28,150	303	451	752	752
	Samsung C&T	5,976,362	4.65	15,837	170	254	423	423
	Samsung F&M	1,856,370	1.45	4,919	53	79	131	131
	Samsung Welfare Foundation	89,683	0.07	238	3	4	6	6
	Samsung Foundation of Culture	37,615	0.03	100	1	2	3	3
	<b>Subtotal</b>	<b>18,582,844</b>	<b>14.47</b>	<b>49,245</b>	<b>530</b>	<b>790</b>	<b>1,316</b>	<b>1,316</b>
	<b>(1) + (2)</b>	<b>25,491,783</b>	<b>19.86</b>	<b>67,553</b>	<b>727</b>	<b>1,083</b>	<b>1,805</b>	<b>1,805</b>

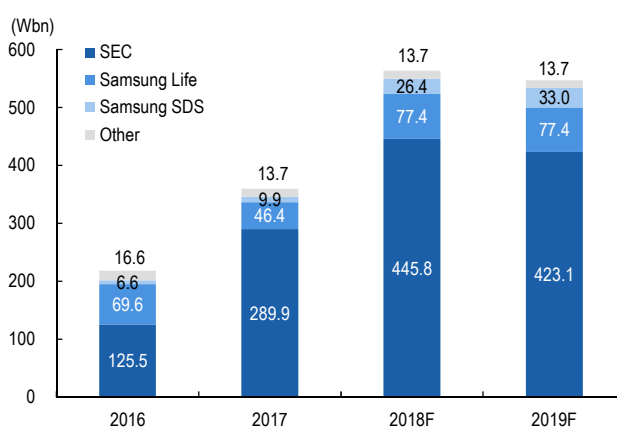
Source: DART, Mirae Asset Daewoo Research

**Figure 254. Dividend income trend for Samsung C&T**



Source: DART, Mirae Asset Daewoo Research

**Figure 255. Samsung C&T's dividend income from stakes in affiliates**



Source: DART, Mirae Asset Daewoo Research

**5) SEC's BOD**

SEC's board of directors (BDD), who jointly oversee the activities of the company, is composed of five inside directors and six independent directors. Directors are appointed via ordinary resolution at a general shareholders' meeting. Inside directors are appointed among candidates recommended by the BOD, while independent directors are recommended by the Independent Director Recommendation Committee. The chairman of the BOD is appointed among directors through BOD resolution. Of note, Samsung Electronics has decided to separate the roles of chairman of the BOD and CEO for the first time since its foundation, in a bid to empower the BOD and enhance its independence. All BOD members have a three-year term of office, and are eligible for re-appointment at a general shareholders' meeting when their term expires. The presence of a majority of all directors constitutes a quorum and resolutions are adopted by a majority of the votes of directors attending the meeting.

SEC assigns major tasks that require expertise and experience to special committees. In particular, the Governance Committee was established in April 2017 to review business decisions that could have a significant impact on shareholder value

**Table 73. Quorum requirements for shareholders' meeting**

	Purpose	For conducting a meeting	For resolution
Ordinary resolution	Electing BOD/BOA and deciding their pay, approving financial statements, etc.	Affirmative vote of at least one-quarter of total issued shares	Affirmative vote of majority of members present in person or by proxy
Special resolution	Alteration of memorandum, transfer of whole or part of business division, dismissal of BOD/BOA, approval of company split or merger	Affirmative vote of at least one-third of total issued shares	Affirmative vote of at least two-thirds of the members present in person or by proxy

Source: Mirae Asset Daewoo Research

**Table 74. SEC's BOD members and committees**

Name	Title	Committee					
		Management Committee	Audit Committee	Independent Director Recommendation Committee	Related-party Transactions Committee	Compensation Committee	Governance Committee
Sang-hoon Lee	BOD chairman						
Ki-Nam Kim	President & CEO (DS)	●					
Hyun-suk Kim	President & CEO (CE)	○					
Dong-jin Koh	President & CEO (IM)	○					
Jae-yong Lee	Vice chairman						
In-ho Lee	Independent director		●		●	○	●
Kwang-soo Song	Independent director		○		○	●	○
Jae-wan Bahk	Independent director			○			○
Sun-uk Kim	Independent director		○		○		○
Byung-gook Park	Independent director			○			○
Jeong Kim	Independent director			○		○	○

Note: ● Chairman, ○ Member,

Source: Company data, Mirae Asset Daewoo Research

**Table 75. Roles and activities of SEC's BOD committees**

	<b>Agenda</b>	<b>Major activities</b>
<b>Management Committee</b>	Development of annual or mid- to long-term management plans and strategies; establishment of major business strategies Cooperation with foreign companies, including strategic partnerships; acquisitions or sales of domestic and overseas subsidiaries Conclusions of technology licensing contracts, technology transfers, and technological partnerships; basic operating principles Decisions or changes regarding basic principles on salaries, bonuses, and the company's welfare system; bond issuance Capex	Investment in Pyeongtaek complex Memory investment Establishment of overseas subsidiaries
<b>Audit Committee</b>	Conduct a business audit; Request a business status report; investigate assets Request reports from directors and investigate subsidiaries Halt any acts in violation of laws and regulations Convene a general meeting of shareholders	Reports on financial statements and quarterly business reports
<b>Independent Director Recommendation Committee</b>	Recommend independent director candidates in accordance with relevant laws and regulations, the Articles of Incorporation, and BOD rules	Independent director recommendation
<b>Related-party transactions Committee</b>	Receive reports on transactions between the company and its affiliates Recommend the Board of Directors take corrective measures for related party transactions	Prior review on large-scale related party transactions Prior review on 2017 remuneration ceiling for directors
<b>Compensation Committee</b>	Ensure the objectivity and transparency of decisions related to Director compensation	
<b>Governance Committee</b>	Assume the responsibilities related to the company's corporate social responsibility, and reviews/addresses all issues related to enhancing shareholder value	Review on shareholder return program for 2018-2020

Source: Company data, Mirae Asset Daewoo Research

**6) Samsung Group’s circular shareholding**

The sale of Samsung SDI’s 2.1% stake (4.04mn shares) in Samsung C&T was finalized on April 10<sup>th</sup>, removing a major regulatory overhang related to new circular shareholdings. As a result, the number of circular shareholdings remaining across the Samsung Group decreased from seven to four (three stem from SEMCO’s stake in Samsung C&T; one stems from Samsung Life’s stake in Samsung C&T via Samsung F&M).

The MRFTA allows corporate groups to maintain existing circular shareholdings. However, Samsung Group made clear that it would actively unwind its remaining circular shareholdings. If the group intends to untie the most loosely-linked circular shareholding loop, SEMCO and Samsung F&M are likely to sell their 2.6% and 1.4% stakes in Samsung C&T, respectively, which are the smallest within the remaining circular shareholding ties. In pursuing the unwinding, the group is expected to make efforts not to undermine shareholder value of Samsung C&T.

**Samsung SDI’s disposal of 5mn Samsung C&T shares**

On February 25, 2016, Samsung SDI sold 5mn Samsung C&T shares (2.6%) immediately before the Samsung C&T/Cheil Industries merger, in compliance with the FTC’s guidelines barring new circular shareholdings arising from a merger.

\*5mn shares (2mn shares held by Samsung Life Public Welfare Foundation, 1.305mn shares by Lee Jae-yong, and a block deal of 1.695mn shares)

\*Sale price and total value: W153,000/share (based on the February 24, 2016 closing price) and total value of W765bn

**Samsung SDI’s disposal of 4.04mn Samsung C&T shares**

Upon the FTC’s decision to revise enforcement guidelines on new circular shareholdings formed from a merger, Samsung SDI disposed of a 2.1% stake in Samsung C&T, which was viewed by the FTC as a new formation of cross shareholdings.

\* Entire 4.04mn shares were sold in block deals in the market

\* Sale price and total value: Total value of W550.0bn based on a 3.8% discount to Samsung C&T’s closing price of W144,000 on April 9th, 2018

**Table 76. Samsung Group’s circular shareholdings: Reduced from 7 to 4**

No	Affiliate 1	Affiliate 2	Affiliate 3	Affiliate 4	Affiliate 5	Affiliate 6	Notes
1	Samsung C&T → 4.2%	SEC →	SEMCO → 23.7%	Samsung C&T → 2.6%			
2	Samsung C&T → 19.3%	Samsung Life → 7.6%	SEC → 23.7%	SEMCO → 2.6%	Samsung C&T →		SEMCO → Samsung C&T
3	Samsung C&T → 19.3%	Samsung Life → 15.0%	Samsung F&M → 1.3%	SEC → 23.7%	SEMCO → 2.6%	Samsung C&T →	
4	Samsung C&T → 4.2%	SEC → 19.6%	Samsung SDI → 2.1%	Samsung C&T →			Samsung SDI → Samsung C&T
5	Samsung C&T → 19.3%	Samsung Life → 7.6%	SEC → 19.6%	Samsung SDI → 2.1%	Samsung C&T →		<b>Untied on April 10th</b>
6	Samsung C&T → 19.3%	Samsung Life → 15.0%	Samsung F&M → 1.3%	SEC → 19.6%	Samsung SDI → 2.1%	Samsung C&T →	
7	Samsung C&T → 19.3%	Samsung Life → 15.0%	Samsung F&M → 1.4%	Samsung C&T →			Samsung F&M → Samsung C&T

Source: FTC, Mirae Asset Daewoo Research

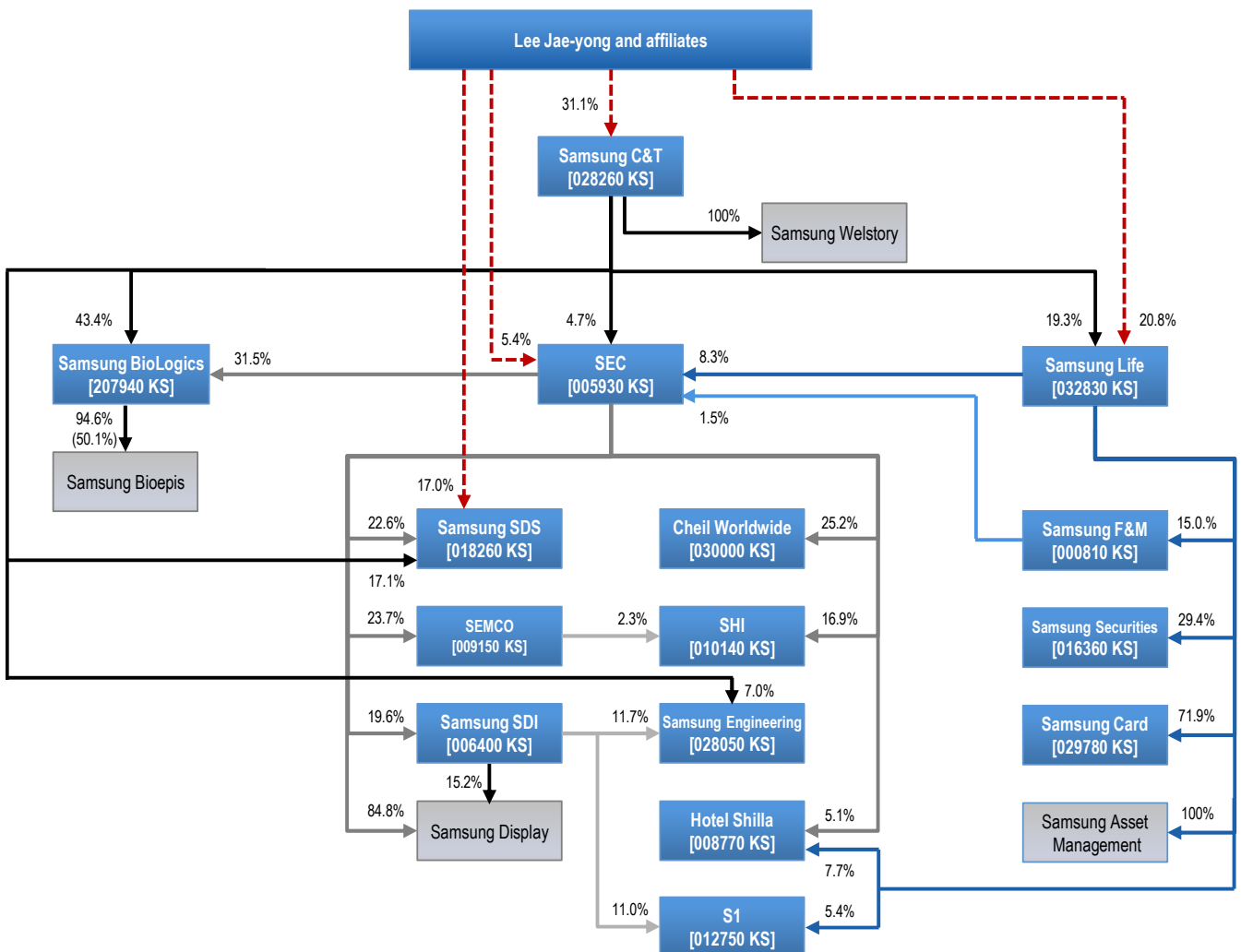
### 7) Direction of Samsung Group's ownership structure restructuring

Samsung Group's controlling family holds firm control over the group via Samsung C&T, which holds a 19.3% stake in Samsung Life and a 4.7% stake in SEC. The combined stake of the group's largest shareholder and affiliated parties in Samsung C&T stands at around 39%. Furthermore, factoring in KCC (002380 KS/CP: W388,500)'s 8.97% stake, which is favorable to the group, and treasury stock of 13.83%, the group's influence on the company appears equivalent to majority ownership.

Meanwhile, the group is unlikely to seek solidification of its grip on SEC through conversion into a holding company structure, as SEC is gradually cancelling its treasury shares. Due to the cancellations, a holding company will have difficulties in meeting ownership requirements for the SEC operating company (20% stake in listed subsidiaries).

Accordingly, Samsung Group is expected to gradually transfer Samsung Life's and Samsung F&M's stakes and part of voting rights in SEC to Samsung C&T, while maintaining the group's stake and voting rights in SEC. We thus believe Samsung C&T will take steps to ensure that its holding ratio remains below 50%, and to secure sufficient financial resources to expand its stake in SEC.

Figure 256. Samsung Group's ownership structure



Source: DART, Mirae Asset Daewoo Research

### Risks

Being engaged in a variety of businesses, SEC is inevitably subject to a number of risks. The patent battle with Apple is still ongoing, and the semiconductor business is likely to face increasing threats from Chinese players. In the TV space, amid strong growth of OLED TVs, SEC’s MicroLED/QLED TVs are struggling.

#### 95. Lawsuits

The highest-profile lawsuit SEC is engaged in is its patent-infringement disputes with Apple. The company is also involved with three antitrust suits related to TFT-LCD. SEC forecasts the results of legal disputes will not significantly affect the company’s financials.

**Table 77. SEC-involved lawsuits as of end-2017**

Lawsuits	Detail	
Apple’s patent suit	Date of filing	April 15th, 2011
	Involved parties	Plaintiff: Apple; defendant: SEC, SEA, and STA
	Grounds for suit	SEC’s infringement of Apple’s design patents and utility patents covering various smart phones and dilution of Apple’s trade dresses
	Future schedule	Retrial related to design patent infringement (May 2018)
Apple’s patent suit	Date of filing	February 8th, 2012
	Involved parties	Plaintiff: Apple; defendant: SEC, SEA, and STA
	Grounds for suit	SEC smartphones’ infringement of certain design patents owned by Apple
	Future schedule	Apple to claim royalties and lost profits
Antitrust suit related to TFT-LCD sales	Date of filing	December 19th, 2014
	Involved parties	Plaintiff: Mouse Computer, five companies in Europe, including Iiyama Defendant: SEC and other LCD panel makers
	Grounds for suit	Defendants’ formation of LCD panel cartel
	Current status	Plaintiff appealed against the lowest court’s decision The appeals court handed down judgements in March 2018
Antitrust suit related to TFT-LCD sales	Date of filing	November 4th, 2015
	Involved parties	Plaintiff: 42 government agencies in the UK Defendant: SEC and overseas subsidiaries
	Grounds for suit	Defendants’ LCD price fixing
	Future schedule	Trials yet to be scheduled
Antitrust suit related to TFT-LCD sales	Date of filing	November 26th, 2013
	Involved parties	Plaintiff: Hatzlacha (Israel) Defendant: SEC and other LCD producers
	Grounds for suit	Defendants’ formation of LCD panel cartel
	Future schedule	Trials yet to be scheduled

Source: SEC, Mirae Asset Daewoo Research

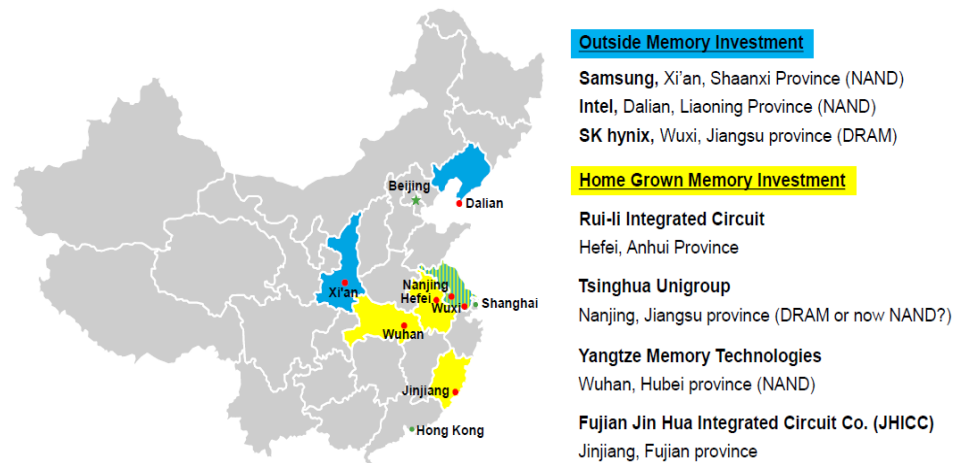
**96. Potential threat from Chinese chipmakers and US protectionist moves**

In 2017, China's semiconductor imports reached US\$260.1bn, sharply outweighing its exports of US\$66.9bn. Currently, the country's semiconductor imports are larger than its crude oil imports. Thus, it is not surprising that the Chinese government is increasing its support for the semiconductor industry.

In 2014, the Chinese government announced Guidelines on Promoting Integrated Circuit Industry Development, pledging that it will provide intensive support for the semiconductor industry through 2030. The government also presented the Made in China 2025 strategy in 2015, pledging that it would increase the country's semiconductor self-sufficiency rate to 40% by 2020 and 70% by 2025.

In light of high technological barriers to semiconductor production, existing players will likely maintain the upper hand for a prolonged period of time, especially in the DRAM segment. The current big names in semiconductors are the winners of a decade-long game of chicken in the industry. However, the case of BOE's success illustrates that Chinese players could soon become a threat on the back of massive R&D investments and government support.

**Figure 257. China's semiconductor investment**



Source: Gartner, Mirae Asset Daewoo Research

**97. QLED vs. OLED**

In the TV market, SEC claimed the top spot in 2007 (topping Sony), powered by the success of the Bordeaux TV (released in 2006), and has maintained market leadership ever since. The Bordeaux TV enjoyed great success, due to its innovative design (the industry's first curved-edge screen, speakers embedded in the bottom), allowing SEC to expand its presence in the high-end market. In our view, the high-end segment is the key to controlling the TV market.

In the high-end TV market, the penetration of OLED TV has recently been increasing rapidly. In this segment, SEC has been pushing OLED TV, but has been facing growing threats from LGE and Sony. SEC has been developing MicroLED TV as a high-end model that targets corporate customers, but it is still too expensive to be sold to B2C customers. Moreover, the firm has difficulties in sourcing OLED panels, as subsidiary Samsung Display has yet to invest in large-sized OLED panels.

If the focus of the high-end market shifts to OLED TV, SEC could suffer a setback.

**Figure 258. SEC's QLED TV**



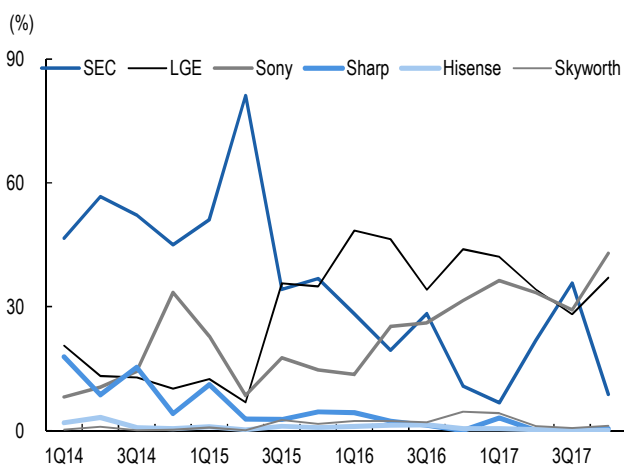
Source: Company data, Mirae Asset Daewoo Research

**Figure 259. SEC's microLED TV (The Wall)**



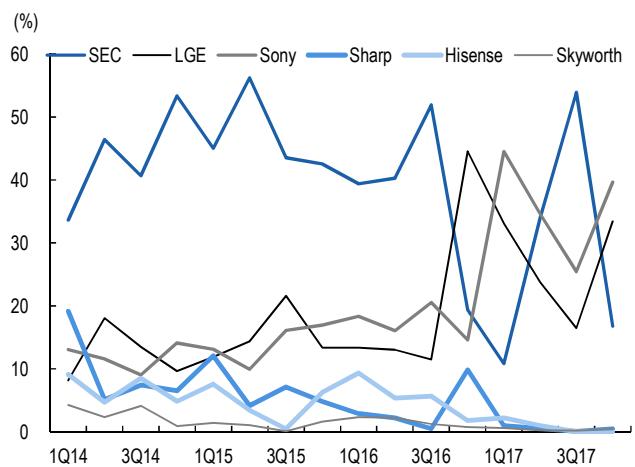
Source: Company data, Mirae Asset Daewoo Research

**Figure 260. High-end TV (\$2,500-or-higher) M/S breakdown**



Source: HIS, Mirae Asset Daewoo Research

**Figure 261. M/S breakdown for TVs priced \$1,500 or higher**



Source: HIS, Mirae Asset Daewoo Research

**98. Major contracts**

SEC has a variety of cross-licensing contracts with global companies, including Ericsson, Google, and Cisco. In addition, the company has a process technology licensing contract with GlobalFoundries (Unlisted), and holds other contracts with Microsoft (MSFT US/CP: US\$97.70), Nokia, and HP (HPQ US/CP: US\$22.71).

**Table 78. SEC's recent contracts**

Counterparty	Item	Details
Ericsson	Type	Cross-licensing contract
	Conclusion date/contract period	Jan. 25, 2014
	Purpose	Secure business freedom via cross licensing
	Others	-
Google	Type	Cross-licensing contract
	Conclusion date/contract period	Jan. 25, 2014/permanent
	Purpose	Secure business freedom via cross licensing
	Others	Permanent licensing contract (including patents to be granted over the next 10 years)
Cisco	Type	Cross-licensing contract
	Conclusion date/contract period	Jan. 23, 2014
	Purpose	Secure business freedom via cross licensing
	Others	-
GlobalFoundries	Type	Process-technology-licensing contract
	Conclusion date/contract period	Feb. 28, 2014
	Purpose	Expansion of customer base for 14nm process production
	Others	-
InterDigital	Type	Patent-licensing contract
	Conclusion date/contract period	June 3, 2014
	Purpose	Secure business freedom via patent licensing
	Others	-
Sharp	Type	Cross-licensing contract
	Conclusion date/contract period	Jan. 1, 2015
	Purpose	Secure business freedom via cross licensing
	Others	-
Microsoft	Type	Dispute-resolution agreement
	Conclusion date/contract period	-
	Purpose	Ends a dispute related to royalty payment
	Others	-
Nokia	Type	Patent licensing contract
	Conclusion date/contract period	July 12, 2016
	Purpose	Secure business freedom via patent licensing
	Others	-
HP	Type	Sale of the printing business unit
	Conclusion date/contract period	Sept. 12, 2016
	Purpose	Enhances core competency
	Others	Contract value: US\$1.05bn
Harman	Type	Stake acquisition
	Conclusion date/contract period	Nov. 14, 2016
	Purpose	Bolster competitiveness via stake acquisition
	Others	Contract value: US\$8.02bn

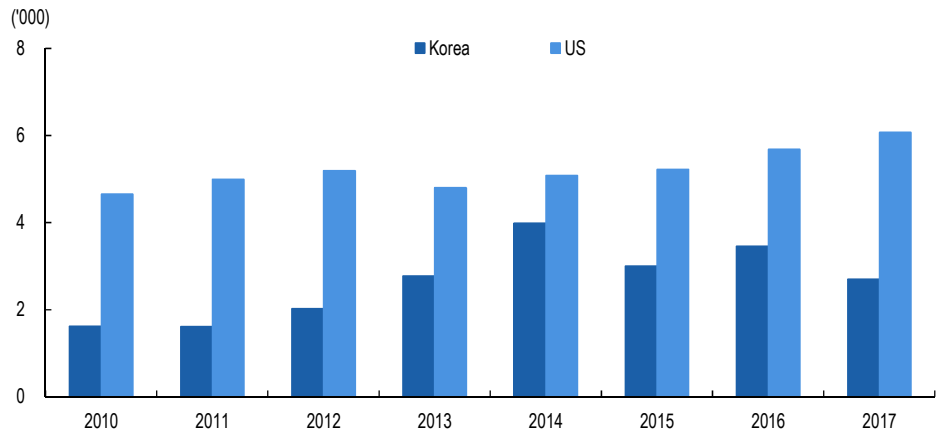
Source: Company data, Mirae Asset Daewoo Research

**99. Patents**

As of January 2018, SEC is reported to hold 75,596 US patents, greater than those held by IBM. Since 2010, SEC has obtained around 5,000 patents in the US and 2,000 in Korea every year.

The value of patents is difficult to estimate. However, the fact that SEC ranks first in terms of patents in the US market is meaningful, as: 1) patents are essential for tech firms like SEC; and 2) they can differentiate the company from Chinese competitors.

**Figure 262. No. of patents held by SEC**



Source: Company data, Mirae Asset Daewoo Research

**Table 79. No. of US patents held by global firms (as of January 2018)**

Ranking	Company	No. of US patents held
1	SEC	75,596
2	IBM	46,443
3	Canon	38,996
4	MS	33,327
5	Intel	30,985
6	Panasonic	28,255
7	LGE	28,235
8	SONY	28,210
9	Hitachi	25,917
10	Toshiba	23,014

Source Mirae Asset Daewoo Research

## Samsung Electronics (005930 KS/Buy/TP: W73,000)

## Comprehensive Income Statement (Summarized)

(Wbn)	12/17	12/18F	12/19F	12/20F
<b>Revenue</b>	<b>239,575</b>	<b>248,041</b>	<b>255,289</b>	<b>262,749</b>
<b>Cost of Sales</b>	<b>129,291</b>	<b>127,329</b>	<b>130,691</b>	<b>134,510</b>
<b>Gross Profit</b>	<b>110,284</b>	<b>120,712</b>	<b>124,598</b>	<b>128,239</b>
<b>SG&amp;A Expenses</b>	<b>56,640</b>	<b>52,797</b>	<b>55,704</b>	<b>57,401</b>
<b>Operating Profit (Adj)</b>	<b>53,645</b>	<b>67,916</b>	<b>68,894</b>	<b>70,838</b>
<b>Operating Profit</b>	<b>53,645</b>	<b>67,916</b>	<b>68,894</b>	<b>70,838</b>
<b>Non-Operating Profit</b>	<b>2,551</b>	<b>7,153</b>	<b>9,749</b>	<b>3,305</b>
Net Financial Income	959	1,486	2,440	3,305
Net Gain from Inv in Associates	201	0	0	0
Pretax Profit	56,196	75,069	78,643	74,143
Income Tax	14,009	19,881	20,242	19,449
Profit from Continuing Operations	42,187	55,188	58,401	54,694
Profit from Discontinued Operations	0	0	0	0
<b>Net Profit</b>	<b>42,187</b>	<b>55,188</b>	<b>58,401</b>	<b>54,694</b>
Controlling Interests	41,345	54,287	57,399	53,755
Non-Controlling Interests	842	900	1,002	938
<b>Total Comprehensive Profit</b>	<b>36,684</b>	<b>55,188</b>	<b>58,401</b>	<b>54,694</b>
Controlling Interests	35,888	54,014	57,159	53,530
Non-Controlling Interests	797	1,174	1,242	1,163
EBITDA	75,762	91,119	93,364	96,812
FCF (Free Cash Flow)	19,370	51,054	54,159	50,861
EBITDA Margin (%)	31.6	36.7	36.6	36.8
Operating Profit Margin (%)	22.4	27.4	27.0	27.0
Net Profit Margin (%)	17.3	21.9	22.5	20.5

## Cash Flows (Summarized)

(Wbn)	12/17	12/18F	12/19F	12/20F
<b>Cash Flows from Op Activities</b>	<b>62,162</b>	<b>78,438</b>	<b>82,912</b>	<b>80,825</b>
Net Profit	42,187	55,188	58,401	54,694
Non-Cash Income and Expense	36,211	41,488	42,161	42,008
Depreciation	20,594	21,697	22,908	24,225
Amortization	1,524	1,507	1,561	1,749
Others	14,093	18,284	17,692	16,034
Chg in Working Capital	-10,621	47	41	157
Chg in AR & Other Receivables	-7,676	-281	-245	-825
Chg in Inventories	-8,445	-254	-221	-744
Chg in AP & Other Payables	5,102	92	80	270
Income Tax Paid	-6,827	-19,881	-20,242	-19,449
<b>Cash Flows from Inv Activities</b>	<b>-49,385</b>	<b>-29,835</b>	<b>-31,192</b>	<b>-34,683</b>
Chg in PP&E	-42,484	-27,384	-28,753	-29,963
Chg in Intangible Assets	-983	-1,836	-1,903	-2,918
Chg in Financial Assets	2,377	-615	-536	-1,802
Others	-8,295	0	0	0
<b>Cash Flows from Fin Activities</b>	<b>-12,561</b>	<b>-4,964</b>	<b>-9,622</b>	<b>-9,900</b>
Chg in Financial Liabilities	3,532	0	0	-279
Chg in Equity	0	0	0	0
Dividends Paid	-6,804	-4,964	-9,622	-9,622
Others	-9,289	0	0	1
<b>Increase (Decrease) in Cash</b>	<b>-1,566</b>	<b>43,570</b>	<b>42,038</b>	<b>36,039</b>
Beginning Balance	32,111	30,545	74,115	116,153
Ending Balance	30,545	74,115	116,153	152,192

Source: Company data, Mirae Asset Daewoo Research estimates

## Statement of Financial Condition (Summarized)

(Wbn)	12/17	12/18F	12/19F	12/20F
<b>Current Assets</b>	<b>146,982</b>	<b>191,736</b>	<b>234,805</b>	<b>274,293</b>
Cash and Cash Equivalents	30,545	74,115	116,153	152,192
AR & Other Receivables	31,805	32,128	32,410	33,338
Inventories	24,983	25,237	25,459	26,203
Other Current Assets	59,649	60,256	60,783	62,560
<b>Non-Current Assets</b>	<b>154,770</b>	<b>160,935</b>	<b>167,251</b>	<b>174,596</b>
Investments in Associates	6,802	6,871	6,932	7,134
Property, Plant and Equipment	111,666	117,353	123,198	128,936
Intangible Assets	14,760	15,090	15,431	16,600
<b>Total Assets</b>	<b>301,752</b>	<b>352,671</b>	<b>402,057</b>	<b>448,888</b>
<b>Current Liabilities</b>	<b>67,175</b>	<b>67,695</b>	<b>68,148</b>	<b>69,392</b>
AP & Other Payables	22,984	23,217	23,421	24,105
Short-Term Financial Liabilities	16,046	16,046	16,046	15,768
Other Current Liabilities	28,145	28,432	28,681	29,519
<b>Non-Current Liabilities</b>	<b>20,086</b>	<b>20,262</b>	<b>20,415</b>	<b>20,931</b>
Long-Term Financial Liabilities	2,768	2,768	2,768	2,768
Other Non-Current Liabilities	17,318	17,494	17,647	18,163
<b>Total Liabilities</b>	<b>87,261</b>	<b>87,956</b>	<b>88,563</b>	<b>90,322</b>
<b>Controlling Interests</b>	<b>207,213</b>	<b>256,537</b>	<b>304,314</b>	<b>348,448</b>
Capital Stock	898	898	898	898
Capital Surplus	4,404	4,404	4,404	4,404
Retained Earnings	215,811	265,134	312,912	357,045
<b>Non-Controlling Interests</b>	<b>7,278</b>	<b>8,178</b>	<b>9,180</b>	<b>10,118</b>
<b>Stockholders' Equity</b>	<b>214,491</b>	<b>264,715</b>	<b>313,494</b>	<b>358,566</b>

## Forecasts/Valuations (Summarized)

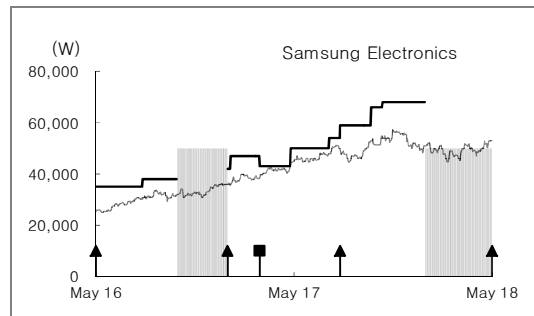
	12/17	12/18F	12/19F	12/20F
P/E (x)	9.4	7.7	7.5	7.5
P/CF (x)	5.5	5.0	4.0	4.2
P/B (x)	1.7	1.4	1.2	1.1
EV/EBITDA (x)	4.3	2.5	1.6	1.1
EPS (W)	5,421	7,410	7,838	7,341
CFPS (W)	10,280	13,195	13,732	13,205
BPS (W)	28,971	35,882	42,407	48,433
DPS (W)	850	1,416	1,416	1,416
Payout ratio (%)	12.1	15.3	14.5	15.5
Dividend Yield (%)	83.4	133.6	133.6	133.6
Revenue Growth (%)	18.7	3.5	2.9	2.9
EBITDA Growth (%)	51.7	20.3	2.5	3.7
Operating Profit Growth (%)	83.5	26.6	1.4	2.8
EPS Growth (%)	98.2	36.7	5.8	-6.3
Accounts Receivable Turnover (x)	9.2	8.9	9.1	9.2
Inventory Turnover (x)	11.1	9.9	10.1	10.2
Accounts Payable Turnover (x)	16.6	13.9	14.2	14.3
ROA (%)	15.0	16.9	15.5	12.9
ROE (%)	21.0	23.4	20.5	16.5
ROIC (%)	29.6	32.3	31.8	31.3
Liability to Equity Ratio (%)	40.7	33.2	28.3	25.2
Current Ratio (%)	218.8	283.2	344.6	395.3
Net Debt to Equity Ratio (%)	-30.0	-41.0	-48.2	-52.7
Interest Coverage Ratio (x)	81.9	91.3	92.6	95.9

# APPENDIX 1

## Important Disclosures & Disclaimers

### 2-Year Rating and Target Price History

Company (Code)	Date	Rating	Target Price
Samsung Electronics (005930)	05/03/2018	Buy	73,000
	12/31/2017	No Coverage	
	10/13/2017	Buy	68,000
	09/22/2017	Buy	66,000
	07/27/2017	Buy	59,000
	07/07/2017	Trading Buy	54,000
	04/27/2017	Trading Buy	50,000
	03/01/2017	Trading Buy	43,000
	01/06/2017	Buy	47,000
	01/01/2017	Buy	42,000
	09/30/2016	No Coverage	
	07/28/2016	Buy	38,000
	04/29/2016	Buy	35,000



### Stock Ratings

- Buy : Relative performance of 20% or greater
- Trading Buy : Relative performance of 10% or greater, but with volatility
- Hold : Relative performance of -10% and 10%
- Sell : Relative performance of -10%

### Industry Ratings

- Overweight : Fundamentals are favorable or improving
- Neutral : Fundamentals are steady without any material changes
- Underweight : Fundamentals are unfavorable or worsening

Ratings and Target Price History (Share price (—), Target price (—), Not covered (■), Buy (▲), Trading Buy (■), Hold (●), Sell (◆))

- \* Our investment rating is a guide to the relative return of the stock versus the market over the next 12 months.
- \* Although it is not part of the official ratings at Mirae Asset Daewoo Co., Ltd., we may call a trading opportunity in case there is a technical or short-term material development.
- \* The target price was determined by the research analyst through valuation methods discussed in this report, in part based on the analyst's estimate of future earnings.
- \* The achievement of the target price may be impeded by risks related to the subject securities and companies, as well as general market and economic conditions.

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	Buy	Trading Buy	Hold	Sell
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Investment Banking Services	70.73%	19.51%	9.76%	0.00%

\* Based on recommendations in the last 12-months (as of March 31, 2018)

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