



# Simmtech

COMPANY REPORT #19-18

Bloomberg Code 222800 KS / Reuters Code 222800.KS

## BUY

Initiate Handset/electronics

CP (Nov. 13) KRW11,350

TP (6 months) KRW15,500

Upside 36.6%



[ Analyst ]

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KOSPI	2,122.45p
KOSDAQ	661.85p
Market cap	KRW258.2bn/USD226.5mn
Par value	KRW500
Outstanding shares	22.8mn
Free float	12.5mn(54.9%)
52-week high/low	KRW11,350/KRW5,150
60-day avg. trading volume	346,025shrs
60-day avg. turnover	KRW3,235mn
Foreign ownership	7.27%
Major shareholders	
Simmtech Holdings and 7 others	45.02%
Absolute performance	3M 78.7%
	6M 76.0%
	12M 53.4%
Relative performance	3M 59.5%
to KOSDAQ	6M 88.5%
	12M 55.5%

## Big cycle for package substrates

### Korea's memory package substrate bellwether

Simmtech manufactures printed circuit boards (PCB) with the supply of substrates used in the semiconductor packaging process accounting for 72% of total sales. The company's core competitiveness comes from: 1) solid partnerships with chipmakers maintained over the past 30+ years; and 2) strengths in memory-use PCB technology.

### Big cycle for package substrates to start in 2020

We expect an upturn in Simmtech's earnings from 2020. Investment points are: 1) structural improvement in package substrate market conditions with supply likely to fall short of demand for certain products; 2) earnings improvement expected from the rebound in memory market conditions with an added boost from DDR5; and 3) turnaround in earnings at the loss-making subsidiary and subsequent increase in operating leverage effect.

### Initiate coverage with BUY rating and target price of KRW15,500

We initiate coverage of Simmtech with BUY for a target price of KRW15,500. Our target price is based on 2020F EPS and the global peer average PER of 15.8x. Operating profit for 2020 and 2021 could far exceed current forecasts as top-line growth starts to drive down the fixed cost burden and the rise in sales share of high margin products leads to profitability improvement.

Year to December	2017	2018	2019F	2020F	2021F
Sales (bn KRW)	811.6	1,007.5	987.6	1,107.1	1,185.3
OP (bn KRW)	33.8	30.8	(18.0)	43.3	68.8
Net Income (bn KRW)	15.9	5.0	(28.0)	23.2	45.8
EPS (KRW)	677	194	(1,193)	1,004	1,978
BPS (KRW)	8,586	8,739	7,106	7,952	9,773
OP Margin (%)	4.2	3.1	(1.8)	3.9	5.8
NP Margin (%)	2.0	0.2	(2.9)	2.4	4.4
ROE (%)	8.2	2.4	(14.8)	13.3	22.3
PER (x)	15.6	35.0	(9.5)	11.3	5.7
PBR (x)	1.2	0.8	1.6	1.4	1.2
EV/EBITDA (x)	5.3	3.6	8.2	3.4	2.2

Source: Company data, Shinhan Investment Corp. / Note: TB = turn black, TR = turn red, RR = remain red

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## I. Investment summary

### Semiconductor PCB manufacturer

Simmtech manufactures printed circuit boards (PCB) with the supply of substrates used in the semiconductor packaging process accounting for 72% of total sales. The company's core competitiveness comes from: 1) solid partnerships with chipmakers maintained over the past 30+ years; and 2) strengths in memory-use PCB technology.

### Investment points

**Investment points:**

- 1) Structural improvement in substrate supply/demand
- 2) Rebound in memory market conditions
- 3) Decline in subsidiary losses

1) Structural improvement in package substrate market conditions: Global supply of package substrates is on a decline while demand continues to grow on the diversification of system semiconductors. The global shift to 5G and increase in server demand are also adding a boost. Growing focus on high value-added package substrates by top-tier firms is driving structural improvement in the package substrate industry and a trickle-down effect of benefits across the board.

2) Rebound in memory market conditions: Smartphone market conditions are expected to rebound in 2020 on the release of 5G models. With mobile-use products accounting for 55% of total sales, Simmtech should see earnings improve on the upturn in client market conditions. The semiconductor industry's shift to DDR5 is also expected to add growth opportunities.

3) Earnings recovery at subsidiary: Subsidiary Eastern has been focusing on expanding its clientele and is expected to report top-line growth from 4Q19. Earnings improvement should start in earnest from 2020. Decline in losses at the subsidiary and increase in capacity utilization rates at the parent should lead to company-wide margin gains.

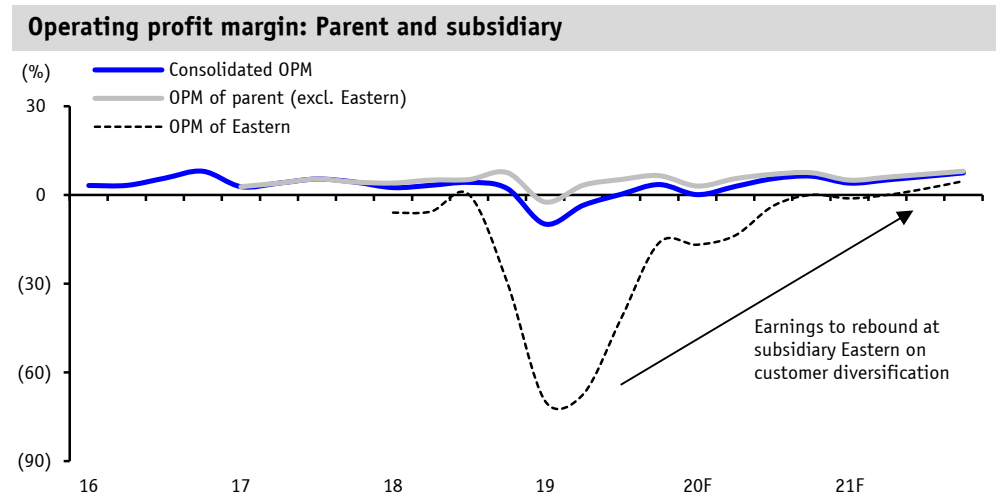
### Valuation and share price trend

**Initiate coverage with BUY and target price of KRW15,500**

We initiate coverage of Simmtech with BUY for a target price of KRW15,500. Our target price is based on 2020F EPS and the global peer average PER of 15.8x. Operating profit for 2020 and 2021 could far exceed current forecasts as top-line growth starts to drive down the fixed cost burden and the rise in sales share of high margin products leads to profitability improvement.

Shares have sharply gained in recent trading but are still cheap at a 12-month forward PSR of 0.24x vs. the historical peak of 0.7x recorded before the reshuffle of ownership. We see ample upside from current levels with the company just starting to see capacity utilization improvement and operating leverage effect.

**Improvement in subsidiary OPM from current -70% to drive operating leverage effect**



Source: Dart, Shinhan Investment Corp.

## II. Valuation

### Current PSR at 0.24x; higher utilization to drive operating leverage effect

We initiate coverage with BUY for a target price of KRW15,500. Our target price is based on 2020F EPS and the global peer average PER of 15.8x. Simmtech shares are currently trading at a 2020F PER of 11.3x and 2019F PBR of 1.6x. Target valuations, based on forecasts for the start of an upturn in earnings, may seem high at first glance.

However, our operating profit projection for 2020 (KRW43.3bn) only reflects expected earnings improvement at the subsidiary and company-wide sales growth. Operating profit for 2020 and 2021 could far exceed current forecasts as top-line growth starts to drive down the fixed cost burden and the rise in sales share of high margin products leads to profitability improvement.

Shares have sharply gained in recent trading but are still cheap at a 12-month forward PSR of 0.24x vs. the historical peak of 0.7x recorded before the reshuffle of ownership. We see ample upside from current levels with the company just starting to see capacity utilization improvement and operating leverage effect.

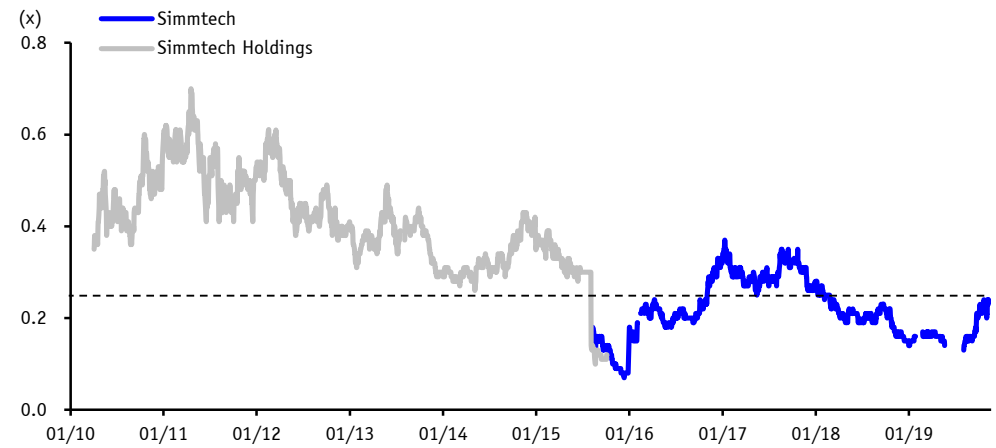
#### Target price calculation

(KRW, x)	2020F	Remarks
Target price	15,500	
EPS	1,004	2020F EPS
Target PER	15.8	PER average of global peers
Value per share	15,863	

Source: Shinhan Investment Corp.

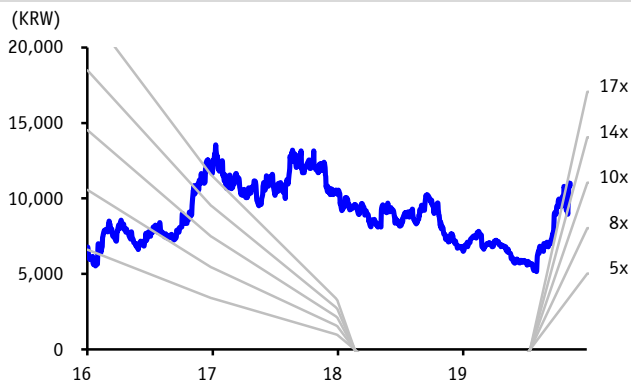
Simmtech shares trading at a PSR of 0.24x vs. historical peak of 0.7x

#### PSR trend of Simmtech and Simmtech Holdings



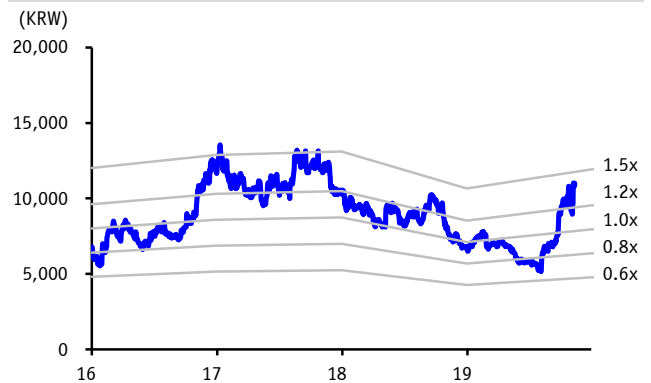
Source: QuantiWise, Shinhan Investment Corp.

#### Simmtech: 12-month forward PER band



Source: QuantiWise, Shinhan Investment Corp.

#### Simmtech: 12-month forward PBR band



Source: QuantiWise, Shinhan Investment Corp.

### Review of share price trends

#### Release of DDR platforms

- DDR1: 2002
- DDR2: 2004
- DDR3: 2007
- DDR4: 2014
- DDR5: 2020-2021F

In the past, Simmtech’s earnings and shares fluctuated alongside DRAM market conditions and technological advancements. The shift to DDR2 in 2004, DDR3 in 2007 and DDR4 in 2014 all led to visible share price improvement.

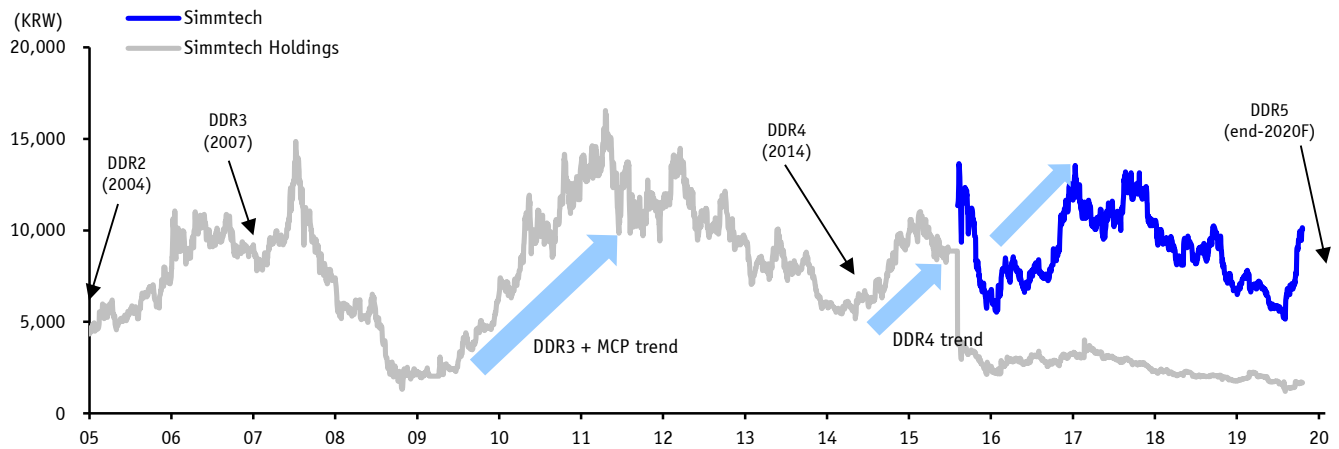
Simmtech posted solid earnings following the launch of DDR3 in 2007. However, sluggish DRAM market conditions and losses of KRW150bn incurred at the end of 2008 on a forex knock-in knock-out (KIKO) option led to the company's designation as an administrative issue for a one-year period. Following the removal of the KIKO issue, Simmtech's earnings resumed on an uptrend from 2009 through 2011 on the rise in sales share of DDR3 products and mobile-use MCP package substrates.

Earnings turned negative as a fire accident in February 2013 caused the entire module PCB production line to shut down for two months. The company was able to turn around earnings with aggressive capacity conversion and a boost from the shift to DDR4.

From 2H18, weak DRAM demand started to weigh on Simmtech’s earnings. Consolidated operating earnings turned negative in 1H19 as falling utilization rates led to a hike in losses at subsidiary Eastern.

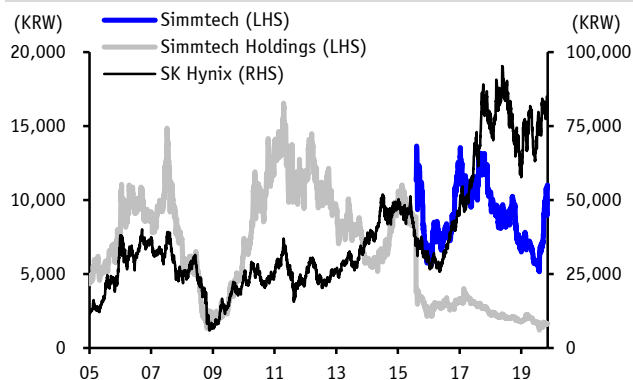
Shares recently rallied as expectations turned upbeat on structural improvement in package substrate market conditions and rise in capacity utilization rates. We now urge investors to focus on forecasts for an upturn in memory market conditions and the shift to DDR5 in 2020. We believe supply/demand conditions for package substrates will improve in this market cycle with demand growth expected to outpace supply growth.

#### Share performance of Simmtech and Simmtech Holdings



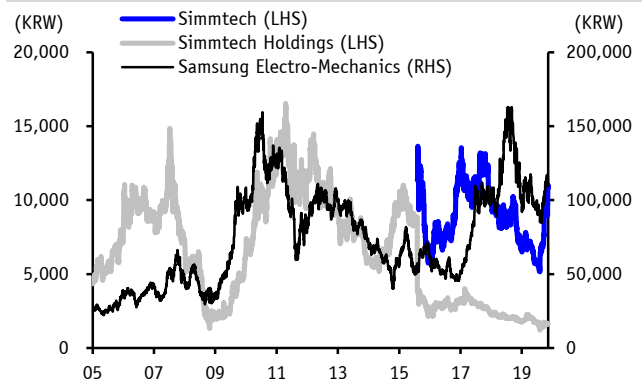
Source: QuantiWise, Shinhan Investment Corp.

#### Relative share performance vs. SK Hynix



Source: QuantiWise, Shinhan Investment Corp.

#### Relative share performance vs. Samsung Electro-Mechanics



Source: QuantiWise, Shinhan Investment Corp.

## Peer group analysis

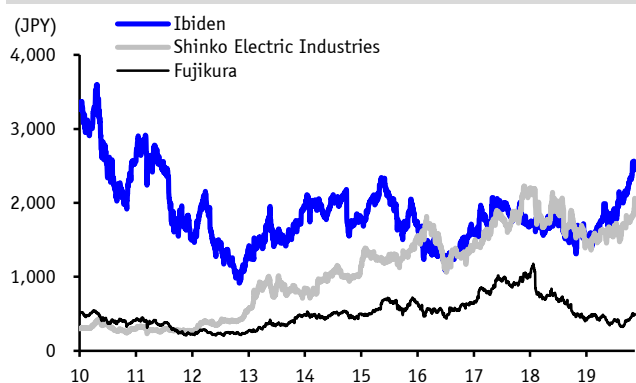
Companies in the PCB supply chain are mostly based in Taiwan, China, Korea and Japan.

Share prices of certain PCB suppliers are now on a rebound, backed by: 1) market share gains in the case of China/Taiwan-based companies; 2) Apple's adoption of substrate-like PCB (SLP) mainboards on iPhones; and 3) growing demand for package substrates on client efforts to diversify and raise margins of system semiconductors.

Peer group valuation													
(mn USD, x, %)		2019F						2020F					
Company	Market cap	PER	PBR	EV/EBITDA	ROE	OPM	NPM	PER	PBR	EV/EBITDA	ROE	OPM	NPM
Simmtech	221	(9.5)	1.6	8.2	(14.8)	(1.8)	(2.9)	11.3	1.4	3.4	13.3	3.9	2.4
Samsung Electro-Mechanics	7,034	14.3	1.6	6.2	11.6	8.1	7.1	16.2	1.4	5.7	9.6	8.6	5.8
LG Innotek	2,411	14.9	1.2	4.6	8.6	4.3	2.4	10.6	1.1	4.1	11.2	4.6	2.9
Daeduck Electronics	701	12.0	0.8	5.1	6.8	6.7	6.7	10.2	0.8	4.4	7.8	7.7	7.3
Korea Circuit	218	490.9	0.9	9.5	0.5	0.2	0.4	32.7	0.9	6.9	2.9	2.0	1.8
Ibiden	3,218	275.2	1.3	9.3	0.6	3.3	0.6	39.2	1.3	7.5	3.3	5.9	3.1
Unimicron Technology	2,383	21.3	1.6	6.7	7.5	5.0	4.2	16.9	1.5	5.8	10.2	6.2	5.0
AT&S Austria Technologie & Systemtechnik	722	8.3	1.1	4.2	13.6	11.8	7.7	10.9	1.0	4.5	9.8	-	7.4
Shinko Electric Industries	1,349	35.0	1.1	4.6	2.9	4.1	2.9	85.6	1.1	5.5	1.0	1.8	1.2
Suzhou Dongshan Precision Manufacturing (MFLEX)	4,503	23.2	3.2	10.9	14.0	7.2	5.5	16.6	2.7	8.6	16.8	8.0	6.6
Shennan Circuits	7,494	46.0	10.6	30.8	24.6	12.5	11.0	33.7	8.3	23.2	25.7	13.1	11.4
Shenzhen Kinwong Electronic	3,797	27.3	4.4	21.6	17.9	16.6	15.2	21.3	3.6	15.4	19.3	17.2	15.1
Shenzhen Suntak Circuit Technology	2,187	25.6	4.7	15.7	16.8	18.1	15.5	19.8	4.2	13.8	18.6	19.3	16.9
Shenzhen Fastprint Circuit Tech	1,618	39.5	4.2	21.8	9.5	8.5	6.6	29.9	3.7	15.6	11.4	8.6	6.7
Victory Giant Technology Huizhou	4,565	44.2	3.2	9.8	9.0	3.9	1.6	20.3	2.8	8.7	13.9	4.7	3.0
China Circuit Technology Shantou	4,384	27.6	3.9	25.6	13.5	39.1	35.3	21.6	3.4	19.2	15.4	40.6	36.5
Zhen Ding Technology Holding	4,112	13.6	1.8	5.3	13.8	12.9	7.4	12.1	1.6	4.7	13.7	13.6	7.5
Tripod Technology	2,318	12.5	2.0	5.8	16.7	11.8	10.4	11.6	1.9	5.4	16.8	12.5	10.7
Compeq Manufacturing	1,989	17.0	2.4	7.3	13.9	9.8	6.3	13.6	2.1	6.2	16.1	11.4	7.2
HannStar Board	725	11.2	1.2	-	-	6.1	4.8	-	-	-	-	-	-
TPK Holding	748	37.7	0.6	2.5	1.5	0.7	0.4	44.2	0.6	2.6	1.4	0.5	0.4
Kinsus Interconnect Technology	710	-	0.8	7.4	(6.9)	(7.0)	(8.0)	47.6	0.8	4.2	1.0	2.8	2.0
Unitech	703	10.9	1.9	6.3	18.3	11.2	8.7	10.0	1.7	6.3	16.3	10.9	9.1
Chin-Poon Industrial	402	18.2	0.8	5.5	4.0	3.0	3.8	14.0	0.8	4.4	5.8	5.1	4.6

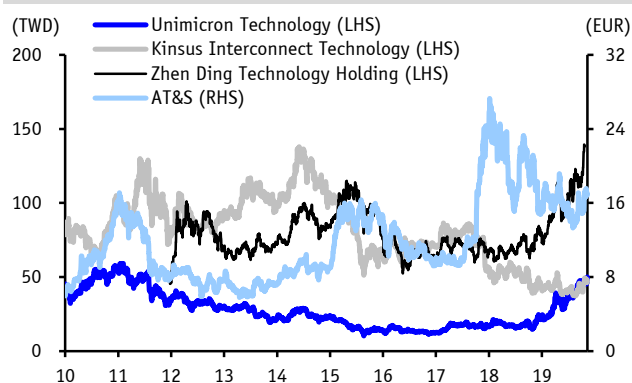
Source: Bloomberg, Shinhan Investment Corp.

### Share performance of Japan-based PCB makers



Source: Bloomberg, Shinhan Investment Corp.

### Share performance of Taiwan/Austria-based PCB makers



Source: Bloomberg, Shinhan Investment Corp.

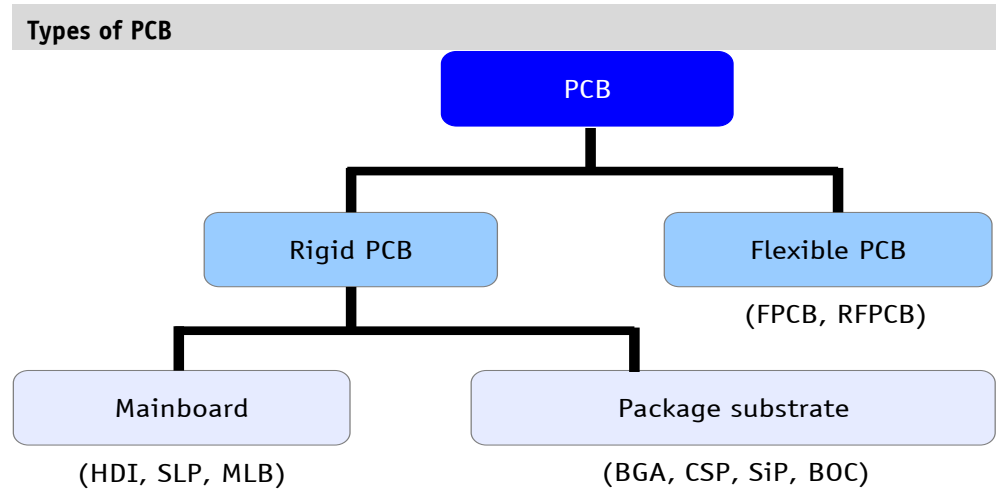
### III. Company overview

#### PCB and package substrate supplier

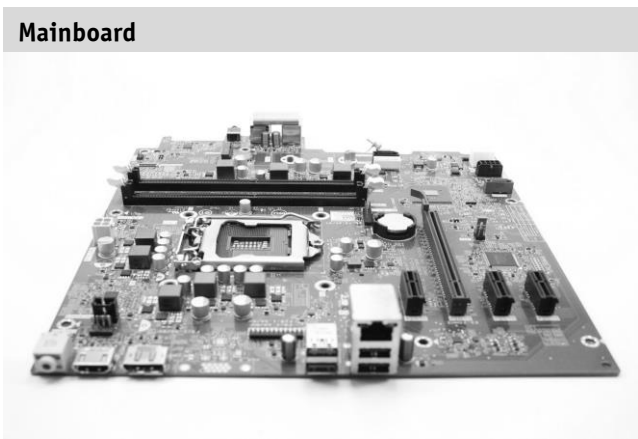
Simmtech manufactures printed circuit boards (PCB), a key component in tech devices.

PCBs are used to attach and connect various components, with electronic circuit patterns printed on the boards to allow parts to properly function. PCBs are categorized into rigid or flexible PCBs depending on material, and rigid PCBs into mainboards and substrates according to use.

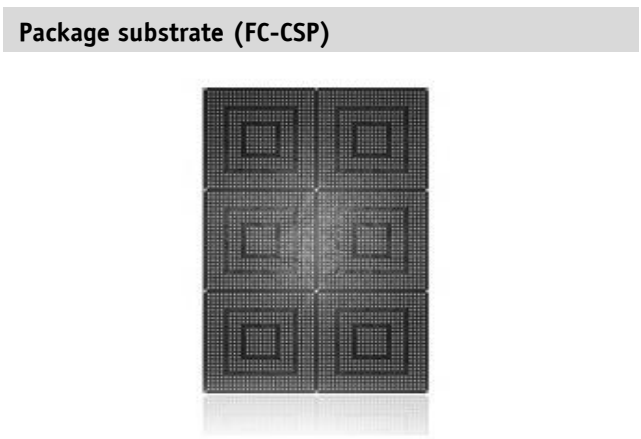
Used mainly to attach components, mainboards are offered in a wide variety including high density interconnect (HDI), substrate-like PCB (SLP) and multilayer boards (MLB), and selected according to the required level of performance of the end product. Substrates are used in the packaging process to connect semiconductor chips to the mainboard.



Source: Shinhan Investment Corp.



Source: Dell, Shinhan Investment Corp.



Source: Simmtech, Shinhan Investment Corp.

**Core competitiveness:**

- Solid partnerships with chipmakers
- Strengths in memory-use PCB technology

**Company history and core competitiveness**

We focus on Simmtech's competitiveness in memory-use PCBs.

Simmtech started off in 1987 as a memory module PCB manufacturer. The company initiated production of package substrates (ball grid array) in 1996.

Since its beginning, the company has maintained solid partnerships with global chipmakers Samsung Electronics and SK Hynix. The company has also supplied system semiconductor-use PCBs to chipmakers in Greater China from 2012.

Simmtech was spun off from Simmtech Holdings in 2015 in the conversion to a holding company structure. In 2016, STJ Holdings was established for equity investment in Japan-based PCB maker Eastern. Simmtech later on acquired Eastern as a subsidiary in efforts to expand production capacity and add new clients.

Simmtech has focused on the development and production of semiconductor-use PCBs, with its core competitiveness coming from: 1) partnerships with chipmakers maintained over the past 30+ years; and 2) strengths in memory-use PCB technology.

As of 2019, semiconductor-related products account for 99% of the company's total sales with 85% coming from memory-related products.

**Company milestones**

Date	Details
Aug 1987	Established Chungbuk Electronics
Sep 1988	Completed construction on first PCB plant
Nov 1990	Received USD5mn Export Tower Award on the 27th Trade Day
Feb 1995	Changed company name to Simmtech
Sep 1996	Completed construction on the country's first ball grid array (BGA) production line
Nov 1997	Received USD50mn Export Tower Award on the 34th Trade Day
Aug 1999	Completed construction on second PCB plant in Cheongju
Jan 2000	Listed on the KOSDAQ
May 2002	Completed joint development of build-up flip chip BGA with Japan's CMK
Apr 2004	Signed chip-scale package (CSP) supply agreement with Samsung Techwin
Nov 2004	Received USD100mn Export Tower Award on the 41st Trade Day and Order of Iron Tower Industrial Service Merit
Nov 2006	Received USD200mn Export Tower Award on the 43th Trade Day and Order of Bronze Tower Industrial service Merit
Jun 2008	Initiated large-scale supply of products to Japan's Toshiba
Dec 2009	Issued KRW30bn BWs targeted at domestic institutional investors
Jul 2010	Established Simmtech Hong Kong Holdings and production line in China (Simmtech Electronics)
Nov 2010	Received USD400mn Export Tower Award on the 47th Trade Day
Dec 2011	Received USD500mn Export Tower Award on the 48th Trade Day
Jul 2015	Spun off from Simmtech Holdings
Aug 2015	Relisted on the KOSDAQ (August 7, 2015)
Sep 2015	Completed a rights issue through third-party allocation to Simmtech Hong Kong Holdings
May 2016	Established STJ Holdings in Japan
Jul 2016	Participated in the rights issue of STJ Holdings
Dec 2016	Simmtech's buried pattern PCB selected as a World Class Product of Korea by the Ministry of Trade, Industry and Energy
Jan 2017	Issued redeemable convertible preferred stock through third-party allocation to Simmtech Holdings
Dec 2017	STJ Holdings acquired additional stake in Eastern (total stake: 68.98%)
Dec 2017	STJ Holdings and Eastern included as subsidiaries of Simmtech
Feb 2018	Established Simmtech Global (initial capital contribution)
Jun 2018	STJ Holdings increased its stake in Eastern to 96.08% through debt-to-equity swap
Nov 2018	Completed investment in kind in Simmtech Global
Dec 2018	Received USD600mn Export Tower Award on the 55th Trade Day

Source: Simmtech, Dart, Shinhan Investment Corp.



**Sales breakdown by product and client**

**Sales share by client:**

- Domestic 65%
- Overseas 35%

**Sales share by product:**

- Package substrate 72%
- Module PCB 28%

Among companies in the domestic PCB supply chain, Simmtech has the highest sales share of memory-use PCBs. The company also boasts a diversified product lineup and client base.

As of 2019, package substrates account for 72% of sales and module PCBs 28%. In package substrate sales, 60% comes from MCP (multi-chip package), 20% from BOC (board on chip) and 17% from system semiconductor-use products such as FC-CSP (flip chip-CSP).

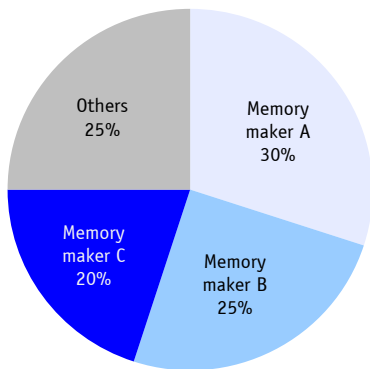
The share of memory-related sales stands at 85%. Simmtech continues to maintain solid partnerships with Samsung Electronics, SK Hynix and Micron Technology, and also supplies products to semiconductor packaging companies at home and abroad.

We estimate that domestic clients contribute to 65% of sales and overseas clients 35%.

Among domestic peers, Simmtech relies the most on package substrates for sales at 72%, vs. Daeduck Electronics 45%, Korea Circuit 30%, Haesung DS 26%, Samsung Electro-Mechanics 12% and LG Innotek 4%.

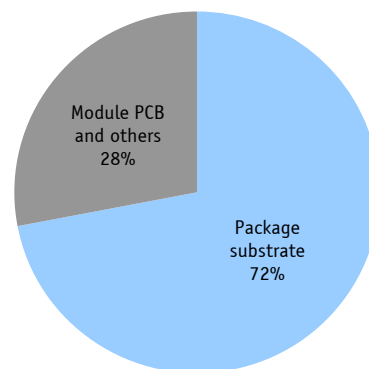
Simmtech is expected to emerge as the biggest beneficiary of: 1) structural improvement of the package substrate industry (diversification and technological advancement of system semiconductors); 2) expected upturn in DRAM and NAND market conditions in 2020; and 3) shift in semiconductor technology to finer processes and DDR5.

**Sales breakdown by client**



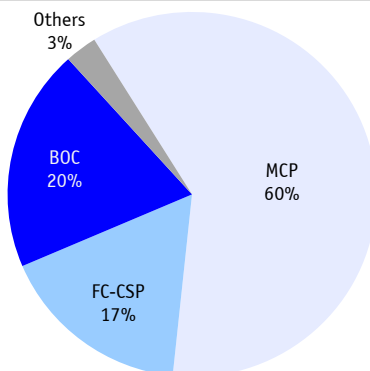
Source: DART, Shinhan Investment Corp.  
Note: As of 2019

**Sales breakdown by business**



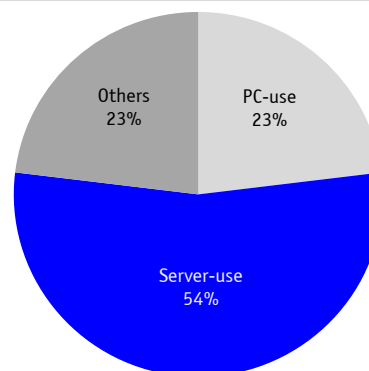
Source: DART, Shinhan Investment Corp.  
Note: As of 2019

**Package substrate sales breakdown**



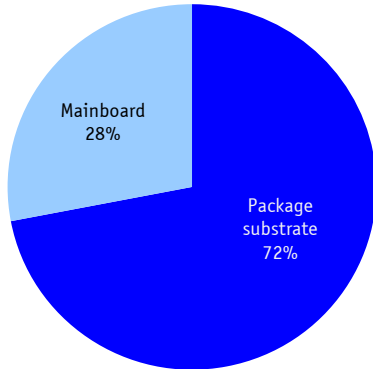
Source: DART, Shinhan Investment Corp.  
Note: As of 2019

**Module PCB sales breakdown**



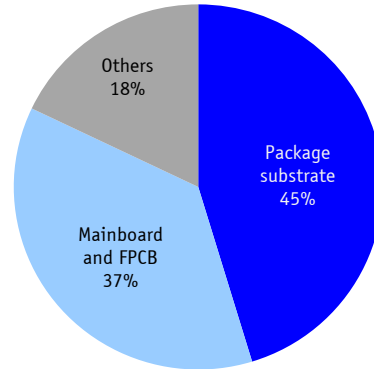
Source: DART, Shinhan Investment Corp.  
Note: As of 2019

**Simmtech: Sales breakdown by product**



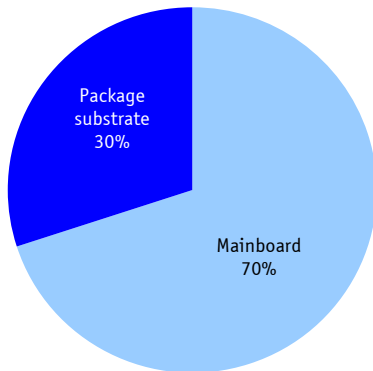
Source: DART, Shinhan Investment Corp.  
 Note: As of 2019

**Daeduck Electronics: Sales breakdown by product**



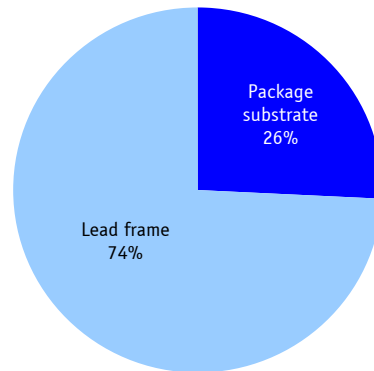
Source: DART, Shinhan Investment Corp.  
 Note: As of 2019

**Korea Circuit: Sales breakdown by product**



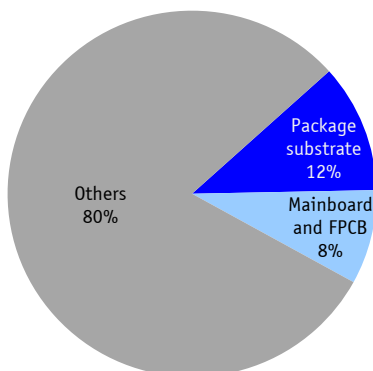
Source: DART, Shinhan Investment Corp.  
 Note: As of 2019

**Haesung DS: Sales breakdown by product**



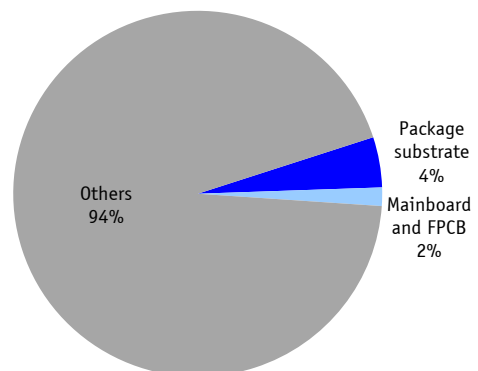
Source: DART, Shinhan Investment Corp.  
 Note: As of 1H19

**Samsung Electro-Mechanics: Sales breakdown by product**



Source: DART, Shinhan Investment Corp.  
 Note: As of 2019

**LG Innotek: Sales breakdown by product**



Source: DART, Shinhan Investment Corp.  
 Note: As of 2019

## IV. Investment points

### 1. Structural improvement in package substrate market conditions

Global supply of package substrates is on a decline while demand continues to grow on the diversification of system semiconductors. Growing focus on high value-added package substrates by top-tier firms is driving structural improvement in the package substrate industry and a trickle-down effect of benefits across the board.

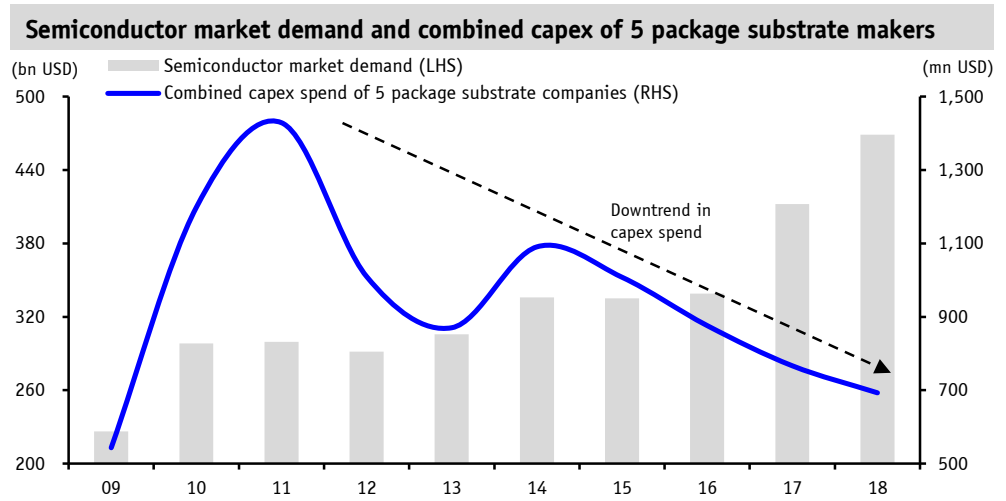
#### 1) Decrease in global capex spend on package substrates

Despite rising demand from the semiconductor market, package substrate manufacturers have cut back on capex investments in recent years. As a result, demand may start to exceed supply going forward.

PCB companies increased their capex spend in line with the launch of Apple’s first iPhone in 2007 and full-fledged smartphone market expansion in 2010. Combined capex spending of the five package substrate majors climbed from USD0.54bn in 2009 to USD1.43bn in 2011. However, the following slowdown in smartphone sales and introduction of substrate-less fan-out wafer-level packaging technology caused substrate demand to fall short of expectations. Capex investments by package substrate makers have continued on a steady downtrend over the past five years, reaching USD0.69bn in 2018.

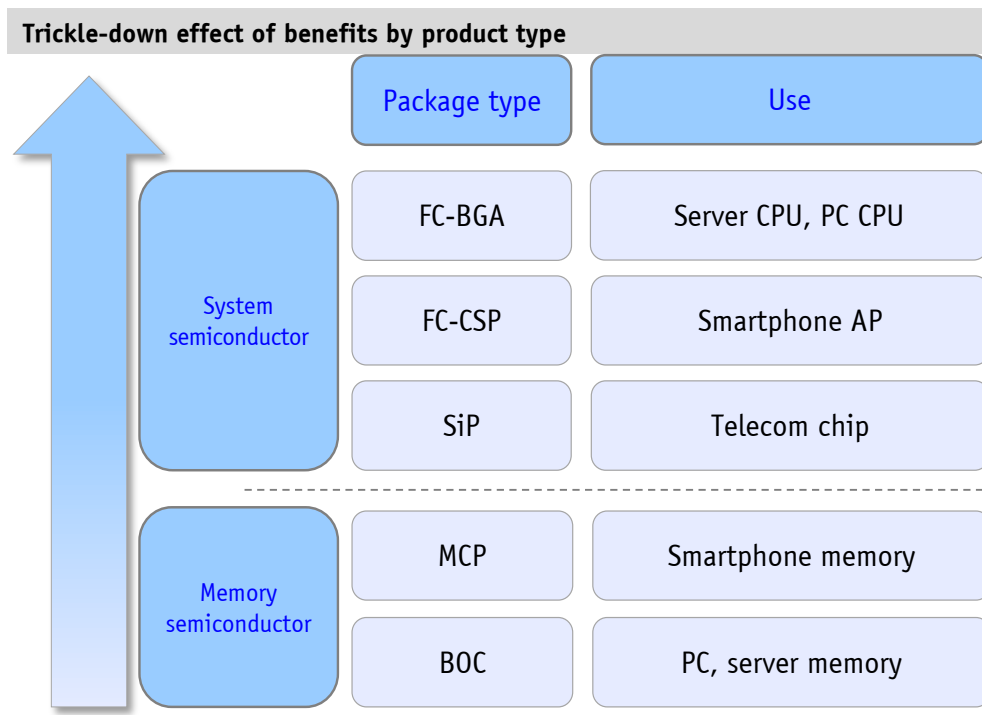
Meanwhile, semiconductor market demand has steadily increased despite weak performance of IT products, driven by growth of relatively smaller market segments such as semiconductors and sensors for telecom/server/mining equipment and telecom chips. Package substrate demand is expected to continue on an uptrend alongside growth of the semiconductor market as a whole.

**Combined capex spend of five package substrate makers dropped from USD1.4bn in 2011 to USD0.7bn in 2018**



Source: Bloomberg, Shinhan Investment Corp.

Note: 5 package substrate companies are Ibiden, AT&S, Nan Ya PCB, Shinko Electric Industries and Kinsus Interconnect Technology



Source: Shinhan Investment Corp.

**Smartphone shipment growth in 2020 to boost demand for AP, RFIC and mobile DRAM/NAND, helping to improve package substrate market conditions**

**2) 5G-related demand: Mobile market turnaround in 2020, mmWave in 2021**

The global mobile market is poised for a rebound in 2020 with the launch of 5G smartphones.

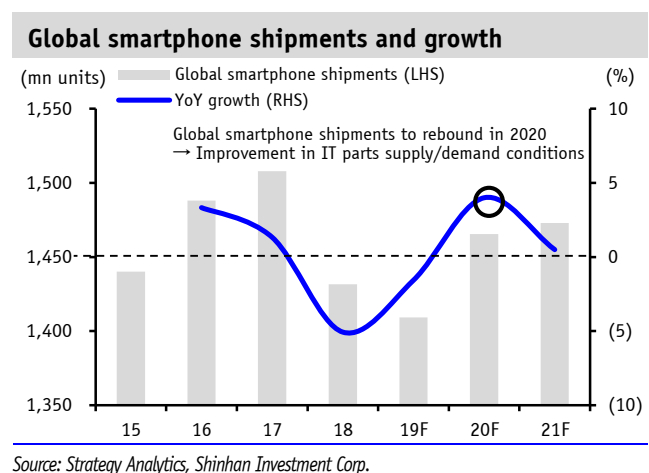
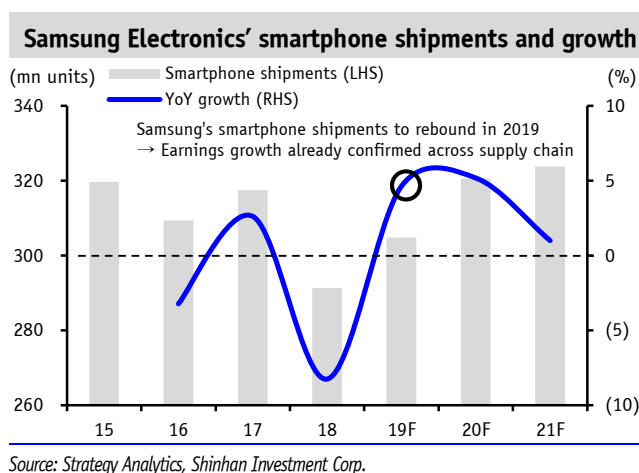
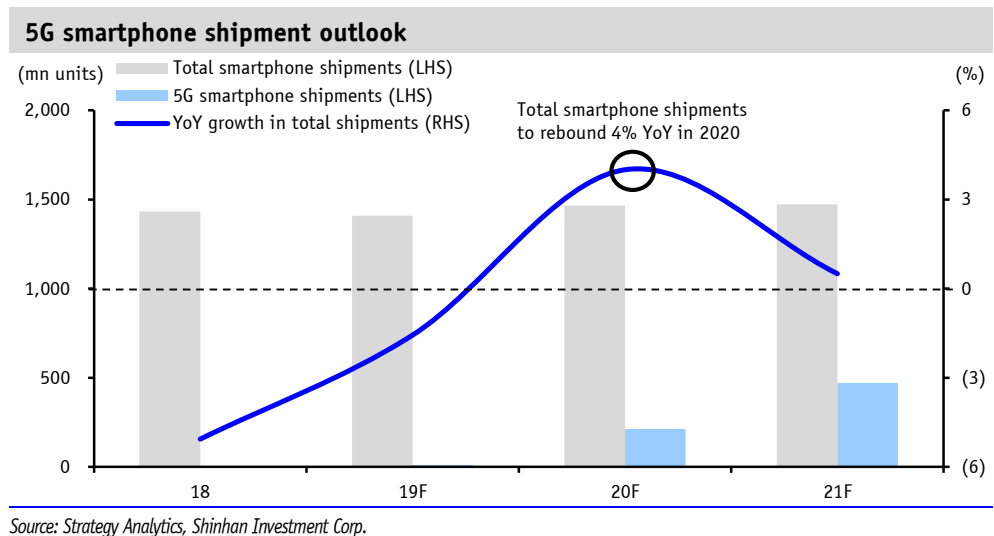
Intensifying competition in 5G smartphones among global handset makers will likely spur an increase in subsidies. More subsidies mean lower smartphone prices, which should push up demand. Market expectations for global 5G smartphone shipments in 2020 have increased from 35mn to 120mn and, more recently, to over 200mn units. Major smartphone makers like Samsung Electronics, Apple and Huawei are expanding their 5G lineup slated for release in 2020. The speed of market penetration of 5G smartphones will be faster than expected and even than that of 4G smartphones.

Smartphone sales volume should grow in 2020 after declining for the past two to three years.

Samsung Electronics' aggressive marketing for low/mid-range models successfully led to a rebound in smartphone shipments this year (SHIC estimate of 5% YoY). Growing shipments helped improve earnings of many parts suppliers (camera, casing, electronic parts, etc.) in 1H19.

We forecast positive growth of global smartphone shipments in 2020. Supply and demand conditions for IT parts are highly likely to improve going forward as seen in the Samsung value chain in 2019 and the mobile market during 2016-2017. Increasing demand for AP, RFIC (radio frequency integrated circuit) and mobile DRAM/NAND should positively affect package substrate suppliers.

Simmtech, which generates 55% of its sales from mobile products, stands to benefit from an upturn in smartphone market conditions.



**5G beneficiaries:**

- 1) FCCSP (5G AP)
- 2) MCP (memory)
- 3) SiP (AiP modules)

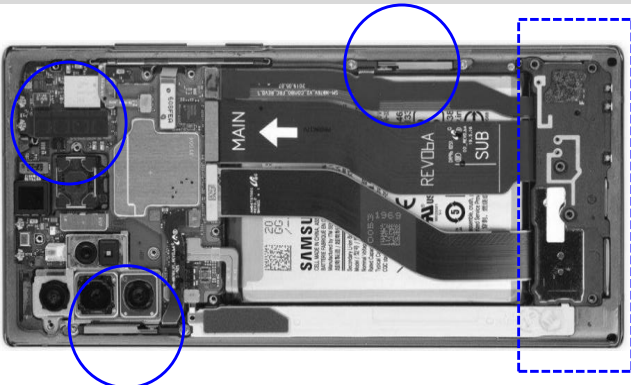
Technological advances in mobile devices should lead to package substrate upgrades in 2021.

The 5G smartphones coming out in 2020 will mostly operate in the sub-6GHz spectrum bands. The shift to millimeter wave technology (28/39GHz mmWave bands) will be prominent in 2021, which will require parts upgrades especially for telecom and general-use components.

Technological advancement will also have a positive impact on package substrate demand. First, the adoption of more sophisticated AP and baseband modem should require an upgrade of FCCSP (flip-chip chip scale package). Second, DRAM/NAND content in smartphones is highly likely to increase, leading to stronger demand for MCP (multi-chip package). Third, AiP (antenna-in-package) module is required to send and receive signals in higher frequency bands. New antenna designs currently under review involve adopting three AiP modules per smartphone. This should trigger a surge in demand for SiP (system-in-package).

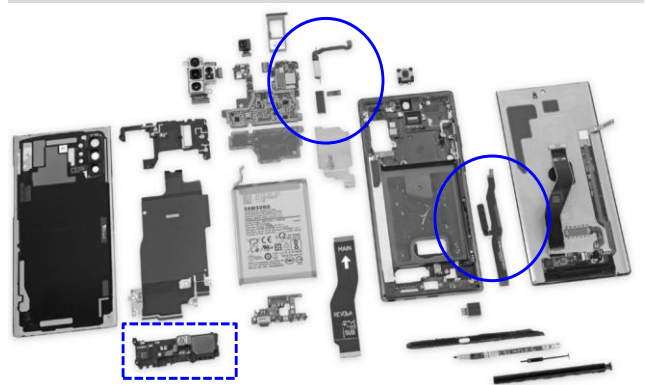
All these factors offer growth opportunities to Simmtech, which has a large sales share of semiconductor PCBs.

**Galaxy Note 10 5G with mmWave capability**



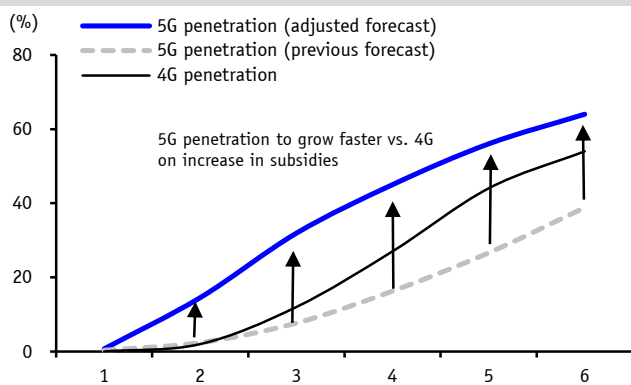
Source: iFixit, Samsung Electronics, Shinhan Investment Corp.

**5G mmWave antenna module**



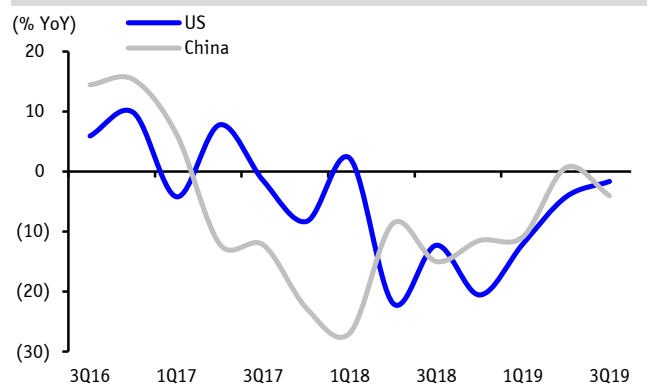
Source: iFixit, Samsung Electronics, Shinhan Investment Corp.

**Smartphone market penetration: 5G vs. 4G**



Source: Strategy Analytics, company data, Shinhan Investment Corp.

**Smartphone shipment growth: China vs. US**



Source: Strategy Analytics, Shinhan Investment Corp.

**Expectations are high for Ice Lake server chips, as evident in increase in capex spend at package substrate makers**

### 3) Server-related demand: Launch of Intel's Ice Lake

Demand for package substrates is expected to rise in 2020 with the launch of Intel's new CPU platform for servers.

Intel alternated advances in microprocessor manufacturing and microarchitecture every two years in the past. Following the introduction of 14nm process technology with Broadwell in 2014, the company faced long setbacks on further advancement to 10nm. Meanwhile, AMD has rapidly expanded its market share by tapping into the advanced technologies of foundries. Intel finally unveiled its 10nm Ice Lake processors on August 1. The first batch of Ice Lake chips are for laptops, with higher-performance processors for desktops and servers expected to be released in 2020.

We expect resumption of capex spending at data centers in 2020 in view of the new Ice Lake processors and base effect from sluggish capex growth in 2019.

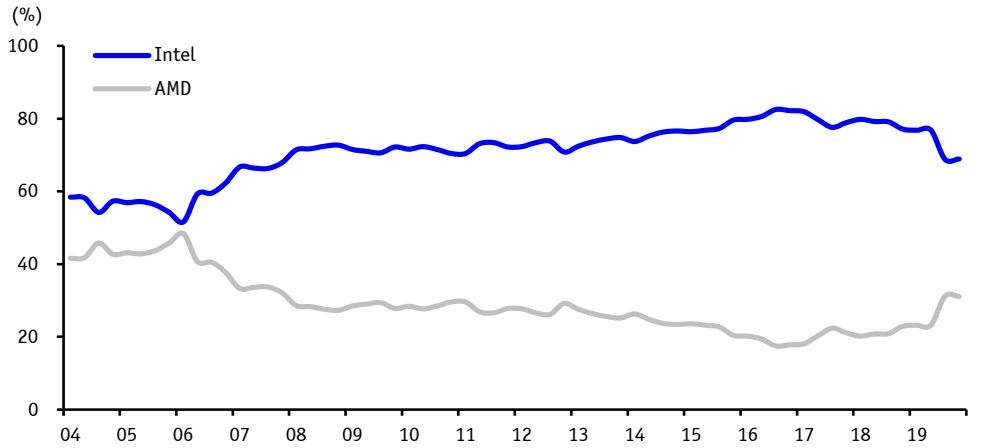
Expectations are high for Ice Lake server chips, as evident in the increase in capex spend at package substrate manufacturers. Ibidem, Unimicron Technology, Shinko Electric Industries, AT&S and Nan Ya Printed Circuit Board have expanded capacity in stages since the start of this year, focusing on the production of high value-added CPU-use FCBGA (flip-chip ball grid array) while reducing capacity for other substrates like FCCSP and SiP.

Overseas peers' shift to FCBGA has benefited LG Innotek and Samsung Electro-Mechanics. Despite sluggish demand for mobile-use products, the companies saw earnings improvement from 3Q18 with FCCSP and SiP sales growing on market share gains. In 2020, market leaders are expected to reduce the share of memory PCBs in production to focus on system semiconductor package substrates. The resulting benefits are likely to spill over to Simmtech.

Intel CPU microarchitectures			
	Microarchitecture	Max. clock	Tech process
1993	P5 (Pentium)	300 MHz	600 nm
1995	P6 (Pentium Pro)	450 MHz	350 nm
1999	P6 (Pentium III)	1400 MHz	250 nm
2000	NetBurst (Pentium 4)	2000 MHz	180 nm
2002	NetBurst (Pentium 4)	3466 MHz	130 nm
2003	Pentium M	2133 MHz	130 nm
2004	NetBurst (Pentium 4)	3800 MHz	90 nm
2006	Intel Core	3000 MHz	65 nm
2007	Penryn	3333 MHz	45 nm
2010	Westmere	3730 MHz	32 nm
2011	Sandy Bridge	4000 MHz	32 nm
2012	Ivy Bridge	4100 MHz	22 nm
2013	Haswell	4400 MHz	22 nm
2014	Broadwell	3700 MHz	14 nm
2015	Skylake	4200 MHz	14 nm
2016	Kaby Lake	4500 MHz	14 nm
2017	Coffee Lake	5000 MHz	14 nm
2018	Cannon Lake	3200 MHz	10 nm
2018	Whiskey Lake	4600 MHz	14 nm
2018	Amber Lake	4200 MHz	14 nm
2019	Cascade Lake	4400 MHz	14 nm
2019	Cooper Lake		14 nm
2019	Comet Lake		14 nm
2019	Ice Lake		10 nm
2019	Lakefield		10 nm
2020	Tiger Lake		10 nm
2021	Alder Lake		10 nm
2022	Meteor Lake		7 nm

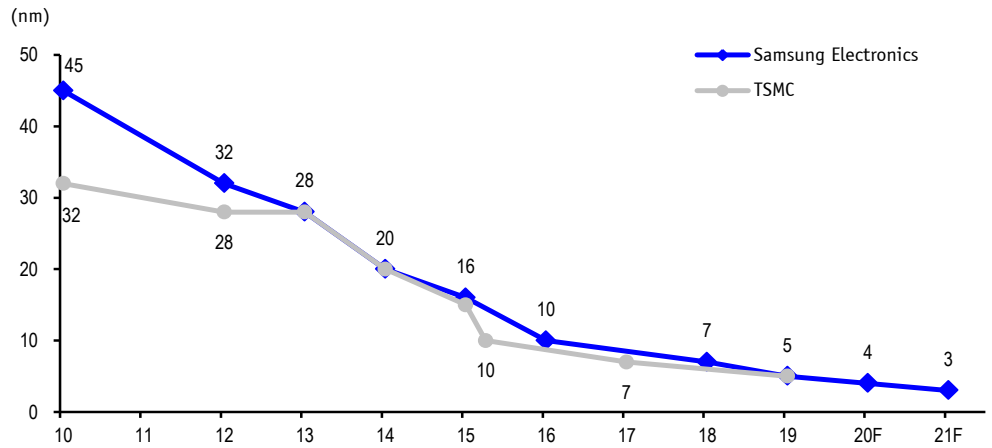
Source: Intel, Shinhan Investment Corp.

**CPU market share: Intel vs. AMD**



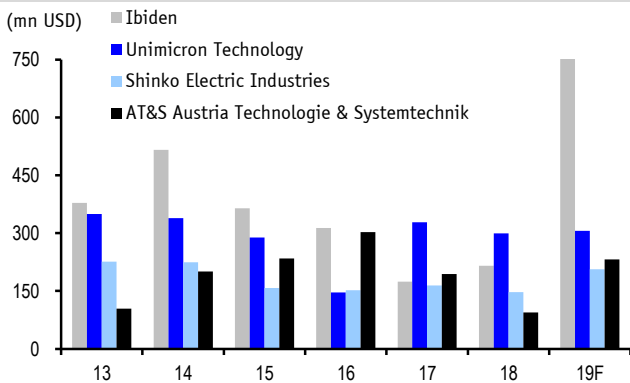
Source: PassMark, Shinhan Investment Corp.

**Process technology roadmap: Samsung Electronics vs. TSMC**



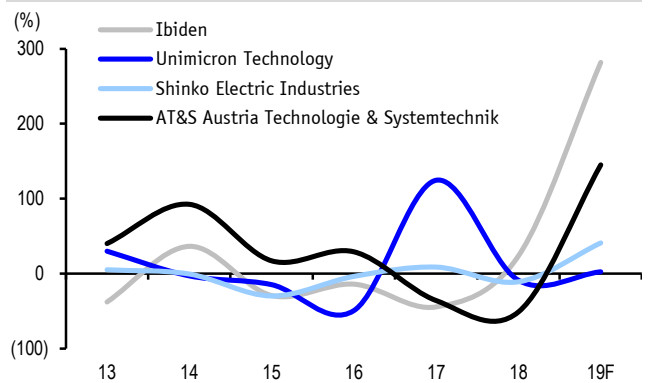
Source: PassMark, Shinhan Investment Corp.

**Capex spend of major package substrate makers**



Source: Bloomberg, Shinhan Investment Corp.

**YoY change in capex of major package substrate makers**



Source: Bloomberg, Shinhan Investment Corp.



**Key share price triggers in the past:**

- Memory market upturn
- Shift in DDR platform

**2. Upturn in memory market conditions**

We forecast Simmtech’s shipments to increase in 2020 with improvement in memory market conditions.

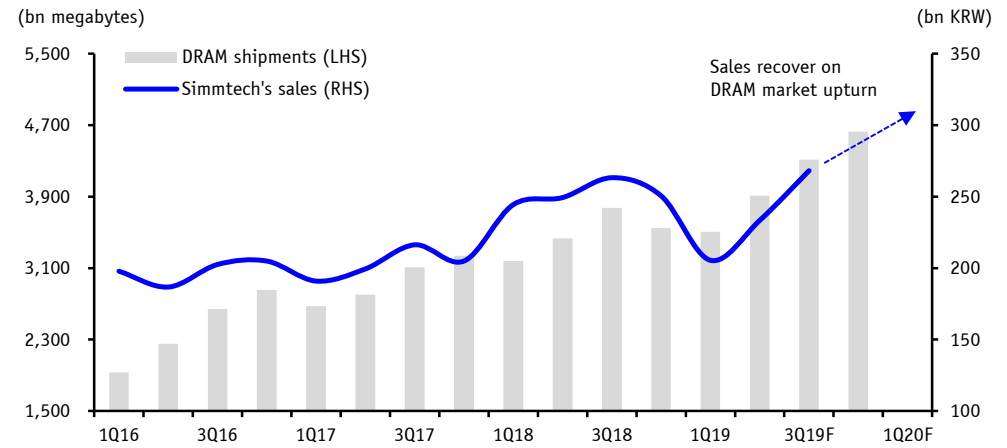
DRAM shipments started to decline in 2H18 due to capex cuts at data centers and mounting concerns over demand for tech products amid the US-China trade conflicts. DRAM bit growth fell 6% QoQ in 1Q19.

Simmtech was not left unscathed from the memory market downturn. Its production capacity utilization rate dropped from the mid/high-80% level in 2H18 to 75% in 1Q19. Sales tumbled by 16% YoY and 18% QoQ in 1Q19. Operating loss was seen for the first time in 13 quarters.

The memory market is poised for an upturn in 2020. Amid continuing supply constraints from DRAM makers, demand is expected to recover on a new wave of replacement demand for 5G smartphones and resumption of capex spending on data centers. Shipments of package substrates should increase along with improvement in memory supply/demand conditions. Earnings improvement is in store for Simmtech given that memory-related sales make up 85% of total sales.

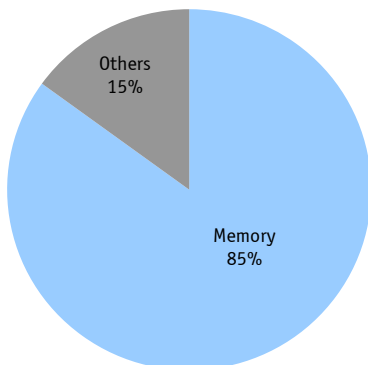
Technological advancement is also positive. Smartphone makers plan to adopt LPDDR5 DRAM chips on some of their premium smartphones set to hit the market in 1H20. Adoption of DDR5 is likely from as early as 2H20. ASP of package substrates is expected to rise. In the transition to 1xnm process for DRAM memory, package substrates with higher ASP are used.

**DRAM shipments and Simmtech’s sales**



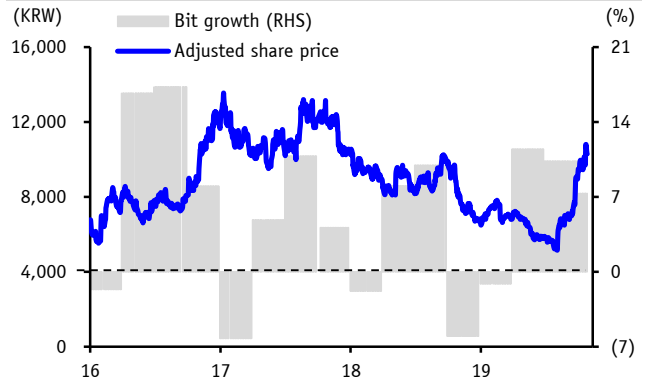
Source: Shinhan Investment Corp.

**Simmtech’s sales breakdown**



Source: DART, Shinhan Investment Corp.

**DRAM bit growth and Simmtech’s share price**



Source: DART, Shinhan Investment Corp.

**Eastern to post earnings improvement on memory market upturn and client diversification**

**3. Improvement in subsidiary earnings**

We focus on the subsidiary Eastern’s client diversification strategy.

Simmtech acquired Eastern in 2016 with aims of expanding its production capacity and adding new clients for system semiconductors. With increasing losses from Eastern, consolidated operating profit has deteriorated sharply in 2019. Eastern’s operating loss is estimated to worsen from KRW15.4bn in 2018 to KRW48.4bn in 2019 due to falling chip demand from cryptocurrency mining equipment makers and the semiconductor market downturn.

Eastern now has impaired capital on cash outflows from deepening losses.

However, we expect to see sales growth and financial structure improvement going forward. Shipments should grow with diversification of customer base. Eastern derives 40% of sales from Japanese clients and 40% from overseas clients. In 2020, sales to memory semiconductor clients should increase along with the upturn in the memory market. Sales will likely start to recover in 4Q19 and pick up growth in 2020.

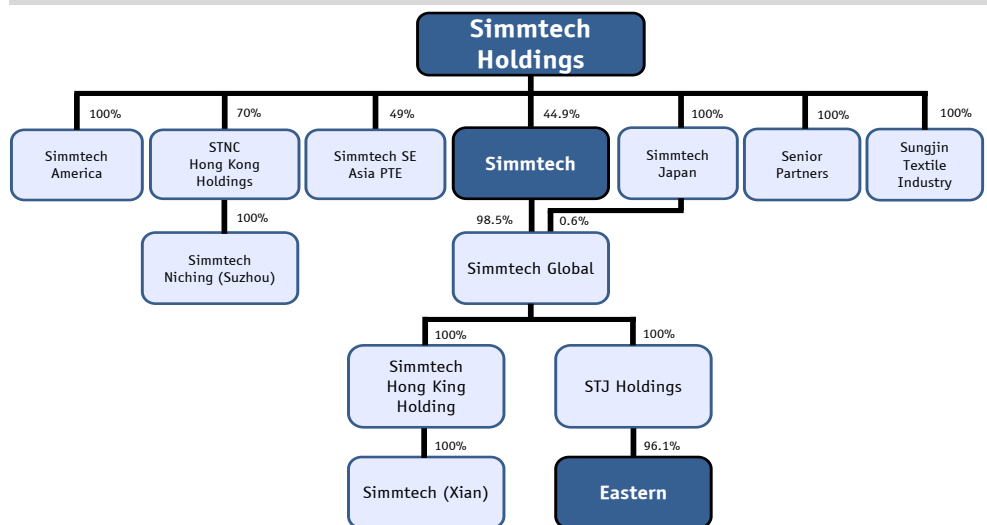
We estimate Eastern’s operating loss to decrease from KRW15.1bn in 2Q19 to KRW11.9bn in 3Q19 and KRW6bn in 4Q19. For the full-year, operating loss is projected to shrink from KRW48.8bn in 2019 to KRW12.5bn in 2020. The decline in losses could be steeper if the sales increase is greater than expected (KRW159.7bn) and the sales share of high value-added package substrates grows bigger.

**Simmtech’s acquisition process of Eastern**

Date	Remarks
May 2016	Established STJ Holdings in Japan
Jul 2016	Participated in the rights issue of STJ Holdings
Dec 2017	STJ Holdings acquired additional stake in Eastern, bringing the total up to 68.98%
Dec 2017	STJ Holdings and Eastern included as subsidiaries of Simmtech
Feb 2018	Established Simmtech Global (initial capital contribution)
Jun 2018	STJ Holdings increased its stake in Eastern to 96.08% through debt-to-equity swap
Nov 2018	Completed investment in kind in Simmtech Global

Source: Simmtech, DART, Shinhan Investment Corp.

**Simmtech’s ownership structure**



Source: DART, Shinhan Investment Corp.

**Package substrate OPM of LG Innotek and SEMCO up by more than 10%p**

**Simmtech to beat 2020 earnings projections on higher capacity utilization and normalization of subsidiary earnings**

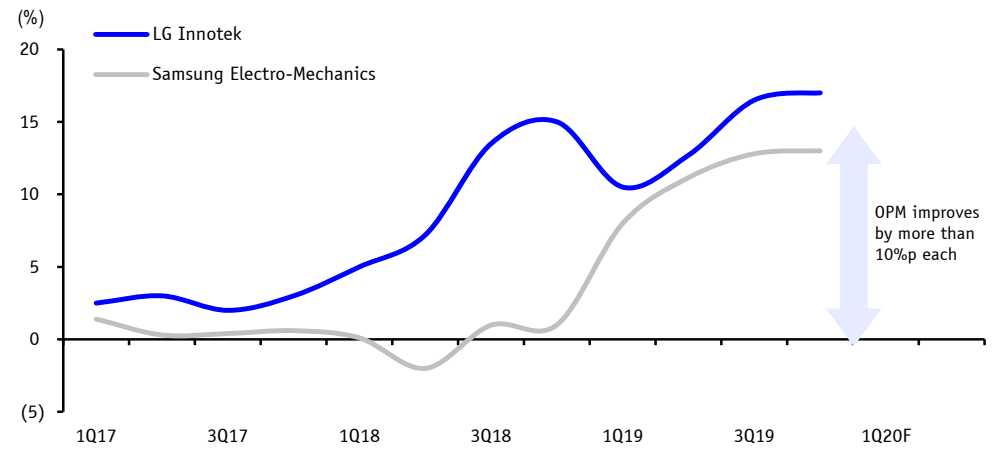
Consolidated profitability should improve helped by declining losses at the subsidiary and higher capacity utilization at the parent.

Simmtech is forecast to report consolidated operating loss of KRW18bn this year. In 2020, we expect the subsidiary's loss to decrease by KRW30bn-40bn and the parent's profit to increase by more than KRW20bn.

We focus on the high operating leverage of the package substrate business. The structural improvement of the industry (trickle-down effect) led to an earnings turnaround at LG Innotek in 3Q18 and Samsung Electro-Mechanics in 1Q19. Their operating profit margins increased nearly 10%p compared to early 2018 (SHIC estimates).

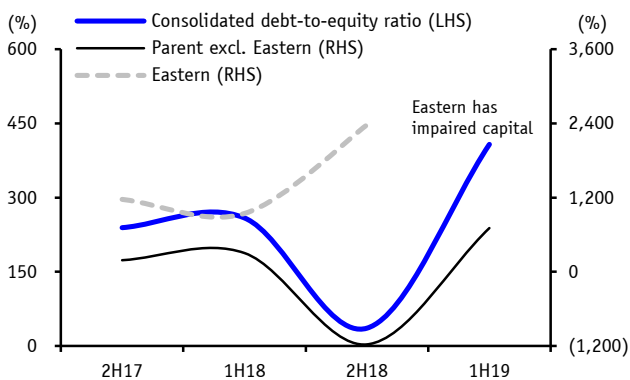
Simmtech is also expected to enjoy higher capacity utilization and operating leverage. Operating profit margin excluding Eastern is projected at 3.5% for 2019 and 5.9% for 2020. The size of profits is highly likely to be bigger than anticipated.

**Package substrate OPM of LG Innotek and Samsung Electro-Mechanics**



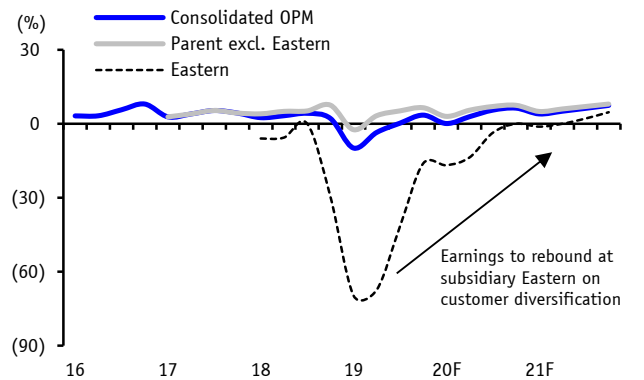
Source: Shinhan Investment Corp.

**Debt-to-equity ratio: Parent and subsidiary**



Source: DART, Shinhan Investment Corp.

**OPM: Parent and subsidiary**



Source: DART, Shinhan Investment Corp.

## V. Earnings forecasts

### 4Q19 outlook: Continued earnings improvement

Simmtech is expected to post sales of KRW280.7bn (+12% YoY) and operating profit of KRW9.8bn (+80% YoY) in 4Q19. Earnings should continue to improve based on: 1) declining losses from Eastern (KRW11.9bn in 3Q19 → KRW6bn in 4Q19) on shipment growth; 2) increase in sales of BOC for high value-added DRAM; and 3) solid new demand for FCCSP (AP use) from Chinese customers.

Eastern's sales are estimated to increase to KRW37.2bn in 4Q19 from KRW28.5bn in 3Q19. The improvement in memory market conditions is creating a trickle-down effect across the company.

### 2020 outlook: Expectations for operating leverage and earnings surprise

We forecast Simmtech to report full-year sales of KRW987.6bn (-2% YoY) and operating loss of KRW18bn (negative swing YoY). For 2020, we project sales of KRW1.1tr (+12% YoY) and operating profit of KRW43.3bn (positive swing YoY).

Earnings growth should be driven by: 1) structural improvement of the package substrate industry; 2) upturn in memory market conditions; and 3) subsidiary's earnings turnaround.

We conservatively estimated operating leverage at the time of earnings turnaround. If the capacity utilization rate rises from the 80% level in 2019 to near 90% in 2020, operating profit margins of the parent and Eastern are likely to surpass projections. We believe the direction of mid/long-term earnings hinges on demand for tech products and semiconductors and supply/demand conditions for package substrates.

**KRW18bn loss expected in 2019, KRW43.3bn profit in 2020**

**Potential upside to 2020 earnings forecasts**

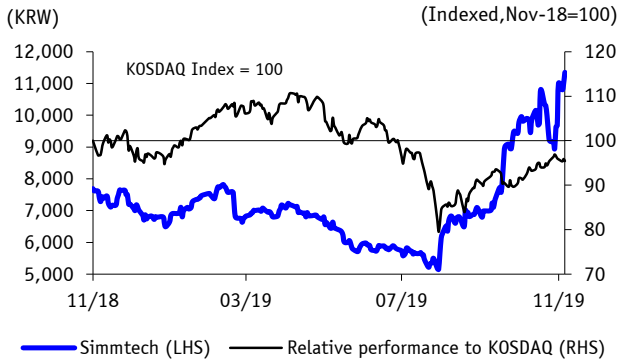
Earnings trend and outlook											
(bn KRW, %)	1Q19	2Q19	3Q19	4Q19F	1Q20F	2Q20F	3Q20F	4Q20F	2018	2019F	2020F
<b>Sales</b>	<b>205.5</b>	<b>233.3</b>	<b>268.1</b>	<b>280.7</b>	<b>243.3</b>	<b>266.6</b>	<b>293.6</b>	<b>303.6</b>	<b>1,007.5</b>	<b>987.6</b>	<b>1,107.1</b>
Parent	182.8	210.9	239.6	243.5	207.6	230.1	252.8	256.9	842.1	876.9	947.4
Subsidiary (Eastern)	22.7	22.4	28.5	37.2	35.6	36.5	40.7	46.7	165.5	110.8	159.7
Module PCB	55.8	63.9	71.8	70.4	57.9	66.1	72.9	72.5	278.9	261.9	269.4
Substrate	148.3	165.4	193.2	207.6	182.6	197.3	217.7	228.2	722.1	714.5	825.9
<b>YoY</b>	<b>(15.9)</b>	<b>(6.4)</b>	<b>1.9</b>	<b>12.0</b>	<b>18.4</b>	<b>14.3</b>	<b>9.5</b>	<b>8.2</b>	<b>24.1</b>	<b>(2.0)</b>	<b>12.1</b>
Parent	(11.2)	2.1	11.3	13.7	13.6	9.1	5.5	5.5	3.8	4.1	8.0
Subsidiary (Eastern)	(41.1)	(47.6)	(40.5)	2.3	57.3	63.1	42.8	25.7	-	(33.1)	44.1
Module PCB	(11.5)	(10.3)	(6.3)	3.5	3.8	3.4	1.6	3.0	8.5	(6.1)	2.9
Substrate	(17.4)	(6.8)	4.5	15.3	23.1	19.3	12.7	10.0	32.1	(1.0)	15.6
<b>Sales share</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Parent	89.0	90.4	89.4	86.8	85.3	86.3	86.1	84.6	83.6	88.8	85.6
Subsidiary (Eastern)	11.0	9.6	10.6	13.2	14.7	13.7	13.9	15.4	16.4	11.2	14.4
Module PCB	27.1	27.4	26.8	25.1	23.8	24.8	24.8	23.9	27.7	26.5	24.3
Substrate	72.2	70.9	72.1	73.9	75.1	74.0	74.2	75.2	71.7	72.3	74.6
<b>OP</b>	<b>(20.2)</b>	<b>(8.2)</b>	<b>0.6</b>	<b>9.8</b>	<b>0.2</b>	<b>7.7</b>	<b>16.2</b>	<b>19.3</b>	<b>30.8</b>	<b>(18.0)</b>	<b>43.3</b>
OPM	(9.9)	(3.5)	0.2	3.5	0.1	2.9	5.5	6.3	3.1	(1.8)	3.9
Parent	(4.4)	6.9	12.5	15.8	6.2	12.7	17.7	19.3	46.1	30.8	55.8
Subsidiary (Eastern)	(15.8)	(15.1)	(11.9)	(6.0)	(6.0)	(5.0)	(1.5)	0.0	(15.4)	(48.8)	(12.5)

Source: Shinhan Investment Corp.



**Simmtech (222800 KS)**

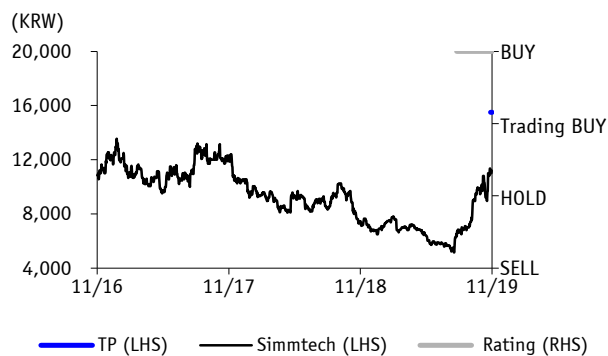
**Share performance**



Date	Rating	Target price (KRW)	Target price gap (%)	
			Average	Max/Min

Note: Calculation of target price gap based on past 6 months

**Target price**



**Rating Distribution - SHIC Universe (as of 13 November 2019)**

BUY (BUY)	96.12%	Trading BUY (HOLD)	0.97%	HOLD (HOLD)	2.91%	REDUCE (SELL)	0%
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**Rating Distribution - SHIC Investment Banking Clients (as of 13 November 2019)**

BUY (BUY)	100%	Trading BUY (HOLD)	0%	HOLD (HOLD)	0%	REDUCE (SELL)	0%
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**SHIC Ratings (as of 1 April 2017)**

Stock	Sector
<ul style="list-style-type: none"> <li>◆ <b>BUY:</b> Expected 6-month gain of 10% or more</li> <li>◆ <b>Trading BUY:</b> Expected 6-month gain of 10% to loss of 10%</li> <li>◆ <b>HOLD:</b> Expected 6-month loss of 10% to 20%</li> <li>◆ <b>SELL:</b> Expected 6-month loss of 20% or more</li> </ul>	<ul style="list-style-type: none"> <li>◆ <b>OVERWEIGHT:</b> Based on market cap, largest share of sector stocks under coverage is rated BUY</li> <li>◆ <b>NEUTRAL:</b> Based on market cap, largest share of sector stocks under coverage is rated Trading BUY or HOLD</li> <li>◆ <b>UNDERWEIGHT:</b> Based on market cap, largest share of sector stocks under coverage is rated SELL</li> </ul>

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- ◆ The following analysts hereby certify that their views about the companies and securities discussed in this report are accurately expressed and that they have not received and will not receive direct or indirect compensation in exchange for expressing specific recommendations or views in this report: HyungWou Park, HyunWook Kim

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