Overweight (Maintain)

Industry Report
November 28, 2019

Mirae Asset Daewoo Co., Ltd.

[Chemicals/Oil Refining/EV Batteries]

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EV Batteries

2020 outlook: Tesla dynamics

The EV market and Tesla

Model 3's rapid rise and the Model Y: Tesla (TSLA US/CP: US$331.29) is reshaping the electric vehicle (EV) industry landscape. In September, the company's Model 3 was the 11th highest selling automobile in all of Europe. In 2020, Tesla is set to become even more competitive with the release of the Model Y compact SUV and the introduction of full autonomous driving capabilities. Cost competitiveness is also expected to increase on the operation of the Chinese plant and scale effects.

E-tron unlikely to stop Tesla's advance: The EV models of traditional automakers still lag behind Tesla's EVs. We believe traditional automakers have higher cell costs, given their relatively underdeveloped battery management system (BMS) technology, and also face battery and space efficiency issues due to their use of internal combustion engine vehicle platforms rather than EV platforms. We also think they have set EV sales targets at levels just high enough to meet CO_2 regulations, making it difficult for them to achieve scale. Lastly, they appear to have set selling prices higher to reduce related losses.

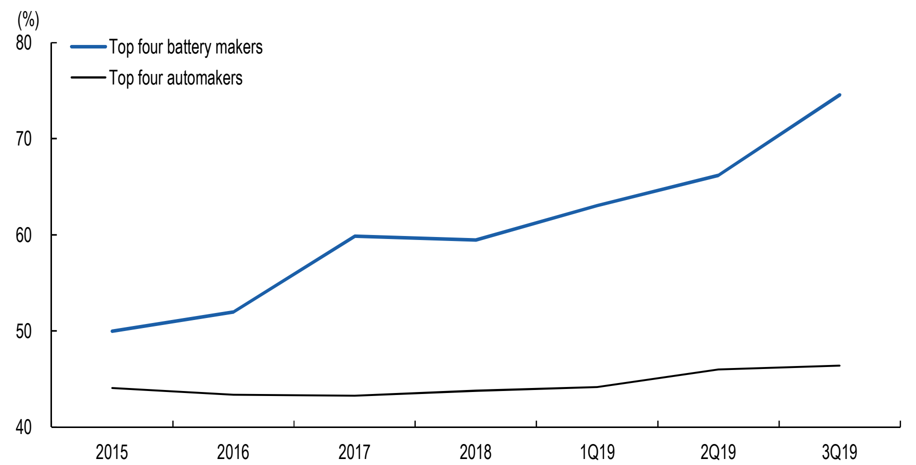
Time to shake things up: If they continue down their current path, traditional automakers will struggle to win the battle against Tesla. It is critical to improve commercial appeal and cost competitiveness. Lowering battery prices, while desirable, may be hard to achieve, given the oligopolistic nature of the battery market. In the end, automakers need to increase productivity and commercial appeal by adopting EV platforms as quickly as possible and build scale by raising their sales targets. The more success Tesla and its Model Y find in 2020, the more likely conventional automakers will be to step up their game by raising EV sales targets, enhancing marketability, and investing in EV platforms.

In EV batteries, winners take all; Top picks are LG Chem and Samsung SDI

Winners take all: Batteries are probably the most concentrated segment in the entire EV supply chain. The market share of the top four battery suppliers has increased from 50% in 2015 to 75% in 3Q19, largely because industry latecomers have failed to catch up. An oligopolistic market structure inevitably leads to margin expansion.

Additional order momentum expected; LG Chem and Samsung SDI are our top picks: Leading battery makers have seen additional order flows after Volkswagen (VOW GR/CP: EUR176.20) and BMW (BMW GR/CP: EUR74.72) recently raised their EV sales targets. We believe other automakers will follow suit and ramp up their EV strategies. In particular, joint ventures between automakers and leading battery suppliers could gain traction. We believe globally competitive Korean battery makers are well-positioned to benefit in the years ahead.

M/S trends: Top four automakers and top four EV battery makers



Source: SNE Research, MarkLines, Mirae Asset Daewoo Research

I. Tesla dynamics

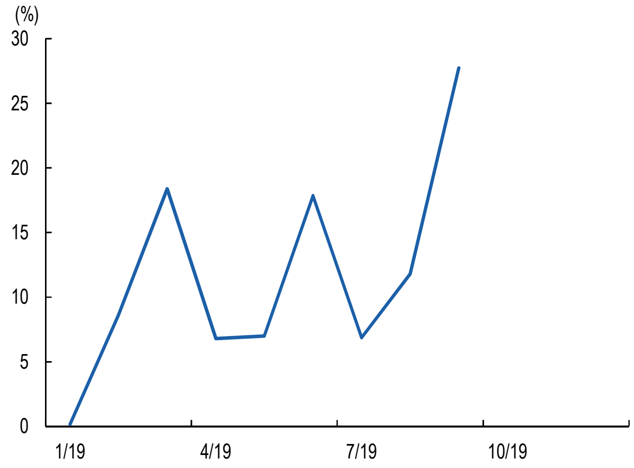
1. Stellar performance in Europe

The Tesla Model 3's sales performance in Europe since its February launch has been nothing short of exceptional. The model became the 11th best-selling car in the region in September, after selling more than 60,000 units in the first eight months of the year. Its market share in the premium midsize sedan segment stands at 28% (as of September).

Meanwhile, sales of Audi's (NSU GR/CP: EUR792.00) A4 and A5 have visibly declined during the same period. While the Model 3 is slightly more expensive than the competition, we believe that Tesla's strong brand power and superior efficiency have appealed to eco-conscious consumers. Against this backdrop, it appears that Tesla poses a growing threat to traditional European automakers.

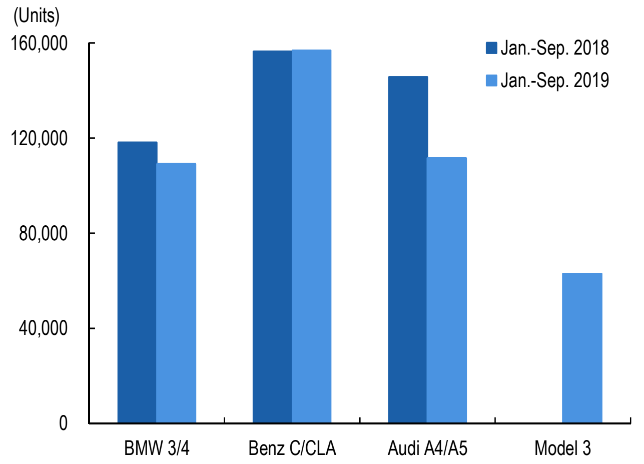
Of note, sales of other EVs have also picked up, as automakers have released new models (e.g. Audi e-tron) and upgraded existing ones to better compete with Tesla's offerings. It appears that Tesla is accelerating EV market growth.

Figure 1. Tesla Model 3 M/S in Europe (premium midsize sedan segment)



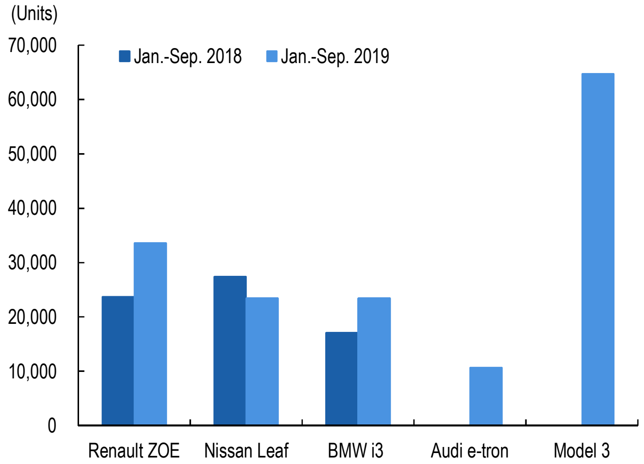
Source: CarSalesBase, Mirae Asset Daewoo Research

Figure 2. Europe sales volume: Tesla Models vs. conventional vehicles



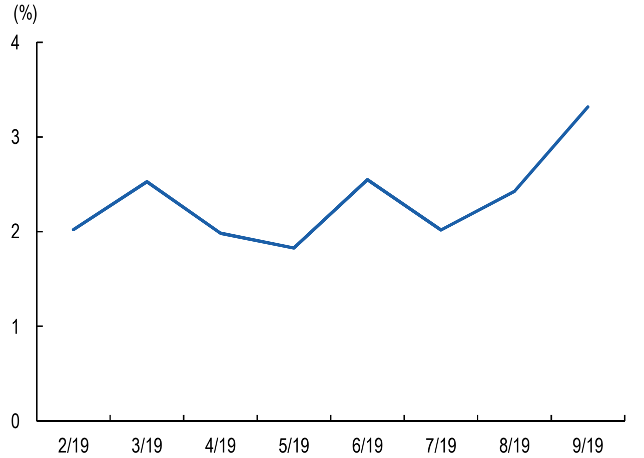
Source: MarkLines, Mirae Asset Daewoo Research

Figure 3. EV sales volume in Europe



Source: CarSalesBase, Mirae Asset Daewoo Research

Figure 4. M/S of pure EVs in Europe (sedan segment)



Source: SNE Research, Mirae Asset Daewoo

2. 2020 outlook: Model Y and fully autonomous driving technology

Tesla is set to become even more competitive with the release of the Model Y compact SUV. While the Model Y features a slightly higher price tag than the Model 3, it should be able to compete with conventional SUVs given the fuel cost savings it provides.

In addition, autonomous driving technology is anticipated to increase Tesla's commercial appeal. The company said it may grant some customers early access to a limited beta version of its full self-driving (FSD) capabilities by end-2019. FSD can be activated via software upgrades (for vehicles shipped during or after April 2019), and will allow vehicles to recognize traffic signals and navigate downtown routes.

Notably, the EU's move to relax autonomous driving laws should also benefit Tesla. The company has been offering only limited autonomous driving functions in the region due to regulations.

Table 1. Model 3 vs. Model Y

	Model 3 Long Range AWD	Model Y Long Range AWD
		
Segment	Compact sedan	Compact SUV
Price (US$)	48,000	52,000
Range (km, WLTP)	560	505
Size (L x W x H, cm)	4694 x 1850 x 1443	4775 x 1850 x 1600 (projected)
Battery (kWh)	75	75
Acceleration (0-60 mph, s)	4.6	5.1
Horsepower (kW)	258	258

Source: Industry materials, Mirae Asset Daewoo

Table 2. Model 3 vs. conventional competitors

	Model 3 Long Range AWD	2018 BMW 3 Series	2019 Audi A4 Sedan	2018 Mercedes-Benz C-Class
				
Segment	Compact sedan	Compact sedan	Compact sedan	Compact sedan
Price (US$)	48,000	34,900	37,400	40,250
Acceleration (0-60 mph, s)	5	5.8	6.1	5.9
Size (L x W x H, cm)	4694 x 1850 x 1443	4717 x 1826 x 1443	4727 x 1842 x 1427	4686 x 1811 x 1430

Source: Industry materials, Mirae Asset Daewoo

Table 3. Model Y vs. conventional competitors

	Model Y Long Range AWD	2020 BMW X3	2020 Audi Q5	2020 Mercedes-Benz GLC
				
Segment	Compact SUV	Compact SUV	Compact SUV	Compact SUV
Price (US$)	52,000	43,950	43,300	44,500
Acceleration (0-60 mph, s)	5.1	4.2	6.3	6.2
Size (L x W x H, cm)	4775 x 1850 x 1600	4722 x 1890 x 1676	4663 x 1892 x 1659	4656 x 1890 x 1643

Source: Industry materials, Mirae Asset Daewoo

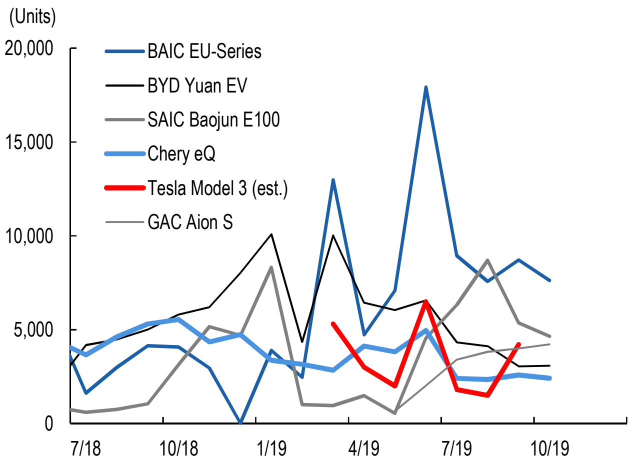
3. China: Tesla gains a foothold in the world's largest vehicle market

Model 3 sales in China have risen quickly since the Chinese government excluded Tesla cars from a 10% tax in August 2018. As the company's Chinese plant is set to launch mass production next year (Model Y to be produced from mid-2020), import tariffs will also be lifted. The Chinese factory aims to produce 150,000 units in 2020, and around 500,000 units annually in the medium term.

Telsa's push into China's premium sedan market should deal a heavy blow to European automakers, which had established dominant positioning in this highly profitable, fast-growing segment amid the overall decline in China's car sales.

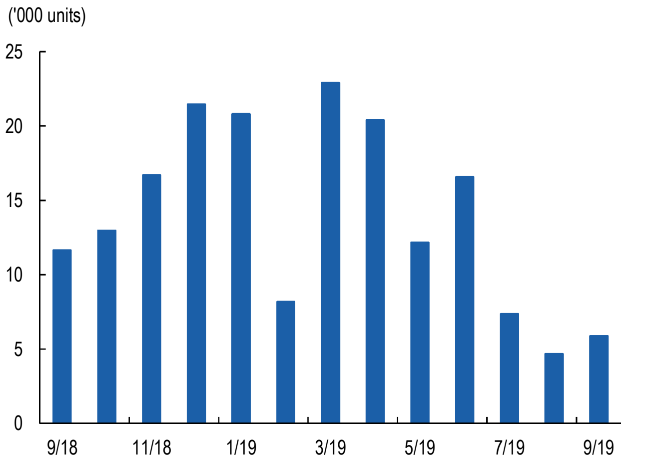
We believe that Tesla's new factory marks a shift in the Chinese EV market from protection to competition. With EVs being one of the key areas of focus in the country's "Made in China 2025" initiative, the government has imposed tariffs on foreign cars to protect its local brands. The fact that China has opened its doors to Tesla suggests that market competition will now play a greater role in shaping the country's EV space; this should incentivize Tesla's rivals to develop and roll out more marketable models.

Figure 5. EV sales volume in China



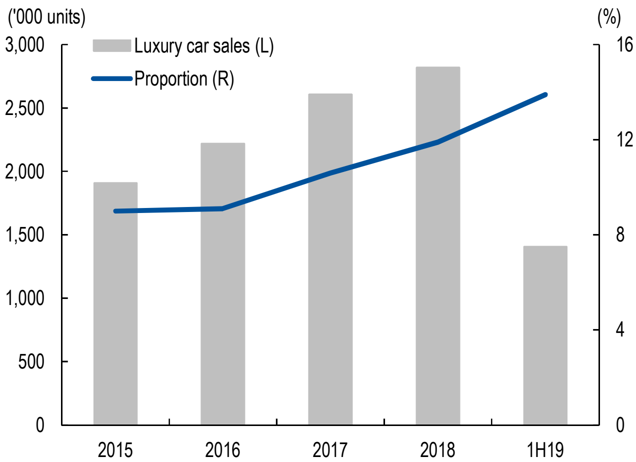
Source: MarkLines, Chinamobil, CarSalesBase, Mirae Asset Daewoo Research

Figure 6. BYD: EV sales volume



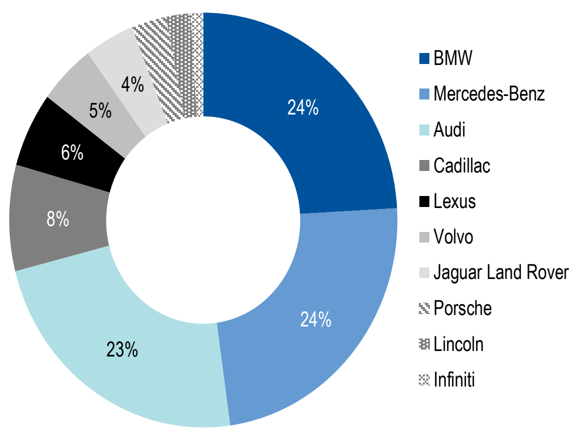
Source: SNE Research, Mirae Asset Daewoo Research

Figure 7. Chinese luxury car sales volume



Source: Gasgoo, MarkLines, Mirae Asset Daewoo Research

Figure 8. Chinese luxury car M/S breakdown by automaker



Source: Gasgoo, Mirae Asset Daewoo Research

4. Tesla to gain cost competitiveness

It is also worth noting that Tesla is becoming more cost competitive.

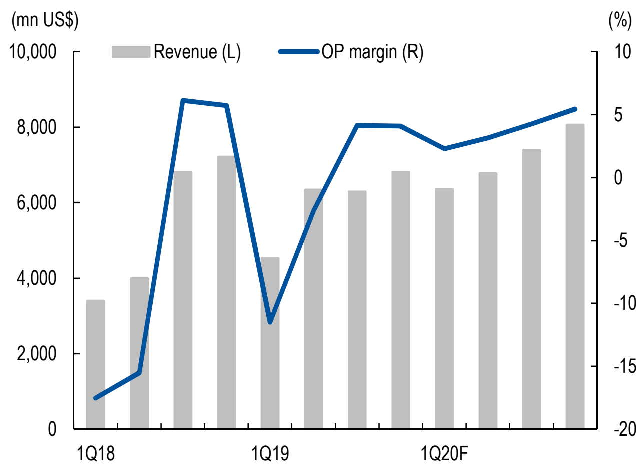
Tesla's initial fixed costs were higher than those of conventional automakers, as the company invested billions of dollars in developing EV platforms and establishing automated factories.

Nevertheless, Tesla turned a profit in 3Q19, with YTD sales volume for the Model 3 nearing 200,000 units. We expect cost competitiveness to increase on the operation of the Chinese plant (deliveries scheduled to begin in 2020) and production of the Model Y (mid-2020). According to industry estimates, the Chinese plant's investment costs per vehicle and labor expenses will be equal to just 35% and 10%, respectively, of the levels of other plants. The Model Y will be built on the same platform as the Model 3, enabling R&D expense savings.

When the Chinese plant and Model Y are fully launched, Tesla should be able to quickly reduce its fixed-cost burden and secure a stable profit structure. Even without a sharp decline in battery prices, scale effects should be strong enough to drive cost savings in 2020 and beyond.

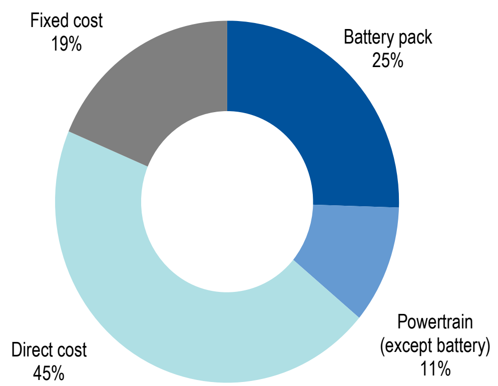
Tesla has been focusing on the premium segment, but it plans to step up its efforts to penetrate the mass market once it achieves cost competitiveness through economies of scale. If so, Tesla's market influence should further increase.

Figure 9. Tesla: Quarterly revenue and OP consensus



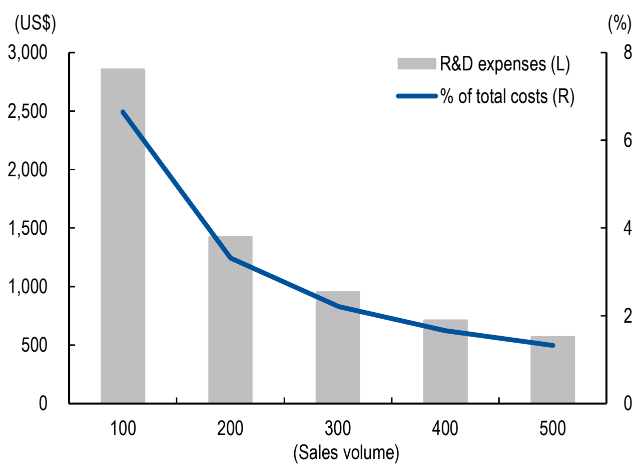
Source: Bloomberg, Mirae Asset Daewoo Research

Figure 10. Tesla Model 3 estimated cost breakdown



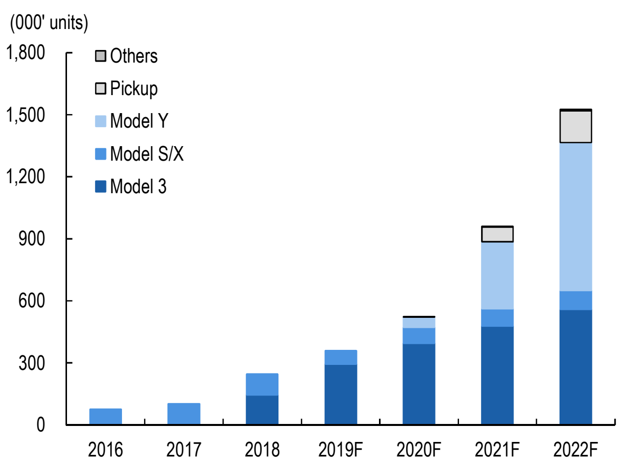
Source: Industry data, Mirae Asset Daewoo Research

Figure 11. Tesla's R&D expenses per vehicle sold



Source: Industry data, Mirae Asset Daewoo Research

Figure 12. Tesla: Sales volume by model



Source: Tesla, Mirae Asset Daewoo Research

5. Audi e-tron is no match for Tesla EVs

The rise of Tesla should increasingly pressure conventional automakers to step up their game. Conventional automakers have thus far approached the EV market somewhat passively due to concerns over market cannibalization. Therefore, the EVs they have released still lag behind Tesla's.

For example, Audi's e-tron falls short of Tesla's EVs in terms of kilometers per kWh and price per kilometer of range. We see several reasons for this.

First, conventional automakers' cell costs are higher as a result of their relatively underdeveloped BMS technology. Second, the use of internal combustion engine vehicle platforms rather than EV platforms is detrimental to battery efficiency and optimization of battery space. Third, it is difficult for Audi and other conventional automakers to achieve scale, as they have set sales targets just high enough to meet CO_2 regulations. Lastly, to reduce related losses, automakers have set selling prices of EV models (including the e-tron) higher.

To compete against Tesla, it is critical for Volkswagen and other conventional automakers to improve commercial appeal and cost competitiveness. Reducing battery costs is difficult, given the small number of suppliers and the strong bargaining power of leading companies. In the end, automakers need to increase productivity and commercial appeal by adopting EV platforms as quickly as possible and build scale by raising their sales targets.

Against this backdrop, it is notable that Volkswagen is the only conventional automaker to have developed a dedicated EV platform. Volkswagen is also capable of procuring EV batteries at the most competitive prices, thanks to its preemptive efforts to secure battery supply contracts. Meanwhile, automakers that have not yet fully prepared their EV strategies will likely be forced to act quickly, before it is too late.

Looking to 2020, we expect conventional automakers to raise their EV sales targets and invest in EV platforms (or make use of existing EV platforms).

Table 4. Price and specification by key EV model (EUR'000, km, kWh, s)

	Price	Segment	Range (WLTP)	Battery	0-100 km/h
Tesla Model 3 Long Range AWD	60	Compact	560	75	4.6
Tesla Model Y Long Range AWD (2020)	62	Compact SUV	505	75	5.1
Renault ZOE ZE 50 R135	35	Hatchback	390	52	10.0
Chevrolet Bolt	46	Hatchback	380	60	7.2
Nissan Leaf e+	46	Hatchback	385	62	6.9
BMW i3 120 Ah	42	Hatchback	310	42	7.3
Audi e-tron quattro	77	Midsize SUV	400	95	5.7
Mercedes EQC	80	Compact SUV	416	80	5.1
HMC Kona EV	41	Small SUV	449	64	7.6
Volkswagen ID.3 mid-range (2020)	40	Hatchback	420	58	7.0
Volvo Polestar 2 (2020)	60	Midsize sedan	500	78	4.9
BMW iX3 (2020)	70	Compact SUV	400	70	5.0

Source: Industry data, Mirae Asset Daewoo Research

Early in November, Volkswagen, which has the most aggressive EV strategy among conventional automakers, announced massive EV investments. As the only conventional automaker with a dedicated EV platform (MEB), Volkswagen boasts cost competitiveness (Volkswagen estimates the MEB-based ID.3 will cost 40% less to produce than the e-Golf).

The issue at hand is competition with Tesla. With the Model 3 surpassing Volkswagen's key EV model in sales volume, Volkswagen will inevitably expand production volume. Indeed, Volkswagen recently announced a plan to expand EV production capacity in China to around 1mn units by end-2022 to compete with Tesla. Volkswagen believes it is well-positioned to secure higher cost competitiveness than Tesla thanks to its existing production facilities and labor resources.

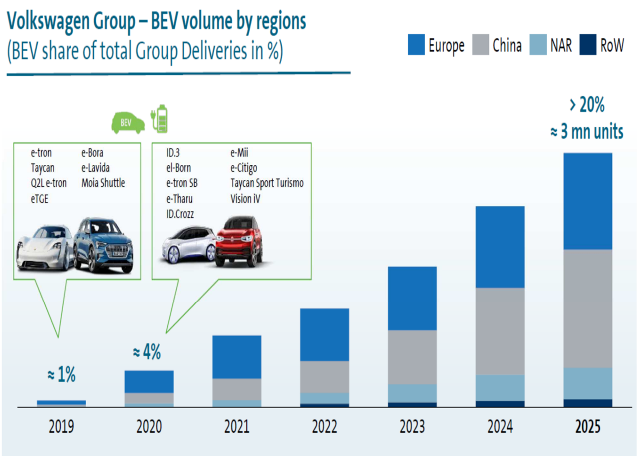
Hyundai Motor (HMC; 005380 KS/Buy/TP: W178,000/CP: W123,500) is also moving quickly; the automaker has set a target of 850,000 annual EV sales by 2025 and plans to launch a dedicated EV platform, making it the second conventional automaker to do so. Toyota (7203 JP/CP: 7,690), which has approached the EV market conservatively, moved forward its EV sales target by five years.

We expect such aggressive moves to continue, marking a strategic shift from automakers' earlier conservative approach to the EV market.

Automakers are unlikely to secure competitiveness in the EV market by adapting existing internal combustion engine vehicle platforms for EV/PHEV production. Those that lack EV platforms or struggle to achieve scale may adopt EV platforms that have already been developed (e.g., Ford's [F US/CP: US$9.10] use of Volkswagen's MEB platform) or jointly develop EV platforms with partners (e.g., BMW).

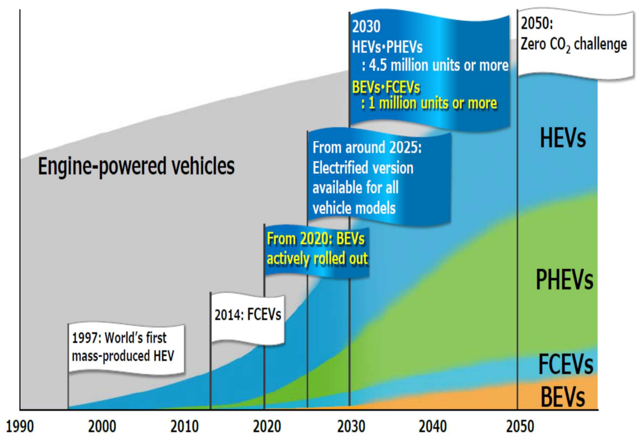
Given the heavy initial investments required in the EV business, achieving a certain volume is crucial. As such, automakers are likely to raise their EV sales targets going forward.

Figure 13. Volkswagen's EV sale targets by region



Source: Volkswagen

Figure 14. Toyota's EV rollout plan



Source: Toyota

II. Winners take all

1. In EV batteries, winners take all; Top picks are LG Chem and Samsung SDI

Batteries are probably the most concentrated segment in the entire EV supply chain. The combined market share of the four major battery suppliers has increased from 50% in 2015 to 75% in 3Q19, largely because industry latecomers have failed to catch up. We expect the three following upside catalysts for Korean battery suppliers to take shape in 2020.

First, the battery margin outlook is improving. Leading suppliers should record higher margins on recently taken orders (which will translate into revenue with a two- to three-year lag). And while margin improvement has been limited in 2019 due to numerous industry negatives (e.g., ESS fires), we believe battery suppliers will enjoy stronger bargaining power in negotiations related to 2020 supply contracts, leading to margins that are higher than expected

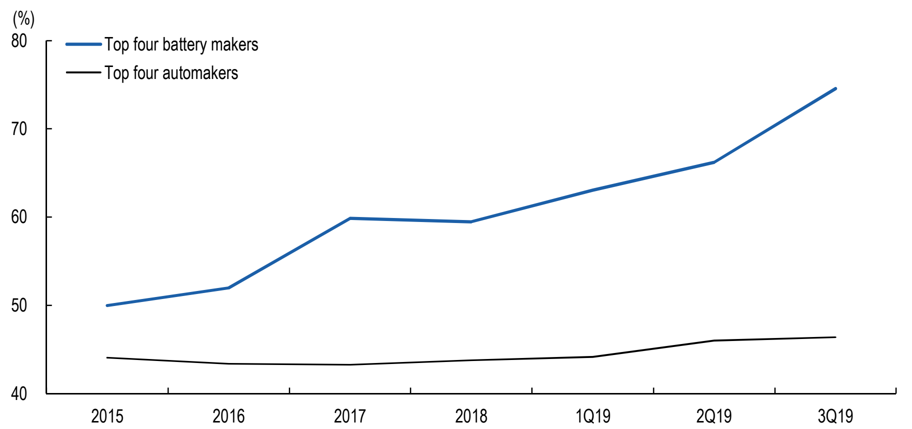
Second, EV market growth is forecast to accelerate, leading to additional order momentum for battery suppliers. When Tesla's Chinese plant starts mass production and if the Model Y gains more popularity than the Model 3, we believe the sense of urgency among traditional automakers to step up their game will increase. In order to improve their competitiveness in EVs, traditional automakers are highly likely to adopt EV platforms and build scale, resulting in upward adjustments to their EV sales targets and additional order momentum for leading battery suppliers.

Third, the likelihood of entry into China could provide an additional boost. The scheduled operation of Tesla's Chinese plant in 2020, as well as the Chinese government's EV subsidy halt (from 2021) should lead to intensification of EV market competition in China. In order to compete with Tesla, Chinese EV makers will need to adopt higher-quality batteries.

LG Chem (Buy/TP: W460,000) shares have been trading sideways after pulling back on worries about provisioning related to domestic ESS fires and delays in yield improvements at the European battery plant. However, most of the negatives, including the risk of weak earnings in 4Q19, are already widely known. As traditional automakers ramp up their EV strategies in 2020, we expect top-tier battery suppliers to benefit via order expansion and margin improvement.

Samsung SDI (Buy/TP: W315,000): While earnings have been softer than anticipated this year due to the ESS fires and the weakness of the cylindrical battery market, we believe mid/large-sized batteries will drive overall earnings in 2020. The EV battery unit is forecast to break even in 4Q19 and deliver sharp earnings growth in 2020. Notably, the Mini Cooper BEV (2020) has so far recorded 78,000 preorders. For ESS, we think the worst is over. Meanwhile, electronic materials should benefit from foldables growth.

Figure 15. M/S trends: Top four automakers and top four EV battery makers



Source: SNE Research, MarkLines, Mirae Asset Daewoo Research

2. Increasing market share of top tiers

Batteries are the most concentrated segment in the entire EV supply chain. The market share of the top four battery suppliers—Panasonic (6752 JP/CP: JPY981.3), LG Chem, Samsung SDI, and CATL (300750 CH/CP: RMB87.25)—has increased from 50% in 2015 to 75% in 3Q19.

Most industry latecomers have failed to achieve meaningful growth due to high entry barriers, as the manufacture of EV batteries requires highly sophisticated chemical, machinery and electronic technologies, as well as years of mass-production experience. Indeed, in China, despite the large number of market entrants (roughly 100 in 2015), the EV battery market has become further concentrated, with market leader CATL controlling nearly 70% as of 3Q19.

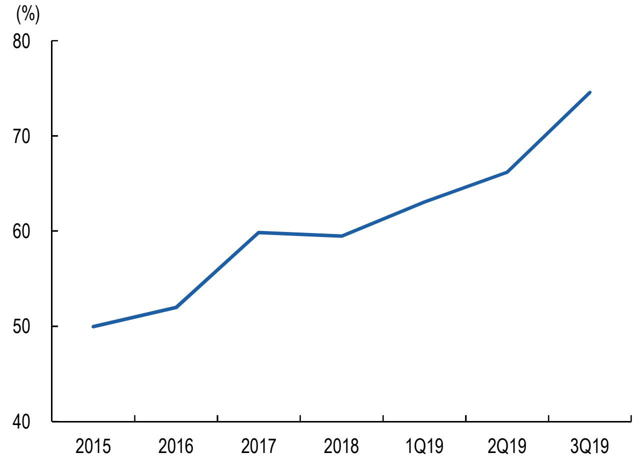
We expect battery market concentration to persist or even intensify for years to come. Given the importance of mass-production know-how in the EV battery business, it will be difficult for latecomers to narrow the technology gap with top tiers. Moreover, for new entrants, the constant evolution of batteries makes large-scale investments a risky proposition, as it is difficult to keep up with technological changes.

We expect EV market growth to pick up speed, and the oligopolistic battery market structure will inevitably lead to margin expansion for top-tier suppliers.

Indeed, Korean battery suppliers have recently been winning high-margin orders, which will translate into revenue in two to three years. Notably, current sales are attributable to orders received in 2017, when battery makers' bargaining power was not as strong as it is now. In addition, we note that they experienced yield issues following capacity ramp-ups in 2019. Starting in 2021, however, we expect margins to improve full swing. Furthermore, if Tesla performs well and automakers ramp up their EV strategies, battery suppliers will gain the upper hand in 2020 supply contract negotiations with EV makers (which are currently underway).

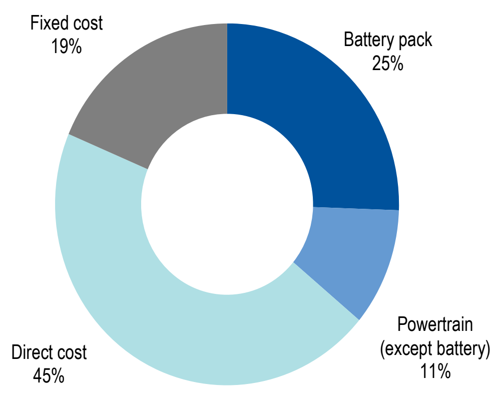
Of note, there are currently two major concerns over EV batteries: 1) whether automakers will pursue in-house production of batteries to avoid heavy reliance on a handful number of battery suppliers; and 2) whether the battery business can make profits at a time when the EV business is incurring losses. As for the former, we expect to see an increase in automaker/battery manufacturer joint ventures, which should allow automakers to enjoy some of the profitability of batteries while lessening the capex burden of suppliers. All in all, we believe that once automakers achieve economies of scale and adopt EV platforms, EVs could become solidly profitable, even without a dramatic decline in battery prices (as confirmed by the case of Tesla).

Figure 16. Combined M/S of top four global battery suppliers



Source: SNE Research, Mirae Asset Daewoo Research

Figure 17. Tesla Model 3 cost structure (estimated)



Source: Industry data, Mirae Asset Daewoo Research

3. Korean suppliers to start to advance into China in 2020

We believe the year 2020 will mark the beginning of Korean battery suppliers' advance into the Chinese market, given that: 1) the country's EV subsidies have already been cut significantly and are set to be completely eliminated in 2021; and 2) Tesla's expansion into China is intensifying competition in the local market.

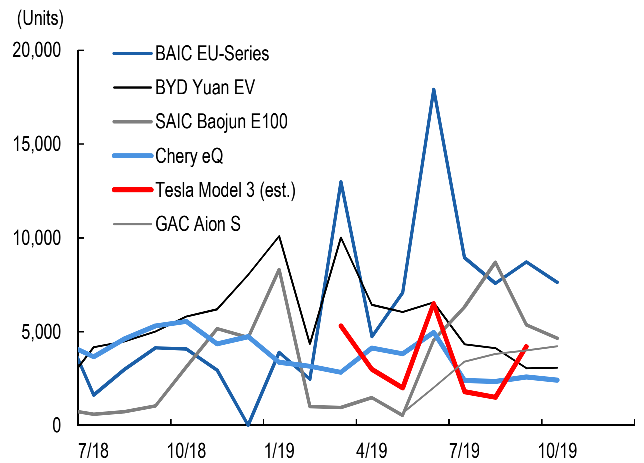
Starting in 2015, the Chinese EV market expanded sharply thanks to massive government subsidies. Since 2018, however, subsidy cuts have led to a sharp market slowdown, with negative growth expected in 2019.

Although the government wanted to wait until Chinese automakers became competitive before liberalizing the EV industry, the Chinese market is opening up sooner than expected, due to political issues such as US-China trade friction and the rise of Tesla. Tesla recently started up its first Chinese plant (Gigafactory 3), making it difficult for the government to hamstring Tesla via heavy tariffs.

Chinese automakers need to launch more competitive EV models to respond to these market changes. And in our view, EV models to be released in 2020 and beyond will likely have higher commercial appeal than those available now. The problem is that Chinese automakers currently rely only on CATL batteries; indeed, with CATL controlling around 70% of the Chinese EV battery market, CATL may not move as Chinese automakers wish.

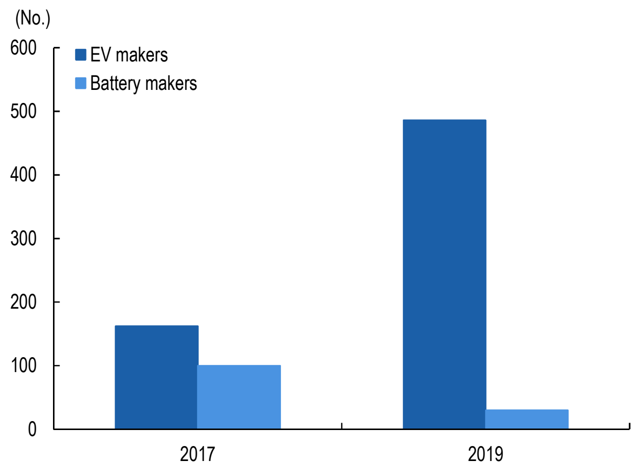
According to media reports, Tesla is likely to adopt LG Chem's batteries in China. In addition, Geely (175 HK/CP: HK$15.30) has agreed to build a battery plant with LG Chem. These events all indicate that the Chinese EV market is opening up.

Figure 18. Chinese EV model sales volume trends



Source: MarkLines, Chinamobil, CarSalesBase, Mirae Asset Daewoo Research

Figure 19. No. of Chinese EV makers and battery suppliers



Source: Industry data, Mirae Asset Daewoo Research

LG Chem (051910 KS)

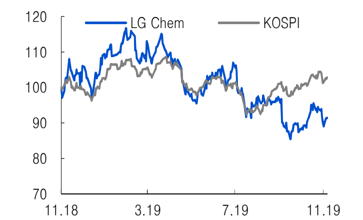
Tesla dynamics

Chemicals

(Maintain)	Buy
Target Price (12M, W)	460,000
Share Price (11/27/19, W)	309,000
Expected Return	49%

OP (19F, Wbn)	1,109
Consensus OP (19F, Wbn)	1,209
EPS Growth (19F, %)	-67.0
Market EPS Growth (19F, %)	-33.0
P/E (19F, x)	49.8
Market P/E (19F, x)	14.4
KOSPI	2,127.85
Market Cap (Wbn)	21,813
Shares Outstanding (mn)	78
Free Float (%)	64.3
Foreign Ownership (%)	38.2
Beta (12M)	1.31
52-Week Low	289,000
52-Week High	394,500

(%)	1M	6M	12M
Absolute	2.5	-5.2	-9.9
Relative	0.6	-8.9	-11.1



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Winners take all; Still one of our top picks

Maintain TP and reiterate as our top pick: LG Chem's stock has been trading sideways, after pulling back on worries about provisioning related to domestic ESS fires and delays in yield improvements at the European battery plant. However, at this point, most of the negatives, including the risk of weak earnings in 4Q19, are widely known. We expect EV market growth to accelerate in 2020 and believe the overall market environment remains favorable to battery suppliers. We maintain our target price of W460,000 on LG Chem and reiterate the stock as our top pick.

Tesla dynamics: Tesla is reshaping the EV industry landscape. In September, the Tesla Model 3 was the 11th highest selling automobile in all of Europe. In 2020, Tesla is set to become even more competitive with the release of the Model Y—an electric compact SUV that will have strong commercial appeal—and the introduction of fully autonomous driving capabilities. Cost competitiveness is also expected to increase on the operation of the Chinese plant and scale effects.

If they continue down their current path, traditional automakers will struggle to compete directly with Tesla. We therefore expect automakers to increase productivity and commercial appeal by adopting EV platforms and build scale by raising their sales targets. As a result, EV market growth should accelerate.

Winners take all: Batteries are probably the most concentrated segment in the entire EV supply chain. The market share of the top four battery suppliers has increased from 50% in 2015 to 75% in 3Q19, largely because industry latecomers have failed to achieve meaningful growth due to high entry barriers. The oligopolistic market structure should result in greater negotiating power and margin expansion for battery suppliers. LG Chem, which has struggled with yield issues in Europe this year, should see margins improve in 2020 on the back of better yields, revenue growth, and negotiations with customers.

4Q19 earnings weakness already known; Focus on battery momentum in 2020

Focus on battery momentum in 2020: We conservatively estimate LG Chem's 4Q19 operating profit at W185.9bn. While the size of ESS provisioning has not yet been determined, we assume it will be around W200bn, given the level projected by one of the company's peers. That said, the provisioning issue is widely known and should be mostly reflected in share prices by early 2020.

As conventional automakers ramp up their EV strategies in 2020, LG Chem is likely to increasingly gain battery orders and also establish joint ventures with automakers, which should help accelerate growth. Given that the company has one of the strongest competitive positions in the highly concentrated EV battery market, margins could improve even faster than anticipated.

FY (Dec.)	12/16	12/17	12/18	12/19F	12/20F	12/21F
Revenue (Wbn)	20,659	25,698	28,183	29,735	39,131	44,320
OP (Wbn)	1,992	2,928	2,246	1,109	1,821	2,820
OP Margin (%)	9.6	11.4	8.0	3.7	4.7	6.4
NP (Wbn)	1,281	1,945	1,473	485	1,162	1,876
EPS (W)	17,336	24,854	18,812	6,201	14,842	23,963
ROE (%)	9.5	12.9	8.9	2.8	6.6	10.0
P/E (x)	15.1	16.3	18.4	49.8	20.8	12.9
P/B (x)	1.4	1.9	1.6	1.4	1.3	1.2
Dividend Yield (%)	1.9	1.5	1.7	1.3	1.9	1.9

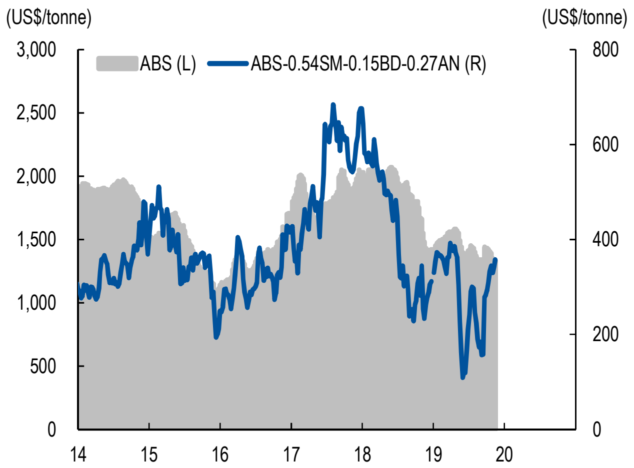
Note: All figures are based on consolidated K-IFRS; NP refers to net profit attributable to controlling interests
Source: Company data, Mirae Asset Daewoo Research estimates

Table 5. Quarterly and annual earnings (Wbn)

		1Q19	2Q19	3Q19	4Q19F	1Q20F	2Q20F	3Q20F	4Q20F	2018	2019F	2020F
Revenue		6,639.1	7,177.4	7,347.3	8,571.6	8,753.8	9,347.3	10,290.3	10,740.0	28,183.0	29,735.4	39,131.4
	Chemicals	3,748.8	3,936.4	3,964.8	4,286.0	4,412.0	4,437.0	4,502.3	4,477.2	16,987.0	15,936.0	17,828.5
	Advanced Materials	1,233.5	1,253.5	1,217.9	1,202.4	1,139.2	1,189.2	1,189.2	1,239.2	4,170.2	4,907.3	4,756.7
	Battery	1,650.1	2,009.4	2,210.2	2,849.7	2,804.8	3,371.7	4,326.4	4,772.7	6,519.6	8,719.4	15,275.6
	Red bio	143.5	154.0	165.9	173.6	157.9	169.4	182.5	190.9	575.1	637.0	700.7
	Green bio	228.0	169.6	93.7	60.0	240.0	180.0	90.0	60.0	599.8	551.3	570.0
Operating profit		275.4	267.5	380.3	185.9	402.7	414.0	472.7	531.8	2,246.1	1,109.1	1,821.2
	Chemicals	398.6	382.2	321.2	307.8	292.2	292.9	295.5	294.7	2,031.4	1,409.8	1,175.3
	Advanced Materials	3.6	19.0	32.8	12.2	2.9	2.9	2.9	2.9	71.3	67.6	11.5
	Battery	-147.9	-128.0	71.2	-122.8	54.7	84.7	180.2	254.7	209.2	-327.5	574.4
	Red bio	11.8	10.9	16.1	8.7	7.9	8.5	9.1	9.5	49.5	47.5	35.0
	Green bio	38.2	9.1	-11.1	-20.0	45.0	25.0	-15.0	-30.0	15.4	16.2	25.0
Pretax profit		279.6	192.9	243.9	134.1	344.0	348.1	401.0	456.1	1,940.0	850.6	1,549.1
Net profit		194.5	68.1	128.6	94.3	258.0	261.1	300.7	342.1	1,472.6	485.4	1,161.9

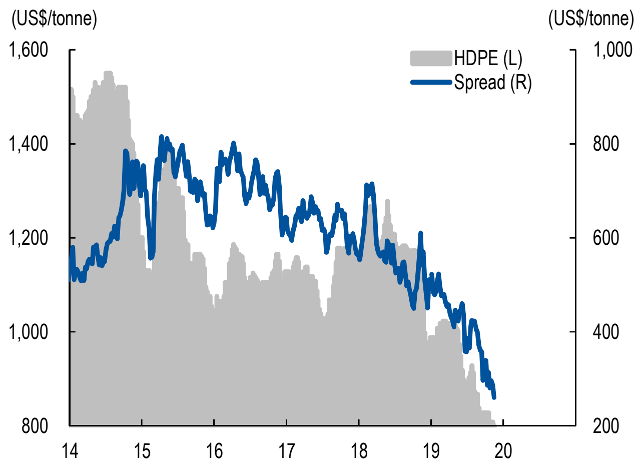
Source: Company data, Mirae Asset Daewoo Research

Figure 20. ABS spread



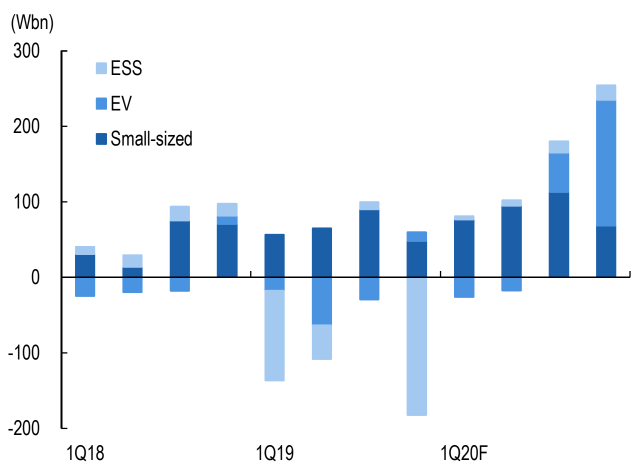
Source: Cischem, Mirae Asset Daewoo Research

Figure 21. HDPE spread



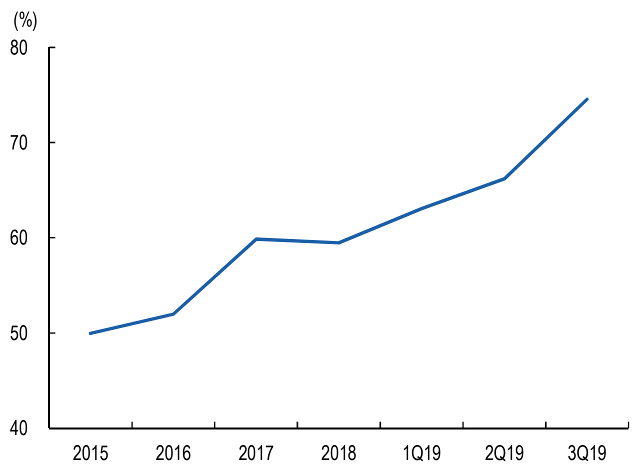
Source: Cischem Mirae Asset Daewoo Research

Figure 22. LG Chem: OP by battery application



Source: Company data, Mirae Asset Daewoo Research

Figure 23. M/S trend of top four battery makers



Source: SNE Research, Mirae Asset Daewoo Research

LG Chem (051910 KS/Buy/TP: W460,000)

Comprehensive Income Statement (Summarized)

(Wbn)	12/18	12/19F	12/20F	12/21F
Revenue	**28,183**	**29,735**	**39,131**	**44,320**
Cost of Sales	**22,837**	**25,103**	**33,786**	**37,976**
Gross Profit	**5,346**	**4,632**	**5,345**	**6,344**
SG&A Expenses	**3,100**	**3,524**	**3,524**	**3,524**
Operating Profit (Adj)	**2,246**	**1,109**	**1,821**	**2,820**
Operating Profit	**2,246**	**1,109**	**1,821**	**2,820**
Non-Operating Profit	**-306**	**-258**	**-272**	**-319**
Net Financial Income	-88	-170	-277	-324
Net Gain from Inv in Associates	5	13	0	0
Pretax Profit	1,940	851	1,549	2,501
Income Tax	421	317	387	625
Profit from Continuing Operations	1,519	534	1,162	1,876
Profit from Discontinued Operations	0	0	0	0
Net Profit	1,519	534	1,162	1,876
Controlling Interests	1,473	485	1,162	1,876
Non-Controlling Interests	47	48	0	0
Total Comprehensive Profit	**1,433**	**705**	**1,162**	**1,876**
Controlling Interests	1,388	650	1,103	1,780
Non-Controlling Interests	45	56	59	96
EBITDA	3,733	2,970	4,130	5,400
FCF (Free Cash Flow)	-2,094	-4,910	-3,314	-611
EBITDA Margin (%)	13.2	10.0	10.6	12.2
Operating Profit Margin (%)	8.0	3.7	4.7	6.4
Net Profit Margin (%)	5.2	1.6	3.0	4.2

Statement of Financial Condition (Summarized)

(Wbn)	12/18	12/19F	12/20F	12/21F
Current Assets	**12,089**	**13,027**	**15,185**	**18,434**
Cash and Cash Equivalents	2,514	1,643	922	1,776
AR & Other Receivables	4,624	5,698	7,139	8,338
Inventories	4,289	5,686	7,124	8,320
Other Current Assets	662	0	0	0
Non-Current Assets	**16,856**	**21,556**	**24,130**	**25,619**
Investments in Associates	266	266	333	389
Property, Plant and Equipment	13,839	18,284	20,903	22,437
Intangible Assets	2,006	2,169	2,040	1,926
Total Assets	**28,944**	**34,583**	**39,315**	**44,053**
Current Liabilities	**7,274**	**8,167**	**8,912**	**10,116**
AP & Other Payables	2,166	2,926	3,666	4,281
Short-Term Financial Liabilities	1,632	1,765	1,771	1,775
Other Current Liabilities	3,476	3,476	3,475	4,060
Non-Current Liabilities	**4,348**	**8,824**	**11,979**	**14,107**
Long-Term Financial Liabilities	3,738	8,214	11,214	13,214
Other Non-Current Liabilities	610	610	765	893
Total Liabilities	**11,622**	**16,991**	**20,891**	**24,223**
Controlling Interests	**17,083**	**17,270**	**18,103**	**19,509**
Capital Stock	391	391	391	391
Capital Surplus	2,275	2,275	2,275	2,275
Retained Earnings	14,994	15,013	15,846	17,252
Non-Controlling Interests	**239**	**321**	**321**	**321**
Stockholders' Equity	**17,322**	**17,591**	**18,424**	**19,830**

Cash Flows (Summarized)

(Wbn)	12/18	12/19F	12/20F	12/21F
Cash Flows from Op Activities	**2,125**	**1,206**	**1,486**	**3,389**
Net Profit	1,519	534	1,162	1,876
Non-Cash Income and Expense	2,212	2,689	2,973	3,529
Depreciation	1,379	1,729	2,180	2,466
Amortization	108	132	129	114
Others	725	828	664	949
Chg in Working Capital	-1,264	-1,671	-1,985	-1,067
Chg in AR & Other Receivables	52	-965	-1,374	-1,143
Chg in Inventories	-959	-1,351	-1,438	-1,196
Chg in AP & Other Payables	165	666	740	615
Income Tax Paid	-689	-497	-387	-625
Cash Flows from Inv Activities	**-3,639**	**-5,993**	**-4,816**	**-4,014**
Chg in PP&E	-3,777	-6,064	-4,800	-4,000
Chg in Intangible Assets	-108	-207	0	0
Chg in Financial Assets	511	43	-16	-14
Others	-265	235	0	0
Cash Flows from Fin Activities	**1,794**	**3,844**	**2,677**	**1,534**
Chg in Financial Liabilities	2,325	4,609	3,005	2,005
Chg in Equity	0	0	0	0
Dividends Paid	-494	-484	-329	-470
Others	-37	-281	1	-1
Increase (Decrease) in Cash	**264**	**-870**	**-721**	**854**
Beginning Balance	2,249	2,514	1,643	922
Ending Balance	2,514	1,643	922	1,776

Forecasts/Valuations (Summarized)

	12/18	12/19F	12/20F	12/21F
P/E (x)	18.4	49.8	20.8	12.9
P/CF (x)	7.3	7.5	5.8	4.5
P/B (x)	1.6	1.4	1.3	1.2
EV/EBITDA (x)	7.8	10.7	8.6	6.8
EPS (W)	18,812	6,201	14,842	23,963
CFPS (W)	47,668	41,170	52,822	69,041
BPS (W)	222,761	225,152	235,793	253,751
DPS (W)	6,000	4,000	6,000	6,000
Payout ratio (%)	27.2	52.9	36.5	22.6
Dividend Yield (%)	1.7	1.3	1.9	1.9
Revenue Growth (%)	9.7	5.5	31.6	13.3
EBITDA Growth (%)	-13.8	-20.4	39.1	30.8
Operating Profit Growth (%)	-23.3	-50.6	64.2	54.9
EPS Growth (%)	-24.3	-67.0	139.3	61.5
Accounts Receivable Turnover (x)	6.4	6.1	6.4	6.0
Inventory Turnover (x)	7.4	6.0	6.1	5.7
Accounts Payable Turnover (x)	10.9	9.9	10.3	9.6
ROA (%)	5.6	1.7	3.1	4.5
ROE (%)	8.9	2.8	6.6	10.0
ROIC (%)	9.6	2.7	4.9	6.7
Liability to Equity Ratio (%)	67.1	96.6	113.4	122.2
Current Ratio (%)	166.2	159.5	170.4	182.2
Net Debt to Equity Ratio (%)	16.2	47.4	65.5	66.6
Interest Coverage Ratio (x)	16.6	5.2	5.7	7.7

Source: Company data, Mirae Asset Daewoo Research estimates

Samsung SDI (006400 KS)

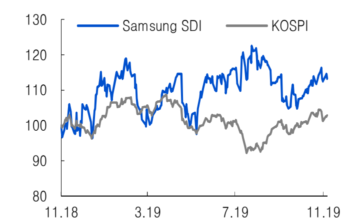
Growth trajectory intact

Technology

(Maintain)	Buy
Target Price (12M, W)	315,000
Share Price (11/27/19, W)	236,000
Expected Return	33%

OP (19F, Wbn)	479
Consensus OP (19F, Wbn)	493
EPS Growth (19F, %)	-38.3
Market EPS Growth (19F, %)	-33.0
P/E (19F, x)	38.4
Market P/E (19F, x)	14.4
KOSPI	2,127.85
Market Cap (Wbn)	16,228
Shares Outstanding (mn)	70
Free Float (%)	73.6
Foreign Ownership (%)	43.7
Beta (12M)	0.81
52-Week Low	201,000
52-Week High	255,500

(%)	1M	6M	12M
Absolute	4.4	9.3	12.6
Relative	2.5	5.0	11.1



EV batteries look robust

Samsung SDI's EV battery business looks robust. The company's conservative capacity expansions are actually working to its advantage. As revenue grows, leverage effects from lower percentages of R&D and depreciation expenses should gather steam. As a result, we expect the EV battery business to reach breakeven in 4Q19. Looking to 2020, we forecast the EV battery unit to post revenue of W3.7tr (+55% YoY) and operating profit of W31bn (turning to profit YoY). EV batteries alone should boost 2020 operating profit by roughly W200bn compared to 2019.

The monthly EV sales of Samsung SDI's major customers are also looking strong. In Europe, where the EV market is continuing steady growth, sales of major EV models for which the company supplies batteries jumped 114.9% YoY during the month of September. The Mini Cooper BEV coming out in 2020 also merits attention, as the model has so far taken 78,000 preorders—more than any other EV model that has recently started preorders, aside from Tesla's EVs. Considering that preorders have been brisk in recent months (after hitting 45,000 in August), it appears that consumer interest in the Mini Cooper BEV remains strong.

ESS: Worst is over

The price of solar renewable energy credits (RECs), which closely tracks the renewable energy plus ESS market cycle, has rebounded 28% since November 5th. While it will still take some time for the market to fully normalize (prices have fallen more than 40% since June), we believe the worst has come to an end. If the domestic ESS market picks up in 2020, the resulting increase in demand will likely go to Samsung SDI, which has shown superior follow-up management and customer support in response to the fires.

Electronic materials: A beneficiary of foldable smartphones

Material supplies for the Galaxy Fold also deserve close attention. For the first-generation Galaxy Fold, we believe Samsung SDI supplies films, such as optically clear adhesives (OCAs) and pressure-sensitive adhesives (PSAs). With the foldable smartphone market projected to grow from 7mn units in 2020 to 18mn units in 2021, revenue from related materials should grow.

Reaffirm TP of W315,000; Just a temporary lull

We reaffirm our target price of W315,000 on Samsung SDI. While earnings have been softer than anticipated this year due to the ESS fires and the weakness of the cylindrical battery market, we believe mid/large-sized batteries will drive overall earnings in 2020. Growth may have hit a temporary lull, but the overall growth trajectory remains intact.

[Display/Batteries]

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FY (Dec.)	12/16	12/17	12/18	12/19F	12/20F	12/21F
Revenue (Wbn)	5,201	6,347	9,158	10,259	11,798	13,567
OP (Wbn)	-926	117	715	479	1,001	1,238
OP Margin (%)	-17.8	1.8	7.8	4.7	8.5	9.1
NP (Wbn)	219	657	701	432	864	1,069
EPS (W)	3,117	9,338	9,962	6,143	12,274	15,183
ROE (%)	2.0	6.0	6.0	3.5	6.7	7.7
P/E (x)	35.0	21.9	22.0	38.4	19.2	15.5
P/B (x)	0.7	1.2	1.3	1.3	1.2	1.1
Dividend Yield (%)	0.9	0.5	0.5	0.4	0.4	0.4

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

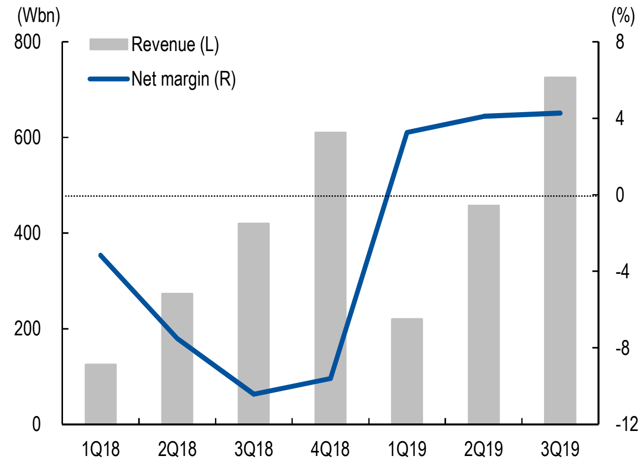
EV batteries look robust

Samsung SDI's EV battery business appears robust. The company's conservative capacity expansions are actually working to its advantage. As revenue grows, leverage effects from lower percentages of R&D and depreciation expenses should gather steam. As a result, we expect the EV battery business to reach breakeven in 4Q19. Looking to 2020, we forecast the EV battery unit to post revenue of W3.7tr (+55% YoY) and operating profit of W31bn (turning to profit YoY). EV batteries alone should boost 2020 operating profit by roughly W200bn compared to 2019.

Monthly EV sales of Samsung SDI's major customers are also looking strong. While US and Chinese market growth has recently lost steam, the European market has seen sharp sales growth thanks to subsidy expansion. In Europe, sales of major EV models adopting Samsung SDI batteries jumped 114.9% YoY during the month of September.

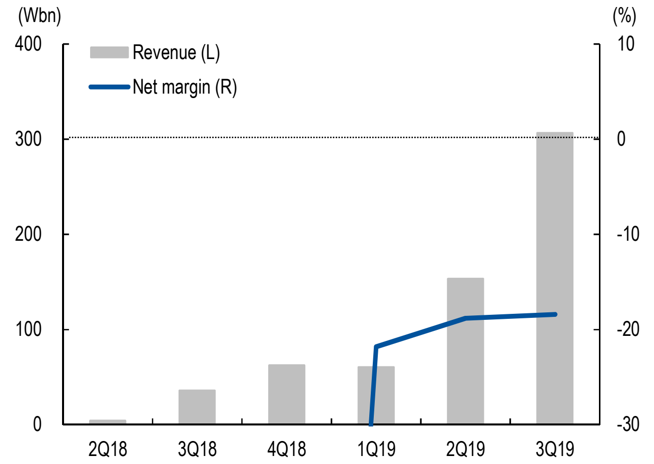
The Mini Cooper BEV coming out in 2020 also merits attention, as the model has so far recorded 78,000 preorders—more than any other EV model that has recently started preorders, aside from Tesla's EVs. Considering that preorders have been brisk in recent months (after hitting 45,000 in August), it appears that consumer interest in the Mini Cooper BEV remains strong.

Figure 24. SDI-ARN (Xi'an) Power Battery: Revenue and net margin



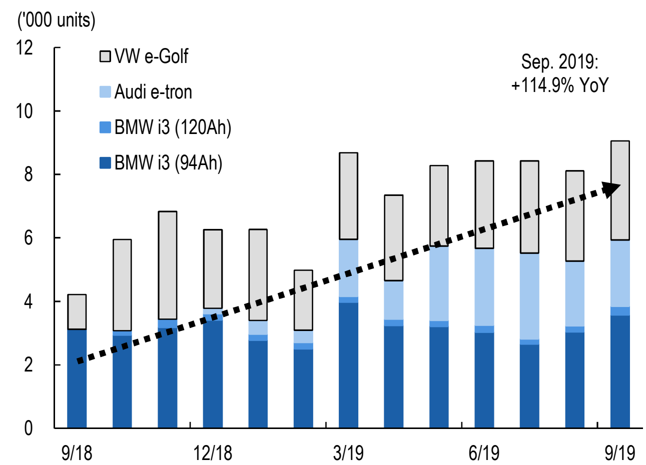
Source: Company data, Mirae Asset Daewoo Research

Figure 25. Samsung SDI Hungary: Revenue and net margin



Source: Company data, Mirae Asset Daewoo Research

Figure 26. BEV models adopting Samsung SDI batteries



Source: SNE Research, Mirae Asset Daewoo Research

Figure 27. 78,000 preorders for the Mini Cooper BEV

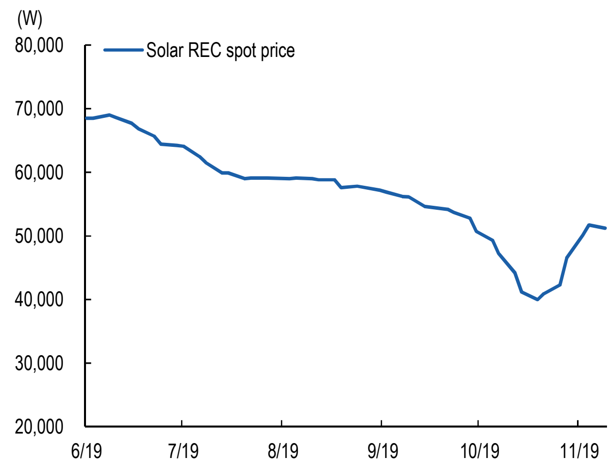
Source: BMW, Mirae Asset Daewoo Research

ESS: Worst is over

The price of solar RECs, which closely tracks the renewable energy plus ESS market cycle, has rebounded 28% since November 5th. While it will still take some time for the market to fully normalize (prices have fallen more than 40% since June), we believe the worst has come to an end. If the domestic ESS market picks up in 2020, the resulting increase in demand will likely go to Samsung SDI, which has shown superior follow-up management and customer support in response to the fires.

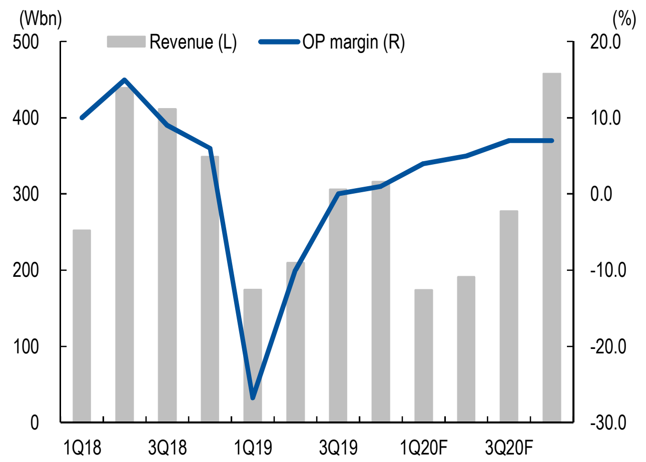
In 2020, we expect Samsung SDI's ESS unit to post revenue of W1.1tr (+9.4% YoY) and operating profit of W68bn (turning to black YoY). We see potential upside to our estimates in the event of a pickup in the domestic ESS market.

Figure 28. Solar REC price trend



Source: Mal-eum, Mirae Asset Daewoo Research

Figure 29. Samsung SDI: ESS battery revenue and OP margin



Source: Company data, Mirae Asset Daewoo Research

Table 6. Quarterly and annual earnings (Wbn, %)

	1Q19	2Q19	3Q19	4Q19F	1Q20P	2Q20F	3Q20F	4Q20F	2019F	2020F
Revenue	2,304	2,404	2,568	2,982	2,612	2,731	3,038	3,417	10,258	11,798
Batteries	1,731	1,823	1,954	2,385	2,055	2,166	2,433	2,776	7,893	9,431
Small-sized (IT)	1,135	1,155	1,062	1,119	1,073	1,102	1,178	1,234	4,471	4,588
Mid/large-sized (EV, ESS)	596	668	892	1,267	982	1,064	1,255	1,543	3,423	4,844
EM	573	581	614	597	556	564	605	641	2,365	2,367
Operating profit	119	157	166	37	192	213	279	318	479	1,001
Batteries	35	67	70	133	107	121	178	211	305	616
Small-sized (IT)	138	145	132	130	116	120	139	142	546	517
Mid/large-sized (EV, ESS)	-104	-78	-63	3	-9	0	39	69	-241	99
EM	84	91	96	104	85	92	101	106	375	385
Others				-200					-200	0
OP margin	5.2	6.5	6.5	1.2	7.3	7.8	9.2	9.3	4.7	8.5
Batteries	2.0	3.7	3.6	5.6	5.2	5.6	7.3	7.6	3.9	6.5
Small-sized (IT)	12.2	12.6	12.4	11.6	10.8	10.9	11.8	11.5	12.2	11.3
Mid/large-sized (EV, ESS)	-17.4	-11.7	-7.0	0.2	-0.9	0.0	3.1	4.5	-7.0	2.0
EM	14.7	15.6	15.7	17.4	15.3	16.3	16.7	16.6	15.8	16.3

Source: Company data, Mirae Asset Daewoo Research

Electronic materials: A beneficiary of foldable devices

We expect revenue from OLED materials (including green host and p-dopant) to grow sharply, as: 1) Chinese panel makers will likely operate small/medium-sized OLED lines in earnest; and 2) volume from LG Display's (034220 KS/Buy/TP: W20,000/CP: W14,750) large-sized OLED plant in Guangzhou should increase in 2020. .

Material supplies for the Galaxy Fold also deserve close attention. For the first-generation Galaxy Fold, we believe Samsung SDI is supplying films, such as OCAs and PSAs. With the global foldable smartphone market projected to grow from 7mn units in 2020 to 18mn units in 2021, revenue from related materials should grow.

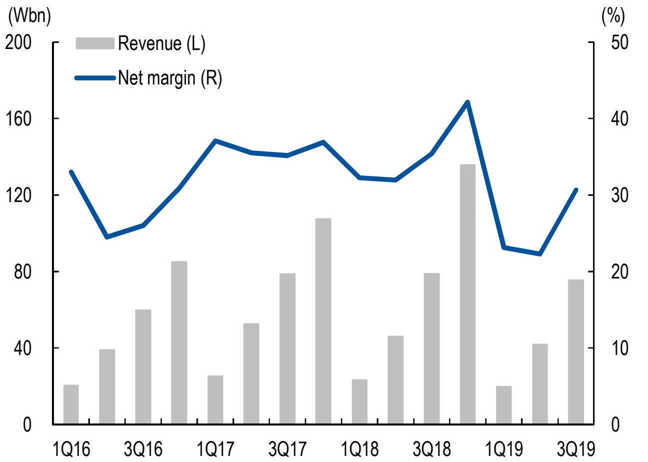
Figure 30. Supply chain for the Galaxy Fold

Galaxy Fold

Supplier	Layer	μm
Segyung	Anti Finger	1
SKC	Hard Coating	6
	PET	40
SDI	OCA	40
Sumitomo	Hard Coating	5
	CPI	40
Biel	Black Matrix	8
SDI	OCA	50
Nitto	Polarizer	31
	PSA	50
SDC	Flexible Panel(YOCTA inside)	30
Innox	PSA	10
SKC	PI(Yellow)	50
SDI	PSA	25
Utis	Cushion Film	100
SDI	PSA	25
Finetechnix	Sus Frame	20
??	PSA	8
??	Poli Uretan + tape	30
Finetechnix	Sus Frame	20
	Total	589

Source: DSCC, Mirae Asset Daewoo Research

Figure 31. Novaled: Revenue and net margin



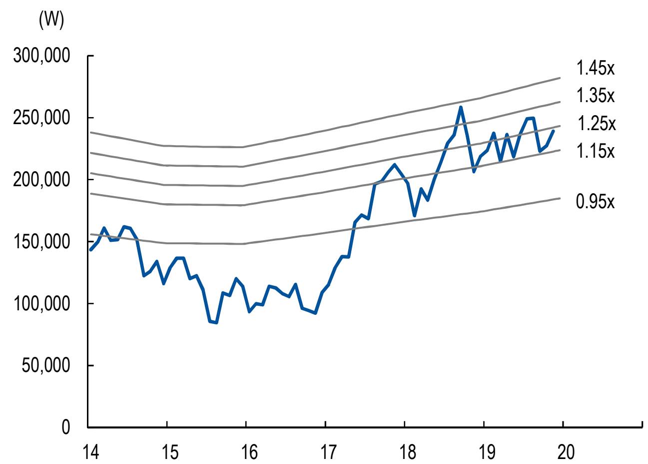
Source: Company data, Mirae Asset Daewoo Research

Reaffirm TP of W315,000; Just a temporary lull

We reaffirm our target price of W315,000 on Samsung SDI. We believe the stock has only modest downside risk and view a 12-month forward P/B of 1.15x (W223,000) as the stock's bottom.

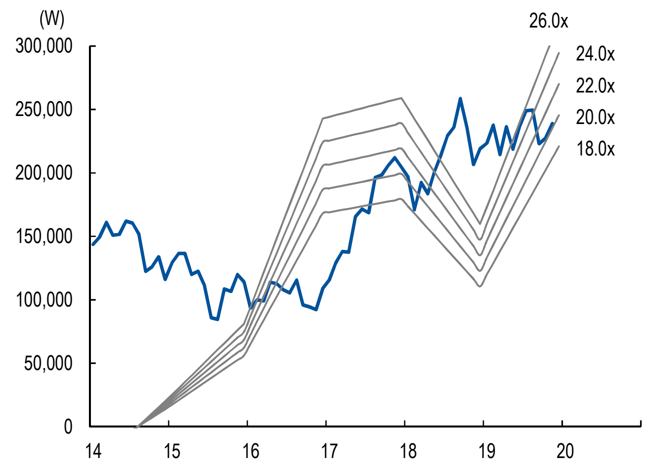
The uncertainties behind the company's share price weakness in 1H19 (ESS fires, concerns over EV battery market share and yield, and equity-method losses from Samsung Display) should gradually dissipate in 2020. Growth may have hit a temporary lull, but the overall trajectory remains intact.

Figure 32. Samsung SDI: 12-month forward P/B



Source: WISEfn, Mirae Asset Daewoo Research

Figure 33. Samsung SDI: 12-month forward P/E



Source: WISEfn, Mirae Asset Daewoo Research

Samsung SDI (006400 KS/Buy/TP: W315,000)

Comprehensive Income Statement (Summarized)

(Wbn)	12/18	12/19F	12/20F	12/21F
Revenue	**9,158**	**10,259**	**11,798**	**13,567**
Cost of Sales	**7,118**	**7,960**	**9,085**	**10,430**
Gross Profit	**2,040**	**2,299**	**2,713**	**3,137**
SG&A Expenses	**1,325**	**1,819**	**1,711**	**1,899**
Operating Profit (Adj)	**715**	**479**	**1,001**	**1,238**
Operating Profit	**715**	**479**	**1,001**	**1,238**
Non-Operating Profit	**321**	**143**	**211**	**262**
Net Financial Income	-34	-69	-81	-94
Net Gain from Inv in Associates	342	196	325	320
Pretax Profit	1,036	622	1,212	1,500
Income Tax	291	160	303	375
Profit from Continuing Operations	745	462	909	1,125
Profit from Discontinued Operations	0	0	0	0
Net Profit	745	462	909	1,125
Controlling Interests	701	432	864	1,069
Non-Controlling Interests	44	29	45	56
Total Comprehensive Profit	**796**	**611**	**909**	**1,125**
Controlling Interests	748	562	833	1,031
Non-Controlling Interests	48	50	76	94
EBITDA	1,297	1,367	2,168	2,668
FCF (Free Cash Flow)	-1,886	-796	-179	512
EBITDA Margin (%)	14.2	13.3	18.4	19.7
Operating Profit Margin (%)	7.8	4.7	8.5	9.1
Net Profit Margin (%)	7.7	4.2	7.3	7.9

Statement of Financial Condition (Summarized)

(Wbn)	12/18	12/19F	12/20F	12/21F
Current Assets	**5,519**	**5,734**	**5,921**	**6,786**
Cash and Cash Equivalents	1,517	919	432	482
AR & Other Receivables	1,585	1,907	2,185	2,504
Inventories	1,746	2,100	2,407	2,768
Other Current Assets	671	808	897	1,032
Non-Current Assets	**13,830**	**15,574**	**17,101**	**18,577**
Investments in Associates	6,555	7,210	7,931	9,121
Property, Plant and Equipment	4,608	5,767	6,663	6,976
Intangible Assets	866	808	745	701
Total Assets	**19,350**	**21,309**	**23,022**	**25,363**
Current Liabilities	**4,013**	**4,300**	**4,698**	**5,161**
AP & Other Payables	1,334	1,605	1,839	2,115
Short-Term Financial Liabilities	1,755	1,583	1,585	1,581
Other Current Liabilities	924	1,112	1,274	1,465
Non-Current Liabilities	**3,112**	**4,131**	**4,606**	**5,431**
Long-Term Financial Liabilities	1,544	2,245	2,445	2,945
Other Non-Current Liabilities	1,568	1,886	2,161	2,486
Total Liabilities	**7,125**	**8,431**	**9,305**	**10,592**
Controlling Interests	**11,934**	**12,556**	**13,349**	**14,347**
Capital Stock	357	357	357	357
Capital Surplus	5,038	5,038	5,038	5,038
Retained Earnings	6,613	6,978	7,771	8,770
Non-Controlling Interests	**291**	**322**	**368**	**424**
Stockholders' Equity	**12,225**	**12,878**	**13,717**	**14,771**

Cash Flows (Summarized)

(Wbn)	12/18	12/19F	12/20F	12/21F
Cash Flows from Op Activities	**261**	**1,127**	**1,821**	**2,212**
Net Profit	745	462	909	1,125
Non-Cash Income and Expense	630	897	1,207	1,484
Depreciation	491	799	1,104	1,386
Amortization	91	89	63	43
Others	48	9	40	55
Chg in Working Capital	-979	-64	24	8
Chg in AR & Other Receivables	-786	55	-263	-309
Chg in Inventories	-504	-85	-306	-361
Chg in AP & Other Payables	147	130	112	132
Income Tax Paid	-129	-149	-303	-375
Cash Flows from Inv Activities	**-1,705**	**-1,929**	**-2,024**	**-1,748**
Chg in PP&E	-2,142	-1,916	-2,000	-1,700
Chg in Intangible Assets	-13	-2	0	0
Chg in Financial Assets	1,600	-15	1	-48
Others	-1,150	4	-25	0
Cash Flows from Fin Activities	**1,756**	**418**	**132**	**425**
Chg in Financial Liabilities	1,854	529	203	496
Chg in Equity	-5	0	0	0
Dividends Paid	-72	-67	-70	-70
Others	-21	-44	-1	-1
Increase (Decrease) in Cash	**308**	**-598**	**-487**	**50**
Beginning Balance	1,209	1,517	919	432
Ending Balance	1,517	919	432	482

Source: Company data, Mirae Asset Daewoo Research estimates

Forecasts/Valuations (Summarized)

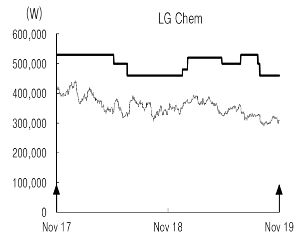
	12/18	12/19F	12/20F	12/21F
P/E (x)	22.0	38.4	19.2	15.5
P/CF (x)	11.2	12.2	7.9	6.4
P/B (x)	1.3	1.3	1.2	1.1
EV/EBITDA (x)	13.2	14.2	9.3	7.7
EPS (W)	9,962	6,143	12,274	15,183
CFPS (W)	19,533	19,311	30,064	37,062
BPS (W)	174,463	183,298	194,570	208,752
DPS (W)	1,000	1,000	1,000	1,000
Payout ratio (%)	8.8	14.9	7.6	6.1
Dividend Yield (%)	0.5	0.4	0.4	0.4
Revenue Growth (%)	44.3	12.0	15.0	15.0
EBITDA Growth (%)	124.8	5.4	58.6	23.1
Operating Profit Growth (%)	511.1	-33.0	109.0	23.7
EPS Growth (%)	6.7	-38.3	99.8	23.7
Accounts Receivable Turnover (x)	7.3	6.2	6.1	6.1
Inventory Turnover (x)	6.8	5.3	5.2	5.2
Accounts Payable Turnover (x)	12.9	11.3	11.0	11.0
ROA (%)	4.2	2.3	4.1	4.6
ROE (%)	6.0	3.5	6.7	7.7
ROIC (%)	8.5	7.1	10.3	11.5
Liability to Equity Ratio (%)	58.3	65.5	67.8	71.7
Current Ratio (%)	137.5	133.4	126.0	131.5
Net Debt to Equity Ratio (%)	13.3	21.2	24.7	25.8
Interest Coverage Ratio (x)	13.8	5.3	9.9	11.2

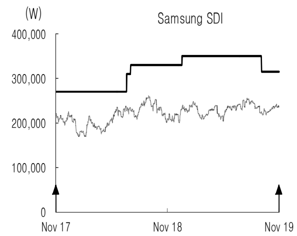
APPENDIX 1

Important Disclosures & Disclaimers

2-Year Rating and Target Price History

Company (Code)	Date	Rating	Target Price
LG Chem (051910)			
	09/24/2019	Buy	460,000
	09/18/2019	Buy	500,000
	07/24/2019	Buy	530,000
	05/23/2019	Buy	500,000
	01/31/2019	Buy	520,000
	01/14/2019	Buy	480,000
	07/17/2018	Buy	460,000
	06/03/2018	Buy	500,000
	10/26/2017	Buy	530,000
Samsung SDI (006400)			
	10/01/2019	Buy	315,000
	01/14/2019	Buy	350,000
	07/30/2018	Buy	330,000
	07/17/2018	Buy	310,000
	10/31/2017	Buy	270,000





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.

Equity Ratings Distribution & Investment Banking Services

	Buy	Trading Buy	Hold	Sell
Equity Ratings Distribution	84.57%	9.88%	5.55%	0.00%
Investment Banking Services	82.76%	6.90%	10.34%	0.00%

* Based on recommendations in the last 12-months (as of September 30, 2019)

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