



# Fuyao Glass

## Volume and price of automotive glass to rise; earnings to improve

### Investment Focus

#### Action

We are upbeat on the growth potential of the automotive glass industry given the use of head-up displays (HUD) and panoramic sunroofs. We expect earnings at Fuyao Glass to turn around after COVID-19 outbreaks overseas are brought under control. In addition, we are optimistic about Fuyao's earnings in the longer term and expect the firm to gain market share worldwide given its investments in the aluminum trim and smart glass businesses.

#### Reasoning

**Volume and price of automotive glass to rise.** We are upbeat on China's automotive glass industry given the healthy competitive landscape, high barriers to entry, and glass exports. We think the higher volume and price of automotive glass used in vehicles will add to the growth potential of the automotive glass industry.

**Earnings to turn around as impacts of overseas outbreaks ease; FYSAM to turn a profit.** In 1H20, Fuyao faced headwinds from COVID-19 outbreaks in China and abroad. We expect its earnings to improve as impacts of overseas outbreaks ease. We think its German subsidiary FYSAM will generate profits monthly in the short term.

**We expect Fuyao to gain market share worldwide given its high R&D input and broad product portfolio.** Fuyao has recorded a higher R&D expense ratio and provided a broader product portfolio than many leading glass manufacturers. It has cooperated with BOE and BICV in switchable glass, antenna glass, and other smart glass. We think Fuyao's high R&D input and focus on the auto glass business will help it rapidly respond to changing market demand during product upgrades. Given its business scale and R&D strength, we think Fuyao will continue to gain market share worldwide.

#### Earnings forecast and valuation

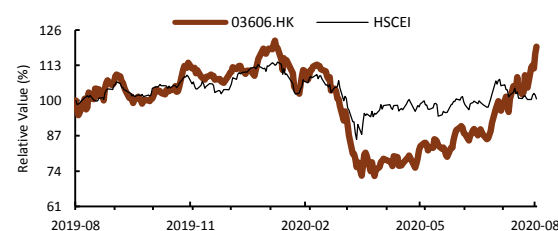
We maintain our earnings forecasts. Fuyao-A is trading at 27.8x 2020e and 20.6x 2021e P/E. Fuyao-H is trading at 21.2x 2020e and 15.7x 2021e P/E. We are upbeat on the sector valuation given the increased volume and price of automotive glass, and expect the firm's valuation to increase as its earnings recover and FYSAM turns a profit. We maintain our OUTPERFORM ratings for Fuyao-A/H, and raise our TP for Fuyao-A by 39% to Rmb35 (25x 2021e P/E, 21.4% upside) and lift our TP for Fuyao-H by 39% to HK\$32 (20x 2021e P/E, 29.3% upside).

#### Risks

Recurrence of COVID-19 outbreaks in the US; weakening of US dollars.

### Maintain OUTPERFORM

Ticker	600660.SH	03606.HK
CICC investment rating	OUTPERFORM	OUTPERFORM
Last close	Rmb28.82	HK\$24.75
CICC target	Rmb35.00	HK\$32.00
52wk price range	Rmb29.88~17.34	HK\$25.28~14.73
Market cap (bn)	Rmb69	HK\$77
Daily value (mn)	Rmb997.11	HK\$107.37
Shares outstanding (mn)	2,509	2,509
Free float (%)	80	20
Daily volume (mn sh)	39.65	4.77
Business sector		Automobiles & Parts



(Rmb mn)	2018A	2019A	2020E	2021E
Revenue	20,225	21,104	18,651	21,664
(+/-)	8.1%	4.3%	-11.6%	16.2%
Net profit	4,120	2,898	2,602	3,503
(+/-)	30.9%	-29.7%	-10.2%	34.6%
EPS	1.64	1.16	1.04	1.40
BPS	8.05	8.52	8.81	9.45
DPS	1.15	0.75	0.75	0.75
CPS	2.32	2.04	1.94	2.13
P/E	13.2	19.2	21.2	15.7
P/B	2.7	2.6	2.5	2.3
EV/EBITDA	8.9	11.7	11.6	8.9
Dividend yield	5.3%	3.4%	3.4%	3.4%
ROAA	12.4%	7.9%	6.8%	9.0%
ROAE	21.0%	13.9%	12.0%	15.3%

Source: Wind, Bloomberg, Corporate filings, CICC Research

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**Financial summary**

Financial statement (Rmb mn)	2018A	2019A	2020E	2021E	Financial ratios	2018A	2019A	2020E	2021E
<b>Income statement</b>					<b>Growth ability</b>				
Revenue	20,225	21,104	18,651	21,664	Revenue	8.1%	4.3%	-11.6%	16.2%
COGS	-11,806	-13,395	-11,898	-13,134	Operating profit	1.0%	-17.3%	-16.9%	43.1%
Selling expenses	1,468	1,482	1,399	1,560	EBITDA	18.8%	-21.0%	-1.6%	26.8%
Administrative expenses	2,063	2,185	1,958	2,275	Net profit	30.9%	-29.7%	-10.2%	34.6%
Other ops income (expense)	-123	-182	-184	-184	<b>Profitability</b>				
Operating profit	4,124	3,411	2,834	4,056	Gross margin	41.6%	36.5%	36.2%	39.4%
Finance costs	-111	21	-82	78	Operating margin	20.4%	16.2%	15.2%	18.7%
Other income (expense)	25	-241	-95	-93	EBITDA margin	31.2%	23.6%	26.3%	28.7%
Profit before income tax	4,962	3,231	2,901	3,905	Net margin	20.4%	13.7%	14.0%	16.2%
Income tax	855	333	299	402	<b>Liquidity</b>				
Minority interest	-13	0	0	0	Current ratio	1.26	1.20	1.27	1.38
Net profit	4,120	2,898	2,602	3,503	Quick ratio	1.00	0.98	1.05	1.15
EBITDA	6,312	4,986	4,907	6,223	Cash ratio	0.51	0.56	0.62	0.69
Recurrent net income	4,120	2,898	2,602	3,503	Liabilities / assets	41.5%	45.0%	41.8%	40.7%
<b>Balance sheet</b>					Net debt / equity	2.2%	6.2%	7.0%	1.4%
Cash and bank balances	6,358	8,353	8,137	9,343	<b>Return</b>				
Trade and bill receivables	3,594	3,457	3,056	3,549	RoA	12.4%	7.9%	6.8%	9.0%
Inventories	3,242	3,280	2,914	3,214	RoE	21.0%	13.9%	12.0%	15.3%
Other current assets	2,388	2,684	2,599	2,677	<b>Per-share data</b>				
Total current assets	15,581	17,774	16,706	18,784	EPS (Rmb)	1.64	1.16	1.04	1.40
Fixed assets and CIP	16,567	16,496	16,606	16,569	BPS (Rmb)	8.05	8.52	8.81	9.45
Intangible assets and others	2,343	4,556	4,611	4,602	DPS (Rmb)	1.15	0.75	0.75	0.75
Total non-current assets	18,909	21,052	21,217	21,170	Cash flow per share (Rmb)	2.32	2.04	1.94	2.13
Total assets	34,490	38,826	37,923	39,954	<b>Valuation</b>				
Short-term borrowings	6,852	9,615	8,492	8,492	P/E	13.2	19.2	21.2	15.7
Trade and bill payables	1,301	1,237	1,098	1,212	P/B	2.7	2.6	2.5	2.3
Other current liabilities	4,204	3,934	3,572	3,869	EV/EBITDA	8.9	11.7	11.6	8.9
Total current liabilities	12,357	14,786	13,162	13,572	Dividend yield	5.3%	3.4%	3.4%	3.4%
Long-term borrowings	1,247	1,193	1,193	1,193					
Other non-current liabilities	697	1,478	1,478	1,478					
Total non-current liabilities	1,943	2,671	2,671	2,671					
Total liabilities	14,301	17,457	15,834	16,243					
Share capital	2,509	2,509	2,509	2,509					
Retained profit	17,682	18,862	19,583	21,204					
Shareholders' equity	20,191	21,370	22,091	23,713					
Minority interest	-1	-1	-2	-2					
Total liabilities & equity	34,490	38,826	37,923	39,954					
<b>Cash flow statement</b>									
Pretax profit	4,962	3,231	2,901	3,905					
Depreciation & amortization	1,693	2,060	2,088	2,240					
Change in working capital	877	490	350	-462					
Others	-1,725	-654	-461	-345					
Cash flow from operations	5,808	5,127	4,878	5,338					
Capital expenditure	-2,637	-1,164	-1,814	-1,814					
Others	-691	-1,962	-359	-359					
Cash flow from investing	-3,328	-3,125	-2,173	-2,173					
Equity financing	0	0	0	0					
Bank borrowings	202	2,709	-1,124	0					
Others	-3,282	-2,825	-1,800	-1,959					
Cash flow from financing	-3,080	-116	-2,924	-1,959					
Foreign exchange gain (loss)	253	109	0	0					
Net changes in cash	-347	1,995	-219	1,206					

Source: Corporate filings, CICC Research

**Company description**

Fuyao Glass Industry Group Co., Ltd. is a joint venture founded in 1987 in Fuzhou. It specializes in producing automotive safety glass and industrial technological glass, and ranks No.1 in China and No.2 in the world. Fuyao is a major supplier to OEMs and commands more than half of the Chinese OEM market share. Globally, Fuyao has passed certification by eight leading automakers and has become a qualified supplier for Audi, Bentley, VW, GM, Ford, Toyota, Honda, Nissan, PSA, Volvo, Hyundai, and Daimler Chrysler.



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## Volume and price of automotive glass to both rise

### Domestic brands begin to upgrade automotive glass

We expect the volume and price of automotive glass to rise. First, we think the amount of glass used in a car will increase, as: 1) the size of automobiles increases given the growing supply and demand for B-level sedans, medium and large sized SUVs, and other larger models; and 2) the penetration rate of panoramic sunroofs rises. Second, we think the value of glass per sqm will increase as companies upgrade techniques to improve the performance of automotive glass and add more features to this product.

We note that domestic brands have upgraded automotive glass in their new models. Previously, pre-installed HUD were standard equipment only in top-tier luxury models, and they were provided, at a price of over Rmb10,000/unit, as optional extras in other models. As technologies improve and the cost of key technologies drops, HUD has become standard equipment in several higher-end models provided by domestic companies. Geely has offered HUD as standard equipment in multiple Geometry A models that are priced at Rmb160,000/unit or above. GWM is set to offer HUD as standard equipment in the upcoming third generation Haval 6. In addition, BYD has used premium film and sandwich glass in the Han series to better shield sunlight and improve heat insulation.

Figure 1: GWM is set to offer HUD as standard equipment in the upcoming third generation Haval 6



Source: Company website, CICC Research




Figure 2: HUD Geely has offered HUD as standard equipment in multiple Geometry A models



Source: Company website, CICC Research



Figure 3: Glass in the new Han series

Car window	Solution	Function	Graph
Windshield	Double silver low-e glass	Blocks more than 99% of ultraviolet rays and more than 85% of infrared rays if plaited 9-14 layers of nano metal film on the inner layer of the glass	
Front door glass	Solar green laminated glass	Increases the performance of sound insulation, anti-theft, and sun protection when compared with traditional single-layer car windows	
Back door glass	Advanced gray glass	Provides better sun protection, heat insulation, as well as privacy	

Source: Fuyao Group's official account on WeChat, CICC Research

**We expect the penetration rate of HUD to increase markedly; this product has higher technique requirements on front windshield glass**

HUD: Classification and image-forming principles

HUDs present driving information and other data without requiring drivers to look away from their usual viewpoints, thereby improving driving safety and experience. According to the screen, HUDs can be categorized into direct reflection HUDs, combiner HUDs, and windshield HUDs. Companies have almost stopped the use of direct reflection HUDs, and mostly use combiner and windshield HUDs.

**Direct reflection HUDs:** A reflection HUD is a display film that has a proper refractive index. It is imposed on windshield glass, and presents data that is beamed on it via an optics system. Reflection HUDs are cheaper than the other two HUDs, and are easy to install. However, they offer limited range of visibility (around 0.5m), fewer features, and less clarity.

**Combiner HUDs:** A combiner HUD shows information on a transparent glass display, or combiner. The combiner is typically put on the dashboard. The cost of combiner HUDs is relatively low, related technologies are not sophisticated, and this product provides a long range of visibility (over 2m). However, the surface that displays information is restricted by the size of the combiner.

**Windshield HUDs:** A windshield HUD system uses a projector to send an image onto the windscreen. The image bounces off a series of mirrors before being magnified so it is legible to drivers. Windshield HUDs show clear, colorful images and provide a long range of visibility (more than 2.5m). However, the cost of windshield HUDs is high, and this product has high technique requirements.

Windshield HUDs are mostly pre-installed in vehicles. They present information on windshield glass, a wider surface than the size of combiners, and they show more data, provide a longer range of visibility, and offer better user experience. In addition, we think the use of augmented reality (AR) technology will increase the range of visibility and enable windshield HUDs to show more data and further improve user experience. Combiner HUDs are mostly



post-installed in vehicles. The cost of this product is lower, but the surface on which they present information is limited and they are unlikely to use more advanced technologies, in our view.

#### HUD has higher technique requirements on windshield glass

Windshield glass typically has two layers. Rays are likely to be reflected by air between the layers, thus causing the ghosting problem in windshield HUDs. Companies have used multiple technologies to eliminate the ghosting problem in windshield glass. Fuyao utilizes two technologies – wedge angle technology and nanofilm technology – to reduce the problem. It uses a wedge angle between the inner and outer layer of the glass and changes the thickness of the PVB interlayer. The presence of the wedge angle enables two rays (the red one and the green one shown in Figure 7) to coincide on the path to the driver’s eye and therefore eliminate image ghosting. In March 2008, Fuyao was awarded a patent on wedge angle technology. It has used this technology to reduce image ghosting in most of its windshield products.

In 2016, the firm received a patent for nanofilm technology. It uses transparent nanofilm deposited on the front of the interlayer of the windshield and polarized light to weaken the reflection of secondary image and enhance the reflection of primary image in order to improve the luminance ratio between the two and avoid visual ghosting. A combination of transparent nanofilm enables monochrome display, multicolor display, and full-color display<sup>1</sup>. The development cycle for nanofilm is shorter than PVB, and nanofilm can be used in windshields that present larger images<sup>2</sup>.

#### We expect the penetration rate of HUD to rise and the value of Fuyao glass per vehicle to increase

Pre-installed HUD shipments in China remain limited. The penetration rate of this product stood low at 1.4% in 2018. Pre-installed HUDs have been standard equipment in top-tier luxury models, and in other models, they are offered as optional extras at Rmb1,000 to over Rmb10,000/unit. Higher-end brands and domestic brands also offer pre-installed HUD as standard equipment in battery electronic vehicles. In addition, domestic brands have been installing HUD in several gasoline models. As such, we expect the penetration rate of pre-installed HUD to increase.

*Figure 4: Prices of HUD as optional extras in several models*

Car model	Price of a HUD option (Rmb)	Price range (Rmb '000)	Lowest Price of a standard model equipped with a HUD (Rmb '000)
Audi Q8	20,500	768.8-1,018.8	1,018.80
BMW 3series	13,100	293.9-409.9	379.90
BMW X3	10,000	389.8-479.8	479.80
BMW X6	15,900/17,000	766.9-936.9	936.90
Benz EQC	9,000	499.8-622.8	622.80
Honda INSPIRE	N.A.	182.8-249.8	249.80
Honda Accord	N.A.	179.8-259.8	259.80
Buick GL8	N.A.	232.9-529.9	399.90

<sup>1</sup> Source: <https://patentimages.storage.googleapis.com> [Chinese only]

<sup>2</sup> Source: [https://www.fuyaogroup.com/products\\_2.html#features](https://www.fuyaogroup.com/products_2.html#features) [Chinese only]



Buick Regal	N.A.	172.8-259.8	216.80
Buick LaCrosse	N.A.	229.8-289.8	269.80
Toyota Camry	N.A.	179.8-279.8	199.80
Geometry A	N.A.	150.0-190.0	160.00
Cadillac XT6	N.A.	389.7-549.7	549.70
Lexus RX	N.A.	398.0-799.0	405.00
NIO ES6	6,500	358.0-518.0	468.00
NIO ES8	6,500	448.0-624.0	558.00
Volvo V60	N.A.	339.9-439.9	439.90

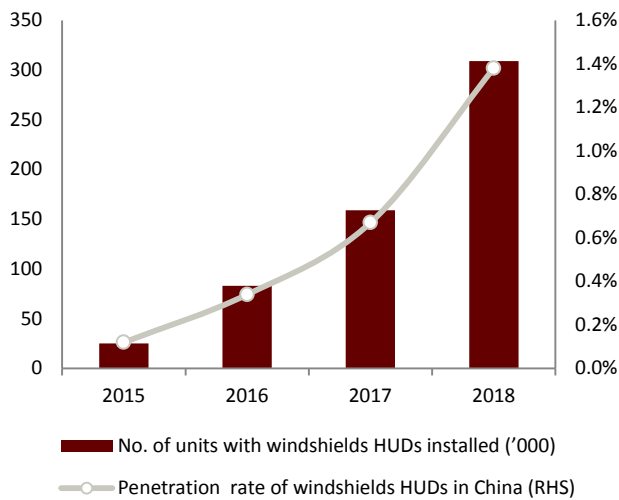
Source: autohome.com, CICC Research

The penetration rate of automotive LED lamps increased more than 10 times over 2012–2017. Given the growth rate of the penetration rate of this product, we estimate that the penetration rate of windshield HUD will exceed 15% by 2023. The actual penetration rate may exceed our expectation due to HUD supply and demand conditions.

- ▶ Supply – Auto companies will likely increase the installation of HUD in vehicles as technologies improve and the cost of this product drops. Several domestic brands have released plans to offer HUD as standard equipment in their new models (such as H6). We think domestic and JV brands will likely add HUDs in order to increase the competitive advantages of their products going forward.
- ▶ Demand – We think the use of the AR technology in HUD will notably improve driving experience, thus boosting consumer demand for HUD.

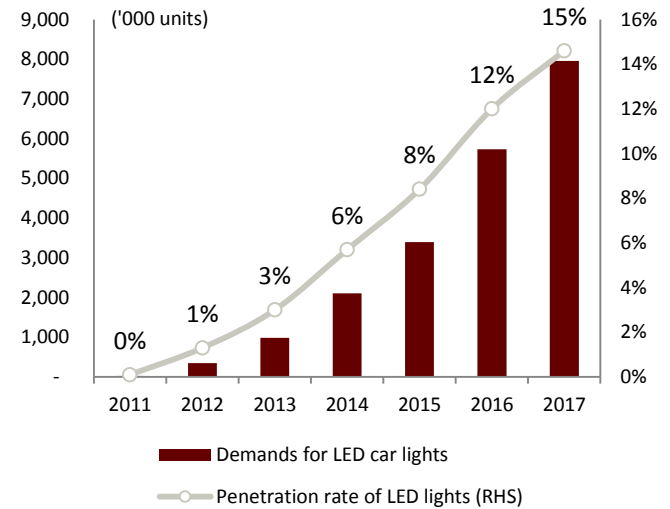


Figure 5: Penetration rate of pre-installed HUD in China over 2015–2018



Source: Imcmr.com, www.sohu.com, CICC Research

Figure 6: Penetration rate of automotive LED lamps in China over 2012–2017



Source: www.zhiyan.org.com, CICC Research

We estimate that the installation of HUD will increase at a CAGR of more than 40% over 2020–2023 if the penetration rate of HUD reaches 15% or 20% in 2023 and sales volume of passenger vehicles stays flat over 2021–2023 compared with 2020. In addition, we think the penetration rate of HUD will continue to increase after the mass production of AR-enabled HUD.

Figure 7: Penetration rate of HUD over 2018–2023e

Assumption 1	2018	2019e	2020e	2021e	2022e	2023e	2020-2023 CAGR
Assumed growth rate of sales of passenger vehicles		-9.5%	-10.0%	0.0%	0.0%	0.0%	
No. of units of windshield HUD installed	30.9	40.0	89.9	143.8	215.8	269.7	44%
Penetration rate of windshield HUD	1.4%	2.0%	5.0%	8.0%	12.0%	15.0%	

Assumption 2	2018	2019e	2020e	2021e	2022e	2023e	2020-2023 CAGR
No. of units of windshield HUD installed	30.9	40.0	107.9	179.8	269.7	359.6	49%
Penetration rate of windshield HUD	1.4%	2%	6%	10%	15%	20%	

Source: Imcmr.com, www.sohu.com, CICC Research

According to tuhu.cn data on the BMW 318i, the prices of post-installed Fuyao windshield HUD glass that uses nanofilm, PVB, and both materials are 64%, 108%, and 158% higher than the price for common windshield glass. In the BMW X5, the price for windshield HUD glass that uses both nanofilm and PVB are 251% higher than the price of common windshield glass and 92% higher than the price of windshield glass that uses nanofilm. We think the price hikes for Fuyao HUD glass will be more notable than those for common windshield glass. As the penetration rate of HUD rises, we think the value of Fuyao glass per vehicle will increase markedly as: 1) the size of windshield glass is larger than other types of automotive glass; and



2) this product has more features.

Figure 8: Prices of windshield HUD glass and common windshield glass

Rmb	Common windshield	Front coated glass	Window shield HUD (PVB)	Window shield HUD (coated+PVB)
BMW 318i	2,143	3,507	4,462	5,523
Markup compared with common glass		64%	108%	158%
BMW X5	2,484	4,549	6,809	8,719
Markup compared with common glass		83%	174%	251%

Source: tuhu.cn, CICC Research

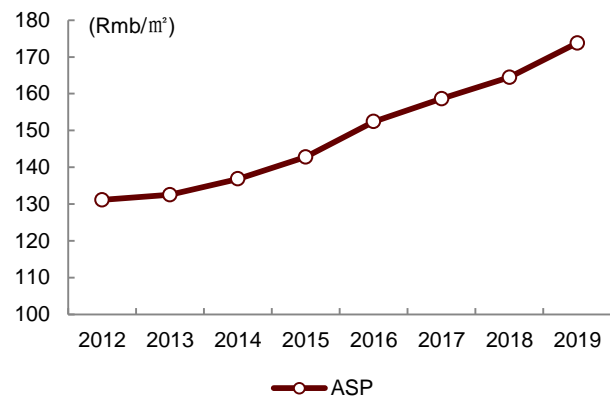
We think front windshield glass accounts for 30–40% of the value of automotive glass in a car as the size of windshield glass is larger than other automotive glass and this product has multiple functions (such as heating, thermal insulation, and sound insulation, among others). In addition, we think the value of front windshield glass as a percentage of total automotive glass value is higher in models with small sunroofs or without sunroofs. We estimate that the value of front windshield glass in a car increases 12–54%, assuming that: 1) the value of side window glass, rear windshield glass, and sunroof glass stays unchanged, 2) the use of HUD increases the price of front windshield glass by 60%, 80%, 100%, and 120%; and 3) front windshield glass accounts for 30–55% of the value of automotive glass in a car. We note that the ASP of Fuyao Glass has increased since 2012. We think ASP will continue to increase as the penetration rate of HUD rises.

Figure 9: We estimate that the value of front windshield glass in a car will increase 12–54% thanks to the use of HUD

Proportion of windshield in the total car glass	Percentage of ASP increase of windshield HUD				
		60%	80%	100%	120%
20%	12%	16%	20%	24%	
25%	15%	20%	25%	30%	
30%	18%	24%	30%	36%	
35%	21%	28%	35%	42%	
40%	24%	32%	40%	48%	
45%	27%	36%	45%	54%	

Source: Company website, CICC Research

Figure 10: ASP of Fuyao glass has increased since 2012



Source: Company website, CICC Research

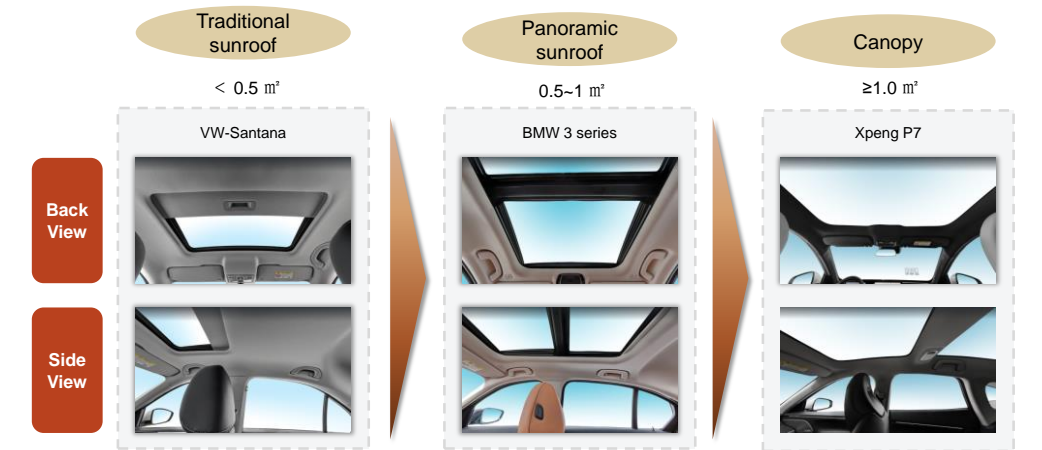
### Volume and price to rise as the size of panoramic sunroofs increases

Panoramic sunroofs have gained popularity with customers as they can let in sunlight, make passenger compartments seem larger than they are, and enable passengers to enjoy a panoramic view of the sky above them. The penetration rate of panoramic sunroofs has increased notably. The size of panoramic sunroofs is nearly double the size of traditional sunroofs, thereby increasing the size of automotive glass used in cars. In addition, we think the size of panoramic sunroofs will continue to increase as they transform from panoramic



“sunroofs” into panoramic “canopies”. The size of panoramic canopies has exceeded 1 sqm, and surpassed 2 sqm in several models, more than doubling the size of panoramic sunroofs and quadrupling or quintupling the size of traditional sunroofs. The size of sunroofs in the Xpeng P7, NIO EC6, and BAIC Arcfox has reached 1.75 sqm, 2.1 sqm, and 2.6 sqm. The size of sunroofs in the Changan UNI-T, Song MAX, and Tesla Model 3 is nearly 1 sqm.

Figure 11: The size of sunroofs is increasing



Source: autohome.com, CICC Research

Figure 12: Size of sunroofs in select models

Car model	Size of sunroof			
	Length (mm)	Width (mm)	Total area (m <sup>2</sup> )	Daylighting area (m <sup>2</sup> )
BAIC New Energy Arcfox			2.60	
Xpeng P7	1,505	1,252	1.75	1.14
NIO EC6			2.10	
CHANGAN UNI-T	850	835	0.71	
Song MAX	1,210	725	0.88	0.83
Tesla Model3	670	1,050	0.70	

Source: autohome.com, CICC Research

Larger sunroofs will not only increase the size of sunroof glass but also impose more feature requirements (such as thermal insulation and shielding sunlight). As such, we think they will increase the size and the value of glass used in a car. The Fuyao sunroof glass in NIO EC6 covers a surface of 2.1 sqm. It is the first sunroof glass in China to use nanofilm and low-E technology. It can insulate heat and shield solar irradiation. It also has highly visible transmittance. The size of this sunroof glass is more than double the size of traditional sunroof glass. In addition, its value is higher than that of tempered glass, sandwich glass, and low-E glass.

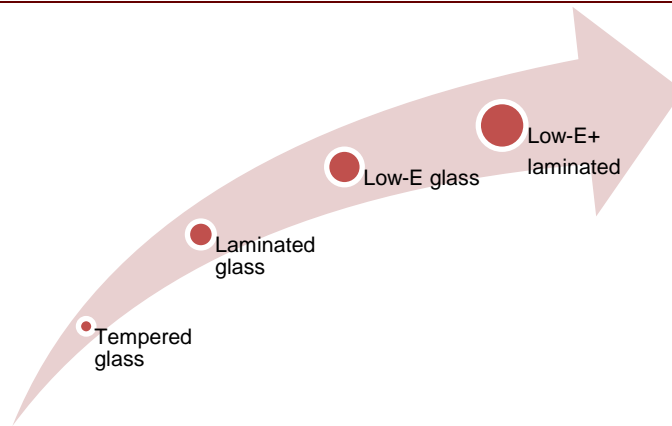


Figure 13: Fuyao sunroof glass in NIO EC6



Source: NIO website, Fuyao Group's official account on Wechat, CICC Research

Figure 14: Companies are upgrading sunroof glass



Source: Corporate filings, CICC Research

We estimate that the value of sunroof glass used in a car will grow 3–35% if the size of sunroof glass increases 30%, 50%, 70%, and 100%, assuming that the value of sunroof glass will increase commensurately with the size of this product, and sunroof glass accounts for 10–35% of the value of automotive glass in a car. Coupled with additional features (such as thermal insulation, shielding sunlight, and ambient lighting) and the possibility of using switchable glass, we think the value of sunroof glass in a car will increase notably.

Figure 15: We estimate that the value of sunroof glass used in a car will grow 3–35% if the size of sunroof glass increases 30%, 50%, 70% and 100%

	Percentage of area increased of sunroof				
		30%	50%	70%	100%
Proportion of sunroof in the total car glass	10%	3%	5%	7%	10%
	15%	4%	8%	11%	15%
	20%	6%	10%	14%	20%
	25%	8%	13%	18%	25%
	30%	9%	15%	21%	30%
	35%	11%	18%	25%	35%

Source: Corporate filings, CICC Research



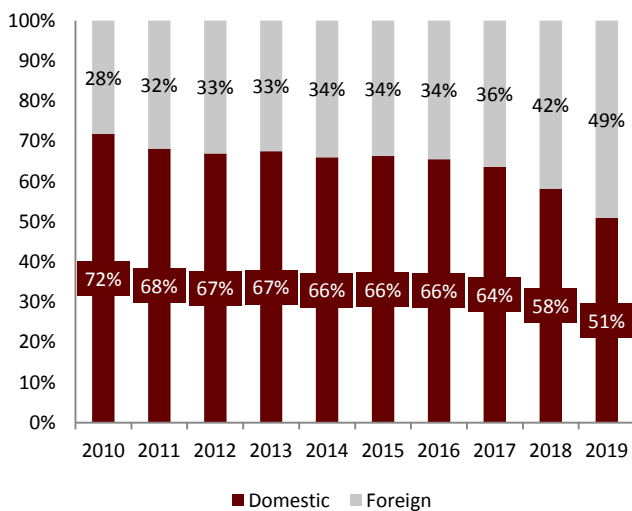
## An asset-heavy auto component leader; turnaround likely in the short term, new growth driver possible in the longer term

**Turnover in the short term: Earnings to improve after hitting bottom; impacts of overseas COVID-19 outbreaks easing**

### Overseas outbreaks weigh on earnings in 1H20

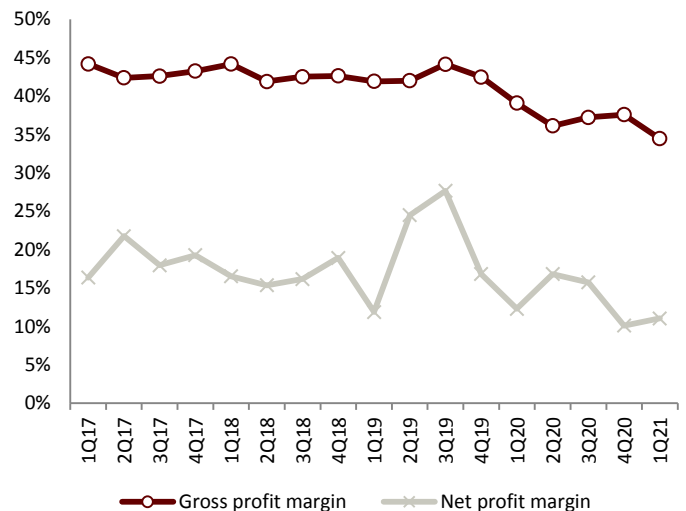
Overseas revenues account for nearly 50% of total revenue at Fuyao. As a result, the impacts of COVID-19 outbreaks on the firm have lingered. In 1Q20, the firm's revenue dropped 15.5% to Rmb4.17bn and attributable net profit fell 24% to Rmb460mn due to the spread of COVID-19 in China. In 2Q20, the outbreak was brought under control in China. However, overseas automakers and auto component firms began to halt operations in March, weighing on Fuyao's overseas business. Quarantines in several regions may have affected the firm's auto parts exports. As such, we think the firm's earnings continued to face headwinds in 2Q20. In 1Q20, Fuyao's GM plunged to a 10-year low of 34.4%, as: 1) the utilization rate for production facilities dropped; and 2) depreciation and amortization as a percentage of revenue increased. Its net profit margin also hit a historical low. In addition, FYSAM continued to suffer a loss, thereby weighing on Fuyao's earnings.

Figure 16: Fuyao – Breakdown of revenue over 2010–2019



Source: Annual reports, CICC Research

Figure 17: Fuyao – GM and net profit margin over 1Q17–1Q21



Source: Annual reports, CICC Research

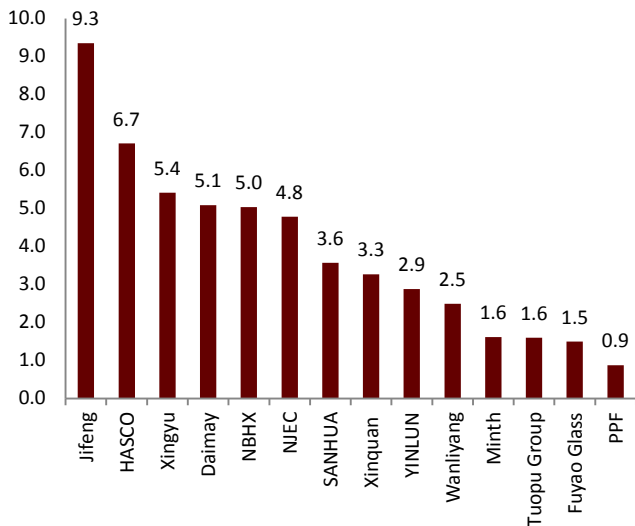
### An asset-heavy auto component leader; economies of scale notable

The fixed asset turnover rate at Fuyao is lower than that of many auto component companies in China. We think the firm's earnings will improve markedly if the capacity utilization rate rises, given the firm's heavy assets and notable economies of scale. Assuming that Fuyao's new automotive glass project in Suzhou (production capacity: 4mn units per year) sees operation reach 50% of production capacity in 2019, with the remaining capacity in operation in 2020, we estimate that the firm's production capacity for automotive glass rose 5.5% in 2019 and will increase 5.2% in 2020. Stripping out changes in sales volume, we estimate that the capacity utilization rate for automotive glass will drop 5% YoY in 2020. Coupled with the impacts of COVID-19 outbreaks on sales volume in China and abroad, we think the capacity



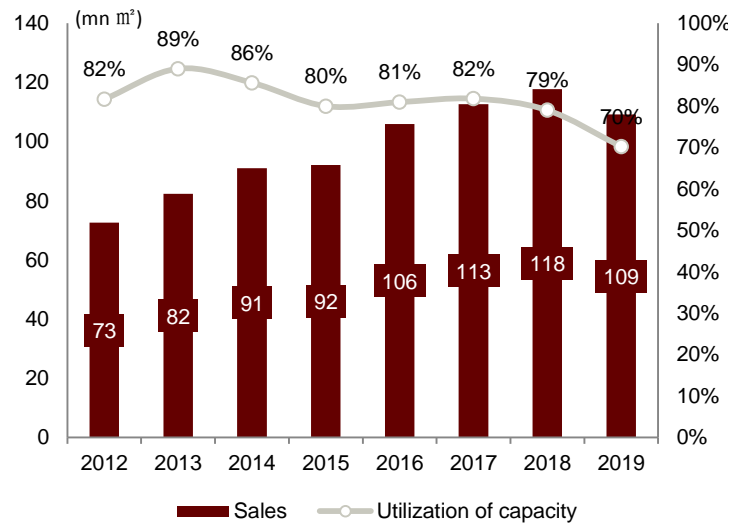
utilization rate should decline further in 2020 and hit a historical low since 2012, thus pushing up depreciation and amortization as a percentage of revenue.

Figure 18: Fixed asset turnover rates at auto component companies in China



Source: Annual reports, CICC Research

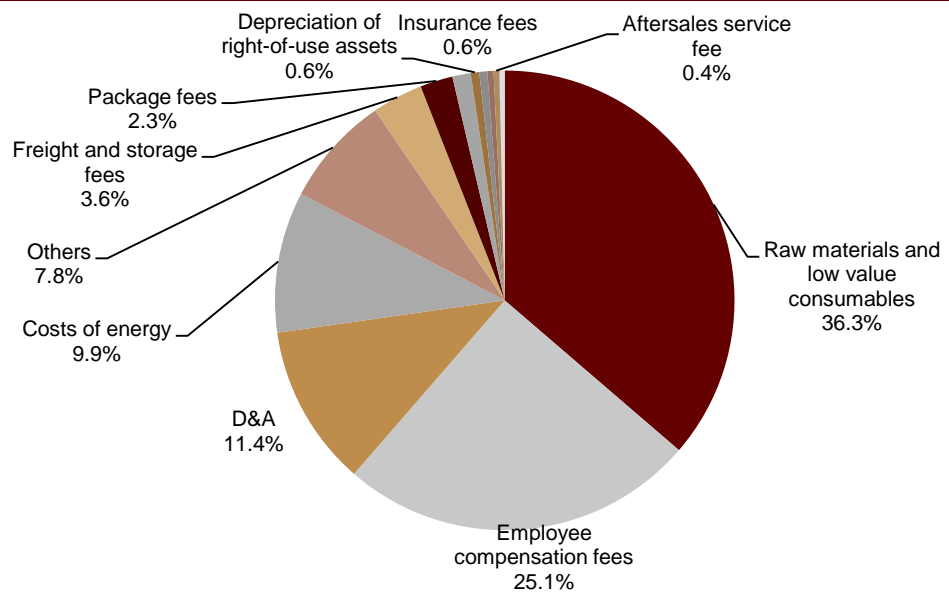
Figure 19: Fuyao – Sales volume of automotive glass and capacity utilization rates over 2012–2019



Source: Annual reports, CICC Research

In 2019, depreciation and amortization accounted for 11% of operating costs, selling, G&A, and R&D expenses at Fuyao. Given its fixed costs, which consist of depreciation and amortization, financial expenses, and staff salaries<sup>3</sup>, we estimate that the degree of operating leverage (DOL) at the firm stood at around 2.3 in 2019. Given the high proportion of fixed costs, we think the firm's earnings are likely to change markedly as its revenue changes. Stripping out the impacts of FYSAM and foreign exchange gains, we estimate that the firm's profit fell 22.3% in 1Q20, (vs. a 15.5% drop in revenue).

Figure 20: Fuyao – Breakdown of operating costs, selling, G&A and R&D expenses in 2019



Source: Annual reports, CICC Research

<sup>3</sup> We deduct the costs of automotive glass and float glass work from staff salaries.



The firm's overseas business has recovered steadily as automakers and auto component companies in Europe and the US began to reopen factories in May and June. In addition, sales volume in China continued to improve QoQ. In 2Q20, production volume of passenger vehicles increased 5.8% YoY and jumped 53.4% QoQ to 1.74mn units. We are upbeat on the growth of production volume in 3Q20 given a low base in 3Q19 caused by the ramp-up of production capacity before the implementation of China's VI emission standard. Looking ahead, we think the firm's capacity utilization rate will hit bottom at the end of 2020 before returning to the pre-2019 level in 2021 as we estimate that sales volume of passenger vehicles in China will grow 5.7% in 2021. In addition, we expect the firm's GM to recover. Thanks to the high operating leverage, we think the firm's earnings will gradually improve.



**Longer-term growth driver: We expect FYSAM's to improve**

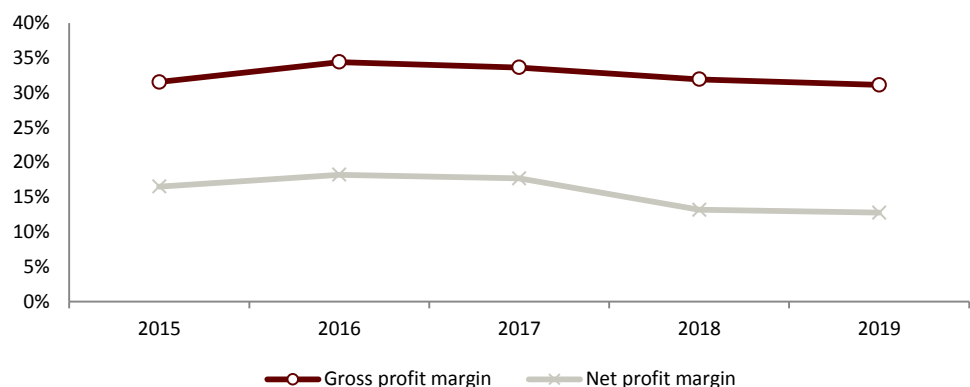
FYSAM generated -EUR37.71mn in profit after it was included into Fuyao's financial statement in 2019. As a result, Fuyao's profit dropped Rmb300mn YoY in 2019, equal to around 9% of the firm's total revenue in 2019. In 1Q20, FYSAM generated -EUR12.22mn in profit (down Rmb125mn from a year ago), weighing on earnings at Fuyao. According to Fuyao management at the 2018 earnings press conference, FYSAM was faced with three problems. First, it did not receive investment to conduct upgrade and modification projects after it was sold by its founder to a fund. Second, FYSAM saw operating costs increase due to fragmented production capacity. Third, FYSAM did not have a complete industry-value chain.

Fuyao has taken the following measures to mitigate these problems.

- ▶ **Increasing investment in FYSAM:** In 2019, Fuyao's capital expenditure on FYSAM reached around Rmb634mn. At the end of 2019, the book balance of FYSAM's trim projects that were under construction reached Rmb333mn. In June 2020, Fuyao invested EUR65mn in FYSAM to replenish its working capital.
- ▶ **Fine-tuning and combining production lines:** Fuyao has reduced FYSAM's 11 production sites to two production lines, and the reconstruction project has almost come to an end. In addition, it has cut the headcount at FYSAM.
- ▶ **Improving industry-value chain; increasing synergies between FYSAM and domestic business:** Fuyao is developing the aluminum trim industry-value chain in China. It has acquired Jiangsu Sanfeng Trim and established Tongliao Refined Aluminum in order to create synergies between its domestic business and FYSAM's aluminum trim business.

The value of aluminum trim is higher than the value of automotive glass in a car. In addition, synergies between aluminum trim and automotive glass businesses are likely. We think the aluminum trim business will become a new growth driver for earnings at Fuyao. We think FYSAM's revenue will return to its pre-bankruptcy level (around EUR300mn per year) in the short term after the firm improves its production lines and reduces headcount. Net profit margin is around 13–15% at Minth Group, an aluminum trim leader in China. We think that the net profit margin at FYSAM should be 7–13% given the higher salaries in Germany. As such, if FYSAM's revenue reaches EUR300mn, we estimate that net profit at the firm will reach Rmb150–300mn, equal to 5–10% of net profit at Fuyao in 2019. In addition, we think profit of the trim business will increase after Fuyao builds production lines in China.

Figure 21: Minth Group – GM and net profit margin over 2015–2019



Source: Wind Info, CICC Research



Figure 22: FYSAM – Earnings forecast

EUR mn		FYSAM projected revenue				
		120	150	200	250	300
FYSAM projected net profit margin	7%	8.4	10.5	14.0	17.5	21.0
	8%	9.6	12.0	16.0	20.0	24.0
	9%	10.8	13.5	18.0	22.5	27.0
	10%	12.0	15.0	20.0	25.0	30.0
	11%	13.2	16.5	22.0	27.5	33.0
	12%	14.4	18.0	24.0	30.0	36.0
	13%	15.6	19.5	26.0	32.5	39.0

Source: Wind Info, CICC Research

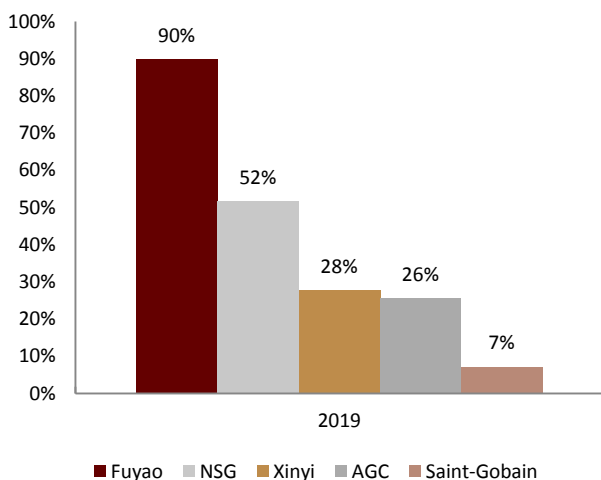
### High R&D spending; expansion into smart glass

#### Heavier R&D investment, broader product portfolio vs. other world-leading glass manufacturers

With a market share of around 25% of the global glass market, Fuyao is more focused on the production and sales of automotive glasses than its peers, and the glass business accounts for more than 90% of its revenue. The firm has established a full presence along the value chain, covering upstream flat glass as well as downstream assembly products such as encapsulated glass and accessories. This has contributed to higher margins than its foreign rivals. Fuyao has been spending a higher proportion of revenue on R&D than overseas auto-glass frontrunners. It enjoys first-mover advantage in smart/high-end glass and value chain integration, and offers a broader product portfolio.

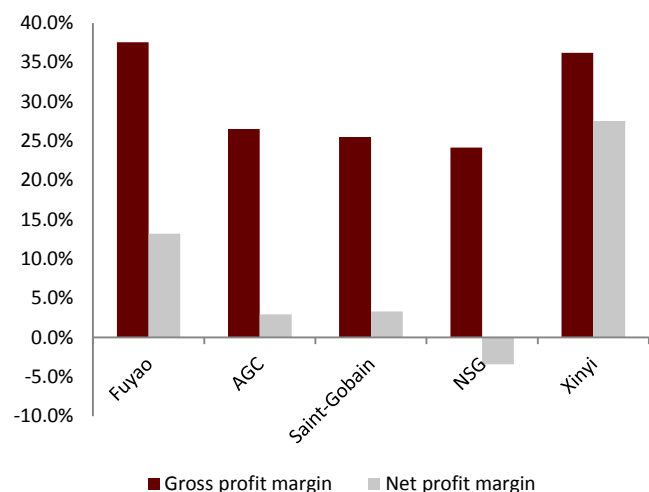
We think Fuyao’s high R&D input and focus on the auto glass business will help it rapidly respond to changing market demand during product upgrades. Moreover, Fuyao’s keener focus on glass business means a more stable supply for automakers, and its integrated solutions can also save them the trouble of looking for parts suppliers. Leveraging its business scale and R&D strength, Fuyao will likely continue to gain market share worldwide.

Figure 23: Revenue contribution from automotive glass business at global leading producers in 2019



Source: CapitalIQ, Wind Info, CICC Research

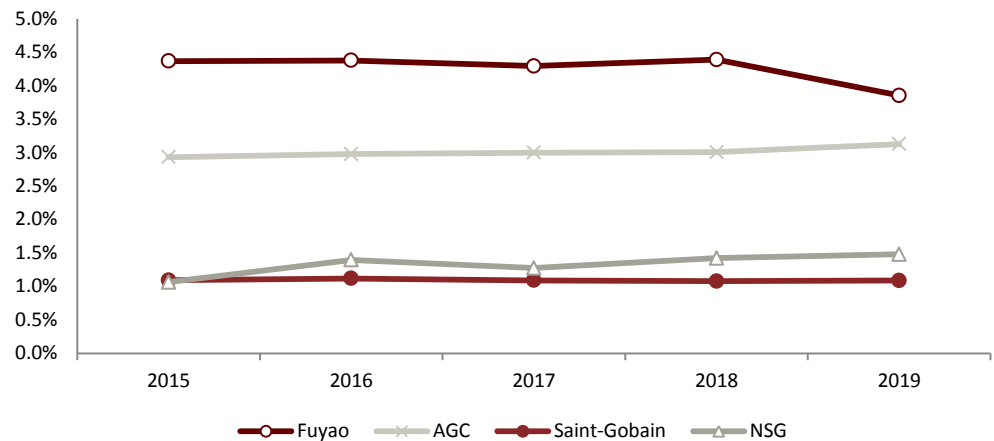
Figure 24: GM and net profit margin of world’s leading automotive glass makers



Source: CapitalIQ, CICC Research



Figure 25: R&D spending as a percentage of revenue over 2015–2019



Source: Annual reports, CICC Research

Figure 26: Fuyao offers a broader product portfolio than its international peers

	Sound insulation glass	Heating glass	Infrared glass	Anti ultraviolet glass	HUD	Dimming glass	Hydro-phobic glass	Privacy glass	Solar glass	Module glass	Integrated glass antenna
Fuyao	√	√		√	√	√	√	√	√	√	√
AGC	√	√	√	√	√	√	√	√		√	√
Saint-Gobain	√	√			√	√	√	√			
NSG	√	√	√		√		√		√	√	√
Xinyi	√	√			√						

Source: Company website, CICC Research

Allying with BOE to develop smart switchable glass and window display

On June 1, 2020, Fuyao entered strategic cooperation with BOE to jointly develop smart switchable glass and window display, and the two also plan to promote the use of these smart products in passenger vehicles. BOE is a global frontrunner in semiconductor displays, and it is the producer of more than a quarter of the world’s displays.

BOE has developed cutting-edge technologies for smart driving assistance such as double-layer display consisting of AR and HUD, advanced driving assistance system (ADAS), and driver fatigue detection system. Backed by AR technology, the major functions of ADAS (i.e. lane departure warning, forward collision warning, and pedestrian detection) can be integrated in HUD. Other data such as vehicle speed and real-view navigation can also be shown on the front windshield so that drivers will respond in a timely manner to avoid



potential accidents.

Figure 27: BOE's ADAS products



Source: BOE website, CICC Research

#### Joint development of smart antenna with BICV

On July 1, 2020, Fuyao and BDStar Intelligent & Connected Vehicle Technology (BICV) entered a strategic cooperation agreement to jointly develop integration solutions of global navigation satellite system (GNSS) high-precision positioning, multimode smart antenna, and automotive glass.

With auto electronics becoming increasingly smart and interconnected, BDStar Navigation set up subsidiary BICV to expand its presence in smart vehicle interconnection. BICV has more than 700 R&D employees, and it has the ability to mass produce a full set of smart vehicle cabin products, including DA, IVT, TBOX, LCD dashboard, domain controller, V2X, smart antenna, TSP, and apps. It can also develop high-grade automotive software.

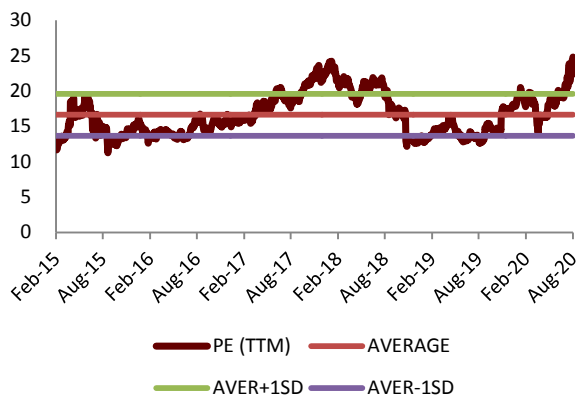


## Valuation attractive; downside risks limited

### Average valuation to increase, but stock remains attractive

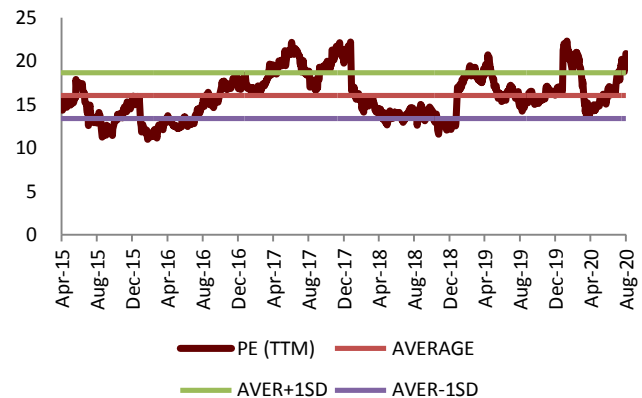
Fuyao-A recently saw P/E reach the high recorded in January 2018. Fuyao-H also exceeded 1x standard deviation above the historical mean. However, after shifting to 2021, we note that Fuyao-A and Fuyao-H is trading at 20.6x and 15.7x 2021e P/E, with Fuyao-A coming in at around 1x standard deviation above the historical mean and Fuyao-H standing below the historical mean. As such, we think the firm's valuation remains attractive. Downside risks that Fuyao faces include the recurrence of COVID-19 outbreaks in the US, which may weigh on its earnings, and the weakening of the US dollar, which may bring foreign exchange losses. However, we think risk exposure is limited. In addition, we think the following upside risks will support the firm's valuation – a higher capacity utilization rate, increased growth potential in earnings thanks to consolidation of the aluminum trim business, and improved expectations around China's auto market in 2021.

Figure 28: Fuyao-A-P/E



Source: Wind Info, CICC Research

Figure 29: Fuyao-H-P/E

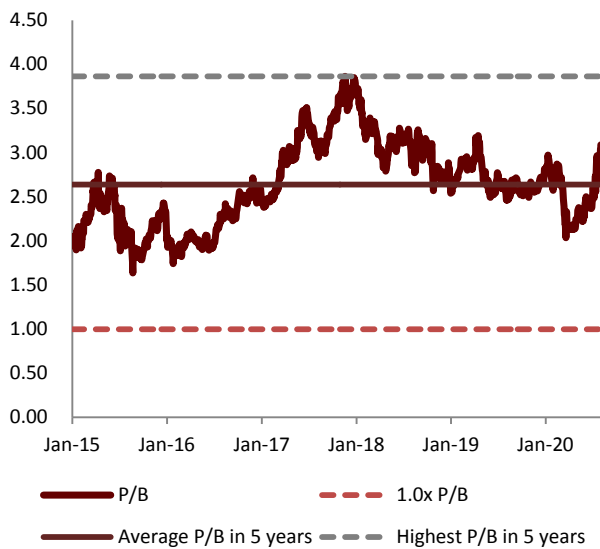


Source: Wind Info, CICC Research

Fuyao-A's P/B has exceeded the 5-year average, but it stays below the highs recorded at the end of 2017 and in early 2018. Fuyao-H's P/B is lower than the 5-year average, thus offering a good entry point and margin of safety. We maintain our OUTPERFORM rating, and raise our target price for Fuyao-A/H by 39% and 39% to Rmb35 (25x 2021e P/E) and HK\$32 (20x 2021e P/E), to reflect a turnaround in its earnings, growth potential of the automotive glass industry, and the highly likely recovery of the automotive market.



Figure 30: Fuyao-A-P/B



Source: Wind Info, CICC Research

Figure 31: Fuyao-H-P/B



Source: Wind Info, CICC Research

### Risks

Recurrence of COVID-19 outbreaks in the US and uncertainty of US-China relations will likely weigh on Fuyao's business in exports to the US. In addition, the weakening of the US dollar will likely bring foreign exchange losses.

Figure 32: Valuations of comparable companies

Ticker	Company	Trading currency	Mkt cap (RMB)	Rating	P/E			P/B			Reporting currency	NET PROFIT (Report CY mn)			Last price 07-AUG
					2019A	2020E	2021E	2019A	2020E	2021E		2019A	2020E	2021E	
600660.SH	Fuyao Glass-A*	CNY	68,977	OUTPERFORM	24.9	27.8	20.6	3.4	3.3	3.0	CNY	2,898	2,602	3,503	28.82
03606.HK	Fuyao Glass-H*	HKD	68,980	OUTPERFORM	19.2	21.2	15.7	2.6	2.5	2.3	CNY	2,898	2,602	3,503	24.75
600741.SH	HASCO*	CNY	74,436	OUTPERFORM	11.5	13.4	11.4	1.5	1.4	1.3	CNY	6,463	5,554	6,525	23.61
01316.HK	Nesteer*	HKD	11,002	OUTPERFORM	6.8	9.2	5.5	0.9	0.8	0.6	USD	232	171	285	4.88
300258.SZ	PPF*	CNY	5,318	OUTPERFORM	30.6	28.9	19.0	2.6	2.5	2.3	CNY	174	184	280	13.13
601799.SH	Xingyu Lighting*	CNY	39,855	OUTPERFORM	50.5	47.1	34.0	8.2	7.3	6.5	CNY	790	847	1,172	144.32
600699.SH	Ningbo Joyson Electronics*	CNY	28,383	OUTPERFORM	30.2	47.2	25.5	2.3	2.2	2.0	CNY	940	601	1,115	22.94
002048.SZ	NBH*	CNY	10,239	OUTPERFORM	10.4	11.6	8.9	1.1	1.0	0.9	CNY	981	884	1,154	16.35
603997.SH	Ningbo Jifeng*	CNY	7,230	OUTPERFORM	17.1	15.1	13.4	2.3	2.2	2.1	CNY	265	300	339	7.08
00425.HK	Mint Group*	HKD	24,023	OUTPERFORM	14.2	18.3	12.5	1.7	1.6	1.5	CNY	1,690	1,300	1,901	23.20
002050.SZ	SANHUA*	CNY	81,180	OUTPERFORM	44.0	50.0	27.4	6.7	6.3	5.3	CNY	1,421	1,250	2,285	22.60
603179.SH	XINQUAN AUTOMOTIVE TRIM	CNY	8,593	n.a.	42.6	28.5	22.4	4.4	4.3	3.9	CNY	183	244	339	27.73
603788.SH	NBGF	CNY	3,909	n.a.	23.0	17.4	14.0	2.1	1.9	1.8	CNY	178	197	242	17.50
601689.SH	TUOPU GROUP*	CNY	37,684	OUTPERFORM	82.6	58.6	43.2	5.1	4.8	4.5	CNY	456	643	872	35.72
002126.SZ	YINLUN*	CNY	11,723	OUTPERFORM	36.9	31.7	24.4	3.1	2.9	2.6	CNY	318	370	480	14.80
000887.SZ	AZHONGDING	CNY	13,798	n.a.	30.3	21.9	17.1	1.5	1.5	1.4	CNY	602	492	721	11.29
603305.SH	XUSHENG	CNY	19,909	n.a.	68.4	53.0	39.7	6.4	9.0	7.8	CNY	207	305	418	44.47
600933.SH	IKD	CNY	11,485	n.a.	25.7	22.5	18.7	2.7	2.6	2.4	CNY	439	437	547	13.35
603730.SH	DAIMAY	CNY	14,069	n.a.	22.4	21.5	18.0	3.6	3.4	3.0	CNY	625	611	752	35.07
603786.SH	KEBODA	CNY	31,815	n.a.	61.3	51.4	40.9	9.8	8.0	6.9	CNY	475	530	698	79.40

Note: CICC covers the companies marked \* and we use our estimates, time weighted average forecasts used; the others represent market consensus

Source: Wind Info, Bloomberg, Corporate filings, CICC Research





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