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fuyao glass: global strategy for U.S. COUNTRY risk

Vernon Hsu, Hugh Thomas, Joyce Wang, and Yuhui Wu wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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Cao Dewang, the chairman of Fuyao Glass Industry Group Co. Ltd. (Fuyao), was reviewing his company’s financial results for the first half of 2018, when he confidently asserted:

I’m really satisfied with our performance under the conditions we face this year. Because this year a lot of businesses are suffering. We basically relied on our technology and we worked together with our customers to achieve our goals. This year’s first half results are better than last year’s. The main reason is our foreign investments: this year they are profitable; last year they lost money. They call me a hick. I don’t care. They tell me to go onto the Internet and do P2P [platform to platform], build a financial platform. I’m sure I could make money. But I tell them I’m not in it for the money.

Two years earlier, Fuyao’s subsidiary, Fuyao Glass America Inc. (FGA), had completed the construction of the largest auto glass (AG) manufacturing facility in the world, which was located in Moraine, a United States (U.S.) city near Dayton, Ohio. Its revenues in the first half of 2018 had surged 27 per cent compared with the previous year, while groupwide revenues of Fuyao had grown 16 per cent. FGA had converted its loss of ¥65 million[[1]](#footnote-1) into a profit of ¥48 million (see Exhibit 1). With deteriorating relations between the governments of China and the United States indicating an uncertain future, some social pundits were criticizing Cao for deserting China by investing overseas.[[2]](#footnote-2) But Cao remained defiant, answering to critics, “It is extremely glorious to be able to go out from our country and establish factories. There are only a few entrepreneurs in our country with the technology and the strategy to do this.”

Although Cao was confident in his strategy, he and Fuyao’s top management had to review how the company’s U.S. expansion and global strategy were affected by recent developments in the relationship between China and the United States.

Fuyao’s Development

Fuyao had just celebrated 30 years in business. Established as a Chinese–foreign joint venture in Fuqing County, Fujian Province, China, in 1987, the company was initially named the Fujian Yaohua Glass Industry Company Limited. Fuyao had been founded by Cao to supply inexpensive AG to the local auto repair glass (ARG) market. In 1989, Fuyao expanded into the original equipment manufacturer (OEM) market, providing AG for installation in new manufactured vehicles in China, where its first OEM purchaser was Peugeot, located in Guangzhou. At the same time, it entered the global AG market by exporting ARG to Hong Kong.

In 1993, it listed its common shares on the Shanghai Stock Exchange and established its first foreign subsidiary, in Hong Kong. In 1994, it set up an ARG sales subsidiary in the United States. In 2000, to establish its domestic dominance, Fuyao set up a subsidiary in Changchun, Jilin Province, the traditional Chinese automobile capital. Fuyao concentrated on brand building. Cao commented, “At the time, we had an equity partnership with Saint-Gobain [Compagnie de Saint-Gobain S.A.]. They told me to use their brand, their famous brand. I said I couldn’t because we had to use the Fuyao brand. We had to build our own brand.”

Shortly after China entered the World Trade Organization (WTO), the first ruling concerning China took place. The WTO found Fuyao not guilty of dumping[[3]](#footnote-3) AG in the Canadian market in 2001. The next year, Fuyao contracted with Hyundai Motor Company to provide OEM AG to its auto assembly operations in Korea. It was Fuyao’s first overseas OEM. From 2013 to 2017, sales revenues of Fuyao grew at a compound annual rate of 13 per cent, based on a growing global automobile market and Fuyao’s growing share of that market. Eventually, OEM sales grew to 59 per cent of Fuyao’s sales revenues.

The Market for Auto Glass

By 2018, Fuyao was the largest supplier of AG to the world’s top automakers, including Audi AG, BMW, Chrysler, FAW Group Corporation,[[4]](#footnote-4) Ford Motor Company, General Motors Company, Hyundai Motor Company, Mercedes-Benz, Toyota Motor Corporation, and Volkswagen. Fuyao had a mature corporate structure, with shares listed in Shanghai and Hong Kong,[[5]](#footnote-5) major operations in many locations across China, and a substantial presence in the United States, Germany, Japan, Russia, and South Korea. And yet, the organization was still controlled by its founder, Cao, from its corporate headquarters in Fuqing, in the Chinese province of Fujian.

Although Fuyao’s sales accounted for just over 20 per cent of the global AG market, its three largest competitors—Asahi Glass Co. Ltd. (AGC), Nippon Sheet Glass Co. Ltd. (NSG), and Compagnie de Saint-Gobain S.A. (Saint-Gobain)—were not much smaller. Each had just under 20 per cent of the market, and the four companies competed to be AG suppliers for each model that the OEMs launched. A fourth competitor, Vitro Glass of Mexico (Vitro), had recently acquired the U.S. AG manufacturing facilities of Pittsburgh Glass Works LLC.[[6]](#footnote-6) Among the five global AG industry leaders, Fuyao was the youngest and only company that specialized exclusively in AG production. The others had interests in building materials (Saint-Gobain); electronics, chemicals, and ceramics (AGC); construction glass (NSG and Vitro); and glass containers (Vitro) that outweighed their AG businesses. But as Cao proudly pointed out, “our profits are greater than our four largest competitors’ combined profits.”

Global annual sales of all automobiles were approximately 97 million in 2017, with the largest market being China, at 30 per cent. The United States, Mexico, and Canada, which comprised the three countries in the North American Free Trade Agreement (NAFTA), was the second-largest market, at 22 per cent. The European Union, comprising the European Free Trade Association, was the third-largest market, at 19 per cent (see Exhibit 2). Citing internal data, Fuyao management stated that automobile ownership in 2015 had reached 12, 18, and 80 per cent of total population in China, the world, and the United States, respectively.

Given the low but rising level of Chinese car ownership, expected increases in Chinese consumer spending power, the continuing improvement of China’s road and highway infrastructure, and technological advances anticipated in the automobile industry, especially in new energy and intelligent automobiles, Fuyao management expected the Chinese market to offer strong, long-term growth opportunities. In contrast, the growth opportunities in the United States were modest; the 3.8 per cent per year projected growth in auto sales in NAFTA was largely attributable to Mexico.[[7]](#footnote-7)

Vertical Integration

Cao had avoided diversification in favour of vertical integration. Starting in 2005, Fuyao produced flat glass through the float (or “Pilkington”) glass manufacturing technique, which involved molten glass being mixed in a furnace at over 1,500 degrees Celsius. The substance was then poured into a ribbon of glass drawn continuously over a molten tin bath in a protective atmosphere of nitrogen and hydrogen. Through the force of gravity, a plate glass was thus created, with perfectly flat parallel surfaces on both the top and bottom of the sheet. The consistent thickness was determined by the speed of pulling. Float glass production was capital and energy intensive. And once the furnace was fired up, it could not be cooled down without destroying the kiln brick lining, so float glass production at Fuyao continued 24 hours a day.

Fuyao’s float glass production in China, Russia, and the United States was almost exclusively for its own use (see Exhibit 3A). Its float glass had to be of sufficiently high quality to meet the AG requirements of the top OEMs in the industry, so it was considerably more expensive than flat glass, which was also produced using the float glass method and was used in the construction industry. The higher quality and higher price made float glass produced for AG purposes unsuitable for other markets.

In 2014, Fuyao announced its purchase of a U.S. float glass facility in Mount Zion, Illinois. Fuyao purchased the float glass facility, which had been producing glass for the construction industry, from PPG (formerly Pittsburgh Plate Glass). FGA then rebuilt and retrofitted the facility, using Fuyao technology from China, to meet the higher requirements of AG. “We gutted the old lines and put in new equipment. Now the best float glass lines in the U.S. are ours,” stated Cao.

The new facility started producing float glass before FGA increased the size of its AG plant in Moraine, Ohio. Therefore, FGA exported all output from the Mount Zion facility back to China to use there. The Mount Zion plant thus became FGA’s in-house supplier of AG.

Local Manufacturing versus Importing from China

In deciding on a location of its AG manufacturing facilities, Fuyao considered all relevant costs (i.e., raw materials, manufacturing, transportation, and inventory) against the benefits of proximity to OEMs for joint product development and supply chain flexibility. AG’s aggregate manufacturing costs, as reflected in the annual financial statements, were approximately 53 per cent raw materials, 17 per cent labour, 13 per cent energy, and 17 per cent other costs (see Exhibit 3B). However, these proportions tended to fluctuate due to changes in raw materials, energy and labour costs, and Fuyao’s globalization strategy.

Costs differed between the United States and China. In 2017, U.S. hourly labour costs for office work were about three times higher than in China; for factory work, they were eight times higher. However, labour costs in China were increasing at an annual rate of over 10 per cent per year, whereas U.S. costs were not increasing. The cost of energy was approximately one-third lower in the United States, although energy prices were expected to rise in 2018, after having dropped from 2015 to 2017. The cost of shipping AG half way around the world was considerable. Transportation costs (including the cost of financing the inventory) to ship AG from China to New York and then on to Detroit, the largest U.S. automobile manufacturing centre, was about 30 per cent higher than the cost of trucking AG from Moraine to Detroit.

These transportation cost estimates did not consider import duties. Free trade agreements were important to supply chain management not only because they allowed for the passage of parts and finished goods without tariffs and quotas but also because they saved time. Goods crossing borders in a free trade zone did not need to clear customs, a process that could take anywhere from a few hours to over a week, depending on the efficiency of customs and forwarder agents as well as the queue of cargo shipments awaiting customs clearance. The U.S. automotive industry had been integrated into the North American market with the signing of NAFTA in 1994. However, AG shipped from China to the United States did not enjoy reduced tariffs. These imports were given “most-favoured-nation” rates, which applied to products from any WTO member (see Exhibit 4).

Fuyao kept about one month of finished goods in inventory for its China sales (see Exhibit 5). It needed this buffer to fulfil OEM buyers’ just-in-time policies. Each OEM buyer reduced its inventory costs by storing a minimal amount of parts, thereby requiring suppliers to deliver the parts as needed. A supplier that failed to deliver the parts on time would cause the OEM’s lines to stop. That supplier would then be fined by the OEM according to the supply contract.

There were also implied costs for Fuyao to consider for lost time from changing OEM specifications. Typically, 12–18 months elapsed for a newly designed specifications model, from concept to launch. In addition, approximately one month was needed to ship between China and the United States, which reduced Fuyao’s ability to work effectively with the OEM. Being located nearby allowed for joint development between the supplier and OEM during the 12–18-month development period. It also allowed for production troubleshooting, in case issues were discovered during assembly by the OEM. Although OEMs could source AG from more than one supplier, they usually had a preferred supplier for each model. However, the location of the preferred supplier was critical. In some cases, the OEM would choose a local supplier regardless of competitive bids from suppliers located further away.

Investing in Russia and in the United StAtes

Fuyao invested in Russia in 2011 and in the United States in 2014, acting on direct requests from its OEM partners. Volkswagen had been importing complete knocked-down kits of cars from Germany to its assembly factory in Russia’s Kaluga Oblast.[[8]](#footnote-8) Looking for a higher amount of domestic value-added components in the factory, the oblast’s authorities insisted that Volkswagen use Russian-made AG, rather than importing it from Germany. However, Volkswagen had been importing AG from Fuyao in Changchun, China, rather than from Germany. Cao explained how the discussion evolved:

The Russians said, “The glass has to be made in Russia because it’s such a simple thing.” Volkswagen told them, “If you really want to bring in an AG factory, you should go to China. They build factories quickly.” So the provincial governor came here in person.

Cao later visited Kaluga and obtained a guarantee from the Kaluga Oblast government to purchase the output of Fuyao’s proposed greenfield-integrated AG facility. With the market for its output assured, Fuyao established Fuyao Glass Rus Co. Ltd. in Kaluga, as a wholly owned foreign direct investment (FDI), reporting to Fuyao’s headquarters in Fuqing.

Fuyao’s U.S. investment was made at the request of General Motors Company, in a strategic partnership dating back to 2010. As Cao noted, “the problem they faced was the safety of their supply chain.” In return for a large order, Fuyao agreed to produce the OEM’s AG in the United States by the end of 2016.

Risks in Foreign Direct Investment and Trade

In its 2017 annual report, Fuyao noted two major potential risks: “risks on economic, political and social conditions, and government policies” (commonly known as country risk) and “risks of the industry development.” Regarding the first set of risks, the company stated that “most assets of the Company are located in the PRC [People’s Republic of China] and approximately 65% of the income is from the business in the PRC. Therefore, the operating results, financial status and prospects of the Company are influenced by the changes in economy, politics, policies and laws.”[[9]](#footnote-9) However, Fuyao’s globalization strategy had exposed the company to other country risks, especially related to Russia and the United States.

During the second half of the 20th century, U.S. and European multinational organizations dominated global FDI. In 2005, these organizations held an aggregate stock of over 75 per cent of outward FDI and over 62 per cent of inward FDI. However, from 2005 to 2016, those percentages dropped to 55 per cent and 50 per cent, respectively. One reason for that drop was China’s emergence. Chinese outward FDI grew from under 1 per cent to over 5 per cent globally, while its inward FDI (i.e., foreign FDI into China) rose from 4 per cent to 10 per cent globally. China was also becoming a major force in inward FDI into the United States (see Exhibits 6A and 6B).

Yet, FDI was difficult and controversial. The investing company not only faced issues related to foreign laws, language, and culture but was also frequently subject to political discrimination. Outward FDI also commonly generated complaints from the company’s own country, claiming that the company was undermining the value of the domestic currency by selling it to make the investment, foregoing domestic investment (and the associated employment and taxation), hollowing out domestic industry for the benefit of foreign countries, and serving as a conduit to transfer ill-gotten gains away from the control of the home government. Inward FDI could also be subject to criticism from the people in the foreign country who feared exploitation by foreigners, loss of control of their industry and resources, theft of their technologies, and dilution of their local culture.

Fuyao had faced various difficulties in the United States, but Cao considered labour and management supply most serious. “Of course there were challenges. But it wasn’t a problem of this culture or that culture. The critical problem was there were no people. We couldn’t find people,” explained Cao. “The bright ones went to Wall Street and Silicon Valley. The young people don’t want to work in manufacturing.”

FGA addressed the same problem that Fuyao faced in China through training and automation. “Now we use automation to replace workers. So there are more robots,” stated Cao. “In China we also use robots. In China if you don’t use robots, you can’t succeed. The government encourages it. Foreigners don’t understand China.”

Like the Chinese factories of all large enterprises, each of Fuyao’s factories in China had labour unions. But those unions operated under the supervision of the local Chinese Communist Party committee, so they were conciliatory, rather than confrontational. When labour unrest did occur in China, it was not union-led. Cao was proud of the fact that Fuyao had never experienced *any* labour unrest. He felt a responsibility to take care of his workers, much like a parent would take care of his children.

Although FGA’s Moraine factory was not unionized at the start, it soon became a target of the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (commonly known as United Automobile Workers or UAW), one of the largest, most powerful, and diverse unions in North America. UAW started recruiting FGA workers at its Moraine plant and urging them to become UAW members. FGA lobbied against its employees joining UAW and succeeded.

In late 2017, the employees at Fuyao’s Moraine plant voted to reject UAW union membership. During that campaign, the UAW brought action against FGA for breaches of the U.S. Occupational Safety and Health Administration (OSHA) standards. In 2017, FGA addressed the issues raised by OSHA and paid a fine of US$100,000. However, worker complaints and conflict with the UAW over OSHA issues continued throughout 2018.[[10]](#footnote-10) Management at FGA found the worker complaints and the actions of the OSHA unfair. The company also took credit for raising the efficiency of its workforce, claiming that workers in the United States were only about half as productive as Fuyao workers in China.

Looking to the Future

Shortly after FGA’s Moraine facility started production, the trade dispute between the governments and China erupted. On September 17, 2018, the U.S. government’s Trump administration announced 10 per cent tariffs on a list of US$200 billion worth of Chinese imports and threatened increases to 25 per cent in 2019. At the same time, NAFTA was being renegotiated (as the new United States–Mexico–Canada Agreement) to increase the percentage by value of an automobile’s components that had to be manufactured in the United States, Mexico, or Canada to qualify for zero tariffs from 62.5 per cent to 75 per cent, to be phased in over a five-year transition period. The rules of international trade and investment were shifting, and Fuyao had to reassess its global strategy. Most urgently, Cao had to analyze the changes raised by a dramatic shift in U.S. country risk and the resulting effect on his company.

Exhibit 1: Financial Summary (¥ thousands)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Half-Year Ending June 30** | | **Year Ending December 31** | | | |
|  | **2018** | **2017** | **2017** | **2016** | **2015** | **2014** |
| Revenue | 10,085,175 | 8,713,963 | 18,715,609 | 16,621,336 | 13,573,495 | 12,928,182 |
| Cost of sales | 5,951,399 | 5,066,724 | 10,917,999 | 9,648,615 | 7,938,515 | 7,565,501 |
| Gross profit | 4,133,776 | 3,647,239 | 7,797,610 | 6,972,721 | 5,634,980 | 5,362,681 |
| Distribution costs and selling expenses | 672,245 | 611,652 | 1,274,309 | 1,184,740 | 1,020,585 | 982,165 |
| Administrative expenses | 934,275 | 842,216 | 1,803,411 | 1,673,626 | 1,287,869 | 1,031,342 |
| R&D expenses | 421,543 | 389,069 | 803,441 | 727,586 | 592,889 | 517,924 |
| Other income | 53,227 | 60,889 | 188,117 | 89,542 | 97,836 | 46,017 |
| Other gain/(loss), net | 80,425 | (194,394) | (393,640) | 493,785 | 375,797 | (43,091) |
| Operating profit | 2,239,365 | 1,670,797 | 3,710,926 | 3,970,096 | 3,207,270 | 2,834,176 |
| Finance income | 103,883 | 81,063 | 156,659 | 106,576 | 19,725 | 14,362 |
| Finance costs | (166,904) | (65,402) | 182,373 | 157,713 | 190,512 | 241,223 |
| Finance costs, net | (63,021) | 15,661 | 25,714 | 51,137 | 170,787 | 226,861 |
| Share of results of JVs and associates | 1,164 | (245) | (6,017) | (112) | 5,559 | 31,029 |
| Profit before income tax | 2,177,508 | 1,686,213 | 3,679,195 | 3,918,847 | 3,042,042 | 2,638,344 |
| Income tax expenses | 308,680 | 301,697 | 531,479 | 776,909 | 435,226 | 421,567 |
| Profit | 1,868,828 | 1,384,516 | 3,147,716 | 3,141,938 | 2,606,816 | 2,216,777 |
| Earnings per share | 0.74 | 0.55 | 1.25 | 1.25 | 1.10 | 1.11 |
| **Total assets** | **35,420,077** | **31,717,365** | **31,717,365** | **29,879,729** | **24,841,632** | **16,890,937** |
| **Total liabilities** | **16,380,795** | **12,698,751** | **12,698,751** | **11,827,301** | **8,411,905** | **8,072,971** |
| **Total equity** | **19,039,282** | **19,018,614** | **19,018,614** | **18,052,428** | **16,429,727** | **8,817,966** |
| Fuyao Glass America operating revenue | 906,950 | 713,998 | 1,977,775 | 647,522 |  |  |
| Fuyao Glass America net profit | 47,946 | (64,734) | 4,675 | (257,926) |  |  |

Note: ¥ = CNY = Chinese yuan renminbi; US$1 = ¥6.6160 on July 1, 2018; R&D = research and development; JV = joint venture.

Source: Fuyao Glass Industry Group Co. Ltd., *Annual Report 2018,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/SEHK/2019/0325/LTN20190325529.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2017,* accessed July 13, 2019, www.fuyaogroup.com/upfiles/investor/201803/1521795644068.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2016,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2017/0309/ltn20170309505.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2015,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2016/0401/ltn201604011537.pdf.

Exhibit 2: Global Automobile Sales

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** |
| **Country or Region (in millions of units sold)** | | | | | | | | | | | |
| Europe (EU and EFTA) | 18.9 | 17.4 | 16.2 | 15.7 | 15.7 | 14.4 | 14.1 | 15.0 | 16.5 | 17.6 | 18.1 |
| Russia | 2.9 | 3.2 | 1.6 | 2.1 | 2.9 | 3.1 | 3.0 | 2.6 | 1.4 | 1.4 | 1.6 |
| Other Europe (including Turkey) | 1.2 | 1.3 | 0.8 | 1.0 | 1.2 | 1.2 | 1.2 | 1.0 | 1.1 | 1.2 | 1.2 |
| United States | 16.5 | 13.5 | 10.6 | 11.8 | 13.0 | 14.8 | 15.9 | 16.8 | 17.8 | 17.9 | 17.6 |
| Other NAFTA (Canada and Mexico) | 2.8 | 2.7 | 2.3 | 2.4 | 2.6 | 2.7 | 2.9 | 3.1 | 3.3 | 3.6 | 3.6 |
| Other Americas | 4.3 | 4.7 | 4.6 | 5.5 | 6.0 | 6.1 | 6.3 | 5.6 | 4.5 | 4.1 | 4.6 |
| China | 8.8 | 9.4 | 13.6 | 18.1 | 18.5 | 19.3 | 22.0 | 23.5 | 24.7 | 28.0 | 29.1 |
| India | 2.0 | 2.0 | 2.3 | 3.0 | 3.3 | 3.6 | 3.2 | 3.2 | 3.4 | 3.7 | 4.0 |
| Japan | 5.3 | 5.1 | 4.6 | 5.0 | 4.2 | 5.4 | 5.4 | 5.6 | 5.0 | 5.0 | 5.2 |
| Australia and New Zealand | 1.2 | 1.1 | 1.0 | 1.1 | 1.1 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.3 |
| Other Asia, Oceania, and ME | 6.4 | 6.7 | 6.7 | 8.0 | 8.3 | 8.7 | 8.7 | 9.1 | 9.0 | 8.9 | 9.2 |
| Africa | 1.3 | 1.3 | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 | 1.7 | 1.5 | 1.3 | 1.2 |
| **Global Total** | **71.6** | **68.3** | **65.6** | **75.0** | **78.2** | **82.1** | **85.6** | **88.3** | **89.7** | **93.9** | **96.8** |
|  | | | | | | | | | | | |
| **Percentage of Global Sales** | | | | | | | | | | | |
| Europe (EU and EFTA) | 26.4 | 25.4 | 24.7 | 20.9 | 20.0 | 17.5 | 16.5 | 17.0 | 18.3 | 18.7 | 18.7 |
| Russia | 4.0 | 4.7 | 2.4 | 2.8 | 3.7 | 3.8 | 3.5 | 2.9 | 1.6 | 1.5 | 1.7 |
| Other Europe (including Turkey) | 1.7 | 1.9 | 1.3 | 1.4 | 1.5 | 1.4 | 1.4 | 1.1 | 1.3 | 1.2 | 1.2 |
| United States | 23.0 | 19.8 | 16.2 | 15.7 | 16.7 | 18.0 | 18.6 | 19.1 | 19.9 | 19.0 | 18.2 |
| Other NAFTA (Canada and Mexico) | 4.0 | 4.0 | 3.4 | 3.2 | 3.3 | 3.3 | 3.4 | 3.5 | 3.7 | 3.9 | 3.8 |
| Other Americas | 6.0 | 6.8 | 7.1 | 7.4 | 7.7 | 7.5 | 7.3 | 6.3 | 5.0 | 4.3 | 4.7 |
| China | 12.3 | 13.7 | 20.8 | 24.1 | 23.7 | 23.5 | 25.7 | 26.6 | 27.5 | 29.9 | 30.1 |
| India | 2.8 | 2.9 | 3.5 | 4.1 | 4.2 | 4.4 | 3.8 | 3.6 | 3.8 | 3.9 | 4.2 |
| Japan | 7.4 | 7.4 | 7.0 | 6.6 | 5.4 | 6.5 | 6.3 | 6.3 | 5.6 | 5.3 | 5.4 |
| Australia and New Zealand | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 |
| Other Asia, Oceania, and ME | 8.9 | 9.8 | 10.3 | 10.7 | 10.6 | 10.6 | 10.2 | 10.3 | 10.0 | 9.4 | 9.5 |
| Africa | 1.8 | 1.8 | 1.8 | 1.7 | 1.9 | 1.9 | 1.9 | 1.9 | 1.7 | 1.4 | 1.2 |

Note: EU = European Union; EFTA = European Free Trade Association; NAFTA = North American Free Trade Agreement; ME = Middle East.

Source: “World Motor Vehicle Sales by Country by Type 2005–2017: All Vehicles,” Organisation Internationale des Constructeurs d’Automobiles (OICA), accessed September 14, 2018, www.oica.net/category/sales-statistics.

Exhibit 3a: Fuyao Sales by Business Lines

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **2017** | | **2016** | | **2015** | |
| **Business Line** | **(¥ Millions)** | **(%)** | **(¥ Millions)** | **(%)** | **(¥ Millions)** | **(%)** |
| Automotive glass | 17,868 | 95.47 | 16,145 | 97.14 | 13,138 | 96.79 |
| Float glass | 2,899 | 15.49 | 2,729 | 16.42 | 2,485 | 18.31 |
| Others | 621 | 3.32 | 404 | 2.43 | 462 | 3.4 |
| Less: Intergroup purchases | (2,672) | −14.28 | (2,657) | −15.99 | (2,511) | −18.5 |
| **Total** | **18,716** | **100** | **16,621** | **100** | **13,573** | **100** |

Note: ¥ = CNY = Chinese yuan renminbi; US$1 = ¥6.6160 on July 1, 2018.

Source: Fuyao Glass Industry Group Co. Ltd., *Annual Report 2017,* accessed July 13, 2019, www.fuyaogroup.com/upfiles/investor/201803/1521795644068.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2016,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2017/0309/ltn20170309505.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2015,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2016/0401/ltn201604011537.pdf.

Exhibit 3b: Cost Breakdowns by Business Lines and Major Categories

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2017** | | **2016** | | **2016–17** | **2015** | | **2015–16** |
|  | **(¥ Millions)** | **(%)** | **(¥ Millions)** | **(%)** | **Change (%)** | **(¥ Millions)** | **(%)** | **Change (%)** |
| **Auto Glass** | | | | | | | | |
| Materials | 7,356 | 64.4 | 6,586 | 64.5 | 11.7 | 5,406 | 65 | 21.8 |
| Energy | 856 | 7.5 | 838 | 8.2 | 2.2 | 797 | 10 | 5.1 |
| Labour | 1,719 | 15.0 | 1,452 | 14.2 | 18.4 | 1,010 | 12 | 43.8 |
| Other | 1,498 | 13.1 | 1,330 | 13.0 | 12.6 | 1,111 | 13 | 19.8 |
| **Total** | **11,430** | **100.0** | **10,206** | **100.0** |  | **8,324** | **100** |  |
|  | | | | | | | | |
| **Float Glass** | | | | | | | | |
| Materials | 617 | 32.8 | 571 | 29.6 | 8.0 | 512 | 27 | 11.5 |
| Energy | 602 | 32.1 | 686 | 35.5 | −12.1 | 871 | 46 | −21.3 |
| Labour | 180 | 9.6 | 163 | 8.4 | 10.5 | 73 | 4 | 122.9 |
| Other | 480 | 25.5 | 511 | 26.5 | −6.0 | 452 | 24 | 13.0 |
| **Total** | **1,879** | **100.0** | **1,930** | **100.0** |  | **1,908** | **100** |  |
|  | | | | | | | | |
| **Aggregate Costs** (assuming all float glass used by Fuyao) | | | | | | | | |
| Materials | 6,094 | 53.3 | 5,227 | 51.2 | 16.6 | 4,010 | 48.2 | 30.4 |
| Energy | 1,459 | 12.8 | 1,523 | 14.9 | −4.2 | 1,669 | 20.0 | −8.7 |
| Labour | 1,899 | 16.6 | 1,615 | 15.8 | 17.6 | 1,083 | 13.0 | 49.1 |
| Other | 1,977 | 17.3 | 1,841 | 18.0 | 7.4 | 1,563 | 18.8 | 17.8 |
| **Total** | **11,430** | **100.0** | **10,206** | **100.0** |  | **8,324** | **100.0** |  |

Note: Figures may not add up exactly because of rounding; ¥ = CNY = Chinese yuan renminbi; US$1 = ¥6.6160 on July 1, 2018.

Source: Fuyao Glass Industry Group Co. Ltd., *Annual Report 2017,* accessed July 13, 2019, www.fuyaogroup.com/upfiles/investor/201803/1521795644068.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2016,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2017/0309/ltn20170309505.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2015,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2016/0401/ltn201604011537.pdf.

Exhibit 4: U.S. Tariffs on Auto Glass

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Harmonized System Code | Number of Tariff Lines | Number of Duties | Average of Duties (%) | Minimum Duty (%) | Maximum Duty (%) | Percentage of Tariff Lines that Are Duty-Free |
| Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 87.02), including station wagons and racing cars | 8703 | 15.0 | 15.0 | 2.5 | 2.5 | 2.5 | 0.0 |
| Float glass and surface ground or polished glass, in sheets, whether or not having an absorbent, reflecting, or non-reflecting layer, but not otherwise worked | 7005 | 10.0 | 6.0 | 3.1 | 0.0 | 5.6 | 22.5 |
| Float glass and surface ground or polished glass, in sheets, having an absorbent, reflecting, or non-reflecting layer, but not otherwise worked (excluding wired glass) | 700510 | 2.0 | 2.0 | 2.2 | 0.0 | 4.4 | 50.0 |
| Toughened “tempered” safety glass, of size and shape suitable for incorporation in motor vehicles, aircraft, spacecraft, vessels, and other vehicles | 700711 | 1.0 | 1.0 | 5.5 | 5.5 | 5.5 | 0.0 |
| Laminated safety glass of size and shape suitable for incorporation in motor vehicles, aircraft, spacecraft, vessels, and other vehicles (excluding multiple-walled insulating units of glass) | 700721 | 3.0 | 3.0 | 3.3 | 0.0 | 4.9 | 33.3 |

Note: All tariffs in this table are applied on products from countries that are signatories to the World Trade Organization with “most-favoured-nation” status; they do not reflect lower tariffs available to countries under a free-trade pact, such as the North American Free Trade Agreement.

Source: “Welcome to the Tariff Download Facility,” World Trade Organization Integrated Database (IDB) notifications, accessed September 14, 2018, http://tariffdata.wto.org/TariffList.aspx.

Exhibit 5: Fuyao Glass Industry Group Co. Ltd. Inventories, As of December 31   
(¥ millions)

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **2017** | **2016** | **2015** |
| Raw materials | 1,226 | 1,185 | 1,039 |
| Work in process | 116 | 119 | 84 |
| Finished goods | 1,631 | 1,481 | 1,366 |
| Low-value consumables | 10 | 11 | 16 |
| Less: Writedown to net realizable value | (8) | (9) | (10) |
| Net inventories | 2,975 | 2,786 | 2,495 |

Note: ¥ = CNY = Chinese yuan renminbi; US$1 = ¥6.6160 on July 1, 2018.

Source: Author analysis based on information from Fuyao Glass Industry Group Co. Ltd., *Annual Report 2017,* accessed July 13, 2019, www.fuyaogroup.com/upfiles/investor/201803/1521795644068.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2016,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2017/0309/ltn20170309505.pdf; Fuyao Glass Industry Group Co. Ltd., *Annual Report 2015,* accessed July 13, 2019, www.hkexnews.hk/listedco/listconews/sehk/2016/0401/ltn201604011537.pdf.

Exhibit 6A: Global Foreign Direct Investment Stocks

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **(US$ Trillions)** | | **(% of GDP)** | | **(% of World Total FDI)** | |
| **Country or Region** | | **2005** | **2016** | **2005** | **2016** | **2005** | **2016** |
| United States | Outward | 3.64 | 6.36 | 27.8 | 34.3 | 32.1 | 22.8 |
| Inward | 2.82 | 6.56 | 21.5 | 35.3 | 24.9 | 23.5 |
| European Union | Outward | 4.92 | 9.03 | 34.6 | 60.0 | 43.4 | 32.3 |
| Inward | 4.23 | 7.58 | 29.7 | 50.3 | 37.4 | 27.1 |
| Russia | Outward | 0.14 | 0.34 | 17.1 | 26.5 | 1.2 | 1.2 |
| Inward | 0.18 | 0.38 | 21.9 | 29.9 | 1.6 | 1.4 |
| China | Outward | 0.06 | 1.32 | 2.8 | 11.6 | 0.6 | 4.7 |
| Inward | 0.47 | 2.87 | 20.6 | 25.2 | 4.2 | 10.3 |
| Japan | Outward | 0.39 | 1.23 | 8.5 | 27.8 | 3.4 | 4.4 |
| Inward | 0.10 | 0.19 | 2.2 | 4.0 | 0.9 | 0.7 |
| **World\*** |  | **11.33** | **27.94** | **23.9** | **36.9** | **100.0** | **100.0** |

Note: \*A minor discrepancy between the sum of inward FDI and the sum of outward FDI is present; the denominator is set for World as the total of inward FDI; GDP = gross domestic product; FDI = foreign direct investment.

Source: “FDI Flows,” OECD Data, accessed September 15, 2018, https://data.oecd.org/fdi/fdi-flows.htm.

EXHIBIT 6B: Global foreign direct investment Stocks

Annual and quarterly net flows of direct investment from other countries into the United States (US$ million)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **ANNUAL TOTALS** | | | | **2016, BY QUARTER** | | | | **2017, BY QUARTER** | | | | **2018, BY QUARTER** |
| **Country or Region** | **2014** | **2015** | **2016** | **2017** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** |
| NAFTA | 25,221 | 60,003 | 69,425 | 72,606 | 9,478 | 21,965 | 21,826 | 16,155 | 34,076 | 19,689 | 9,983 | 8,857 | 4,269 |
| China | 2,201 | 5,127 | 25,445 | (504) | 4,488 | 4,979 | 5,712 | 10,266 | (97) | 4 | 135 | (547) | (294) |
| Japan | 44,891 | 32,997 | 31,610 | 43,868 | 11,700 | 10,122 | 6,813 | 2,976 | 11,255 | 13,390 | 10,697 | 8,525 | 5,720 |
| Rest of Asia/Pacific | 24,490 | 33,458 | 8,904 | 8,627 | 7,212 | 5,143 | 1,101 | (7,290) | 9,707 | (683) | 393 | (788) | (6,014) |
| Rest of the World | 104,930 | 336,040 | 336,408 | 152,661 | 113,650 | 119,521 | 73,936 | 32,039 | 34,749 | 53,217 | 43,382 | 21,314 | 47,625 |
| **All Countries** | **201,733** | **467,625** | **471,792** | **277,258** | **146,528** | **161,730** | **109,388** | **54,146** | **89,690** | **85,617** | **64,590** | **37,361** | **51,306** |

Note: A negative number occurs when disposal of FDI assets exceeds acquisition of FDI assets; NAFTA = North American Free Trade Agreement.

Source: “Foreign Direct Investment in the U.S.: Balance of Payments and Direct Investment Position Data,” U.S. Bureau of Economic Analysis, accessed September 15, 2018, www.bea.gov/international/di1fdibal.

1. ¥ = CNY = Chinese yuan renminbi; US$1 = ¥6.6160 on July 1, 2018. [↑](#footnote-ref-1)
2. “Cao Dewang Builds in the United States: US$1 Billion for Complaints and Fines” [in Chinese], June 18, 2017, accessed October 7, 2017, http://toutiao.chinaso.com/rd/detail/20170618/1000200032975961497743297361643787\_1.html. [↑](#footnote-ref-2)
3. Dumping is defined as an activity that occurs “when goods are exported at a price less than their normal value, generally meaning that they are exported for less than what they are sold for in the domestic market or third-country markets, or at less than production cost;” “Glossary: A Guide to ‘WTO Speak,’” World Trade Organization, accessed June 6, 2019 www.wto.org/english/thewto\_e/glossary\_e/glossary\_e.htm. [↑](#footnote-ref-3)
4. FAW Group Corporation, based in Changchun China, was originally known as First Auto Works. It was the first automobile manufacturer in China. In 2018, it was the 14th-largest auto manufacturer in the world; “The Largest Car Companies in the World,” Carlogos, May 15, 2019, accessed June 6, 2019, www.carlogos.org/reviews/Largest-Car-Companies-in-the-World.html. [↑](#footnote-ref-4)
5. A-shares were valued in ¥, traded on the Shanghai Stock Exchange, and available for purchase by all domestic Chinese investors, but only by a limited set of authorized international investors. H-shares were traded on the Hong Kong Stock Exchange and purchased by Hong Kong and international investors without restriction. As of 2017, Fuyao had approximately 2.5 billion shares outstanding, of which about 80 per cent were A-shares, and 20 per cent were H-shares. A-shares and H-shares enjoyed identical cash flow and voting rights. [↑](#footnote-ref-5)
6. The purchase included U.S. AG manufacturing plants, two U.S. float glass facilities, an AG plant in Poland, and Mexican and Chinese joint ventures; Graeme Roberts, “Vitro Acquires PGW’s Automotive OEM Glass Business,” *Just-auto,* March 2, 2017, accessed July 13, 2019, www.just-auto.com/news/vitro-acquires-pgws-automotive-oem-glass-business\_id175211.aspx#; Vitro Glass, *2018 Integrated Annual Report*, 44–98, accessed January 12, 2019, www.vitro.com/media/163605/vitro-integrated-annual-report-2018.pdf; PGW was formerly the AG operations of PPG. [↑](#footnote-ref-6)
7. Shu-Ching Jean Chen, “Going Global: Fuyao Glass Goes Where Chinese Carmakers Fear to Tread,” *Forbes*, accessed October 9, 2017, www.forbes.com/sites/shuchingjeanchen/2016/04/06/going-global-fuyao-glass-goes-where-chinese-carmakers-fear-to-tread/#4f52928335dc. [↑](#footnote-ref-7)
8. An oblast is a term used for an administrative area or division in Russia, and in several other former nations of the Soviet Union; “oblast,” Lexico (Oxford English Dictionary), accessed June 28, 2019, www.lexico.com/en/definition/oblast. [↑](#footnote-ref-8)
9. Fuyao Glass Industry Group Co. Ltd., *Annual Report 2017,* 20, accessed July 13, 2019, www.fuyaogroup.com/upfiles/investor/201803/1521795644068.pdf. [↑](#footnote-ref-9)
10. Noam Scheiber and Keith Bradsher, “Chinese Auto Glass Magnate Faces Union Challenge in Ohio,” *New York Times*, November 8, 2017, accessed July 13, 2019, www.nytimes.com/2017/11/08/business/china-auto-ohio-union.html; “Ohio Taxpayers Demand Good, Safe Jobs in Exchange for Tax Subsidies at Fuyao,” Action Network, petition targeted at Jeff Daochuan Liu, President, Fuyao Glass America, accessed October 9, 2017, https://actionnetwork.org/petitions/ohio-taxpayers-demand-good-safe-jobs-in-exchange-for-tax-subsidies-at-fuyao. [↑](#footnote-ref-10)