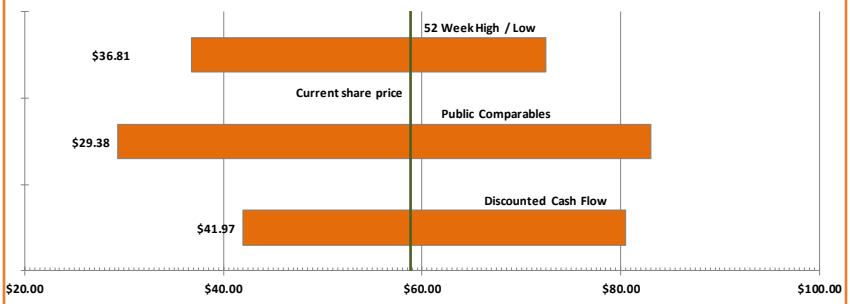
Understanding Global Foundries: Initiation of Coverage

Company Description

- GlobalFoundries (GFS) is a semiconductor manufacturing company headquartered in Malta, NY
- The business is a leading pure-play manufacturer, a capital-intensive business

Valuation Summary



GFS Strategic Highlights

- Industry leader in limiting exposure to China/Taiwan
- Prime candidate for lucrative government grants due to being US based (CHIPS ACT)
- Pioneering capacity expansion via exclusive manufacturing agreements (General Motors)
- Significant percentage of future capacity already sold through long-term revenue agreements
- Proven track record of high utilization. 97.6% average utilization rate over the past three years.

Initiating at Neutral

Public market valuation in line with intrinsic and comparable valuation analysis.

Overview

Ticker: GFS

Industry: Semiconductors

Market Cap: ~32B

P/E: 22.44

52 wk H/L: $36.81 – 72.50

Utilization Rate: 103% (2022)

EBITDA Margin: 38.1%

Recommendation: Hold

Projections

Target Price: $61.24

LT Revenue Growth: 10% YoY

EBITDA Margin: 28%

CapEx: 20% of revenue

Terminal Multiple: 13x

Perpetuity Growth: 5%

WACC: 9%

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I. Business Overview

A. Company History

GlobalFoundries (NASDAQ: GFS) is a semiconductor contract manufacturing company based in Malta, New York. The company focuses on manufacturing specialty semiconductors and is a global leader in their production. GlobalFoundries was born out of a divestiture. In an attempt by its parent company, AMD, to transition from a business that had in-house capabilities for semiconductor design and manufacturing to a company that focused solely on the design component. This corporate spinoff occurred in October of 2008 with GlobalFoundries being incorporated in 2009 as its own separate entity. The fabrication arm of AMD which later became GlobalFoundries was purchased by a subsidiary of Mubadala, a corporate holding company that represents the UAE sovereign wealth fund. The divestiture began as a partnership between the two entities. Their union brought together a proven manufacturing powerhouse and a firm with unparalleled financial resources. By March of 2012, AMD had fully divested its stake in GFS completing its corporate transition to a design-only firm.

The company has made several key acquisitions since its incorporation that have elevated it to its market leading status today. In 2010, shortly after being spun off from AMD, the company, benefitting from the financial backing of Mubadala merged with Chartered Semiconductor Manufacturing, at the time the third-largest foundry by revenue. This combination established the firm's manufacturing presence in Singapore. In 2015, GlobalFoundries bolstered its US manufacturing capabilities through another acquisition, purchasing IBM's Microelectronics division. This acquisition brought with it manufacturing facilities in New York and Vermont, new technological capabilities, and over 2,000 IBM

engineers.[1] By 2017, the company's Malta, New York most advanced manufacturing hub was successfully up and running.

B. Strategic Overview

In 2018, GlobalFoundries made a strategic decision to reposition its business away from supplying the most cutting-edge chips, an extremely capital-intensive business known as advanced semiconductor manufacturing.[2] Rather than solely focusing on transistor density and processing speed, the company embarked on a strategy to address - what is known as - the specialty semiconductor market, or those that are greater than or equal to 7 nm in size.[3]

Strong management execution on strategies of both organic and acquisitive growth have allowed the company to scale its manufacturing capabilities. When the business first started out as its own entity its former parent AMD was its only customer. Just over a decade later the company has diversified its customer base to over 200 companies.[4] The chips the company manufacturers can be found in most semi-conductor end market products used today such as cell phones, automobiles, and datacenters. Currently, GlobalFoundries employs approximately 14,600 people and holds roughly 9,000 patents worldwide. In 2021, the company generated $2.8 billion in revenue delivering 2.4 million 300mm equivalent semiconductor wafers, the third largest market share by revenue. TSMC generated $23.5 billion and UMC sold $3.4 billion worth of 300mm semiconductor wafers.[5]

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[1] "Form F-1 Public Securities Offering Prospectus," GFS-20211231, December 31, 2021, https://www.sec.gov/Archives/edgar/data/1709048/000170904822000008/gfs20211231.htm#i700fb10564ac41ba9754fadb16d76717_22, p.30.

[2] Vishnu Kannan and Jacob Feldgoise, "After the Chips Act: The Limits of Reshoring and next Steps for U.S ...," Carnegie Endowment For International Peace, November 22, 2022, https://carnegieendowment.org/2022/11/22/after-chips-act-limits-of-reshoring-and-next-steps-for-u.s.-semiconductor-policy-pub-88439.

[3] "TSMC Files Annual Report on Form 20-F for 2021," TSMC.com, March 12, 2022, https://pr.tsmc.com/english/news/2922, p.12.

[4] "About Us," GlobalFoundries, March 8, 2023, https://gf.com/about-us/.

[5] "Form F-1 Public Securities Offering Prospectus," GFS-20211231, December 31, 2021, https://www.sec.gov/Archives/edgar/data/1709048/000170904822000008/gfs20211231.htm#i700fb10564ac41ba9754fadb16d76717_22, p.8.

II. Industry Overview

A. Semiconductor Market

Semiconductors, otherwise referred to as integrated circuits or microchips are a crucial component of electronic devices. Semiconductors enable advancements in healthcare, communications, computing, transportation, military systems, and every other industry which relies on electronic devices. Developments in the industry have allowed semiconductors to rapidly become smaller and increasingly effective and reliable. According to the Semiconductor Industry Association, semiconductor sales were $555.9 billion globally in 2021. The World Semiconductor Trade Statistics Fall 2021 report forecasts sales to grow to $601 billion in 2022 and $633 billion in 2023.[6] US companies currently hold the position of largest market share with a 46 percent share of the market as of 2021; the next largest industry shares by country are between 7 and 20 percent of global market share.

The semiconductor industry contains two categories of companies, chip manufacturers and fabless chip companies. Fabless chip companies focus solely on the design stage of the process while chip manufacturers specialize in the execution of manufacturing chips and are referred to as foundries. Companies that both design and manufacture chips are a blend of the two categories and are referred to as Integrated Device Manufacturers, commonly referred to in the industry as IDMs.[7] The most well-known example of and IDM would be Intel as they still house a design team and fabrication capabilities.

Expanding foundry capacity through the construction of new plants is incredibly expensive and time consuming. Companies looking to expand their semiconductor production capacity can expect to spend between ten to twenty billion dollars and wait three to five years for the completion of the facility. [8] Chip manufacturers' profitability is driven by 'utilization' of

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[6]"Semiconductor Industry Association," semiconductors.org, May 2022, https://www.semiconductors.org/wp-content/uploads/2022/05/SIA-2022-Factbook_May-2022.pdf?trk=public_post_comment-text.

[7]"What Is a Semiconductor?," Semiconductor Industry Association, April 3, 2023, https://www.semiconductors.org/semiconductors-101/what-is-a-semiconductor/.

[8]Joel Hruska, "Why We Can't Build Our Way out of the Semiconductor Shortage," ExtremeTech, May 11, 2021, https://www.extremetech.com/computing/322695-why-we-cant-build-our-way-out-of-the-semiconductor-shortage.

its facilities. Utilization refers to the amount of time that the machines in a foundry are producing semiconductors. These plants are designed to operate for twenty-four hours a day to reach profitability and any downtime from machines will lower a foundry's utilization and place a strain on profits.

Fabless chip companies generally enjoy more comfortable margins and are able to operate with relatively low capital expenditures due to the nature of their business. Although the process behind designing a semiconductor is incredibly complex, it only requires a relatively small team of a few highly intelligent and motivated individuals to design a new chip. There is no need for a campus of factories and thus fabless chip companies can be thought of as more of a technology company. Considering the design of a chip requires very little physical infrastructure, it would be a fair argument to assign valuation multiples similar to those of a software company considering once the chip is complete there is very little additional expense needed other than manufacturing cost to produce.

B. Specialty Semiconductor Segment

Specialty semiconductors, those that are greater in size than 12 nm make up roughly 60% of the overall semiconductor market.[9] Common end-market outcomes for these chips are automotive, IoT (Internet of Things), common household appliances, and really just about everything else that uses technology, the key part is that these chips serve more basic purposes than advance chips. Specialty semiconductor manufacturing capabilities are focused more so on material innovations than geometry scaling of chips. Geometric scaling does not decrease the size of the wafer but instead focusses on decreasing the distance between transistors on the chip enhancing the computing power of the chip as more transistors can be fit on the chip. Instead, companies focus on making mechanical improvements to the chips. For example,

[9]"Semiconductor Industry Association | SIA | Voice of the Semiconductor ...," semiconductors.org, 2021, https://www.semiconductors.org/wp-content/uploads/2021/09/2021-SIA-State-of-the-Industry-Report.pdf.

companies can enhance the conductivity of the silicon to specifically enhance the process the chip will be used for. This process of manufacturing is significantly less expensive than advanced chips as cutting-edge machines and manufacturing processes are not necessary. Companies engaged in pervasive chip manufacturing are increasingly gaining pricing power as demand for older chips continues to remain strong and many manufacturers are focused on cutting-edge manufacturing. Companies such as GlobalFoundries may be able to accomplish lowering prices associated with manufacturing as they reach proper economies of scale while at the same time using their leverage over fabless companies to charge higher prices for the manufacturing of their pervasive chips.

III. Understanding GFS' Market & Capabilities

A. Current Manufacturing Capabilities:

The company is currently the only pure-play semiconductor foundry with no manufacturing exposure to China or Taiwan. This positions the company in a favorable position for government grants that will allow them to achieve a greater competitive edge over its competition. The below table illustrates the business natures of some of the world's most popular semiconductor companies.

	Design	Manufacture	Exposure to China
Fabless Chip Companies			
NVIDIA	✓		✓
Qualcom	✓		✓
Broadcom	✓		✓
Integrated Device Manufacturers			
Intel	✓	✓	✓
Texas Innstruments	✓	✓	✓
Pureplay Foundries			
Taiwan Semiconductor		✓	✓
GlobalFoundries		✓	

While the risk involved with a potential geopolitical conflict relating to China or Taiwan poses the greatest threat to companies that house fabrication facilities there, it also poses a material risk to fabless chip companies. This risk is born out of potential loss of geographic revenue as well as outstanding manufacturing agreements with pureplay foundries with exposure to China or Taiwan.

With the passage of the CHIPS ACT in August 2022, the company will use investments it receives from the passage of the $52 billion package to expand manufacturing and research and

development. This is in conjunction with the more than a billion dollars the company is already committed to expanding its manufacturing capacity at its Malta, NY, and Burlington, VT fabs.[10]

In February of 2023, GlobalFoundries and General Motors entered into a long-term agreement to establish an exclusive section of the Malta, NY facility dedicated to manufacturing for GM's key chip suppliers.[11] Executives from both companies referred to this agreement as an industry first as the companies worked together to address the continued struggle for automakers to tackle critical supply chain issues by securing a steady supply of chips. With GM's management predicting a doubling in the number of chips needed to support vehicles that are increasingly becoming "technological platforms" GFS is positioned to benefit from plenty of demand. While this event is being touted as an industry first, investors should consider the probability that further events like this takes place in the near future. GlobalFoundries' CEO floated the possibility that this type of deal could be a framework for future deals citing optimal economics for manufacturer and customer.[12]

B. Sales Process

In order to understand GlobalFoundries' sales process it is important to understand their place in the semiconductor manufacturing process. The company is a middleman that

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[10]Eric Millington, "GlobalFoundries Statement on U.S. House of Representatives' Passage of Legislation to Increase U.S. Semiconductor Manufacturing," GlobalFoundries, February 17, 2023, https://gf.com/gf-press-release/globalfoundries-statement-on-u-s-house-of-representative-passage-of-legislation-to-increase-u-s-semiconductor-manufacturing/.

[11]Millington, Eric. "GlobalFoundries and GM Announce Long-Term Direct Supply Agreement for U.S. Production of Semiconductor Chips." GlobalFoundries, April 18, 2023. https://gf.com/gf-press-release/globalfoundries-and-gm-announce-long-term-direct-supply-agreement-for-u-s-production-of-semiconductor-chips/.

[12]Michael Wayland, "General Motors Signs Deal with GlobalFoundries for Exclusive U.S. Semiconductor Production," CNBC, February 9, 2023, https://www.cnbc.com/2023/02/09/general-motors-globalfoundries-strike-semiconductor-deal.html.

completes a portion of the very complex process of converting a pure silicon wafer into an individual semiconductor. GFS' role in the manufacturing process is to take pure silicon wafers into finished wafers with hundreds or thousands of individual unpackaged chips. The industry term for these unpackaged semiconductors is die. GlobalFoundries does not slice the die, instead another company slices the die to get the chips ready for packaging.[13] GFS negotiates with fabless chip companies to carry out the manufacturing of the chips they design.

GFS is essentially selling its customers manufacturing capacity in its fabs. It is especially competitive in selling its capacity because of its market leading integration of technologies that allows it to sell semiconductors with market leading performance. For example, in a November, 2020 press release the company touted its 55BCDLite solution. The company claimed to have shipped over 3 billion of these units and mentioned that this technology is found in five out of seven of the world's most advanced smartphones in the world.[14] In the press release the company says,

> "In addition to audio amplifiers, GF customers are leveraging the performance, and small size of 55 BCDLite for other power management applications including cellular and wi-fi power amplifiers, interface and authentication for battery charging, audio haptics, and more."

This quote demonstrates the ways in which GFS is able to leverage its own market leading technologies to have customers create more efficient and more powerful chips. This is a

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[13]"Wafer Singulation FAQ," Expert in Plasma Process Technology, March 9, 2022, https://corial.plasmatherm.com/en/blog/wafer-singulation-faq.

[14]Admin, "55 Bcdlite Solution Positions Globalfoundries for Continued Leadership in Audio Amplifiers for Mobile Devices," GlobalFoundries, June 1, 2022, https://gf.com/gf-press-release/55-bcdlite-solution-positions-globalfoundries-continued-leadership-audio-amplifiers/.

demonstration of the company's market-based strategy where they are actively seeking out and working with their customers to ensure they will be the partner of choice for the next generation of semiconductors that need to be manufactured.

In a March, 2022 article, customers of GFS are interviewed about this market-based strategy. The focus was on GFS' next-gen silicon photonics solutions and customer reception to these new technologies was quite strong. Edward Lee, VP of Mixed-Signal Design for NVIDIA said, "We're working closely with GlobalFoundries to design high-bandwidth, low-power optical interconnects for some of our leading-edge data center products. NVIDIA interconnect solutions manufactured with the monolithic GF Fotonix platform will boost high performance computing and AI applications, enabling breakthrough advances." [15] VP of foundry engineering for Broadcom Liming Tsau said, "As one of our trusted semiconductor partners across a broad range of technologies and process nodes, we are happy to see Global Foundries extend their investments for enabling a photonics ecosystem across components and integrated solutions." These statements clearly outline the effectiveness of the company's sales process.

The company seeks out long-term agreements with its customer to be their manufacturing partner of choice over a period of several years. This is one of the hallmarks of GlobalFoundries' business because it provides forward revenue transparency. The company outlines several customer agreements with multi-year durations and multi-billion-dollar revenue commitments currently on the books. This should afford investors confidence in the

[15] "GlobalFoundries Announces Next-Gen Silicon Photonics Solutions," HPCwire, March 7, 2022, https://www.hpcwire.com/off-the-wire/globalfoundries-announces-next-gen-silicon-photonics-solutions/.

company's ability to generate revenue in the foreseeable future. According to the company's latest 20-F, there are about $27 billion in LTA's currently on the books.[16]

The company is contracted by over 200 customers, an incredible expansion from the business' first days where its only customer was its former parent, AMD. The following table highlights some of the company's key client relationships.

[17]

While it is unknown the exact cost that GlobalFoundries charges for a finished 300mm wafer, a rough estimate can be calculated using publicly available information from the company's filings. The company delivered 2.471 million 300mm equivalent finished wafers in 2022 collecting $8,100 million in sales. The company states that 87% of their recognized revenue is wafer related meaning they collected roughly $7,047 million in wafer related

[16] "2022 Capital Markets Day," gf.com, August 9, 2022, https://investors.gf.com/static-files/65f5f1b9-2aea-47a3-8455-10413c6560f4.

[17] "2022 Capital Markets Day ," gf.com, August 2022, https://investors.gf.com/static-files/65f5f1b9-2aea-47a3-8455-10413c6560f4.

revenue. A rough estimate of the revenue collected by GFS for a single finished wafer can be arrived at by dividing wafer related revenue by the total number of wafers delivered for the year, this estimate is approximately $2,900 per finished wafer.[18] Due to the diversified nature of the chips the company produces some wafers will be cut into more die than others. It is impossible to exactly determine GFS' share of the economics in a single semiconductor that ends up being sold by one of its customers such as Nvidia because the number of chips cut from one wafer greatly varies by the size of the chip being sold.

C. Manufacturing Capabilities

GlobalFoundries' proprietary knowledge and expertise in manufacturing allows them to excel with the following technologies. The company uses its relationships with its customers to understand what problems they are facing. Using this market-centric approach they excel in satisfying customer needs.

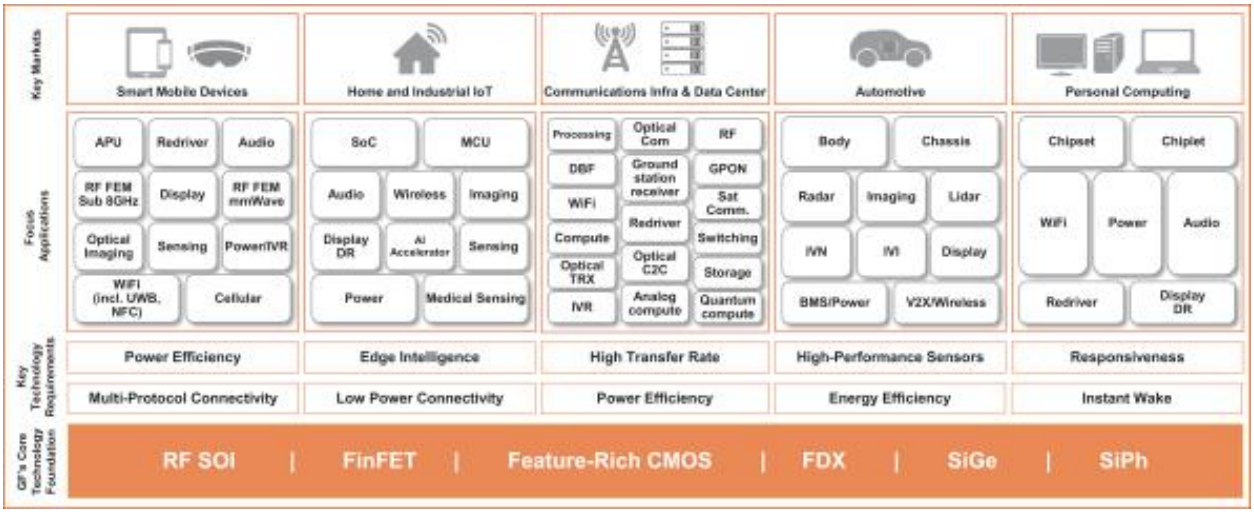
Manufacturing different types of semiconductors requires different sets of manufacturing conditions and equipment. For example, while visiting GFS' Malta, NY Fab-9 different parts of the cleanroom were lit by different shades of light so as not to interfere with the manufacturing process. We walked from fluorescent light to yellow and then red lighting throughout the fab. Because of the highly differentiated nature of fabricating unique semiconductors the company houses key technologies across different fabs that are designed specifically for that individual technology.

[18]Form 20-F for Globalfoundries Inc filed 04/14/2023, accessed June 2, 2023, https://investors.gf.com/static-files/cc73efd0-09c1-442a-b4dd-0bcb74610e31, p.44.

The following table illustrates the different locations of where the company's fabrication facilities are located.

Location	Key Technoloies
Malta, NY	FinFET, RF SOI, Si Ph
Burlington, VT	RF SOI, SIGe
Dresden, Germany	FDX, NVM, HV, BCDL
Singapore	BCD/BCDL, HV, NVM, DDI, RF SOI

During my tour of the Malta, NY fab I was told about the pervasive nature of the semiconductors that the company manufactures. We were told that there is almost certainly semiconductors in each of our cellphones that were made by GlobalFoundries and that the chips being manufactured in the fab we toured were being used in the popular Google Home smart enabled device. Below is a table demonstrating the key end market uses of chips that GlobalFoundries manufactures followed by a brief description of the different key technologies used in the chips.



RF SOI

Radio frequency silicon on insulator (RF SOI) is a specialized process of making radio frequency (RF) chips. Chips using RF SOI processes are most often manufactured for use in cell phones for antenna switch, Wi-Fi, and help facilitate transmit/receive functions. [19] GFS is the industry leader in RF SOI technology and are utilized in high-growth markets such as wireless and Wi-Fi. GFS' RF SOI technology is found in almost every modern cellphone and is critical to 4G LTE and 5G connectivity as well as power saving.[20]

FinFET

Fin field electric transistors (FinFET) are the most advanced transistors currently commercially available. GFS' FinFET technology contains advanced features provide a "best in class" experience in terms of power, performance, and area. GFS is one of four foundries at scale manufacturing FinFET. Costs to begin manufacturing are often in excess of $10 billion creating large barriers to entry in the market. GFS attributes its market penetration to specialty features such as RF and high-performance embedded decoupling capacitors.[21]

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[19] "Knowledge Center: Radio Frequency Silicon on Insulator (RF-SOI)," Semiconductor Engineering, June 7, 2019, https://semiengineering.com/knowledge_centers/materials/radio-frequency-silicon-on-insulator-rf-soi/#:~:text=RF%20SOI%20is%20a%20specialized,%2DSOI)%20for%20digital%20chips.

[20] Form F-1, October 4, 2021, https://www.sec.gov/Archives/edgar/data/1709048/000119312521290644/d192411df1.htm#rom192411_2 p.105.

[21] Form F-1, October 4, 2021,https://www.sec.gov/Archives/edgar/data/1709048/000119312521290644/d192411df1.htm#rom192411_2 p.105.

Feature-Rich CMOs

As the use of semiconductors become more pervasive, Complementary Metal Oxide Semiconductors (CMOS) are an increasingly important technology. Especially important in cloud data centers as the amount of stored energy grows and energy consumption rises from this process GFS is delivering innovative, best in class solutions. In 2021 the company released its innovative GF Fotonix technology. The GF Fotonix technology captures the potential of employing photons to move data instead of electrons. This technology strengthens the company's market leading position in the optical networking module market, one which is expected to have a CAGR of 26% between 2021 and 2026 reaching a market value of $4 billion by 2026.

FDX

GFS' proprietary FDX process technology is based on fully depleted silicon on insulator technology. The technology is beneficial for single-chip integration of digital and analog signals. Single-chip integration allows smaller and simpler systems to be embedded in a single chip leading to increased system efficiency and cost savings.[22] The company advertises the following advantages of its FDX technology

- Integration of up to five chips into one die
- Up to 50% more performance
- Up to 70% more power

[22]Editorial, ed., "System on a Chip (SOC) - Advantages and Disadvantages Explained," RoboticsBiz, February 10, 2021, https://roboticsbiz.com/system-on-a-chip-soc-advantages-and-disadvantages-explained/#:~:text=SoC%20allows%20semiconductor%20manufacturers%20to,standard%20parts%20and%20additional%20components.

An exhaustive list of available features are utilized to allow these performance benefits. These features include ultra-low power, ultra-low leakage, and RF. These features make the FDX platform ideal for IoT/wireless, 5G, automotive radar, and satellite communications end markets.

SiGe:

GlobalFoundries' Silicon Germanium (SiGe) technology is optimized for power amplifier applications or very high-frequency applications for optical and wireless, satellite communications, and communication infrastructure. The company holds a cost advantage compared to other available compound technologies and is performance competitive. SiGe semiconductors are particularly attractive for automotive end markets as they can work under conditions of high heat while still working for efficiency.[23] To illustrate SiGe's efficiency benefits, solar panels that utilize SiGe cells have their useful life improved from the original life of 25-30 years all the way up to 80 years.

SiPh:

Through innovation in SiPh manufacturing technology, GlobalFoundries is helping its customers move data at the speed of light. Integrating SiPh systems with CMOS and RF technology, GFS sports a competitive platform of Silicon Photonics offering customers a wide array of solutions. The company holds addresses the market need for higher data rates with greater power

[23]Vanessa Samuel, "What Is Silicon Germanium's Place at the Semiconductor Table? - News," All About Circuits, June 2, 2020, https://www.allaboutcircuits.com/news/what-is-silicon-germaniums-place-at-the-semiconductor-table/.

efficiency which facilitates the transfer of huge volumes of data creating a new demand for bandwidth. [24]

D. Manufacturing Facilities

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GlobalFoundries operates four different foundries in total after the divestiture of the East Fishkill, NY facility in 2022. Importantly, GFS has no manufacturing exposure to China or Taiwan eliminating a huge risk as geopolitical concerns rise, and semiconductor manufacturing is increasingly seen as a topic of national security. In a commitment to manufacturing at-scale, the company has made several other asset sales in recent years such as the $236 million sale of its Fab 3E facility and operations in Singapore to Vanguard in 2019. Additionally, in April, 2023 the company received approval from EU regulators to construct a new chip facility in Crolles, France partnering with STMicroelectronics NV. The facility should reach full capacity by 2026

[24] "Silicon Photonics," gf.com, March 10, 2023, https://gf.com/technology-platforms/silicon-photonics/.
[25] "2022 Capital Markets Day ," gf.com, August 2022, https://investors.gf.com/static-files/65f5f1b9-2aea-47a3-8455-10413c6560f4.

and is expected to have a capacity of 620,000 wafers per year. GFS will benefit from direct grants from the European Union to support their investments in the project. The direct grants are reportedly ~$8.2 billion project. GFS will have claim to 58% of the plant's capacity and will expand the company's capacity in high growth automotive & IoT chips.[26]

E. Importance of Silicon Wafers

In semiconductor manufacturing, wafers are thin cross sections of highly pure silicon that act as the building blocks for integrated circuits. Pure silicon is not very conductive, in fact it acts as more of an insulator than a conductor. However, because of its atomic structure, it can be easily adapted to be quite conductive through the introduction of tiny quantity of other elements through a process called doping. Common doping agents include nitrogen, aluminum, boron, and gallium.[27]

GlobalFoundries sources its wafers from several companies, however its main supplier Soitec S.A. supplies an outsized number of the company's wafers. Soitec supplied 46% of the company's wafers in 2021.[28] With the long-term wafer supply agreement between the two companies expiring in 2022, GFS has secured several new supply agreements with alternate suppliers such as GlobalWafers Co to ensure an adequate supply of 300mm SOI wafers.

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[26]Tobias Mann, "Globalfoundries, STMicro Snag €7.4B for French Fab Project," The Register® - Biting the hand that feeds IT, April 29, 2023, https://www.theregister.com/2023/04/29/globalfoundries_stmicro_eu_fab/.
[27]Abiola Ayodele, "Silicon Wafers: Everything You Need to Know," Wevolver, November 17, 2021, https://www.wevolver.com/article/silicon-wafers-everything-you-need-to-know.
[28] Form F-1, October 4, 2021, https://www.sec.gov/Archives/edgar/data/1709048/000119312521290644/d192411df1.htm#rom192411_2 p.6

IV. Financial Statement Analysis

A. Balance Sheet Discussion

GlobalFoundries' balance sheet tells the story of a very strong 2022 fiscal year ending December, 2022. Total assets grew by nearly $3 billion year over year. The company was able to grow assets more than liabilities delivering an addition to shareholder's equity of roughly $1 billion.

The company additionally reduced their short-term debt obligations while increasing their long-term debt. Any additions to long-term debt should be looked upon favorably as the company has a relatively low debt load. Additional debt in the capital structure could prove useful in reducing the company's cost of capital, delivering a boost to intrinsic enterprise value.

The business also enjoyed about $2 billion of property, plant, and equipment growth. This is reflective of the continued growth of manufacturing facilities across all fabrication sites through capital expenditures, the company did not make any acquisitions in 2022.

With management and analysts expecting lingering inventory as surplus inventory from the semiconductor shortage ramp up throughout 2023. GlobalFoundries is in a reasonably strong position only having about $1.4 billion of inventory on the books.

B. Income Statement Discussion

The company's income statement highlights a combination of management execution as well as the positive tailwinds of the global semiconductor shortage. A top-down analysis of the

statement shows eye-popping top-line growth from 2020 through 2022. Through this period the company nearly doubled revenue form $4.8 billion to greater than $8 billion.

The important takeaway from the income statement is just how important utilization is to this business. From 2020-2022 there were not significant variations in line items except for increase in revenue that flowed into net income.

	For the year ended December 31,		
	2022	2021	2020
Net revenue	$ 8,108	$ 6,585	$ 4,851
Cost of revenue	5,869	5,572	5,563
Gross profit (loss)	**2,239**	**1,013**	**(712)**

More sales stemming from a higher volume of wafers delivered to customers not having a tangible effect on the cost of revenue is an excellent demonstration of how fixed the costs of this business are. Importantly, in 2021 and 2022, GFS exceeded 100% utilization rate. Steps to ensure utilization rates remain high, such as the exclusive partnership with GM are important pieces to lead the business to consistent profitability. Because of the capital-intensive nature of the business, it is incredibly difficult to reduce the fixed costs of doing business meaning management must make improvements to pricing and ensuring steady customer demand through long-term agreements.

It is also important to note that the business benefitted from the sale of the East Fishkill, NY location which contributed an additional $403 million to net income for 2022. This should be kept in mind in thinking about modeling out the margins of the business into the future as this would be considered a nonrecurring benefit.

GlobalFoundries' high cost of revenue is due to the fact that management chooses to include depreciation and amortization under the umbrella of cost of revenue rather than as a stand-alone line-item.

C. Cash Flow Statement Discussion

Starting with the cash flows from operating activities, GFS has consistently delivered strong positive cash flows from its operating assets. This signals that this is fundamentally a strong business that has the potential to be consistently profitable. The strength of the cash flows from operations signals that the company will be well positioned to fund its future growth, we see evidence of this on the cash flows from investing section in the ability to fund significant purchases of property, plant, and equipment.

The cash flows from the investing section of the cash flow statement is especially interesting. The net cash used in investing activities is significantly higher than prior years. This signals a significant investment into expanding the manufacturing capacity of the business. The company used ~$3 billion of its cash to put towards the purchase of PP&E. The prior two years combined only saw the company invest ~$2.5 billion in purchasing PPE. The purchase of marketable securities is a new event for the company. This explains 2022 being the first appearance of this particular line-item and can be treated as nonrecurring.

The cash flows from financing activities shows a lower debt pay down than in the prior two years, likely due to the smaller balance of debt currently on the balance sheet. The proceeds from issuance of equity instruments are not from a public offering of shares but rather the proceeds collected from employees exercising stock options.

V. Financial Analysis

A. Ratios

Liquidity Ratios	TTM Ratio	Historical Average
Quick Ratio	1.31	1.99
Current Ratio	1.94	2.31
Inventory Turnover	4.39	3.56
Receivable Turnover	8.5	6.02

[29]

Much of the strength of the company's liquidity related ratios is due to the strong increase in sales and utilization. Higher inventory turnover is generally associated with strong sales and is a sign of operational strength. These figures will likely fall back towards historical averages as 2023 continues due to management guidance on sector wide inventory surplus issues. On the first quarter earnings call CEO Thomas Caulfield said,

> "Though we are expecting continued sequential revenue growth, the return of more normalized inventory and demand levels is forecast to happen more slowly than previously anticipated and will most likely occur later in the year well into the second half of 2023."[30]

A higher-than-average receivable turnover in 2023 is also understandable as the company has benefitted from being in a position of negotiating leverage as chip designers have jockeyed for fabrication capacity. Expect this figure to also decline in 2023 as the negotiating power shifts from manufacturers to designers.

[31]

Debt Management	TTM %	Historical Average
LT Debt to Equity	23%	73%
Total Debt to Equity	28%	79%

[29] Note: Historical Average = All available historical filing years (2018-Q1 2023)
[30] https://seekingalpha.com/article/4602037-globalfoundries-inc-gfs-q1-2023-earnings-call-transcript
[31] Note: Historical Average = All available historical filing years (2018-Q1 2023)

One of the first lessons a student of finance learns about capital structure is cost of capital. It costs a company more to issue equity than it does to issue debt because of the heightened risks and subordinate liquidation position of equity to debt requiring higher returns for investors. GlobalFoundries is currently carrying significantly less long-term debt than it has historically. One possible explanation for the lack of debt financing is a covenant in the shareholders agreement that stipulates that the company will not, without the prior written consent of Mubadala, raise debt financing in excess of $200 million without certain exceptions. The shareholder's agreement does not clarify what these exceptions are. Adding debt to the capital structure may increase shareholder value by lowering the company's weighted average cost of capital.

Another possible explanation for the company's relatively low amount of debt is because it has historically not turned a profit, at least with what is known from publicly available financial statements. It has, however, had historically positive operating cash flow which would support debt repayment. If the company continues to execute on its goal of increasing revenues and expanding margins, there could be an opportunity for a significant increase in shareholder value through adding debt.

B. Peer Company Analysis

Peer Company Analysis (2022 Figures)

	TSM	SMIC	UMC	Tower Semiconductor	GFS	Average
ROE	39.76%	10.02%	28.31%	15.06%	16.19%	21.87%
ROA	23.39	4.55	17.48	11.07	8.81	13.06
Gross Margin	59.56	37.97	45.12	27.8	27.61	39.612
EBITDA Margin	68.84	56.47	53.27	36.37	34.41	49.872

Note: All data as of 12/31/2022

GlobalFoundries appears to be underperforming its peer group based on a ratio analysis. While its management effectiveness ratios are lagging behind its peer average, the company has made tremendous strides in recent years to improve these ratios. Management has lifted the company from consistently negative ROE & ROA in recent years. Expanding margins to be in line with its peer companies is a consistent priority for management. The company is still in a growth phase and should see improved margins in coming years as management executes its plans to expand capacity and increase efficiency.

The capital-intensive nature of the semiconductor fabrication business requires an analysis of depreciation amongst the peer group. As shown on the statement of cash flows and reflected in cost revenue on the income statement[32], depreciation expense has played a role in GlobalFoundries' failure to reach consistent GAAP profitability. The following table breaks down the depreciation expense of the peer group as a percentage of revenue to standardize the expense.

[32] Note: See Financial Statements in Appendix

Company	D&A (As % of revenue)
SMIC	10.07%
TSMC	7.21%
GFS	4.50%
Tower Semiconductor	5.00%
UMC	4.65%
Average	6.29%

Note: Data as of 12/31/2022

The important take away from this table is not actually about depreciation but about revenue and high margins. Referencing above tables shows that the peer group of companies have high margins and are effective at putting their capital to use in a more effective way. The peer group also has levels of depreciation similar to GFS, it is a cost built into the fabric of the foundry business. GFS management needs to learn from this and seem to be effectively targeting the better way to move forward to expanding margins, which is by maximizing efficiency through utilization and not focusing on reducing depreciation.

VI. Model Assumptions / Drivers

A. Revenue

I assume a 10% growth in revenue between 2022 and 2023 and model in a half a percentage growth increase each year until 2027, the end of the projection period for the discounted cash flow analysis. 12% growth in the terminal year puts the terminal projection year at the top of management's projected long-term growth rate. This growth rate is justifiable considering management's ability to effect price increases, achieving a 19% year-over-year pricing increase between 2021 and 2022 coupled with the fact that more than 80% of foundry

capacity is already allocated to long-term agreements ensuring a considerable revenue stream.[33] That 80% of capacity is already accounted for under LTA guarantees sets a utilization rate floor at a comfortable level and puts the company in a strong position to continually approach or exceed a 100% utilization rate. Additionally, the LTAs protect the company's top line from historically cyclical sector trends. On the most recent earnings call management guides for high eighties to low ninety percent utilization rate, a strong projection when considering how the sector is currently slumping. Dave Reeder, CFO, explains that inventory burn in the first half of the year will keep the utilization rate at that level and that it should increase in the latter half of the year as excess inventory is delivered and the inventory stockpile decreases.[34] That the company was able to achieve 35% and 23% revenue growth in 2021 and 2022 on utilization rate of around 100% make a year one 10% growth assumption very defendable when utilization rate is expected to bottom out around 90% in the first half of the year then rise through the end of the year.

B. Perpetuity Method Terminal Growth Rate

In GFS' DCF I assume a perpetuity growth rate of 5%. This is at the high end of the assumptions for perpetual GDP growth according to practitioners.[35] Semiconductors are expected to outpace GDP for a considerable period, with growth forecasted at 6% CAGR and

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[33]"2022 Capital Markets Day ," gf.com, August 2022, https://investors.gf.com/static-files/65f5f1b9-2aea-47a3-8455-10413c6560f4.

[34]"GLOBALFOUNDRIES Inc. (GFS) Q4 2022 Earnings Call Transcript," Seeking Alpha, February 15, 2023, https://seekingalpha.com/article/4578145-globalfoundries-inc-gfs-q4-2022-earnings-call-transcript.

[35]Jason.flores, "Terminal Value," Macabacus, January 23, 2023, https://macabacus.com/valuation/dcf-terminal-value#:~:text=Perpetuity%20Growth%20Method&text=The%20perpetuity%20growth%20rate%20is,outpace%20the%20economy's%20growth%20forever.

foundry to grow at 8% CAGR according to capital markets day presentations making the assumption of 5% growth in perpetuity defensible.

C. Exit Multiple Method Terminal Multiple

For the exit multiple method, a multiple of 13x EBITDA was used to arrive at our terminal exit value. This multiple was chosen based off of an NYU Stern School of Business database that tracks multiples by industry. According to their database, of all EBITDA positive firms, the semiconductor industry has an average EV/EBITDA multiple of 12.66x.[36]

D. EBITDA Margin

The EBITDA Margin used in the projection period was arrived upon taking a simple average of the prior three years of historical margin which led to the first projected year's margin being equal to 28%. Each subsequent projected year's margin was stepped up on a one percent per year basis. Operating margin expansion has been stressed in capital markets day presentations. This should flow through to the EBITDA margin. More recently, EBITDA margin has been a topic of discussion on earnings calls between coverage analysts and management. For the year 2022, GFS delivered an adjusted EBITDA margin of ~40%, a more than 10 percentage point increase from the year prior.[37] Management discusses how margins are connected to utilization giving a formula of every 5 percent of utilization rate increase adding

[36]Aswath Damodaran, "Enterprise Value Multiples by Sector (US)," Value to Operating Income, January 2023, https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/vebitda.html.
[37] "GLOBALFOUNDRIES Inc. (GFS) Q4 2022 Earnings Call Transcript," Seeking Alpha, February 15, 2023, https://seekingalpha.com/article/4578145-globalfoundries-inc-gfs-q4-2022-earnings-call-transcript.

about 2 percent to gross margin. Operating margin is driven simply by sales and costs meaning the only way to improve the margin is to sell more or reduce COGS/SG&A. Management seems to believe that expanding capacity and increasing sales is the best way at capturing a higher operating margin by reaching better economies of scale.

E. Capital Expenditure

CapEx was projected at 20% of revenue for each year per management's guidance.[38] There is no step here as it is assumed that the 20% of revenue will be the target throughout the projected period. Depreciation was assumed to be 66% of CapEx each year based off of historical analysis coupled with the fact that management has given guidance on a steady growth of CapEx linked to revenue. Management is currently guiding 2023 CapEx at $2.25 billion. In the DCF the decision was made to maintain modeling CapEx at 20% of revenue which returns a lower 2023 CapEx figure. Management commented that $2.25 billion CapEx estimates were in line with its strategic plan which could allow us to back into a projected revenue figure of around $10 billion further justifying revenue projections.

[38]"2022 Capital Markets Day ," gf.com, August 2022, https://investors.gf.com/static-files/65f5f1b9-2aea-47a3-8455-10413c6560f4.

VII. Discussion of Valuation Results

A. Intrinsic Results (DCF)

The final per share value the DCF model produces depends heavily on which terminal value methodology is used. One of the main critiques of using a discounted cash flow analysis is that the terminal value heavily influences the final equity value that is arrived at. It is said to be an assumption heavy method of valuation. The perpetuity growth method allows for a more intrinsic valuation of the business than the exit multiple approach. This is because the exit multiple approach relies on public market multiples to inform the terminal value. The equity value arrived at using the perpetuity growth method produced the lower end value of $41.97 or a 28.3% discount to the April 28th closing share price.

The equity value arrived at using the exit multiple method produced the higher end value of $80.51 representing a 27.9% premium to the April 25th closing share price. I arrived at a blended price target of $61.24 by using an equal weighted average of the two per share values implying an equity value of around $32.5 billion dollars for the business. This valuation represents a roughly 1.07% premium compared to the April 25th closing trading quote. Therefore, the discounted cash flow analysis is suggesting that GlobalFoundries is very slightly undervalued by the public markets.

The model indicates a target price that is in line with current intraday trading and represents a discount to the 30-day moving average of $65.27 and is nearly equal to the 200-day moving average of $59.41 for the company. While recent sentiment has pulled the semiconductor industry lower, GFS common shares have been depressed back towards the

200-day**.** Currently, shares of the business appear to be appropriately valued by the public markets, leading to an initiation of coverage of neutral.

Intrinsic Valuation Summary	
Target Price	$61.24
4/28/23 Closing Price	$58.80
30 Day Moving Avg	$65.27
200 Day Moving Avg	$59.41
Premium to 4/28/23 Close	1.07%

B. Relative Valuation

Using a comparable company analysis, I arrived at an EV/EBITDA multiple for the company. The multiple was arrived at using trading data from GFS' publicly listed peers. This data was sourced from the equity relative valuation function of the Bloomberg Terminal.

	EV/EBITDA(Forward Blended)	Price / Book	Forward P/E
Tower Semiconductor	6.3x	2.5x	19.4x
SMIC	11.9x	1.1x	12.4x
UMC	5.1x	1.7x	7.1x
TSMC	11.2x	4.7x	29.2x
GFS	12.1x	3.1x	21.2x
Average	9.3x	2.6x	17.9x

Note: Data as of Q1 2023

[39]

In comparison with its peers, GlobalFoundries is trading at a premium in the public markets. While a premium to the peer group, the average multiple is considerably lower than the historical sector multiple of ~13x.[40] This may be due to the fact that the public markets place a higher discount rate on foreign semiconductor manufacturers, especially those based in China or Taiwan. Much of the company's peer group has such exposure and this could explain GFS trading higher than the average of the peer group. Using the multiple of the peer group

[39] Bloomberg Finance, L.P.

[40] Aswath Damodaran, "Enterprise Value Multiples by Sector (US)," Value to Operating Income, January 2023, https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/vebitda.html.

average we would arrive at a relative valuation of $52.81 per share, a discount to the intrinsic valuation. Additionally, it is possible that GFS is viewed as a less mature, higher growth company than many of its peers. Higher growth companies generally have higher multiples ascribed to them to account for higher future earning potential.

C. Bull/Bear Case

Bull Case

There are several factors that could make a strong bull case for GlobalFoundries. The first type of scenario is political. GFS would greatly benefit if U.S. / China relations continue to wither. If China were to cross a red line in any number of ways such as a violation of the independent governance of Taiwan or offering direct support for Vladimir Putin's war in Ukraine, GFS shares would likely benefit greatly. Additionally, as the United States looks to become more independent in terms of critical supply chain there is a constant possibility that a materially beneficial event could occur at the hands of the US government.

Another scenario that supports a bull case is if GlobalFoundries management is correct in their bet on the automotive and IoT sectors. Because of the investments the company has made in these sectors coupled with industry first moves such as being the exclusive provider of GM's chips GFS has the potential to emerge as the partner of choice in the automotive industry - an industry that is becoming increasingly tech enabled. If they are able to secure more exclusive contracts with other automobile manufacturers they would be adding capacity that is guaranteed to be filled. Additionally, with the push to 5G, the company could benefit from increased demand for its superior RF technologies that offer more efficient connectivity and power savings than other technologies. The company announced on May 30, 2023 that its

12nm FinFET technologies are being used in Department of Defense systems on land, air, sea, and space as the US government labeled GFS a Category 1A Trusted Supplier.[41] With defense spending projected to increase greatly in coming years sparked by the conflict in Ukraine, the company could benefit from being a trusted supplier of the US government which has the largest defense budget in the world by a significant margin.

GFS continues to be an attractive acquisition target. With new fabs requiring upwards of $20 billion to construct, GlobalFoundries will be on the radar of companies that are trying to establish or expand their foundry operations. In July of 2021 the Wall Street Journal first reported that Intel was engaged in talks to buy the company for around $30 billion.[42] The deal eventually fell apart and GFS filed for an IPO shortly after. A deal to acquire the company would likely require a significant control premium to be approved by Mubadala, the majority shareholder.

Bear Case

There are a number of scenarios which could adversely affect the operations of GlobalFoundries. GFS top two customers represented an outsized percentage of revenue for the years 2019, 2020, and 2021. They jointly accounted for 36%, 32%, and 27% of sales respectively. [43] The loss of revenue from losing one or both of these customers would cause

[41]Michael Mullaney, "U.S. Government Accredits Globalfoundries to Manufacture Trusted Semiconductors at New York Facility," Yahoo! Finance, May 30, 2023, https://finance.yahoo.com/news/u-government-accredits-globalfoundries-manufacture-123500275.html.
[42]Cara Lombardo, "WSJ News Exclusive | Intel Is in Talks to Buy Globalfoundries for about $30 Billion," The Wall Street Journal, July 16, 2021, https://www.wsj.com/articles/intel-is-in-talks-to-buy-globalfoundries-for-about-30-billion-11626387704.
[43] "SEC Filing: Globalfoundries Inc.." SEC Filing | Globalfoundries Inc., March 31, 2021. https://investors.gf.com/node/7631/html, p. F-56.

shareholder value to decline. Issues in the supply chain such as the company's ability to source pure silicon wafers would halt or reduce fabrication.

Mubadala (Part of the sovereign wealth arm for Abu Dhabi) currently holds a significant majority stake of the business in private markets (89%). Mubadala is free to do as it wishes with this majority share of the company and has the ability to override the wishes of public shareholders if it wishes to do so. Mubadala has also expressed a plan to divest blocks of shares into the public markets in the coming years, this could result in a significant change in the share price of the comp

Competitive forces could be harmful to the company if companies such as TSMC decide to make a large push to gain market share in the specialty foundry market. In 2021, TSMC announced it was to spend $300 billion to expand their capacity over three years.[44] This three year investment is about six times the US government's CHIPS ACT. GlobalFoundries would be unable to keep up with the investments made by TSMC if they made a push in the market. In December of 2022 TSMC announced it was increasing its investment in two new Arizona facilities to $40 billion from a previously announced $12 billion.[45]

Importantly, because the barriers to entering the market are so high and GFS is viewed as a critical US based manufacturer by the US government, the bear case is likely not that bad. The value of the fabrication operations alone should be a floor for the enterprise value of the business at around $20 billion.

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[44]"Apple Supplier TSMC to Spend $300 Billion USD to Expand Chip Manufacturing Capacity • Iphone in Canada Blog," iPhone in Canada Blog • Leading Tech News for Canadians, April 1, 2021, https://www.iphoneincanada.ca/2021/04/01/tsmc-capacity/.

[45]Russell Flannery, "TSMC Will Triple Arizona Investment to $40 Billion, among Largest Foreign Outlays in U.S. History," Forbes, December 7, 2022, https://www.forbes.com/sites/russellflannery/2022/12/06/tsmc-will-triple-arizona-investment-to-40-billion-among-largest-foreign-outlays-in-us-history/?sh=59a6e9e31ec8.

VIII. Appendix

A. 2023 Outlook

Quarter 1 2023 earnings results were released on May 9, 2023. First quarter revenue fell 5% compared to the year prior on an 18% decline in 300mm equivalent wafer shipments. GFS was able to reduce the hit of such a large drop in wafer shipments through high average sale price on delivered wafers and more profitable mix in the type of wafers delivered.[46]

The declines in sales were in line with management projections on the last earnings call in February. Management continues to believe that the first quarter will be the low point of the year with slow recovery through Q2'23 and strong expansion throughout the second half of the year. They are expecting the recovery in Q2 to be slower than initially anticipated in February as they continue to weather macroeconomic headwinds as there is rebalancing of demand in end markets such as communications, data centers, consumer electronics, and smart mobile devices.

CEO Tom Caulfield took time to highlight the success of the company's proprietary FDX and RF technologies that became the focal point of the business after the 2018 strategic repositioning away from geometric scaling. By focusing on these technologies they have targeted end markets such as automotive and IoT both of which have had tremendous growth. IoT grew 7% year over year to represent ~19% of Q1 revenue. Automotive grew 122% representing about 10% of total Q1 revenue. GFS' investment in these high growth markets

[46]"Globalfoundries, Inc. (GFS) Q1 2023 Earnings Call Transcript," Seeking Alpha, May 9, 2023, https://seekingalpha.com/article/4602037-globalfoundries-inc-gfs-q1-2023-earnings-call-transcript.

should continue to pay dividends, especially in automotive as the company looks to transfer existing capacity and build new capacity to these end markets.

Most of the quarter's decline was led by a 29% decline in smart mobile devices, GFS' largest end market making up about 38% of Q1 revenue. RF technology within smart mobile devices helped offset the hit of this decline, experiencing double digit growth, as did higher pricing.

The company had success in securing further LTA's adding $1.4 billion in the first quarter. These LTA's are important in the sustained long-term profitability of the business.

B. Literature Review

Role of Equity Research

Equity research reports released by coverage analysts responsible for closely following and understanding selected securities can have major impacts on financial markets. A well-received optimistic report by a well-regarded analyst that pushes a company's shares just a few basis points higher can generate billions of dollars in market value for a mid to large cap security in a matter of minutes. Alternatively, a competent report making a strong case for a pessimistic road ahead for a company or identifying a miscalculation by management can just as quickly erase billions of dollars of shareholder value for a company. Many assert that the role of equity research analysts is to supply investors with adequate information and advice to properly evaluate investment decisions and make the most profitable trades possible (Bonin, et al., 2010).

As a result of the enormous influence coverage analysts hold, management certainly feels immense pressure to come up with adequate responses to questions raised in corporate conferences and earnings presentations. Researchers have found that there is a negative causal relationship between the number of analysts covering a corporation and the degree of innovation from the company. Using a difference-in-differences approach, Jie He and Xuan Tian (2013) argue that with more analysts covering a company, management places too much focus on meeting short-term earnings goals important to maintaining a positive rating from coverage analysts. This attention from management is siphoned away from investing time in firm innovation.

Li and You (2015) research the value of sell-side coverage analysts measuring their value through two important events: coverage initiations and terminations. In their research they find analysts add value to firms by increasing their recognition among investors and not by closing an information arbitrage gap. It is important to note that this research covers the value analysts add to firms and thus monitoring and attempting to close the information gap could still be of value to investors.

Occasionally, firms hire coverage analysts to initiate coverage on their company. Small and mid-cap firms often struggle from a lack of analyst coverage. Post regulatory changes such as Regulation Fair Disclosure and Sarbanes-Oxley have led to fewer analysts covering these types of firms and more firms paying for coverage. Kirk (2011) conducted empirical analysis on which types of firms' contract coverage and what the effects of this are for a company. The study found that firms with great amounts of uncertainty surrounding aspects of the business are most likely to hire a coverage analyst in hopes of reducing that uncertainty. This study gives

a great insight into why equity coverage is impactful from the point of view of both management and investors. For management, coverage can clear up uncertainty leading to investors buying shares they otherwise would not have, at least not for market price. For investors, coverage analysts can help clear up a veil of uncertainty allowing them to make better informed investment decisions.

Coverage Analyst Behavior (Conflicts of Interest)

It is common for an analyst to assume coverage of a stock shortly after it transitions from a privately owned firm to one that is held in the open market. Banks commonly assign coverage of the company's they assist in their transition to the public markets through an initial public offering (IPO). After an IPO, companies can again enlist the help of banks to assist them in raising more money in the public markets through follow on equity or debt offerings. The possible conflict of interest between banks trying to win investment banking mandates while simultaneously providing objective equity research recommendations is a constant concern for regulators and questioners of equity research. Ljungvist, Marston, and Wilhelm Jr (2006) investigated this potential conflict analyzing whether analyst behavior increased the odds of a bank winning investment banking mandates. The researchers found no evidence of such a relationship between aggressive analyst behavior and increased investment banking business. They did find, however, that 'overly aggressive' behavior led to a loss of credibility for the bank and consequentially observed a decrease in the amount of investment banking mandates won.

Accuracy of Coverage Analysis

Dang, Foerster, Li, and Tang (2021) examine the quality of research analysts covering businesses. They find that high-ability analysts produce firm-specific information rather than general market and industry level information. Additionally, the researchers find that "high-ability" analysts reduce the amount of insider information not yet factored into public market prices leading to a reduction in the profitability and prevalence of insider trading. High ability analysts are identified by their accuracy in forecasting, earnings predictions, and targets.

Merkley, Michaely, and Pacelli (2017) analyze bias, accuracy, and competition in equity research reports. They find that as the number of analysts covering a firm decrease there is a negative effect on forecast accuracy and bias in research reports. These findings suggest that coverage analysts perform more accurately when they are facing heightened competition from other analysts to produce better research findings.

Mohanaram and Sunder (2006) study how Regulation Fair Disclosure has impacted the operations of coverage analysts. Regulation Fair Disclosure was implemented in October of 2000 and requires all firms to release investor communications in such a way that they are accessible to all investors at the same time. This reduces information sharing with preferred analysts and institutional shareholders. Post Reg-FD it was found that the quality of common information in analyst reports was not affected. Their results did, however, indicate an increase in idiosyncratic information indicating that analysts spend more time on information analysis post Reg-FD. This is also reflected in an observable significant drop in the average number of firms covered by the average coverage analyst as well as a move by analysts away from covering firms with lots of coverage, instead gravitating towards firms with less coverage so

that their information analysis may yield a greater benefit. This leads to a more even distribution of analyst coverage across firms.

Differentiation of Initiating Coverage Report

Equity research reports traditionally serve to close a gap of information asymmetry among investors allowing them to make better investment decisions. Generally, reports gather their information from company's public filings, earnings calls and conferences with management, industry reports, and proprietary firm knowledge. This report seeks to provide a more comprehensive understanding of the company through exploring additional avenues of research. While the traditional means of gathering and synthesizing information will certainly be presented in this report, the purpose of this report is to attempt to go beyond filling the information asymmetry gap. Through interviews with all employees from entry level to executives, visits to the facilities where chips are being fabricated, and conversations with customers and suppliers this report seeks to find and present an original finding on the company beyond an integration of public filings.

C. Malta, NY GlobalFoundries Clean Room Visit

While working on my thesis I was able to tour a GlobalFoundries fabrication facility at the Malta, New York location to witness firsthand how the company operates and learn more about the technologies.

I was guided on my tour by an automation engineer whose work directly drives efficiency and utilization rate. I was able to see and learn about the overhead automated robotic system that moved the wafers through the manufacturing process in the 300-yard-long facility. The machines drove on a track hanging from the ceiling at up to 12 miles per hour. I witnessed in house maintenance on these machines to eliminate the time needed to wait for a

spare part to arrive. Overall, there seemed to be a culture of innovation and care that shined through in the company's employees.

D. GlobalFoundries 2022 Consolidated Financial Statements

Balance Sheet

GLOBALFOUNDRIES INC.
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION
(Dollars in millions)

	As of December 31,	
	2022	2021
ASSETS		
Current assets:		
Cash and cash equivalents	$ 2,352	$ 2,939
Marketable securities	622	—
Receivables, prepayments and other assets	1,487	1,231
Inventories	1,339	1,121
Total current assets	**5,800**	**5,291**
Non-current assets:		
Property, plant and equipment, net	10,596	8,713
Goodwill and intangible assets, net	363	377
Marketable securities	372	—
Deferred tax assets	292	353
Receivables, prepayments and other assets	281	254
Other non-current financial assets	137	40
Total non-current assets	**12,041**	**9,737**
Total assets	**$ 17,841**	**$ 15,028**
LIABILITIES AND EQUITY		
Current liabilities:		
Trade payables and other current liabilities	$ 2,849	$ 2,586
Current portion of long-term debt	223	297
Current portion of lease obligations	75	135
Provisions	102	116
Current portion of deferred income from government grants	110	29
Total current liabilities	**3,359**	**3,163**
Non-current liabilities:		
Non-current portion of long-term debt	2,288	1,716
Other non-current liabilities	1,474	1,445
Non-current portion of lease obligations	270	291
Provisions	196	233
Non-current portion of deferred income from government grants	294	147
Total non-current liabilities	**4,522**	**3,832**
Total liabilities	**$ 7,881**	**$ 6,995**
Equity:		
Share capital		
Ordinary shares, $0.02 par value, 547,755 thousand and 531,846 thousand shares issued and outstanding as of December 31, 2022 and 2021, respectively	$ 11	11
Additional paid-in capital	23,831	23,487
Accumulated deficit	(14,021)	(15,469)
Accumulated other comprehensive loss	92	(54)
Equity attributable to the shareholders of GLOBALFOUNDRIES INC.	**9,913**	**7,975**
Non-controlling interests	47	58
Total equity	**9,960**	**8,033**
Total liabilities and equity	**$ 17,841**	**$ 15,028**

Income Statement

GLOBALFOUNDRIES INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(Share amounts and dollars in millions)

	For the year ended December 31,		
	2022	**2021**	**2020**
Net revenue	$ 8,108	$ 6,585	$ 4,851
Cost of revenue	5,869	5,572	5,563
Gross profit (loss)	**2,239**	**1,013**	**(712)**
Research and development expenses	482	478	476
Selling, general and administrative expenses	496	595	445
Restructuring charges	94	—	—
Operating expenses	**1,072**	**1,073**	**921**
Impairment charges	—	—	23
Other operating expenses	**—**	**—**	**23**
Income (loss) from operations	**1,167**	**(60)**	**(1,656)**
Finance income	51	6	3
Finance expenses	(111)	(114)	(154)
Gain on sale of East Fishkill ("EFK") business	403	—	—
Other income (expense), net	22	(8)	442
Income (loss) before income taxes	**1,532**	**(176)**	**(1,365)**
Income tax (expense) benefit	(86)	(78)	12
Net income (loss) for the year	**$ 1,446**	**$ (254)**	**$ (1,353)**
Attributable to:			
Shareholders of GLOBALFOUNDRIES INC.	$ 1,448	$ (250)	$ (1,350)
Non-controlling interests	(2)	(4)	(3)
Net income (loss) for the year	$ 1,446	$ (254)	$ (1,353)
Net income (loss) per share attributable to the equity holders of the Company:			
Basic weighted average common shares outstanding	539	506	500
Diluted weighted average common shares outstanding	552	506	500
Basic earnings (loss) per share	$ 2.69	$ (0.49)	$ (2.70)
Diluted earnings (loss) per share	$ 2.62	$ (0.49)	$ (2.70)

Statement of Cash Flows

GLOBALFOUNDRIES INC.
CONSOLIDATED STATEMENTS OF OTHER COMPREHENSIVE INCOME (LOSS)
(Dollars in millions)

	For the year ended December 31,		
	2022	**2021**	**2020**
Net income (loss) for the year	**$ 1,446**	**$ (254)**	**$ (1,353)**
Attributable to:			
Shareholder of GLOBALFOUNDRIES INC.	1,448	(250)	(1,350)
Non-controlling interest	(2)	(4)	(3)
Net income (loss) for the year	$ 1,446	$ (254)	$ (1,353)
Other comprehensive income (loss), net of tax:			
Items that may be reclassified subsequently to profit or loss:			
Share of foreign exchange fluctuation reserve of joint ventures	$ (23)	$ (12)	$ —
Effective portion of changes in the fair value of cash flow hedges	187	(45)	(23)
Fair value (loss) on investments measured at fair value through other comprehensive income	(9)	—	—
Income tax effect	(18)	3	(2)
	137	(54)	(25)
Items that will not be reclassified subsequently to profit or loss:			
Remeasurement of existing equity interests	—	—	7
Share of foreign exchange fluctuation reserve of joint ventures and associates	—	—	14
	$ 137	$ (54)	$ (4)
Total other comprehensive income (loss)			
Attributable to:			
Shareholders of GLOBALFOUNDRIES INC.	$ 146	$ (50)	$ (9)
Non-controlling interests	(9)	(4)	5
Total other comprehensive income (loss) for the year	**$ 137**	**$ (54)**	**$ (4)**
Total comprehensive income (loss)			
Attributable to:			
Shareholders of GLOBALFOUNDRIES INC.	$ 1,594	$ (300)	$ (1,359)
Non-controlling interests	(11)	(8)	2
Total comprehensive income (loss) for the year	**$ 1,583**	**$ (308)**	**$ (1,357)**

Discounted Cash Flow Model

Discounted Cash Flow Analysis for GlobalFoundries inc

Figures in Millions, except per share

	Historical			Projected					2022-2027
	2020	2021	2022	2023	2024	2025	2026	2027	CAGR
Sales	$ 4,851.00	$ 6,585.00	$ 8,100.00	$ 8,910.00	$ 9,845.55	$ 10,928.56	$ 12,185.34	$ 13,647.59	11.0%
EBITDA	1,157.0	1,442.0	3,155.0	2,494.8	2,855.2	3,278.6	3,777.5	4,367.2	6.7%
Less: Depreciation & Amortization	2,522.0	1,618.0	1,623.0	(1,176.1)	(1,279.9)	(1,398.9)	(1,535.4)	(1,692.3)	
EBIT	1,169.0	1,364.0	3,069.0	1,318.7	1,575.3	1,879.7	2,242.1	2,674.9	(2.7%)
Less: taxes @ 15.0%	(12.0)	78.0	86.0	(197.8)	(236.3)	(282.0)	(336.3)	(401.2)	
Tax-effected EBIT	1,157.0	1,442.0	3,155.0	1,120.9	1,339.0	1,597.8	1,905.8	2,273.7	(6.3%)
Plus: depreciation & amortization				1,176.1	1,279.9	1,398.9	1,535.4	1,692.3	
Less: capital expenditures				(1,782.0)	(1,969.1)	(2,185.7)	(2,437.1)	(2,729.5)	
Less: additions to definite life intangibles				0.0	0.0	0.0	0.0	0.0	
+ / - changes in working capital				(34.4)	(37.4)	(42.4)	(48.3)	(55.2)	
Unlevered free cash flow				**$ 480.60**	**$ 612.38**	**$ 768.47**	**$ 955.77**	**$ 1,181.25**	
Unlevered free cash flow growth rate					*27.4%*	*25.5%*	*24.4%*	*23.6%*	
Period Counter				1	2	3	4	5	
PV				**$ 440.91**	**$ 515.43**	**$ 593.40**	**$ 677.09**	**$ 767.73**	**$ 2,994.56**

	Historical			Projected				
Value Drivers	2020	2021	2022	2023	2024	2025	2026	2027
Sales growth	- -	35.7%	23.0%	10.00%	10.50%	11.00%	11.50%	12.00%
EBITDA margin	23.9%	21.9%	39.0%	28.0%	29.0%	30.0%	31.0%	32.0%
CapEx (amount)				$ 1,782.00	$ 1,969.11	$ 2,185.71	$ 2,437.07	$ 2,729.52
D&A(as a % of CapEx)				66.0%	65.0%	64.0%	63.0%	62.0%
Additions to definite life intangibles (amount)				$0.0	$0.0	$0.0	$0.0	$0.0
Amortization (amount)								
Changes in working capital (as a % of sales) + source, - (use)				(0.4%)	(0.4%)	(0.4%)	(0.4%)	(0.4%)
Changes in other assets and liabilities (amount)				$0.0	$0.0	$0.0	$0.0	$0.0

Perpetuity Growth Method	
Weighted average cost of capital:	**9.0%**
Net present value of free cash flow	$ 2,994.56
Terminal growth rate	5.0%
Terminal value	$ 31,007.94
Present value of the terminal value	20,153.0
Enterprise value	**$ 23,147.59**
Less: Net debt	(159.0)
Equity value	**$ 22,988.59**
Diluted Shares:	547.8
Equity Value Per Share (f)	**$ 41.97**

Exit Multiple Method	
Weighted average cost of capital:	**9.0%**
Terminal Year EBITDA	$ 4,367.23
Terminal Multiple	13.0x
Terminal value	$ 56,773.96
Present value of the terminal value	36,899.2
Enterprise value	**$ 44,260.97**
Less: Net debt	(159.0)
Equity value	**$44,101.97**
Diluted Shares:	547.755
Equity Value Per Share (f)	**$ 80.51**

Sensitivity Analysis - Equity Value per Share

	Perpetuity Growth		
WACC	4.5%	5.0%	5.5%
8.0%	$ 49.17	$ 56.71	$ 67.28
8.5%	$ 42.73	$ 48.29	$ 55.70
9.0%	$ 37.73	$ 41.97	$ 47.42
9.5%	$ 33.73	$ 37.06	$ 41.23
10.0%	$ 30.46	$ 33.14	$ 36.41

	EBITDA Multiple		
WACC	10.5x	13.0x	15.5x
8.0%	$70.13	$83.69	$97.26
8.5%	$68.82	$82.08	$95.34
9.0%	$67.56	$80.51	$93.47
9.5%	$66.33	$78.99	$91.65
10.0%	$65.13	$77.51	$89.88

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