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China CRO/CDMO sector

China CDMO players to play a vital role in global market

CDMO (contract development and manufacturing organization) focuses on outsourcing manufacturing services for pharmaceutical companies. Among all sub-sectors of CXO industry (namely CDMO, preclinical CRO, clinical CRO, etc.), we prefer CDMO given its 1) high barriers in investment capital and technology, 2) high customer royalty because it takes many years to gain client trust, 3) the Matthew Effect indicating large CDMO players will continue to outperform the peers, and 4) favorable policy support by Chinese government.

- **Biologics CDMO sees surging global demand; WuXi Bio's business model has advantages over Samsung Bio.** The increasing R&D investment in biologics drugs and the COVID-19 pandemic have triggered surging demand for biologics CDMO services. Leading biologics CDMO companies in the world are aggressively expanding their capacities to meet such demand. WuXi Bio is among the most active players in capacity expansion, planning to increase total capacity from 150k L (in terms of bioreactor volume) in 2021 to ~430k L by 2024. Additionally, WuXi Bio and its Asia-based peer, Samsung Bio, adopt very different business model which leads to different growth patterns of the two companies. WuXi Bio's "follow the molecule" business model allows the company to generate income from a project throughout the early-stage and commercial stage, while Samsung Bio mainly focus on commercial stage projects. We believe WuXi Bio's business model has larger growth potential and higher visibility than Samsung Bio. WuXi Bio is also building a global manufacturing network to react quickly to customer demand and helps mitigate geopolitical risk on supply chain.

- **Chemical CDMO industry has large consolidation potential globally; WuXi AppTec is gaining growth momentum.** Chemical CDMO accounted for 68% of global outsourced manufacturing market size in 2020 (F&S), while global chemical CDMO market is rather fragmented (CR5 was 15% in 2020, based on our calculation), leaving big room for consolidation. WuXi AppTec, via its subsidiary STA, is the largest chemical CDMO company in China, taking 23.4% of market share in 2020, according to our calculations. We believe that WuXi AppTec's chemical CDMO business is gaining momentum thanks to its rich pipeline and low client acquisition cost within its one-stop service platform. As of 2020, STA has 1,314 pipeline projects, a larger number than its domestic peers. STA also has a larger proportion of early stage projects than its domestic peers, indicating better growth prospects.

- **Maintain positive on China CXO sector; Top picks are WuXi Bio and WuXi AppTec.** We expect WuXi Bio to benefit from the surging demand in biologics CDMO. We think WuXi AppTec will further strengthen its leading position as an integrated one-stop CRO/CDMO service provider.

Valuation Table

Name	Ticker	Rating	Mkt Cap (US$mn)	Price (LC)	TP (LC)	Upside	P/E (x) 2022E	P/B (x) 2022E	ROE 2022E
WuXi Bio	2269 HK	BUY	33,309	61.7	159.2	158.2%	42.6	7.2	18.6
WuXi AppTec	603259 CH	BUY	42,930	93.8	167.4	78.4%	42.1	6.8	16.1
Tigermed	300347 CH	BUY	12,882	98.7	212.6	115.5%	35.2	4.3	13.0

Source: WIND, CMBIS estimates

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CDMO, the subsector with best growth prospects

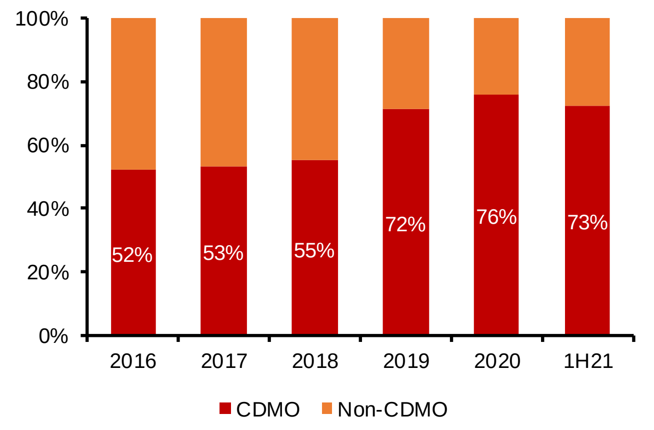
After more than 20 years' of development, China CXO sector has built up strong competency in both China and international markets. Among all sub-sectors of CXO industry (namely CDMO, preclinical CRO, clinical CRO, etc.), we prefer CDMO given its 1) high barriers in investment capital and technology, 2) high customer royalty because it takes many years to gain client trust, 3) the Matthew Effect indicating large CDMO players will continue to outperform the peers, and 4) favorable policy support by Chinese government.

CDMO being an capital and technology intensive industry with high entry barriers

CDMO business requires large and continuous investments in both manufacturing capacity and technology. Investments in capacity and technology are prerequisites for obtaining CDMO orders. Hence, large upfront capital investment sets a high entry barrier for new entrants.

Based on our calculations, among China-based listed CXO companies, CDMO companies accounted for 77% of the total capex spending of China CXO sector, and 46% of the total revenue generation of the sector in 2020. China-based CDMO companies accelerated their Capex investment in recent years, indicating rising entry barriers for new players in this field.

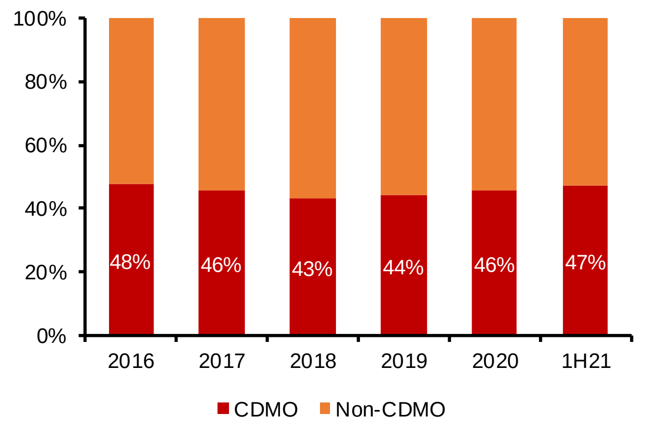
Figure 1: Split of capex between China-based CDMO and non-CDMO companies



Source: Company data, CMBIS

Note: CDMO companies include Porton, STA (WuXi AppTec's subsidiary), Asymchem, Pharmaron's CMC business, WuXi Bio, and Jiuzhou. Non-CDMO companies includes WuXi AppTec (excluding STA), Pharmaron (excluding CMC business), Viva, Hitgen, PharmaBlock, Chempartners, Tigermed, Medicilon and Joinn. We assume 60% of WuXi AppTec's Capex was allocated to STA since 2018 and 30% of Pharmaron's Capex was allocated to its CMC segment.

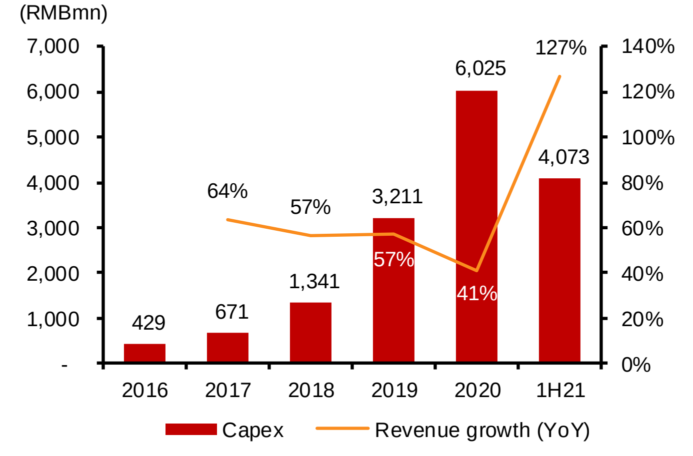
Figure 2: Split of revenue between China-based CDMO and non-CDMO companies



Source: Company data, CMBIS

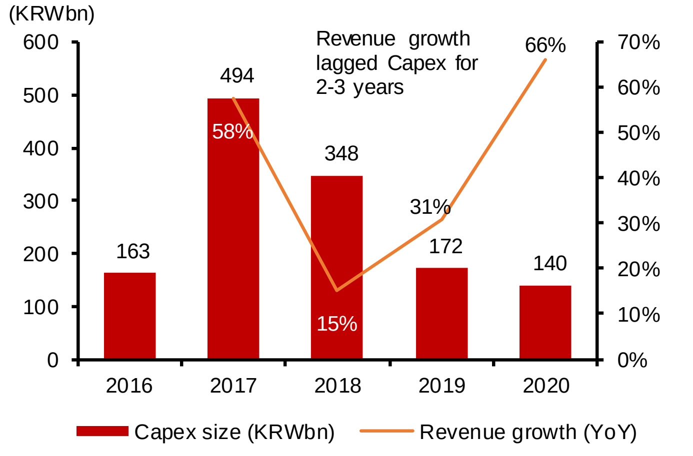
WuXi Bio (2269 HK, BUY, TP HK$159.19), a leading China-based biological CDMO company, has been continuously investing heavily in Capex, enabling the company to win overseas orders amid the COVID-19 pandemic. WuXi Bio spent RMB6.0bn Capex in 2020 and RMB4.1n in 1H21. Based on data from Samsung Bio (207940 KS, NR), a big Capex investment will lead to revenue growth acceleration in 2 to 3 years. We think WuXi Bio is now at the early stage of pay-back periods from its continuous Capex investments.

Figure 3: Capex and revenue growth of WuXi Bio



Source: Company data, CMBIS

Figure 4: Capex and revenue growth of Samsung Bio

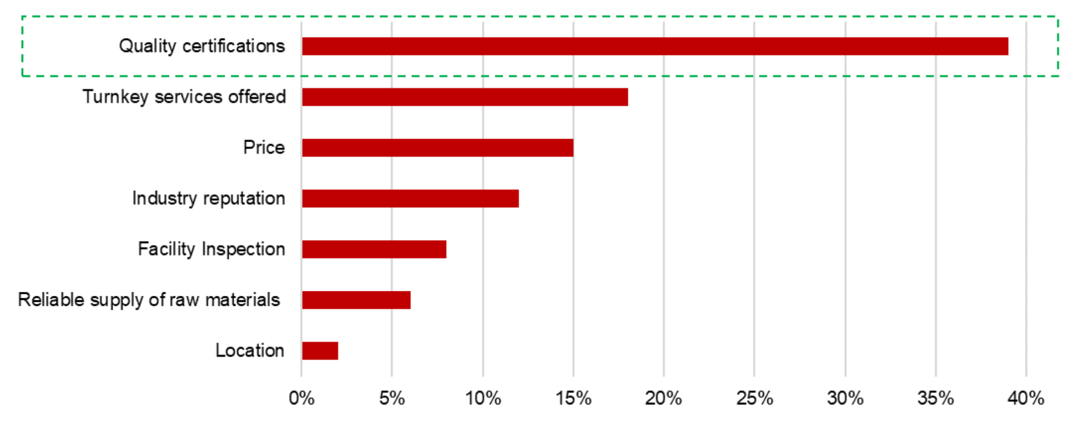


Source: Company data, CMBIS

Proven track record help gaining client trust

Due to the increasing complexity of drug development and manufacturing processes, pharmaceutical companies focus more on service quality than on other factors such as service pricing. A survey conducted by Contract Pharma and Nutraceutical World in 2021 found that quality certification is the most important factor for selecting CDMO/CMO partners. It usually requires good track record for CDMO companies to obtain quality certifications from regulatory authorities. Leading CDMO companies usually have proven track record during the long operating history, and have won client trust.

Figure 5: The important factors in selecting CDMO/CMO partners (2021)



Source: Contract Pharma, Nutraceutical World, CMBIS

During the COVID-19 pandemic, leading China-based CDMO companies have won sizable orders from overseas customers, which helped further strengthen the overseas customer royalty.

Figure 6: Leading China-based CDMO companies winning global orders during COVID-19 pandemic

Company	Ticker	Business focus	CDMO revenue (2020)	COVID-19 related projects
WuXi Bio	2269 HK	Biologics CDMO	RMB5,612mn	•Signed 3 COVID-19 vaccine contracts (as of 3Q21) •Involved in 20+ COVID-19 related projects (as of 3Q21)

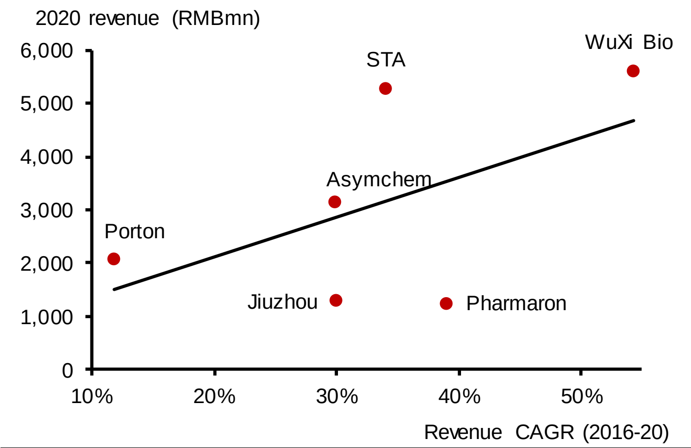
				•Expecting RMB3bn revenue from COVID-19 projects in 2022E •~US$700mn backlogs from COVID-19 related projects (as of 1H21)
WuXi AppTec	603259 CH; 2359 HK	One-stop CXO	RMB5,282mn	•Enabled two MNC to develop anti-COVID-19 products, one of which has reached Phase 3 stage (as of 1H21) •Cumulatively enabled 77 global clients in COVID-19 product R&D (as of 2020)
Asymchem	002821 CH	Chemical CDMO	RMB3,150mn	•Participated in two MNC's anti-COVID drug development programs, one of which has reached Phase 3 stage (as of 2020) •Announced two substantial contracts from US clients
Porton	300363 CH	Chemical CDMO	RMB2,072mn	•Announced two substantial contracts from US clients (including one from Pfizer)

Source: Company data, CMBIS

Strong Matthew Effect

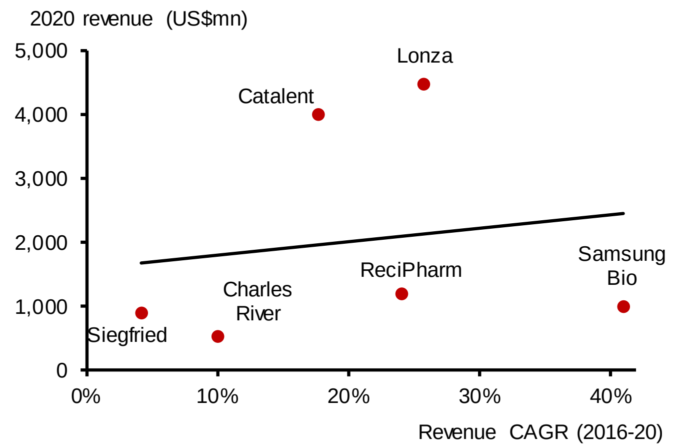
High entry barriers of the CDMO industry has led to a strong Matthew Effect, meaning leading companies to outperform the industry average. WuXi Bio and STA (a subsidiary of WuXi AppTec) are largest biologics CDMO and chemical CDMO companies in China in terms of revenue in 2020, respectively. WuXi Bio and STA recorded higher 2016-20 revenue Cagr than other China-based CDMO companies. We have observed a similar trend in the global market.

Figure 7: Positive correlation between revenue size and growth in China-based CDMO sector



Source: Company data, CMBIS

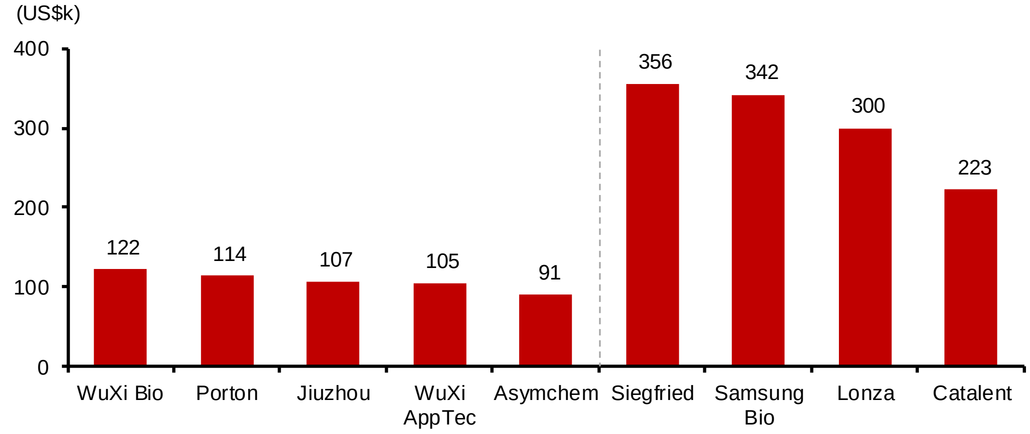
Figure 8: Positive correlation between revenue size and growth in overseas CDMO sector



Source: Company data, CMBIS
Note: Revenue CAGR is based on reporting currency

Though delivering impressive revenue growth in last 4 years, China-based CDMO companies are still far away from a growth ceiling. We found that there is an obvious gap in revenue per employee between China-based CDMO companies and their global peers, indicating an abundant room for Chinese CDMO companies to further grow in the global market. For example, revenue per employee of WuXi Bio was 36% and 41% to that of Samsung Bio and Lonza, respectively, in 2020.

Figure 9: Revenue per employee between China-based CDMOs and their global peers (2020)



Source: Company data, CMBIS

Favorable policy support by Chinese government

In 2019, Chinese government officially introduced the Marketing Authorisation Holder (MAH) system after a 4-year pilot program in selected regions. As a widely used pharmaceutical production system in developed countries, MAH system allows pharmaceutical companies to outsource production work to CDMOs. MAH system helps encourage innovation by avoiding time- and capital-consuming construction of inhouse manufacturing facilities. Thus, the implementation of MAH system in China will stimulate CDMO demand from small-to-medium-sized Chinese pharmaceutical companies. China-based CDMO companies currently generate most of the revenue from international clients while domestic income may rise with fast-growing domestic demand.

Figure 10: Key policies on MAH system

Time	Government agency	Policy	Details
Aug-2015	State Council	Advice regarding the reform of review and approval system on medicines and medical devices	Main targets include conducting a pilot program of MAH system
Nov-2015	Standing Committee of the National People's Congress	Decision to authorize the State Council to conduct a pilot program of MAH system in selected regions	Authorized the State Council to conduct a 3-year pilot program of MAH in 10 regions (Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Sichuan)
Jun-2016	State Council	Plan of the pilot program of MAH system	Marking the inception of the 3-year pilot program of MAH in 10 regions
Oct-2017	State Council; CPC Central Committee	Advice to deepen the reform of review and approval system and to encourage the innovation of medicines and medical devices	To carry out a nationwide implementation of MAH system and to amend Medicine Management Law
Nov-2018	Standing Committee of the National People's Congress	Decision to extend the authorization to the State Council to conduct a pilot program of MAH system in selected regions	Extended the 3-year pilot program of MAH system for another year
Dec-2019	Standing Committee of the National People's Congress	The amended Medicine Management Law in China	Wrote the MAH system into Medicine Management Law for the first time and initiated the nationwide implementation of MAH system
Jul-2020	State Administration for Market Regulation	Regulation on the supervision of medicine manufacturing	Provided more regulation details of MAH system for both marketing authorization holders and manufacturers

Source: Government websites, CMBIS

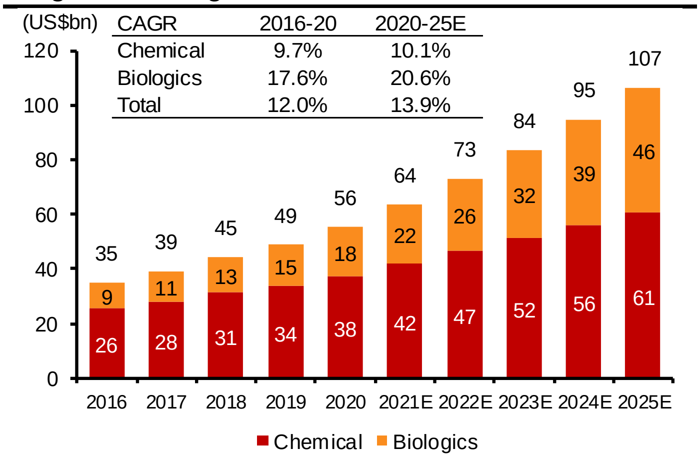
Biologics CDMO sees surging global demand

Global players actively expand capacities to meet surging demand

R&D in biological drugs are hot in the past 20 years. Biologics CDMO/CMO companies are thriving by assisting pharmaceutical companies to fullfil drug supplies in a cost-efficient way. The COVID-19 pandemic since early-2020 has further stimulated the global demand in biological therapies such as vaccines and neutralizing antibodies. Data from Frost & Sullivan show that global market size of biologics CDMO increased at a CAGR of 17.6% over 2016-2020 (vs 9.7% CAGR for chemical CDMO market) and is expected to increase at a CAGR of 20.6% over 2020-2025E (vs 10.1% CAGR for chemical CDMO market).

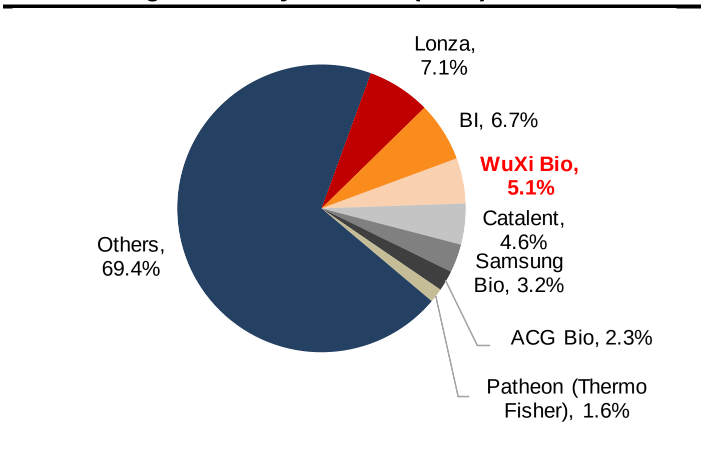
Meanwhile, the global biologics CDMO/CMO market is very fragmented, leaving abundant opportunities for industry consolidation. Lonza, as the largest biologics CDMO company in the world, took only 7.1% of the global market share in 2019, according to Frost & Sullivan. Global leading CDMO/CMO companies are proactively expanding their manufacturing capacities to meet the increasing demand as well as to capture market share. CDMO/CMO companies in Asia, such as China-based WuXi Bio, Korea-based Samsung Bio and Japan-based Fujifilm Diosynth (4910 JP, NR), are among the most active players in capacity expansion.

Figure 11: Global CDMO market size by chemical drugs and biologics



Source: F&S, CMBIS

Figure 12: Market share of global biologics outsourcing market by revenue (2019)



Source: Company data, F&S, CMBIS
Note: Biologics exclude cell and gene therapy

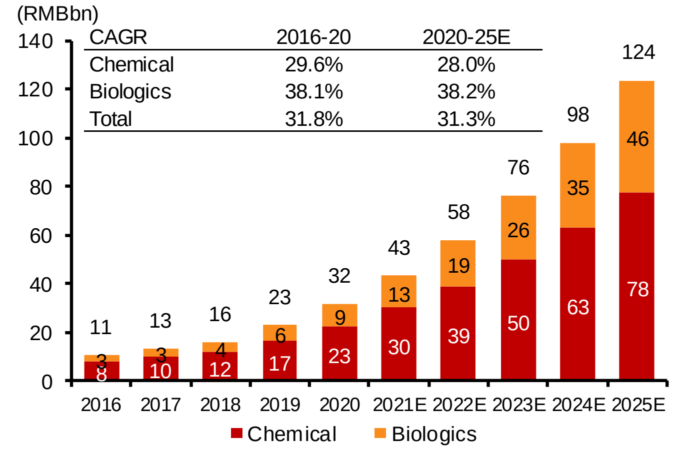
Figure 13: Global biologics CDMO/CMO capacity by company

Company	Ticker	Current capacity	Target capacity	New capacity ready time
Boehringer Ingelheim	Not listed	387,000L	No major expansion plan announced	
Samsung Bio	207940 KS	364,000L	620,000L	2023
Lonza	LONN SW	330,000L	550,000-600,000L	2024
Celltrion	068270 KS	190,000L	250,000L	2024
			600,000L	2030
WuXi Bio	2269 HK	150,000L	430,000L	2024
Fujifilm Diosynth	4910 JP	132,000L	419,000L	2025
AGC Biologics	Not listed	>85,000L	No major expansion plan announced	

Source: Company data, CMBIS
Note: Current capacity is the latest available data as of Jan 2022.

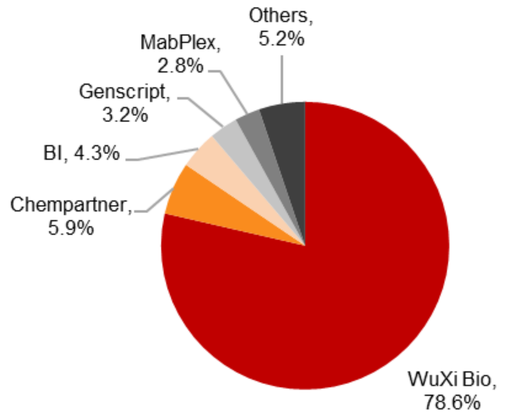
In China, the biologics CDMO/CMO industry is dominated by WuXi Bio with a market share of 78.6% in 2019, according to Frost & Sullivan. Many domestic CDMO players are rapidly emerging in recent years. However, the new entrants can hardly take market share from leading players such as WuXi Bio. Meanwhile, China biologics CDMO/CMO market is relatively untapped by MNCs given their very limited capacities in China, indicating a good competitive environment for domestic companies.

Figure 14: China CDMO market size by chemical drugs and biologics



Source: F&S, CMBIS

Figure 15: Market share of China biologics outsourcing market by revenue (2019)



Source: Company data, F&S, CMBIS
Note: Biologics exclude cell and gene therapy

Figure 16: Biologics CDMO capacity in China

Company	Ticker	Capacity	Operation status	Type of bioreactors	Stage of usage
Chinese companies					
WuXi Bio	2269 HK	150,000L 200,000L	Operational In construction	Single-use Single-use	Clinical/Commercial Clinical/Commercial
3S Bio	1530 HK	>30,000L 200,000L	Operational In construction	Stainless steel Stainless steel	Commercial Commercial
Bibo Pharma	Not listed	>30,000L	Operational	Stainless steel	Clinical/Commercial
MabPlex	Not listed	24,000L	Operational	Single-use	Clinical/Commercial
Thousand	Not listed	20,000L	Operational	Single-use	Clinical/Commercial
Bioworkshops	Not listed	20,000L	Operational	Single-use	Clinical/Commercial
Innoforce	Not listed	12,000L Multiple 2,000L bioreactors	Operational In construction	Single-use Single-use	Clinical/Commercial Commercial
ChemPartner	300149 CH	4,500L 13,500L	Operational In construction	Single-use Single-use	Clinical/Commercial Clinical/Commercial
Zhenge Biotech	Not listed	7,300L 15,000L	Operational In construction	Single-use Stainless steel	Clinical/Commercial Commercial
Chime Biologics	Not listed	Multiple 500-2,000L bioreactors 20,000L 140,000L	Operational In construction In planning	Single-use Single-use Single-use	Clinical Clinical/Commercial Clinical/Commercial
United Biopharma	Not listed	4,000L 20,000L	Operational In planning	Single-use Single-use	Commercial Commercial
Pharmaron	300759 CH;	4,000L	In construction	Single-use	Clinical
Genscript	1548 HK	2,600L	Operational	Single-use	Clinical/Commercial
OPM Bio	Not listed	700L Multiple 200-2,000L bioreactors	Operational In construction	Single-use Single-use	Clinical Commercial
Canton Bio	Not listed	Multiple 50-2,500L bioreactors	Operational	Single-use	Clinical/commercial

HJB Bio	Not listed	Multiple 50-2,000L bioreactors	Operational	Single-use	Clinical/commercial
MNCs					
Celltrion	068270 KS	120,000L	In planning	Not disclosed	Commercial
Boehringer	Not listed	6,000L	Operational	Single-use	Commercial
Lonza	LONN SW	Multiple 1,000 and 2,000L bioreactors	Operational	Single-use	Clinical/commercial
Patheon	TMO US	Joint venture with Innoforce	In construction	Not disclosed	Clinical/commercial
Samsung Bio	207940 KS	No capacity in China			
Fujifil Diosynth	4910 JP	No capacity in China			
Catalent	CTLT US	No capacity in China			

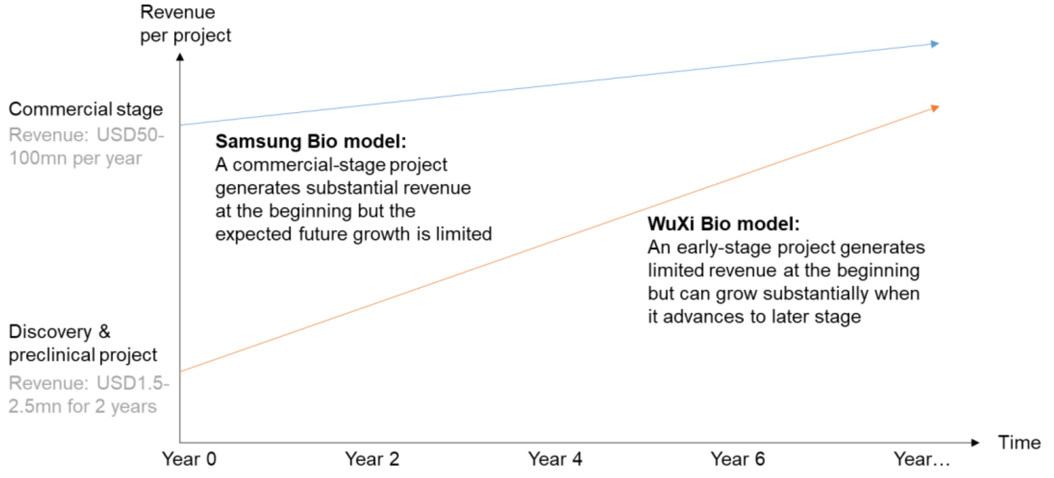
Source: Company data, CMBIS.
Note: Current capacity is the latest available data as of Jan 2022.

WuXi Bio vs Samsung Bio: business model matters

WuXi Bio and Samsung Bio adopts very different business model which leads to different growth patterns. WuXi Bio's "follow the molecule" business model allows the company to generate income from a project throughout the early-stage and commercial stage, while Samsung Bio mainly focus on commercial stage projects.

Income from a single project can grow substantially from an early stage to commercial stage. Given the high customer stickiness in biologics manufacturing, WuXi Bio's large early-stage project pipeline help to secure sizable future CDMO income.

Figure 17: Illustration of income flow of WuXi Bio and Samsung Bio

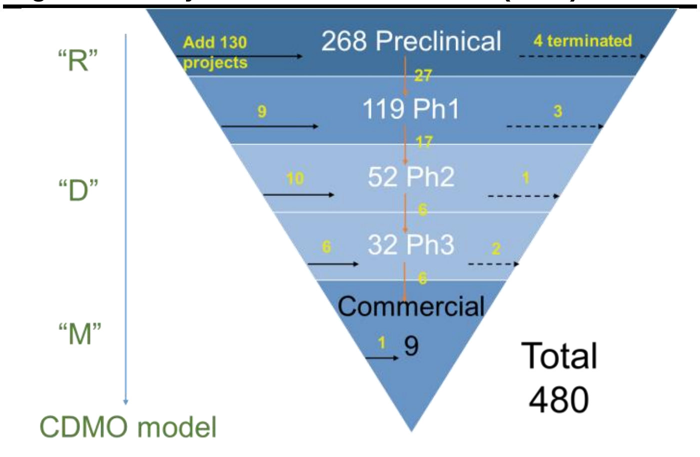


Source: Company data, CMBIS

We believe WuXi Bio's business model has larger growth potential and higher visibility than Samsung Bio. WuXi Bio has accumulated a rich pipeline of early-stage projects, containing a total of 480 projects as of 2021, including 268 in preclinical projects, 203 clinical stage projects and 9 in commercial projects. We note that 6 out of the 9 commercial stage projects were advanced from WuXi Bio's in-house projects. WuXi Bio recently announced to further upgrade its CDMO business model to CRDMO model in order to better serve early-stage projects.

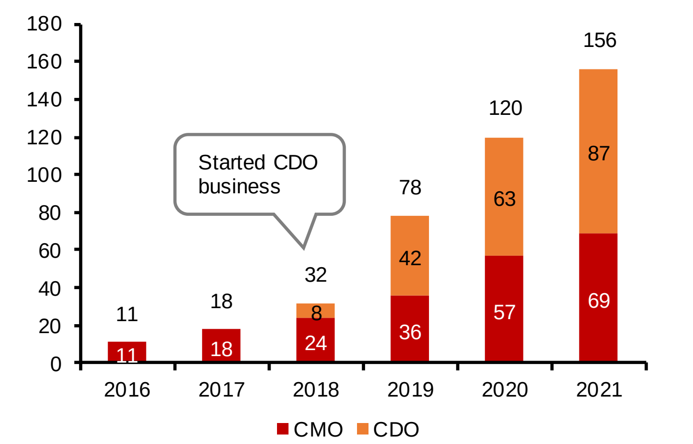
Samsung Bio focused solely on commercial stage projects until 2018 when it initiated the contract development organization (CDO business). As of 2021, Samsung Bio has a pipeline of 69 CMO projects (vs 24 in 2018) and 87 CDO projects (vs 8 in 2018). Samsung Bio following the strategy of WuXi Bio validates the long-term business logics of CDMO model, in our view.

Figure 18: Project number of WuXi Bio (2021)



Source: Company data, CMBIS
Note: Total project number doesn't include non-integrated projects

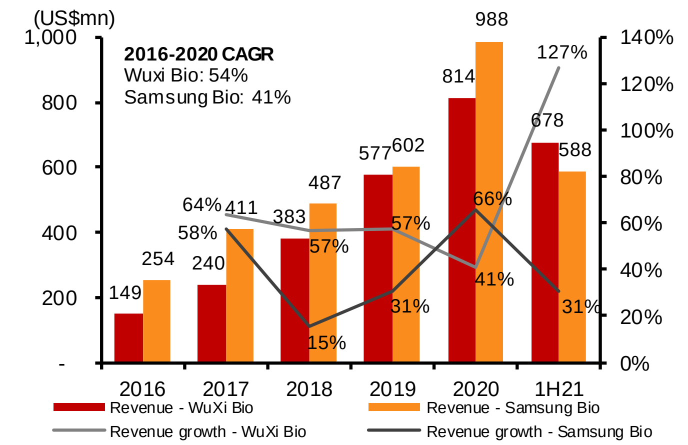
Figure 19: Project number of Samsung Bio



Source: Company data, CMBIS

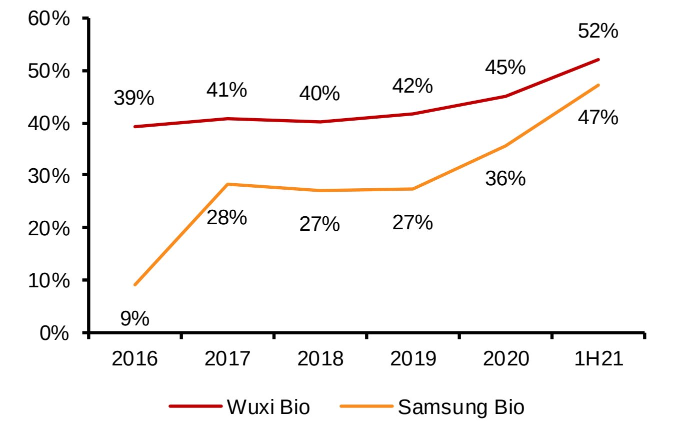
WuXi Bio has delivered a faster revenue growth CAGR during 2016-2020 than Samsung Bio (54% vs 41%). When commercial stage projects started to contribute, WuXi Bio saw a jump in revenue growth of 127% YoY in 1H21. We think WuXi Bio's revenue size may exceed that of Samsung Bio in 2021. Furthermore, WuXi Bio has been enjoying a higher gross margin than Samsung Bio thanks to the higher gross margin of early-stage projects. We expect WuXi Bio to maintain its gross margin premium over Samsung Bio in the future, supported by its fast growing number of early-stage projects as well as the adoption of cost-efficient single-used bioreactors in commercial manufacturing.

Figure 20: Revenue comparison of WuXi Bio and Samsung Bio



Source: Company data, CMBIS
Note: Revenue growth and 2016-2020 revenue CAGR for both companies are based on reporting currency

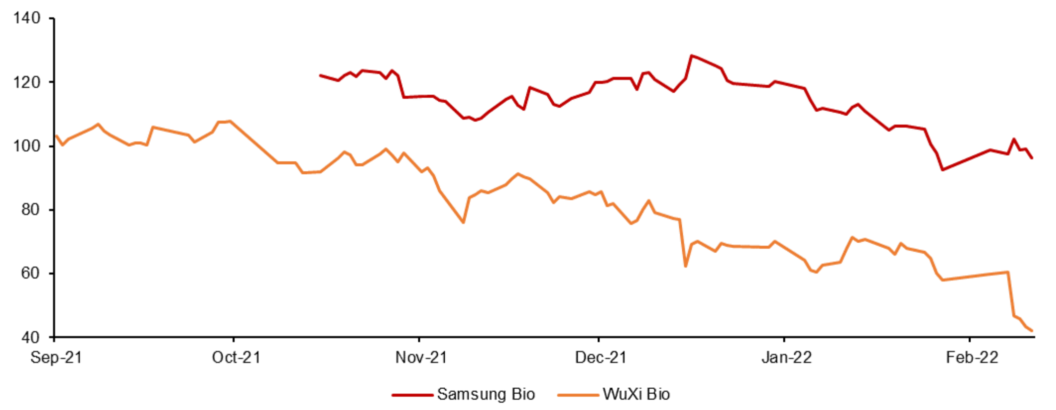
Figure 21: Gross margin comparison of WuXi Bio and Samsung Bio



Source: Company data, CMBIS

With the faster earnings growth and higher earnings visibility, WuXi Bio is trading at a lower 12-month forward PE ratio than Samsung Bio. We think WuXi Bio is undervalued and current price provides a good entry point.

Figure 22: Comparison of 12-month forward PE of WuXi Bio and Samsung Bio

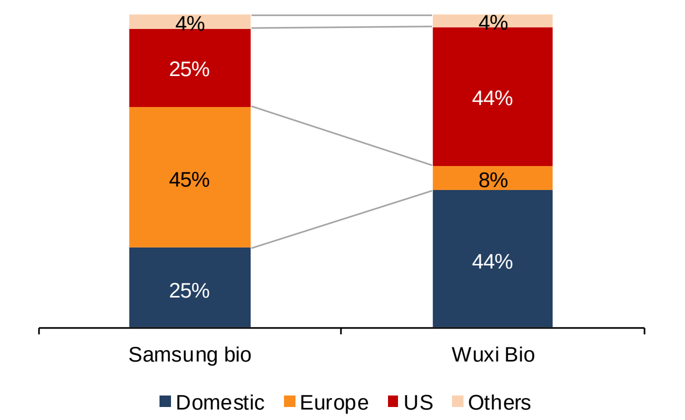


Source: Bloomberg, CMBIS. As of 15 Feb, 2022.

Geopolitical risks not affecting long-term prospects of WuXi Bio

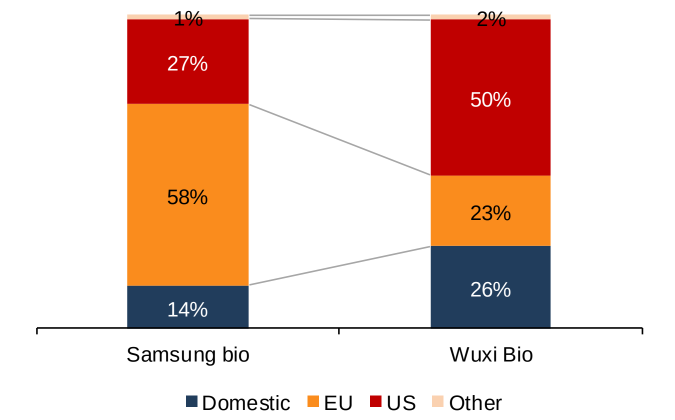
WuXi Bio generated 50% of its revenue from US clients in 1H21 while Samsung Bio had the majority of income from Europe. Despite of the ongoing US-China tensions, WuXi Bio continue to grow its revenue and backlogs from US customers.

Figure 23: Geographic split of revenue of WuXi Bio and Samsung Bio (2020)



Source: Company data, CMBIS

Figure 24: Geographic split of revenue of WuXi Bio and Samsung Bio (1H21)



Source: Company data, CMBIS

To mitigate potential geopolitical risks, WuXi Bio is building a global manufacturing network and expanding capacities in the US and Europe. By 2024, WuXi Bio may have 22% of its total capacities from overseas regions. We think a global network will allow WuXi Bio to react quickly to customer demand and to provide flexible options to customers.

WuXi Bio imports certain critical equipment and consumables from the US. On Feb 7, 2022, WuXi Bio's subsidiaries in Shanghai and WuXi were added in the Unverified List (UVL) by US Department of Commerce, which may affect WuXi Bio's imports of goods from the US. WuXi Biologics has been importing certain hardware controllers for bioreactors and certain hollow fiber filters that are subject to US export controls but have received Commerce Department approvals during the last 10 years.

In our view, if the UVL would not be expanded, the impact on WuXi Bio's supply chain could be mild. Firstly, according to the Company, facilities in Shanghai and Wuxi sites have been fully installed by the end of 2021. Thus, no bioreactor is required after completion of facility construction in Shanghai and Wuxi. During 2022-23, the Company's major capacity expansion will be from facilities in Ireland (adding 54k L), Shijiazhuang (adding 48k L) and Chengdu (adding 48k L). Shanghai site plans to add 10k L capacities by 2023 and Wuxi site has no capacity expansion plan before 2024. Secondly, WuXi Bio has already built a global supply chain with multiple suppliers from the US, EU, Japan and China, which will largely mitigate risks from supply restrictions. The Company stated that it has 4 suppliers for bioreactor controllers and 4 suppliers for hollow fiber filters. Currently, WuXi Bio sourced approximately half of the related equipment/consumables from US and half from EU.

Figure 25: WuXi Bio's capacity expansion plan

Site #	DS Capacity	GMP Ready	Location	Usage
MFG1	7,500L fed-batch/perfusion	2012	Wuxi	Commercial
MFG2	28,000L fed-batch/2,000L perfusion	2017	Wuxi	Commercial
MFG3	5,200L fed-batch/1,500L perfusion	2018	Shanghai	Clinical
MFG4	10,000L fed-batch/CFB	2019	Wuxi	Commercial
MFG5	60,000L fed-batch	2021	Wuxi	Commercial
MFG6	6,000L (6 x 1,000L) perfusion	2022	**Ireland**	Commercial
MFG7	48,000L fed-batch	2023	**Ireland**	Commercial
MFG8	48,000L fed-batch	2022	Shijiazhuang	Commercial
MFG9	96,000L fed-batch	2024	Wuxi	Commercial
MFG10	4,000L fed-batch/500L perfusion	2023	**Singapore**	Clinical/Commercial
MFG11	16,000L fed-batch	2024	**Worcester, MA**	Clinical/Commercial
MFG12	48,000L (12 x 4,000L) fed-batch	2023	Chengdu	Clinical/Commercial
MFG13	2,000L (2 x 1,000L) viral manufacturing	2021	Hangzhou	Clinical/Commercial
MFG14	2,300L (300L/2,000L) microbial	2021	Hangzhou	Clinical/Commercial
MFG17	10,000L fed-batch	2023	Shanghai	Clinical
MFG18	6,000L fed-batch	2021	**Cranbury, NJ**	Clinical
MFG19	12,000L fed-batch/3,000L perfusion	2021	**Wuppertal,**	Commercial
MFG20	8,000L (4 x 2,000L) fed-batch	2021	Hangzhou	Commercial
MFG21	7,000L fed-batch	2021	Suzhou	Clinical

Source: Company data, CMBIS
Note: As of Jun 2021. DS: drug product. Locations marked in red color refer to facilities outside of China

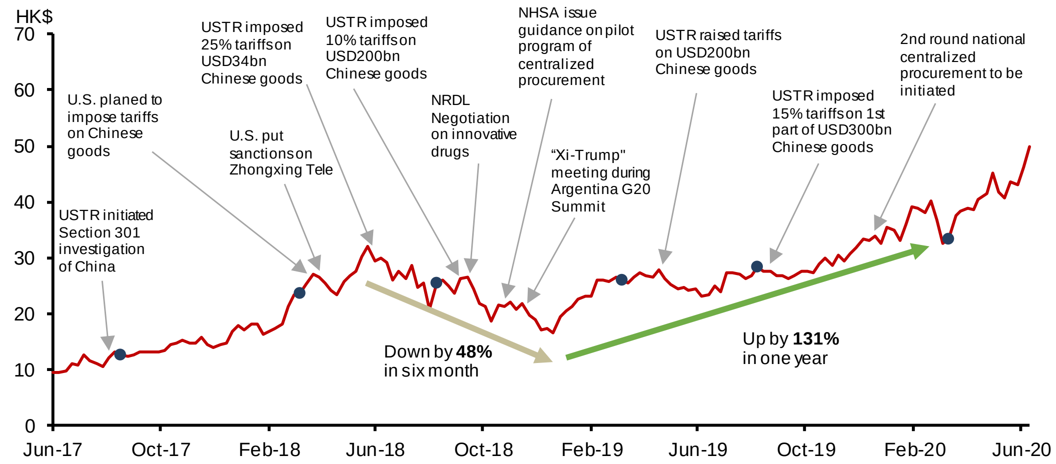
Figure 26: Major suppliers of bioreactors and hollow fiber filters

Hollow fiber filters		Bioreactors	
MNC company	**Headquarter**	**MNC company**	**Headquarter**
Asahi Kasei	Japan	Thermo Fisher	US
Repligen	US	ABEC	US
Danaher	US	Distek	US
Parker-Hannifin	US	Merck KGaA	Germany
Koch Membrane Systems	US	Applikon Biotech	US
Watersep Bioseparation	Germany	OmniBRx Biotech	India
Toyobo	Japan	Danaher	US
Microdyn-Nadir	Germany	GE Healthcare	US
Cantel Medical	US	Sartorius	Germany
Coorstek	US	Parker-Hannifin	US
		MorimatSu	Japan
Chinese company		**Chinese company**	
MOTIMO Membrane Tech (津膜科技)		Duoning (多宁)	
OriginWater Tech (碧水源)		LePure (乐纯)	
Water Business Doctor (万邦达)		JYSS (金仪盛世)	
Zhaojin Motian (招金膜天)		Tofflon (东富龙)	
Various other suppliers in China		Truking (楚天科技)	

Source: Company data, CMBIS

Historically, share prices of WuXi Bio usually experienced a short-term correction due to geopolitical factors, followed by a rapid rebound thanks to the company's solid earnings growth. For example, share prices of WuXi Bio dropped by 48% from Jun 2018 to Jan 2019 due to the US-China trade war. Policy environment in China was also not encouraging due to the initiation of centralized procurement. However, the stock rebounded sharply by 131% in the following 12 months driven by strong earnings growth.

Figure 27: WuXi Bio's historical share price performance amid China-US trade tensions



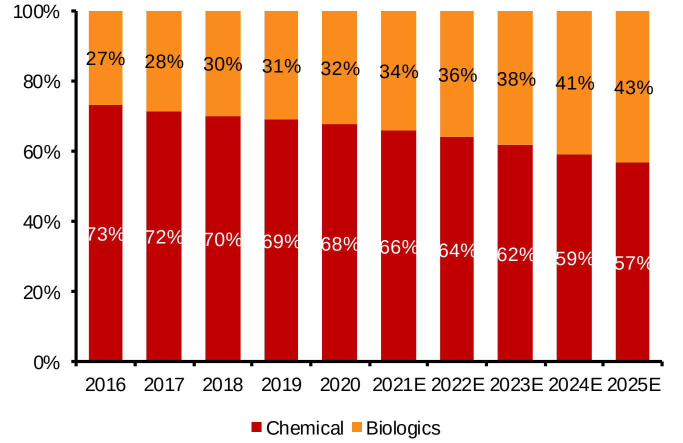
Source: Bloomberg, Government websites, CMBIS
Note: Blue dots indicate positive earnings growth announced by WuXi Bio. USTR: United States Trade Representative. NHSA: China National Health Security Administration. NRDL: China National Reimbursement Drug List

Chemical CDMO has big room for market consolidation

China-based CDMO companies to consolidate the global market

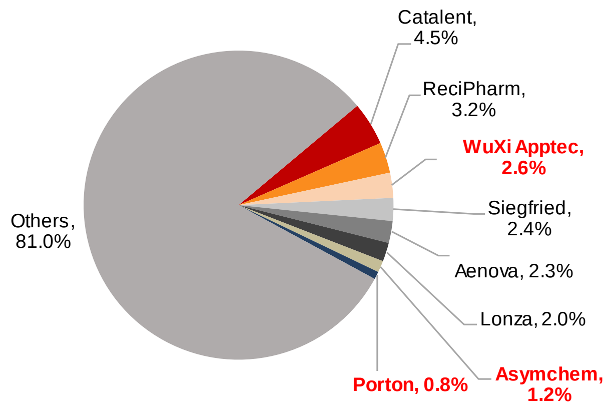
As mentioned above, global biologics CDMO market has been growing faster than that of chemical CDMO market during 2016-2020. However, chemical CDMO still takes the majority portion of global outsourced manufacturing market. Additionally, global chemical CDMO market is very fragmented (CR5 was 15% in 2020 based on our calculation), leaving big room for market consolidation. China-based chemical CDMO companies are well positioned to take the global market share thanks to their cost advantages and improving technology.

Figure 28: Breakdown of global CDMO market by chemical drugs and biologics



Source: F&S, CMBIS

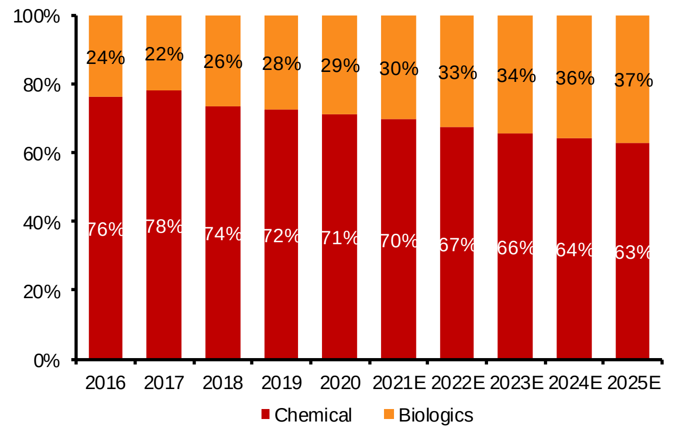
Figure 29: Market share of global chemical drug outsourcing industry by revenue (2020)



Source: Company data, F&S, CMBIS
Note: Based on market size data from F&S and reported chemical drug CDMO revenue (in US$). Catalent uses FY21 data (financial year ended in Jun).

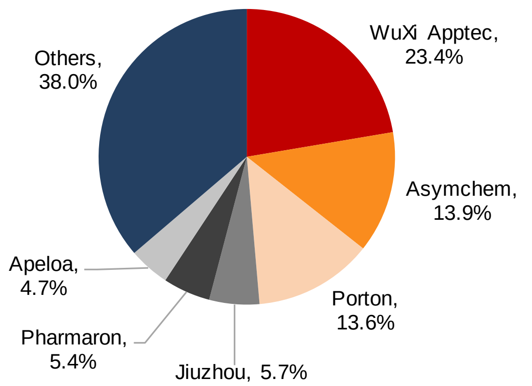
The chemical CDMO market in China is much more concentrated than the global market. WuXi AppTec, the largest chemical CDMO company in China, took 23.4% of market share in China in 2020, while the Top 3 players accounted for a combined 50.9% market share in 2020, according to our calculations. Overseas market consolidation will fuel revenue growth of China-based chemical CDMO companies. Favourable policies, such as MAH system, is set to encourage Chinese pharmaceutical companies to outsource manufacturing to CDMO companies.

Figure 30: Breakdown of China CDMO market by chemical drugs and biologics



Source: F&S, CMBIS

Figure 31: Market share of China chemical drug outsourcing industry by revenue (2020)



Source: Company data, F&S, CMBIS
Note: Based on market size data from F&S and reported chemical drug CDMO revenue

Comparison of domestic chemical CDMO companies – leaders running faster

WuXi AppTec is consistently expanding its service scope in past years and has established a one-stop platform, which allows the company to adopt "follow the molecule" strategy and provide services from early stage to commercial stage. STA, WuXi AppTec's subsidiary, is a pioneer among domestic peers in expanding global manufacturing facility network. We expect WuXi AppTec to continue to benefit from first-mover advantages in the future.

Figure 32: Development history of China-based leading chemical CDMO companies

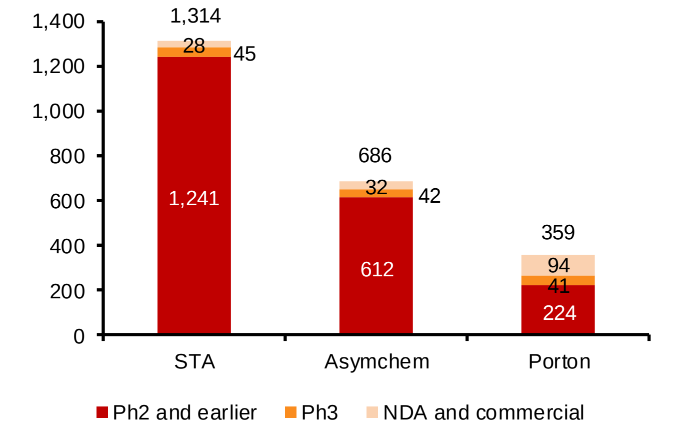
Company	1999	2003	2005	2008	2010	2011	2016	2017	2018	2019	2020
WuXi AppTec		STA founded		△ Acquired AppTec (CGT) in US	☆ Biologics CDMO (now WuXi Bio)	⬠ Clinical CRO	Operation in US	○ Formulation services		△ CGT CDMO in China	1st plant in EU
Asymchem	Founded							○ • Formulation services ⬠ • Clinical CRO		☆ Biologics CDMO	Set CDMO center in US
Porton			Founded					Acquired US subsidiary	△ CGT CDMO	○ Formulation services	

☆ Biologics CDMO   △ CGT CDMO   ⬠ Clinical CRO   ○ Formulation

Source: Company data, CMBIS

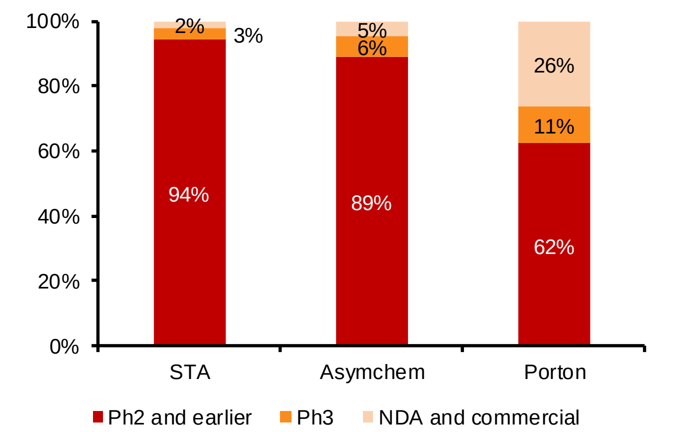
Benefiting from the strong drug discovery service capability within the one-stop platform of WuXi AppTec, STA is able to engage with clients from very early stage and grow its CDMO business as client projects advance to later stage. The "Follow-the-Molecule" business model allows STA to build a sizable early stage project pipelines. As of 2020, STA had 1,314 pipeline projects, compared with 686 for Asymchem (002821 CH / 6821 HK, NR) and 359 for Porton (300363 CH, NR). STA has larger proportion of early stage projects than Asymchem and Porton, indicating better growth prospects for STA thanks to its "Follow-the-Molecule" strategy.

Figure 33: Project number comparison of China-based leading chemical CDMO companies



Source: Company data, CMBIS

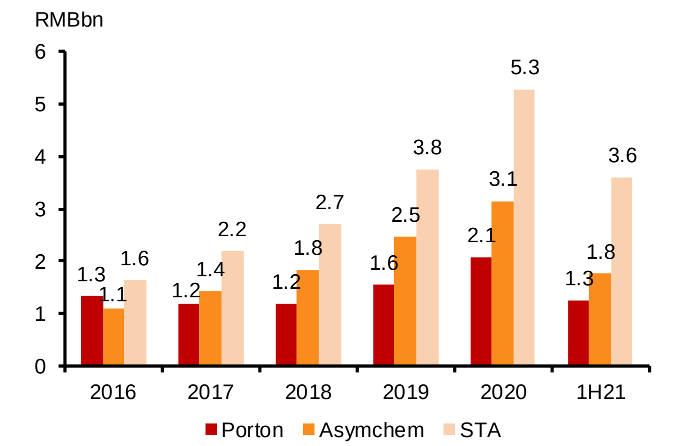
Figure 34: Project breakdown comparison of China-based leading chemical CDMO companies



Source: Company data, CMBIS

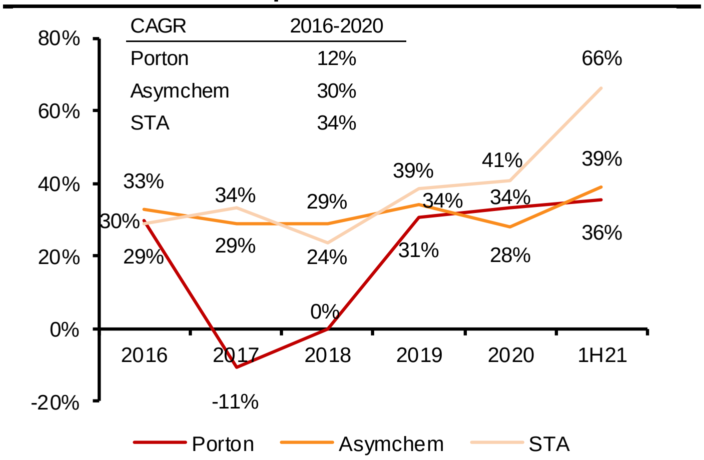
STA recorded a faster revenue CAGR over 2016-2020 than Asymchem and Porton. Both of the two peers lack the capabilities of drug discovery. Revenue growth of STA further outpaced its peers in 1H21. We believe the trend will continue going forward.

Figure 35: Revenue of China-based leading chemical CDMO companies



Source: Company data, CMBIS

Figure 36: Revenue growth of China-based leading chemical CDMO companies



Source: Company data, CMBIS

China-based chemical CDMO companies are actively expanding their manufacturing capacities to meet the growing global demand. STA and Asymchem are the most aggressive companies in capacity expansion given both companies anticipating to more than double their capacities in next 2-3 years. In 4Q21, both Asymchem and Porton announced obtaining substantial orders from US clients amid the COVID-19 pandemic.

Figure 37: Capacity expansion plan of China-based chemical CDMO companies

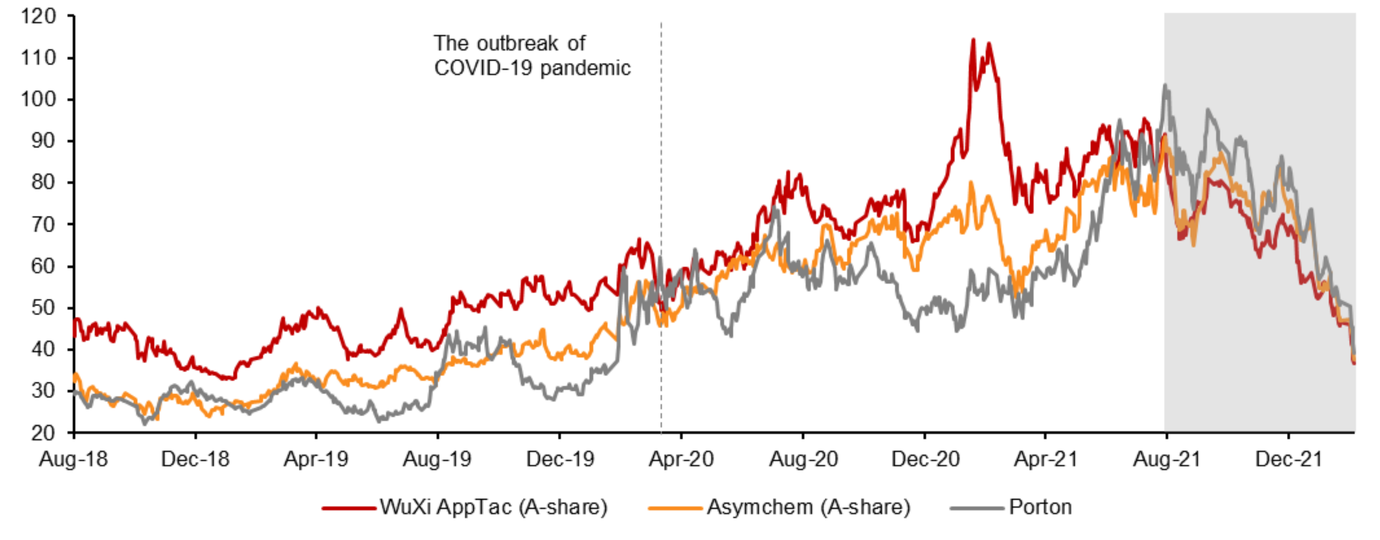
Company	Current capacity scale	Location	Ready time	Usage	Scale
STA	GFA: 420,000m^2	WuXi, China	2Q21	DP development	GFA: 11,000m^2
	(as of 4Q21)	Covet, Switzerland	3Q21	DP manufacturing	GFA: 19,000m^2
		Changshu, China	1Q22	API development and manufacturing	GFA: 91,800m^2
		Taixing, China	2023	API development and manufacturing	GFA: 216,000m^2
		Delaware, U.S.	2024	API/DP development and	GFA: 756,000m^2
		China	2H21	API development and manufacturing	RA: 1,700m^3

Asymchem	RA: 2,980m^3 (as of 1H21)	Dunhua, China	1Q22	API development and manufacturing	RA: 500m^3
		Tianjin, China	1Q22	API development and manufacturing	RA: 160m^3
		Dunhua, China	2022	API development and manufacturing	RA: 500m^3
		Tianjin/Shanghai, China	2022	API development and manufacturing	RA: 500m^3
Porton	RA: 1,400m^3 (as of 1H21)	Chongqing, China	2Q21	API development and manufacturing	RA: 187m^3
		Yuyang, China	3Q21	API manufacturing	RA: 580m^3
		Shanghai, China	4Q22	Chemical CDMO R&D center	GFA: 16,233m^2
		Chongqing, China	1Q23	API manufacturing	RA: 142.6m^3

Source: Company data, CMBIS
Note: GFA: gross floor area. RA: reactor volume. DP: drug product. API: active pharmaceutical ingredient.

After the market correction since mid-2021, valuation of WuXi AppTec, Asymchem and Porton have fallen to the lowest level since the outbreak of COVID-19. Valuation of WuXi AppTec seems very cheap as the stock is trading at a lower 12-month forward PE than Asymchem and Porton. Considering the strong earnings growth momentum and high earnings visibility of the three companies, we think the corresponding stocks are undervalued.

Figure 38: 12-month forward PE of leading China-based chemical CDMO companies



Source: Bloomberg, CMBIS
Note: Shaded area refers to the period when PE of WuXi AppTec (A-share) is lower than both Asymchem (A-share) and Porton. As of 15 Feb, 2022.

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