

CHINA AGRICULTURE

Animal health - healthier and safer future

Animal health is about more efficient and safer production of animal protein. We believe it is a more important issue for China agriculture supply, given the lower grain efficiency in animal protein production, the higher farming intensity, and more frequent disease outbreaks in recent years. We estimate improved grain efficiency and healthier livestock would save grain consumption by 5-12% of domestic grain demand in the long run, contributing to China's food security, and will have more profound impact on safer and more sustainable food supply.

We map growth opportunities in the China animal health sector:

- 1) livestock vaccines for major diseases such as FMD and ASF.
- 2) Advanced feed additive products that contribute to more efficient feed conversion, immune enhancement, alternatives to antibiotics, etc.
- 3) Companion animal health market

We initiate CAHIC, Ringpu and update Jinyu in both livestock and companion animal health segments, and initiate Adisseo in feed additives segment.

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Animal health is about more efficient and safer production of animal protein. We believe it is a more important issue for China agriculture supply, given the lower grain efficiency in animal protein production, the higher farming intensity, and more frequent disease outbreaks in recent years. We estimate improved grain efficiency and healthier livestock would save grain consumption by 5-12% of domestic grain demand in the long run, contributing to China's feed security, and will have more profound impact on safer and more sustainable food supply (link).

China produced 190mnt of animal protein (excluding milk) in 2021A, according to NBS. But it took China 26% more grain than average global peers to produce the same amount of pork and 6% more for poultry, based on a simple comparison of Chinese hog and poultry production efficiency versus peers.

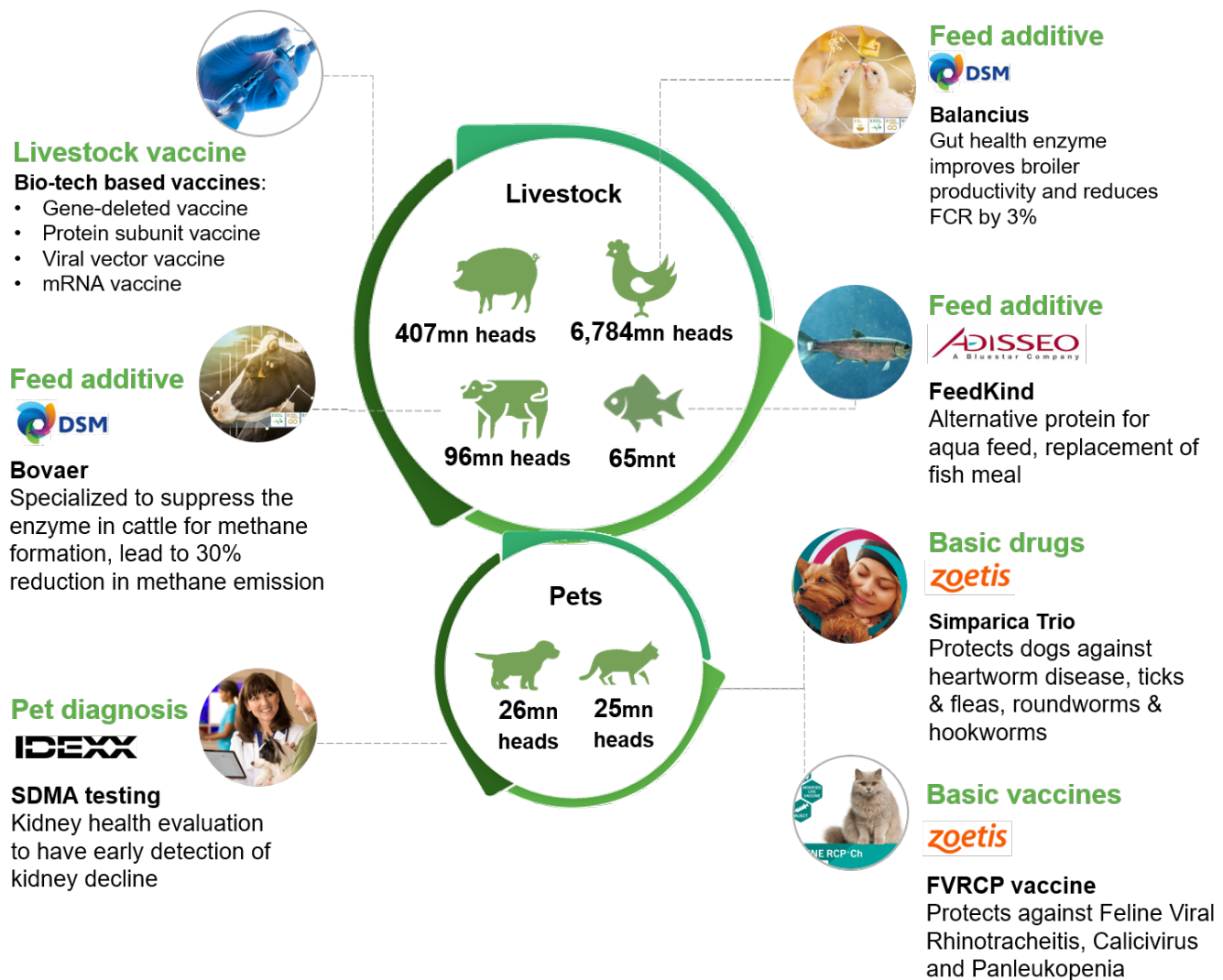
The gap is driven mostly by the breeding system and health of livestock. Globally, the focus to improve animal health is increasing on new vaccination strategies, improving animal nutrition, and refining the breeding system. The use of antibiotics that causes increased resistance, drug residues and environmental pollution are also being replaced by alternatives such as vaccines, immune-related products, chemicals, enzymes, and other innovative drugs that are considered as actionable strategies.

We see strong growth opportunities in the China animal health sector.

- Vaccination remains central in preventing and controlling infectious diseases in livestock. It also contributes in the reduction of use of antibiotics in livestock farming, a key global trend to counter the risk of food safety and security. We see more potential in both growth and market size of vaccines for diseases such as FMD and ASF.
- We are optimistic on advanced feed additives that contribute to more efficient feed conversion, immune enhancement, alternatives to antibiotics, etc. We expect stronger growth outlook in feed additive demand globally and more for China, versus the growth of animal protein production and feed demand.
- And lastly, there is the companion animal health market, with untapped growth potential, presenting long-term opportunities for both established international brands like Zoetis, Elanco and Merck as well as upcoming China producers including Ringpu, Jinyu, HiSun and CAHIC. We highlight CAHIC, Ringpu, and Jinyu in both livestock and companion animal health segment.

We initiate CAHIC, Ringpu and update Jinyu in both livestock and companion animal health segments, and initiate Adisseo in feed additives segment. We initiate CAHIC at Buy with a 12-m target price of Rmb17.5/shr, initiate Ringpu at Neutral with a 12-m target price of Rmb19.0/shr, and initiate Adisseo at Buy with a 12-m target price of Rmb14.5/shr.

Things to make healthier animals

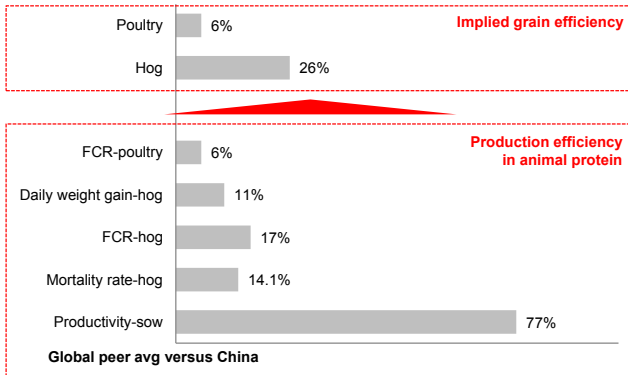


Note: The numbers refer to inventory of hog, poultry and cattle, and output of aqua products as of 2020, population of dogs and cats as of 2021.

Source: Company data, Goldman Sachs Global Investment Research, NBS

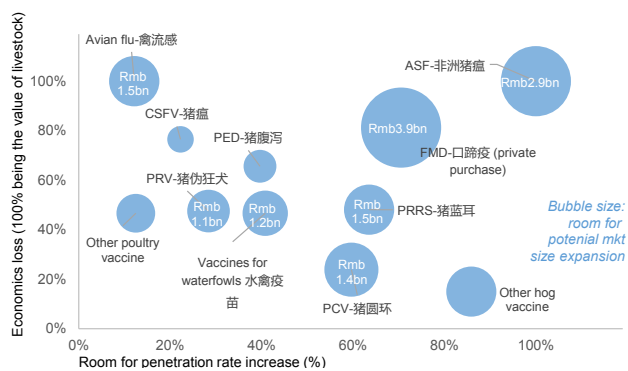
Focus charts - animal health

Exhibit 1: Efficiency gap of China vs average global peers in animal protein production would translate into 6-26% improvement in grain consumption



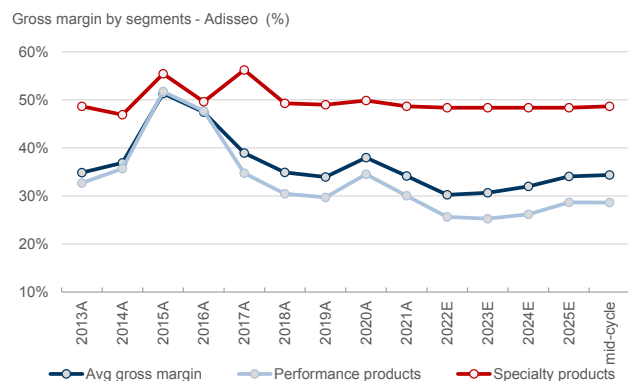
Source: AHDB, Wageningen Economic Research, Goldman Sachs Global Investment Research

Exhibit 3: Livestock vaccines - China: Economic losses, penetration, and room for future market expansions



Source: China Veterinary Drug Association, Goldman Sachs Global Investment Research

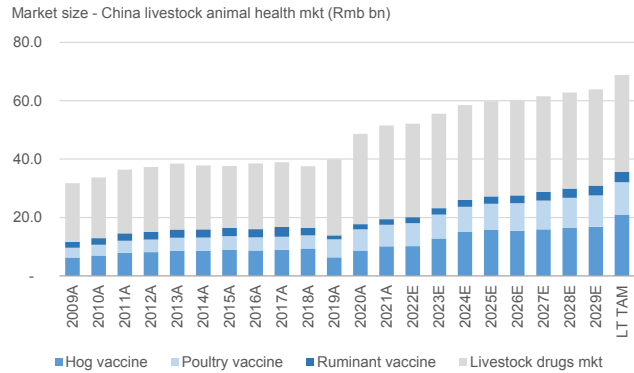
Exhibit 5: Gross margins - performance versus specialty products, Adisseo



Source: Company data, Goldman Sachs Global Investment Research

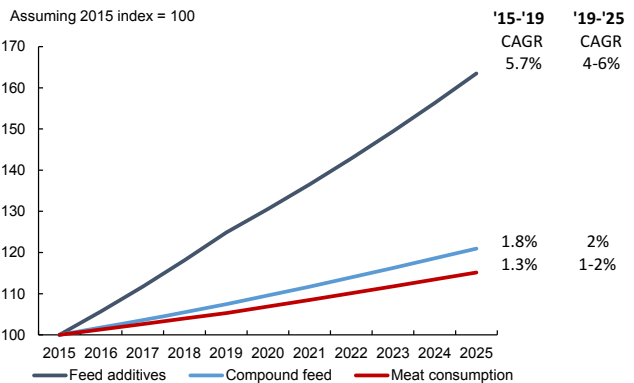
Exhibit 2: China livestock animal health: market size and breakdown

LT TAM: Long-term Total Addressable Market where penetration reaches 100%



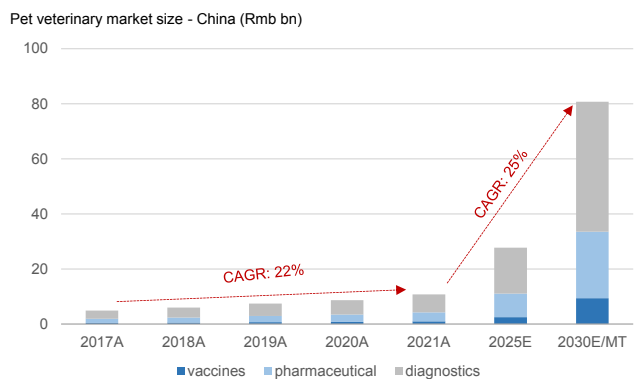
Source: China Veterinary Drug Association, Goldman Sachs Global Investment Research

Exhibit 4: Global feed additive demand should grow at 4-6% in the coming years



Source: DSM

Exhibit 6: Pet veterinary market size - China



Source: China Veterinary Drug Association, NBS, Goldman Sachs Global Investment Research

Stock exposures - animal health

Exhibit 7: Stock coverage summary - Animal health & nutrition

Stock/ticker		Key financials				Investment thesis
		Year	Rev	NP	GM	
			Rmb mn	Rmb mn	%	
CAHIC 中牧股份 600195.SS		2021A	5,302	514	28.6%	One of the leading state-owned animal health company under China National Agricultural Development Group (中国农发集团), central SASAC owned. The company engages in the development of animal vaccines against major animal diseases, and was ranked one of top 3 FMD vaccine producers nationwide and second largest producer of avian flu vaccine. We see CAHIC as well positioned to capture broader sector growth opportunities in hog vaccines including FMD and potential ASF, and others including pet market. Its successful transformation from the traditional government purchased market supplier may also drive additional positive surprises. We initiate CAHIC with BUY and a 12-month target price of Rmb17.5.
Segment	Animal health	2022E	5,559	527	30.0%	
Ratings	BUY	2023E	6,502	757	33.1%	
Target	Rmb17.5	2024E	7,413	1,033	36.3%	
Upside	37%	2025E	7,880	1,188	37.6%	
		CAGR/Diff.	10.4%	23.3%	9.0%	
Ringpu 瑞普生物 300119.SZ		2021A	2,007	413	51.8%	A top integrated animal health company in China with a diversified portfolio including over 200 products in vaccines, veterinary drugs and diagnostic, covering poultry, swine, pet, and others. The company holds 12% market shares for poultry vaccine, and has products covering all major hog diseases except FMD. While we see current business segment to drive solid 15% CAGR recurring earnings growth in the coming years, potential ongoing acquisitions and its early positioning in pet healthcare market should lead to upside risks. Initiate with NEUTRAL and a 12-month target price of Rmb19.0.
Segment	Animal health	2022E	2,143	314	52.5%	
Ratings	Neutral	2023E	2,621	377	52.2%	
Target	Rmb19.0	2024E	2,977	440	52.3%	
Upside	15%	2025E	3,373	505	52.4%	
		CAGR/Diff.	13.9%	5.2%	0.6%	
Jinyu 生物股份 600201.SS		2021A	1,776	382	61.9%	Jinyu is the leader of China's animal health industry, with c.42% market share in private-purchased FMD vaccines by volume as of FY21. We further revise down Jinyu's earnings by 26%-30% for 2022E and 2023E to reflect the lower-than-expected sales volume and margin in its FMD vaccine, partly offset by improvement in poultry vaccine segment. While we see hog cycle bottomed cyclically, we see ongoing competition continue to curb market share gains of Jinyu in hog FMD market. Nevertheless, potential progress in ASF vaccine development, and its preparation for pet health products through its Japanese JV partner Kyoritsu, should provide support to earnings and valuations. Maintain NEUTRAL with a revised 12-month target price of Rmb10.3 (from Rmb12.0).
Segment	Animal health	2022E	1,707	306	55.4%	
Ratings	Neutral	2023E	2,573	438	57.3%	
Target	Rmb10.3	2024E	3,392	617	58.6%	
Upside	21%	2025E	3,682	688	58.6%	
		CAGR/Diff.	20.0%	15.8%	-3.3%	
Adisseo 安迪苏 600299.SS		2021A	12,869	1,472	34.1%	Adisseo is a top global supplier in animal feed additive and nutrition, the second largest producer of methionine (a key feed ingredient for livestock), with ~25% global market shares in 2021A. We view Adisseo well positioned as a major solution provider for more efficient, safer, and sustainable production of animal protein. Its rising presence in China as well as strategic transformation into more specialty products will also translate to higher growth outlook, with margin and return accretion, with higher earnings resilience. We expect solid earnings growth at 9.5% CAGR in the coming years. The rising contribution of specialty product segment should underpin multiple rerating of the stock in our view. We initiate Adisseo with BUY and a 12-month target price of Rmb14.5/shr.
Segment	Adv feed additives	2022E	14,667	1,536	30.2%	
Ratings	BUY	2023E	15,299	1,586	30.7%	
Target	Rmb14.5	2024E	16,613	1,713	32.0%	
Upside	57%	2025E	18,603	2,086	34.1%	
		CAGR/Diff.	9.7%	9.1%	-0.1%	

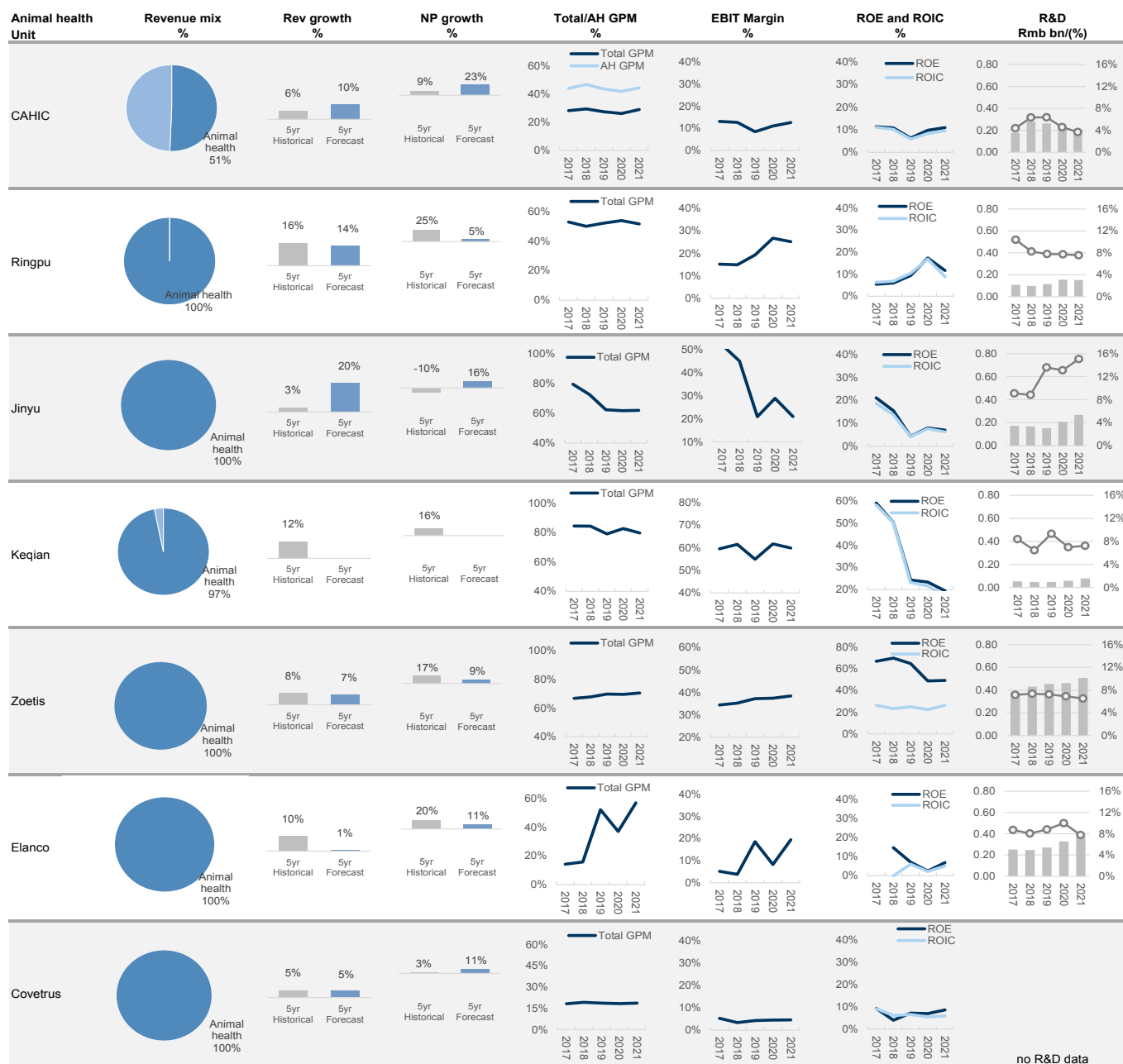
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 8: Valuation peers - Global vs. China

Company	Ticker	Rating	Target	Price	ccy	Upside	Mkt cap US\$ mn	PE			PB		ROE		EV/EBITDA			Div yield			YTD
								21A	22E	23E	21A	22E	21A	22E	21A	22E	23E	21A	22E	23E	
China Animal health																					
Jinyu Bio-tech	600201.SS	Neutral	10.3	8.5	CNY	21%	1,417	24.9	31.3	21.9	1.9	1.8	7%	6%	43.0	35.4	17.2	0.5%	0.6%	1.0%	-49%
CN Husbandry	600195.SS	Buy	17.5	12.7	CNY	37%	1,915	25.2	24.5	17.1	2.9	2.6	11%	10%	23.7	15.7	16.2	1.0%	1.3%	1.2%	-13%
Ringpu Bio-tech	300119.SZ	Neutral	19.0	17.7	CNY	8%	1,224	19.9	26.3	22.0	2.9	2.1	13%	8%	13.2	20.6	16.4	2.0%	1.3%	1.5%	-30%
Keqian Bio-tech	688526.SS	NC	NA	27.0	CNY	NA	1,856	21.9	19.3	14.9	4.0	3.4	28%	25%	19.0	11.1	n.a.	1.1%	1.3%	1.3%	-11%
Pulike Bio-tech	603566.SS	NC	NA	31.8	CNY	NA	1,511	40.7	41.1	28.6	5.5	4.9	14%	14%	28.8	18.9	n.a.	0.8%	1.0%	1.1%	26%
Jinhe Bio-tech	002688.SZ	NC	NA	5.0	CNY	NA	578	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0
Average								26.5	28.5	20.9	3.4	3.0	15%	12%	25.6	20.3	16.6	1.1%	1.1%	1.2%	-15%
Global Animal health																					
Zoetis	ZTS	Buy	207.0	174.3	USD	19%	82,187	37.1	34.9	30.7	22.0	18.1	49%	48%	26.5	28.5	24.7	0.6%	0.5%	0.7%	-25%
Elanco	ELAN	Sell	19.0	19.0	USD	0%	9,316	18.0	18.3	16.7	1.1	1.2	-6%	-1%	32.6	20.2	13.1	0.0%	0.0%	0.0%	-29%
Covetrus	CVET	Not Rated	20.8	20.8	USD	NA	2,870	21.8	19.8	18.1	1.8	1.9	9%	10%	13.1	17.9	13.4	0.0%	0.0%	0.0%	4%
IDEXX Lab	IDXX	Buy	447.0	405.0	USD	10%	35,198	47.1	50.8	41.3	54.7	50.6	113%	102%	37.6	49.2	34.6	0.0%	0.0%	0.0%	-39%
Phibro	PAHC	NC	NA	18.6	USD	NA	753	14.6	13.9	13.8	1.6	2.7	24%	22%	9.8	7.7	6.4	2.4%	1.7%	2.6%	-4%
Heska	HSKA	NC	NA	87.4	USD	NA	943	n.a.	n.a.	176.6	2.1	2.1	0%	4%	28.1	15.6	10.9	n.a.	n.a.	n.a.	-4%
Average								27.7	27.5	49.5	13.9	12.8	31%	31%	24.6	23.2	17.2	0.6%	0.5%	0.7%	-16%
China Animal nutrition																					
Adisseo	600299.SS	Buy	14.5	9.2	CNY	57%	3,668	16.8	16.1	15.6	1.8	1.8	10%	11%	10.1	10.2	7.6	1.4%	1.4%	2.2%	-23%
NHU	002001.SZ	NC	NA	20.3	CNY	NA	9,273	14.5	12.9	10.8	2.9	2.5	21%	20%	9.5	6.4	n.a.	2.9%	3.4%	3.6%	-20%
VTR Bio-tech	300381.SZ	NC	NA	9.6	CNY	NA	691	n.a.	63.7	43.4	1.7	1.6	n.a.	n.a.	34.0	14.9	n.a.	0.5%	0.3%	0.4%	-16%
Vland Bio-tech	603739.SS	NC	NA	15.1	CNY	NA	565	28.0	31.5	21.8	2.4	2.3	9%	7%	16.9	11.6	n.a.	1.2%	1.8%	2.0%	-16%
Average								19.8	31.0	25.3	2.2	2.0	14%	13%	17.6	10.8	7.6	1.5%	1.7%	2.0%	-19%
Global Animal nutrition																					
DSM	DSMN.AS	Not Rated	NA	148.6	EUR	NA	26,267	30.2	37.7	34.6	3.5	2.8	13%	7%	15.0	16.3	17.5	1.9%	1.5%	1.8%	-21%
Novozymes	NZYmb.CO	Sell	360.0	452.9	DKK	-21%	17,427	40.0	41.4	37.8	11.3	10.6	27%	24%	21.3	24.0	22.5	1.5%	1.2%	1.3%	-14%
Chr Hansen	CHRH.CO	Neutral	520.0	463.2	DKK	12%	8,371	37.9	35.7	31.6	9.2	5.0	16%	14%	28.0	28.5	20.7	0.0%	1.1%	1.4%	-8%
Balchem	BCPC	NC	NA	126.8	USD	NA	4,071	35.5	29.8	27.0	4.7	n.a.	11%	n.a.	21.4	n.a.	n.a.	n.a.	n.a.	n.a.	-19%
Croda	CRDAL	Buy	10,100.0	7,296.0	GBP	38%	12,160	29.2	28.9	29.5	5.9	5.7	19%	37%	19.3	19.9	17.5	1.7%	1.3%	1.5%	-26%
Symrise	SY1G.DE	Buy	130.0	111.8	EUR	16%	15,454	40.7	33.3	32.7	6.6	4.8	14%	14%	21.0	21.3	17.6	1.0%	0.9%	1.1%	-13%
Givaudan	GIVN.S	Neutral	3,500.0	3,380.0	CHF	4%	32,542	37.0	37.3	35.3	8.9	7.9	22%	20%	25.5	28.6	23.3	1.8%	1.6%	2.0%	-31%
Evonik	EVKn.DE	Sell	20.9	20.9	EUR	0%	9,955	9.9	9.7	11.9	1.2	1.0	9%	9%	9.0	8.0	5.7	4.9%	4.1%	5.6%	-20%
Average								32.6	31.7	30.0	6.4	5.4	16%	18%	20.1	20.9	17.8	1.8%	1.7%	2.1%	-19%

Source: Datastream, Goldman Sachs Global Investment Research

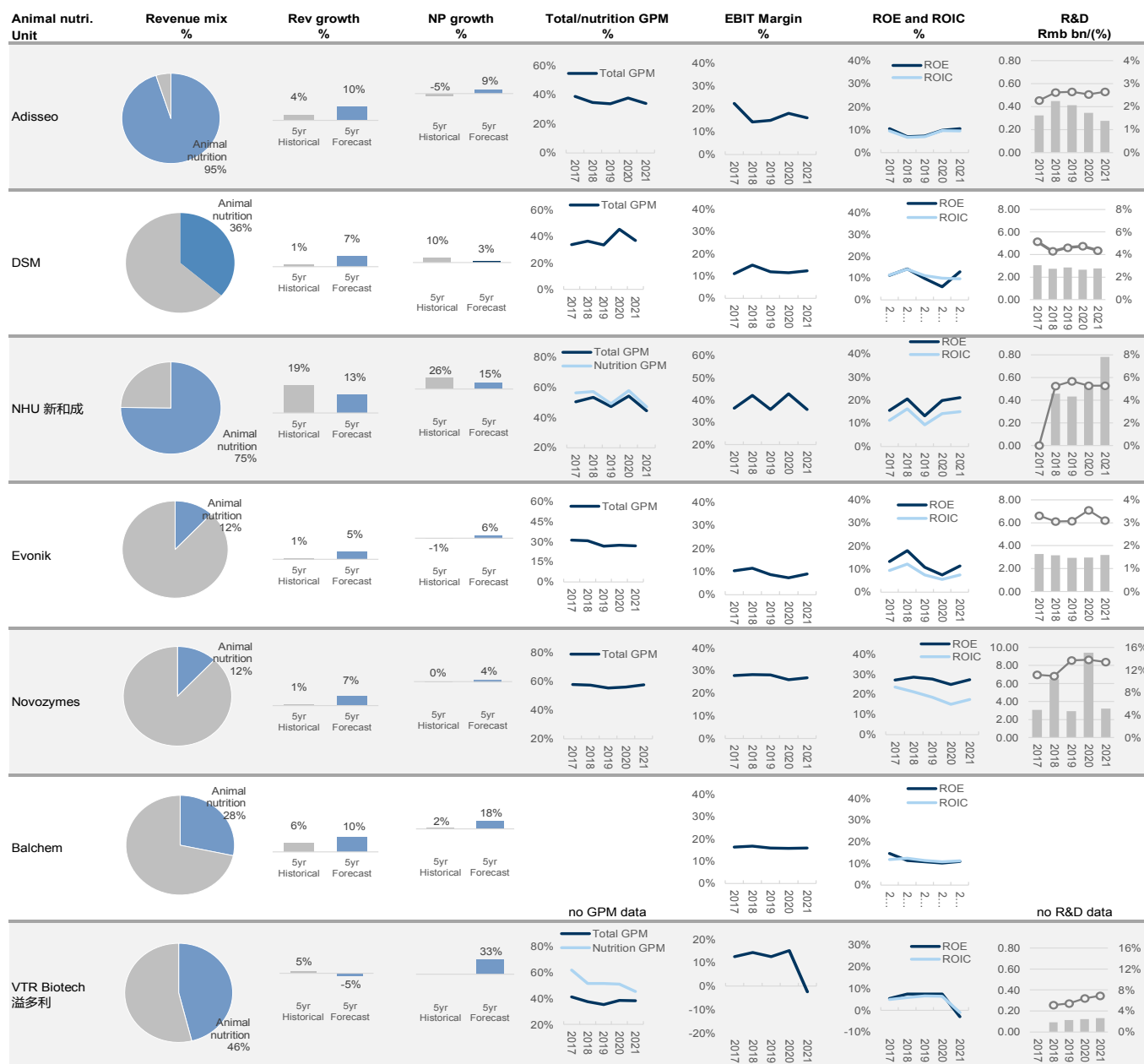
Exhibit 9: Peer comparison - animal health (livestock and companion animals)



Forecasts of not covered companies sourced to Bloomberg and Wind

Source: Company data, Bloomberg, Wind, Goldman Sachs Global Investment Research

Exhibit 10: Peers comparison - animal nutrition (feed additives)



Forecasts of not covered companies sourced to Bloomberg and Wind

Source: Company data, Bloomberg, Wind, Goldman Sachs Global Investment Research

Livestock vaccines - acceleration underpinned by consolidation and technology

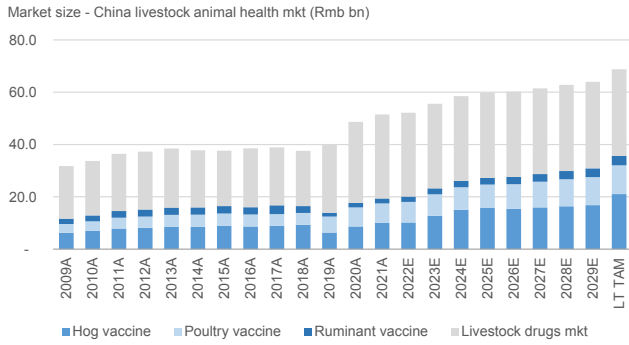
We believe vaccination remains central in preventing and controlling infectious diseases in livestock and as a more important solution for China given higher farming intensity. In the long run, the use of vaccines, along with other alternative products, should support the lower usage of antibiotics in livestock farming, a key global trend to counter food safety and security risks.

We forecast the China livestock animal health market to grow at 2.8-3.3% CAGR from Rmb52bn in 2021A to Rmb64-69bn in the coming 8-10 years, driven mostly by higher spending in vaccination. Specifically, at Rmb20bn in size currently, we estimate the livestock vaccine market to accelerate at 6.1-7.0% CAGR in the coming years (vs 2.9% CAGR in the past 10 years), underpinned by rising vaccine penetration, increase in livestock population (in poultry and cattle), combined with new or improved products to deliver safer and more effective vaccination through improved technology. The ongoing consolidation of the livestock industry would also expedite market growth.

Nevertheless, the livestock vaccine market is not new, and competition has intensified in recent years in our view, fueled partly by accelerated demand from farmers and focus on gaining market share by vaccine producers. However, there are pockets where we see more attractive opportunities.

- *FMD vaccines for the private market:* We estimate Rmb3.9bn market potential, more than twice the current level, underpinned by the intrinsic size of the market, the essential requirement of the vaccine to prevent deep economic losses, replacement of government purchase market (versus the private or non-government purchase part of the market) with Vaccinate now, Reimburse later scheme, industry consolidation, thus improving the penetration outlook.
- *ASF vaccines:* At this stage, there is no commercially approved products. However, we are optimistic on the development of biotech-based vaccines through subunit and mRNA technologies. The market could be as large of Rmb2.9bn, if based on the potential approval for emergency use, at 20% penetration of the industry.
- *Vaccines for PRRS and PED:* The effectiveness of PRRS and PED vaccines is relatively low, and the development of more effective vaccines could realize Rmb0.6-1.5bn market potential on higher penetration.
- *Our mapping on key producers in major vaccine product categories* suggests Jinyu, Pulike, CAHIC, and Ringpu currently have relatively broader coverage in major disease categories in livestock (and companion animal vaccines), and more importantly, Jinyu and Pulike have more products under development for future product pipelines, utilizing gene-engineering technologies.

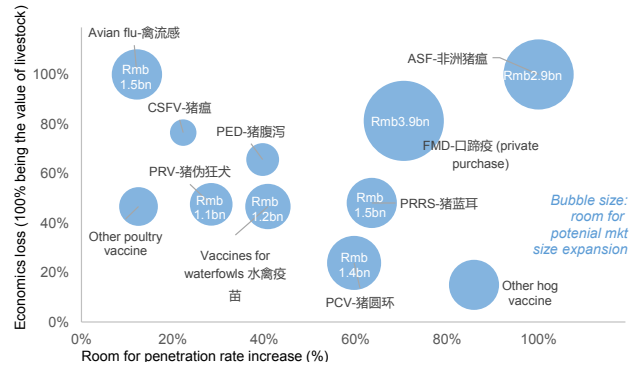
Exhibit 11: China livestock animal health: market size and breakdown



LT TAM: Long-term Total Addressable Market where penetration reaches 100%

Source: China Veterinary Drug Association, Goldman Sachs Global Investment Research

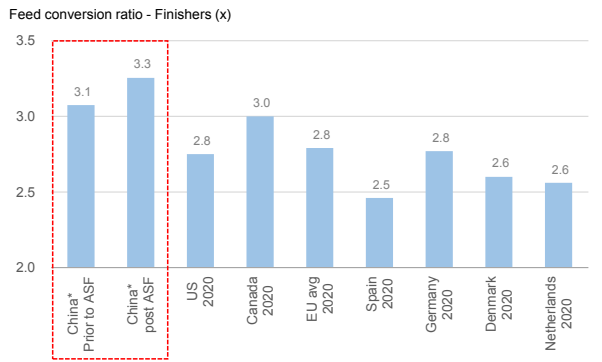
Exhibit 12: Livestock vaccines - China: Economic losses, penetration, and room for future market expansion



Source: China Veterinary Drug Association, Company data, Goldman Sachs Global Investment Research

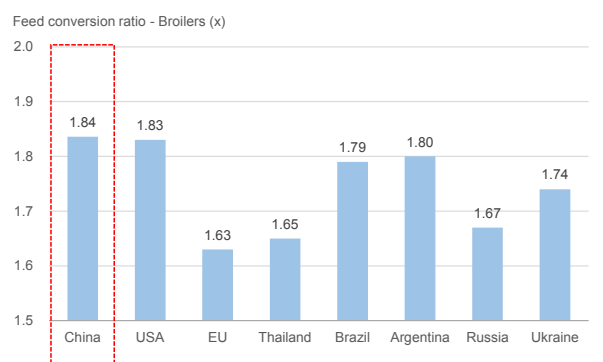
Efficiency gap of China versus global peers in animal protein production

Exhibit 13: Feed conversion ratio (FCR) - hog, China versus peers



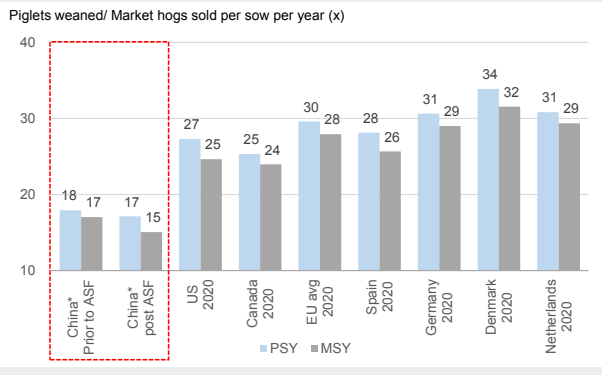
Source: AHDB, Yongyi, Goldman Sachs Global Investment Research

Exhibit 14: Feed conversion ratio (FCR) - broilers, China versus peers



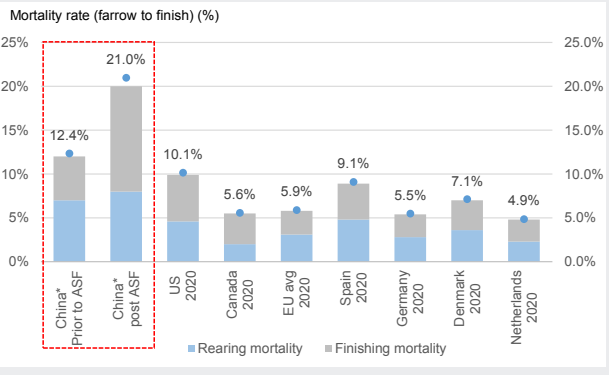
Source: Wageningen Economic Research, Goldman Sachs Global Investment Research

Exhibit 15: Sow productivity - hog, China versus peers



Source: AHDB, Yongyi, Goldman Sachs Global Investment Research

Exhibit 16: Hog health (mortality rate) - China versus peers



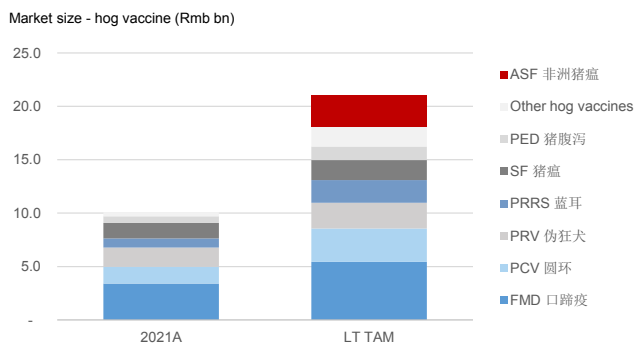
Source: AHDB, Yongyi, Goldman Sachs Global Investment Research

Hog vaccine- higher penetration driven by product and consolidation

Among all food animal vaccines, hog vaccines represent the largest market in China, accounting for 52% of the total vaccine market in China, or Rmb10.1bn as of 2021A. This is also a market where we see material structural changes in the coming years, with room for higher penetration combined with product improvement and expansion, potentially nearly double the industry’s size by 2029-30E, as industry vaccination rates improve from the current 20-80% (or 53% weighted average penetration) to potentially 100% in an optimistic scenario.

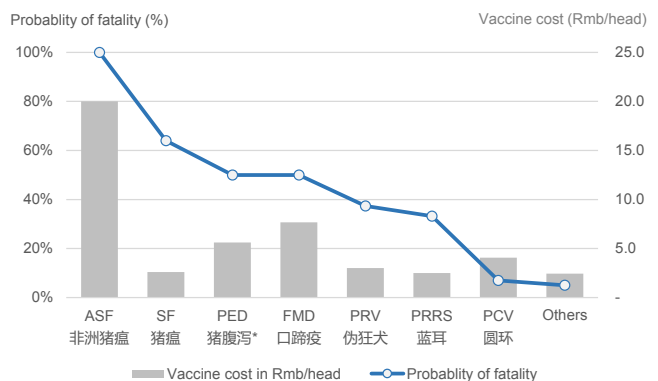
The adoption of vaccines would be driven by the cost-effectiveness (mostly due to the potential economic losses from the infectious diseases which the vaccine helps prevent), provided the vaccine is safe, effective, and easy to use. We rank the economic losses of each major infectious hog diseases in China, based on morbidity (the rate of disease in a population) and mortality rates, and other economic losses associated with non-fatality impact, such as productivity, feed efficiency, and reproductive performance. As a result, we see ASF, FMD, CSFV, and PED among the top diseases that lead to the most immediate potential economic impact to farms, with the least from PCV. On the other hand, the aggregated cost of hog vaccines currently adds about Rmb28/head (or Rmb48/head if including the potential emergency use of AFS vaccine in the future), or 1-2% of the total production cost of hog in our estimates - this does not present a hurdle in our view, implying the key for future penetration is the effectiveness and safety of the vaccines.

Exhibit 17: Market size of hog vaccine market - China, 2021A vs LT



Source: China Veterinary Drug Association, Company data, Goldman Sachs Global Investment Research

Exhibit 18: Cost effectiveness - Major hog infectious diseases versus vaccine costs in China



Source: China Veterinary Drug Association, Company data, Goldman Sachs Global Investment Research

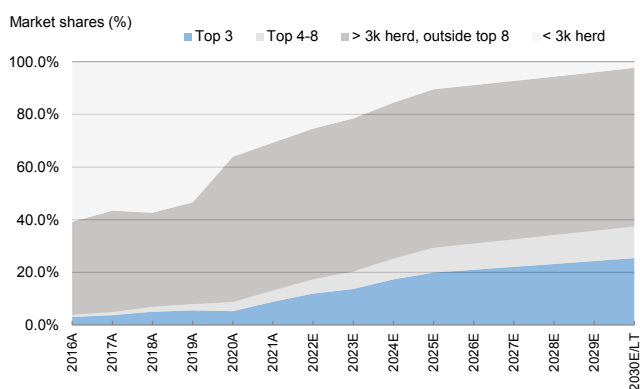
Other factors, including hog industry consolidation and the trend of reduction in antibiotics consumption should also serve as accelerators for higher vaccination penetration.

- Penetration of hog vaccines in large hog farms are usually much higher than others. We estimate there are currently about 18.6mn hog farms in China, with the top 8 producers accounting for 13% of the total output, whereas nearly 30% of the industry output are from small farms with less than 3000 heads. This has halved in the past five years (with ASF disruption accelerating the pace). We expect the trend of consolidation to continue, albeit at a slower pace than recent years, and estimate

the top 8 producers to reach about 36% market share by 2029-30E.

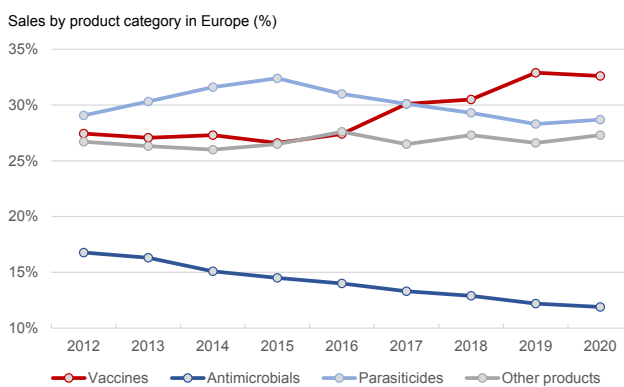
- Vaccines could also prevail as an alternative to antibiotics. There has been a number of studies that suggest the use of vaccines in food-producing animals can result in a significant reduction in antibiotic consumption. For example, based on one study published in 2018 on vaccines as alternatives to antibiotics for food animals, the vaccination against Lawsonia Intracellularis (胞内劳森氏菌) in Danish hog herds can reduce oxytetracycline (土霉素) consumption for this condition by almost 80%, also leading to improved productivity parameters such as average daily gains and carcass weight. According to Animal Health Europe, over the course of 2012 to 2020, as the share of vaccines in total sales in EU increased by 5.2%, the share of antimicrobials fell by 4.9%.

Exhibit 19: Hog farming industry consolidation - China



Source: China Annual Husbandry and Veterinary Yearbook, Company data, Goldman Sachs Global Investment Research

Exhibit 20: EU animal health market - share of vaccines rose as antimicrobials fell (2012-2020)



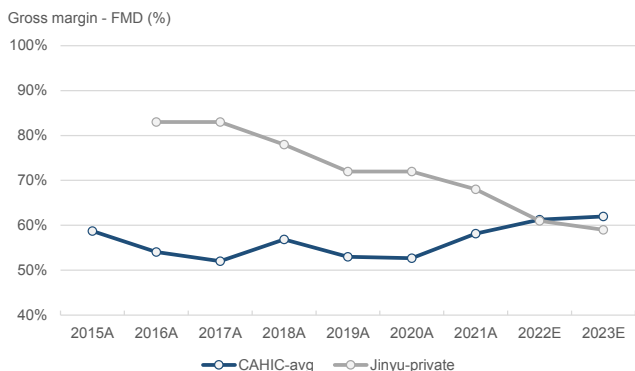
Source: Animal Health Europe

In other livestock market including poultry and cattle, we expect the market size to expand from Rmb9.3bn to Rmb14.6bn over the same period. Specifically, in the poultry industry, we estimate the effective penetration has been high at 90%+ for the Avian flu vaccine, and other poultry vaccines also have overall high penetration of above 85% in broilers and layers, yet the increase in livestock population (about 3% CAGR) should drive the vaccine market growth. We estimate relatively low penetration of about 60% and thus see more growth potential in waterfowl vaccines as less R&D and marketing efforts were made in this sub-market. In the ruminant sector, there are currently only 5-7 producers in each major vaccine area including FMD, Brucellosis, and BVD, and we expect the market could double its size supported by the increase in livestock base, penetration rate, and animal health spending per head.

Oligopoly supply suggests LT pricing power, technology will drive future products

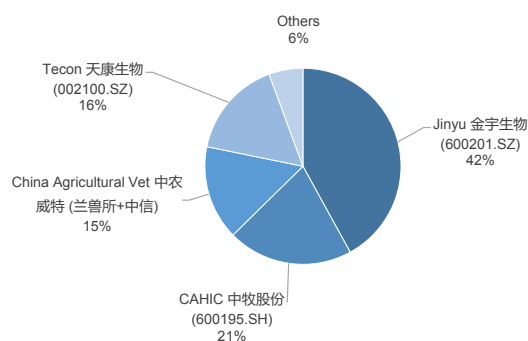
The number of Chinese livestock vaccine producers are limited given the regulation requirement. For each key product categories, there are only a handful of producers. However, the market growth opportunity, such as ASF disruption, the replacement of government compulsory purchases in selected products, has led to higher focus on market shares in recent years, and thus more intensified competition. We note the strong gross margin of industry leaders such as Jinyu has weakened sequentially in the past years, as competitors caught up.

Exhibit 21: Gross margin deterioration of leading FMD products over time - Jinyu versus CAHIC



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 22: FMD market shares - China



Source: China Veterinary Drug Association, Company data, Goldman Sachs Global Investment Research

Nevertheless, going forward, we see biotechnology as key to drive differentiated products in the white space - namely ASF, and more effective vaccines for PRRC and PED. The biotech-based vaccines are expanding the potential for more effective vaccines, including gene-deleted vaccines (基因缺失疫苗), protein subunit vaccines (亚单位疫苗), viral vector vaccines (载体疫苗), and mRNA vaccines versus the traditional live attenuated vaccines (减毒活疫苗) and inactivated vaccines (灭活疫苗).

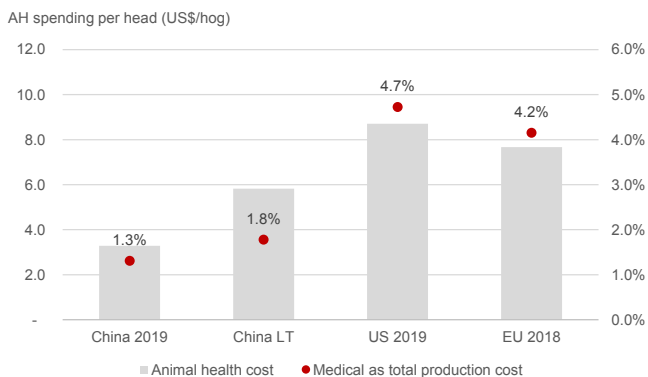
Specifically, on ASF, vaccine development based on all the biotech platforms mentioned above are in progress but none have passed the clinical trial stage. Gene-deleted live attenuated vaccines developed by Harbin Veterinary Research Institute was the first one to receive clinical trial approval in Mar 2020 but there was no progress since then, and according to an industry expert, the platform with virus reversion risk is not favored by Ministry of Agriculture (MOA) for biosafety reason and commercialization in China is considered to be barely possible. We understand both subunit (in development by Lanzhou Veterinary Research Institute and Pulike) and mRNA vaccines (in development by Jinyu) have more potential to be commercialized first given their decent protection rate (60%-70%) and high biosafety. We estimate the commercialization of ASF vaccine will expand the current AH market by about Rmb3bn, assuming 20% penetration rate (for emergency use only). We see Pulike (directly involved in the development), Zhongmu (the largest state-owned vaccine producer), and Jinyu (the largest producer in China with high R&D investment in ASF vaccine development) as the most likely to become the first-to-market players.

Apart from biotech-based vaccines, major vaccine producers in China also invest in R&D

efforts on multivalent/combination vaccines in hog/poultry vaccines, and exploration into ruminant/pet vaccines. R&D investment on average takes up 6-9% of total sales, and Jinyu and Pulike have higher spending than peers.

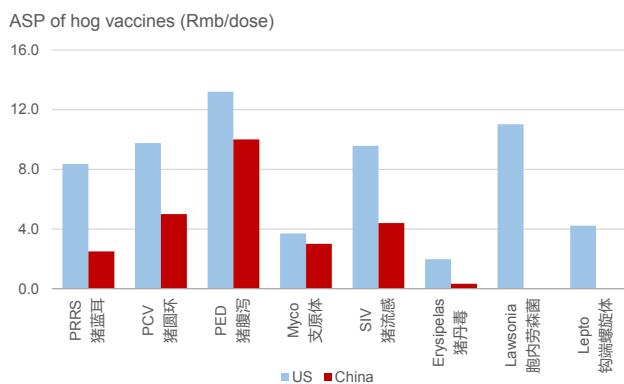
In the longer run, we see additional upside, likely through higher pricing and improved vaccines developed as the industry landscape stabilizes. Benchmarking US and EU livestock medical spending per head, we can see further upside risk of 30% from our LT TAM (we note that prices of major hog vaccines in China are 20-85% lower than those in the US, and most vaccines used in the US currently have very low penetration or have not even been produced commercially in China, as the diseases have low fatality and thus their prevention have not prioritized in hog farms in China).

Exhibit 23: Room for growth on average per head spending



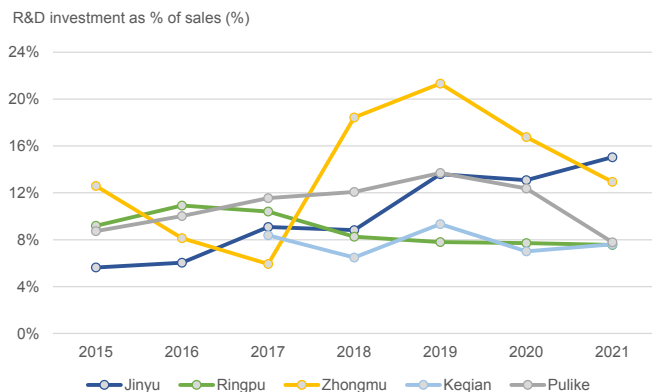
Source: China Annual Husbandry and Veterinary Yearbook, USDA, Animal Health Europe, Goldman Sachs Global Investment Research

Exhibit 24: Hog vaccine ASP comparison - US vs China



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 25: R&D trend - China major producers



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 26: Key product categories and exposures by vaccine producers - Animal vaccines, China

legends for stages	commercial product	commercial product with strength	no commercial product	future product in development with gene engineering technology	commercial product in place +future product in development	High potential in development						
Companies	HOG	HOG	HOG	HOG	HOG	HOG	HOG	Poultry	Ruminant	Companion animals	Companion animals	Companion animals
key product counts	ASF	FMD	Classic SF	PRV	PCV	PRRS	PED	Avian flu	FMD/Bruceellosis	Rabies	DHPP/DA2PP vaccine for dogs	FVRCP vaccine for cats
Jinyu 生物股份 current-11 in dep-8	In R&D pipeline: mRNA	Type O&A bivalent VLP vaccine (subunit vaccine)	E2 protein subunit vaccine	gE gene-deleted inactivated vaccine	PCV subunit vaccine, Combined PCV & Myco subunit vaccine	Subunit vaccine		Avian flu trivalent subunit vaccine (Baculovirus vector)	Gene-deleted vaccine (Bruceellosis)		In R&D pipeline	In R&D pipeline
Ringpu 瑞普 current-7 in dep-8	Likely through Southern China Ag University, subunit and DNA ASF vaccine	Type O&A bivalent VLP vaccine (subunit vaccine)	E2 protein subunit, Combined classic SF & recombinant PRRS viral vector vaccine	gE gene-deleted vaccine		Subunit vaccine	Gene-deleted vaccine	Viral vector vaccine, H5 subtype DNA vaccines			In R&D pipeline	In R&D pipeline
CAHIC 中牧 current-10 in dep-1	Likely through Lanzhou Veterinary Research Institute	Type O/Type O&A bivalent gene-deleted, & synthetic peptide vaccine (subunit)		TK/gE double gene-deleted live vaccine	PCV subunit vaccine				Type O&A bivalent synthetic peptide vaccine (subunit vaccine) (FMD)			
Keqian 科前 current-7 in dep-2			E2 protein subunit vaccine	TK/gE double gene-deleted live, gE gene-deleted inactivated vaccines	Combined PCV, HPS and Myco subunit vaccine							In R&D pipeline
Pulike 普莱柯 current-8 in dep-6	Through Lanzhou Veterinary Research Institute, subunit vaccine	Type O subunit vaccine		Gene-deleted inactivated vaccine	PCV subunit vaccine, Combined PCV (subunit) & Myco vaccine			Avian flu trivalent subunit vaccine (Baculovirus vector)			In R&D pipeline	In R&D pipeline
Tecon Biology 天康 current-6 in dep-2		Type O subunit vaccine		Gene-deleted vaccine, Subunit vaccine								
Hile Bio-Tech 海利 current-7 in dep-5			Combined classic SF recombinant adenovirus vector, PRV gene-deleted vaccine	gE/TK gene-deleted inactivated vaccine	Combined PCV & Myco subunit vaccine			Avian flu trivalent DNA vaccine			In R&D pipeline	
Guangdong Yongshun current-5 in dep-2	Likely through NWAFAU to develop subunit vaccine				PCV subunit vaccine							
Qingdao Yebio current-7 in dep-0												

Source: National Veterinary Drug Basic Information Database, Company data, compiled by Goldman Sachs Global Investment Research

Key regulations for China vaccine industry

I. Animal diseases with compulsory immunization requirements (强制免疫病种)

The MOA keeps an annually-updated list of epidemic animal diseases for farm animals requiring farmers to provide necessary vaccination. In 2022, a total of five diseases are appended to the list, being Highly Pathogenic Avian Influenza (HPAI) for poultry, Food-and-Mouth Disease (FMD) for swine and ruminants, Peste des petis ruminants (PPR) for goats and sheep, Brucellosis for ruminants excluding breeding stock, and Borrelia for goats, sheep and yak in specific areas (高致病性禽流感、口蹄疫、小反刍兽疫 布鲁氏菌病 包虫病).

II. Vaccinate now, Reimburse later scheme (先打后补)

“Vaccinate now, Reimburse later” is a scheme that requires farmers to self-purchase vaccines against the animal diseases with compulsory immunization requirements under government subsidy instead of receiving free government-purchased vaccines. The scheme gained traction since 2020 and ran successful trials across 10 provinces. MOA stipulates that all large-scale farms in China should be covered by the scheme and will not be supplied with government-purchased vaccines by the end of 2022. The government aims to fully implement the scheme across China and end the bidding and procurement of

compulsory immunization vaccines by 2025. The reimbursement rate depends on both the animal vaccinated and the vaccine type. As for hog FMD vaccines, according to Beijing Ministry of Agriculture and Rural Affairs, the government covers Rmb3.68/4.72 for Type O/Type A&O vaccines vs. the market price of Rmb5.0-8.0 per market hog.

III. Veterinary drug development

In the development stage, developers need to go through laboratory research, safety & efficacy evaluation, clinical trial (MOA approval required for vaccines, provincial regulatory authorities are required for others) and new veterinary drug registration. The guaranteed exclusivity period for new veterinary drug registered can be 3-5 years. After registration, manufacturers also need to obtain the veterinary drug approval code for the new drug to produce and sell the product.

In laboratory research, MOA classifies pathogens into three classes, Class I, II and III. Research of Class I and II pathogen (including ASF, FMD, Avian flu and etc.) can only be performed in ABSL-3 and ABSL-4 Laboratories (P3实验室 三级及以上实验室 -具备三级、四级实验室可从事高致病性病原微生物实验活动; verification by MOA required), according to the *Pathogenic microbiology laboratory biosafety management regulations*.

There are only nine ABSL-3 Laboratories in China are authorized to perform work on ASF, eight of which are operated by public research institutions and one by the private-owned listed company Jinyu Biotech (under the condition of cooperating with other 8 labs) are permitted to conduct laboratory research (including virus isolation, identification, live virus culture, animal inoculation/infection test and other experimental activities).

IV. Veterinary drug production

For veterinary drugs to be produced, veterinary drug manufacturers are required to get licence approvals as below:

The veterinary drug manufacturing license & the veterinary drug operating license (兽药生产/经营许可证): vaccine manufacturers must obtain the two licenses to start production and sales, each are valid for five years.

GMP (兽药GMP): stands for Good Manufacturing Practice and stipulates the quality management requirements for the whole production process, valid for five years.

GSP (兽药GSP): stands for Good Supply Practice and stipulates the storage, facilities, personnel, management, and other aspects of quality control for business operation, valid for five years.

The veterinary drug approval code (兽药生产批准文号): Manufacturers are required to obtain the specific approval code for each veterinary product, valid for 5 years.

The Veterinary Biological Products batch issuance system (兽用生物制品批签发制度): Each batch of veterinary biological products, i.e. vaccines, shall be checked by the inspection agency designated by the Veterinary Administrative Department of the State Council before being sold, and random inspections shall be conducted when necessary.

Animal nutrition - advanced feed additives to drive greener and safer efficiency gain

Feed additives are no longer just about the essential products (vitamins, minerals and amino-acids). From special enzymes to probiotics/prebiotics replacing antibiotics, and additives that reduce methane emission from livestock, there is so much science that goes into more advanced animal nutrition products, bringing more efficient feed utilization for production of animal protein, higher food safety, and contribute to carbon emission reduction. Although it is not a new industry, yet technology and products are actively evolving, driving stronger growth outlook in feed additive demand globally, versus the growth of animal protein production and feed demand.

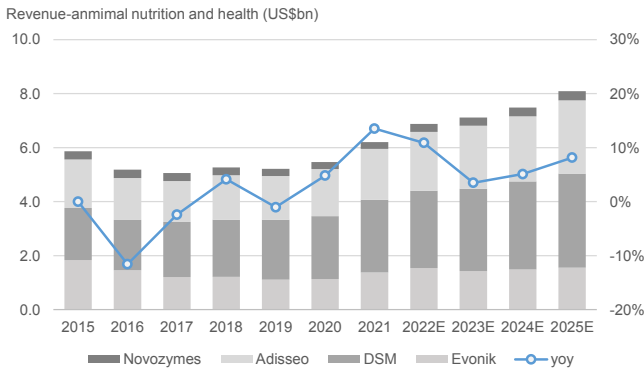
The definitions of the advanced (with special functions) feed additives are wide - we estimate the range of the global market can be more than US\$10-20bn as of 2021A, if based on the size of full feed market globally, and the selected usage ratio of the specialty additives. The aggregated revenue of top global animal nutrition companies have reached US\$6.0bn in 2021A. We see positive growth outlook for the segment - in the context of over 300mnt of global animal protein produced each year (a US\$1.7tn market according to DSM), and likely to expand at more robust growth rate than that of the protein and feed production. DSM estimated global feed additives market to grow at 4-5% CAGR from 2019-2025E, driven by increasing inclusion rates and innovation in compound feed. We estimate the aggregated revenue in animal nutrition from key producers has been growing at an average of 5% in the past three years, and should persist at 5-10% in the coming years.

We are more optimistic on advanced feed products -there are structural factors that could lead to acceleration of advanced feed additives, in our view: 1) higher grain prices (thus the need for higher productivity and feed conversion), 2) food safety (mostly related to abolishment of antibiotics), and 3) enhanced effort on emission control for climate changes would also drive demand for product that can provide sustainable solution for the animal protein production.

The room for growth in China would be more in our view due to lower penetration rate of advanced feed additives - this can be reflected in the stronger growth rate in methionine (a key feed additive) in recent years in China versus global. The ongoing increase in large commercial farming should also contribute as an additional driver for the growth.

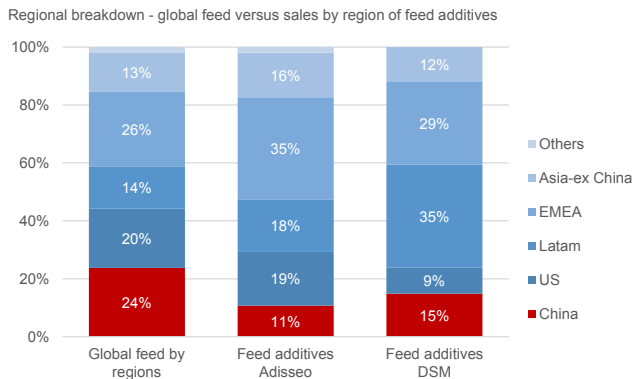
We see higher growth potential also in the essential feed additive industry in China. For example, the methionine demand in China grew at a higher rate of 10% CAGR in 2012-2021A compared to 6% of the global demand in same period in our estimates, which we assume is mostly driven by lower penetration. We estimate the penetration of methionine in China has reached 50% in 2021A, specifically about 80% for poultry, 65% for hogs and <40% for ruminant and aquatic animals, yet there is still room to grow.

Exhibit 27: Aggregated revenue on animal nutrition and health by top producers have been growing at an average of ~5% in past years



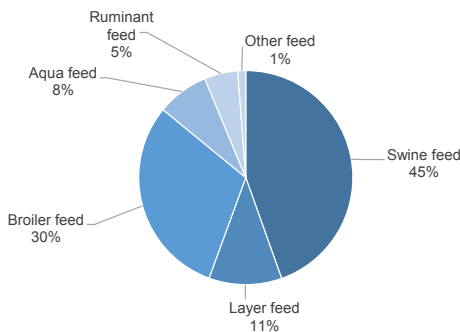
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 29: Sales exposures by region - feed and feed additives by selected producers, 2021A



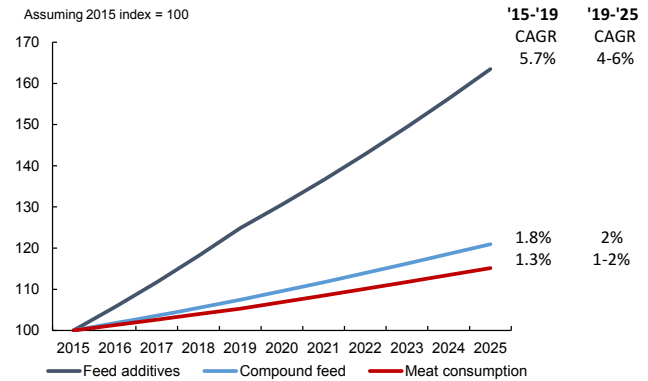
Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Exhibit 31: Feed demand by livestock (2021A) - China



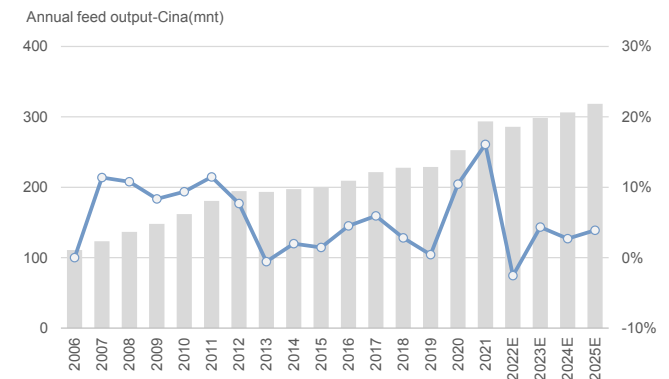
Source: China Feed Industry Association, Data compiled by Goldman Sachs Global Investment Research

Exhibit 28: Global feed additive demand should grow at 4-6% in the coming years



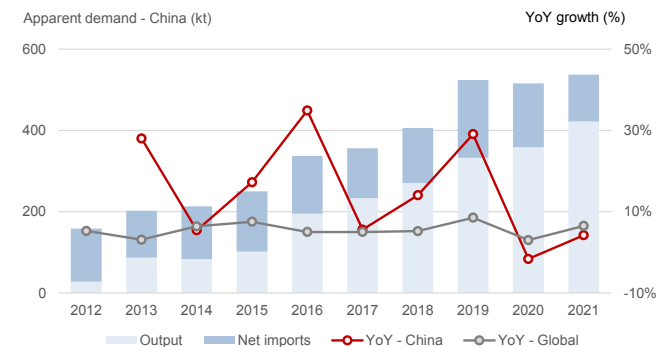
Source: DSM

Exhibit 30: Feed demand in China - has been growing at an average of 6.8% each year



Source: China Feed Industry Association, Goldman Sachs Global Investment Research

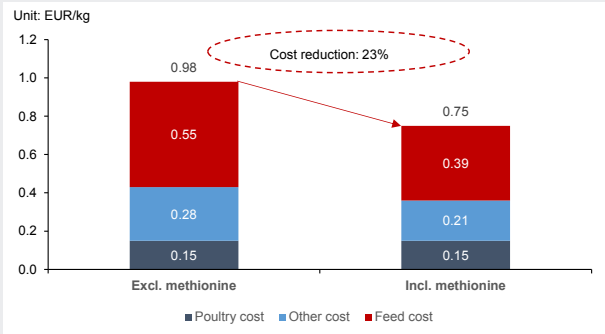
Exhibit 32: Apparent demand of methionion in China



Source: GAC, Company data, Goldman Sachs Global Investment Research

Advanced feed additives - selected products

Exhibit 33: Methionine from Adisseo -23% saving in feed consumption in poultry



Source: Adisseo

Exhibit 35: DSM's Bovaer- specialized to suppress the enzyme in cattle for methane formation, leading to 30% reduction in methane emission

Bovaer™
Reducing emissions from livestock

- Update Q1 Around 14.5% of all human-caused greenhouse gas (GHG) emissions come from livestock, with nearly 65% of this originating from dairy and beef cattle
- Bovaer™ is a cutting edge technology that directly reduces the enteric methane emissions by approximately 30% for dairy and beef cattle as well as sheep – no other player with a similar effectiveness
- 2022:
 - Bovaer approved for dairy cows in Europe
 - Bovaer approved for beef and dairy cows in Brazil and Chile
 - Capacities arranged for up to Euro 100m sales by 2025
 - Several market development cooperations in place with dairy companies in Europe and New Zealand and for beef with JBS in Brazil
 - Large production plant under development in Dairy, UK for start-up in 2025
 - Ramp-up of sales to several hundreds millions of Euros from 2025

Source: DSM

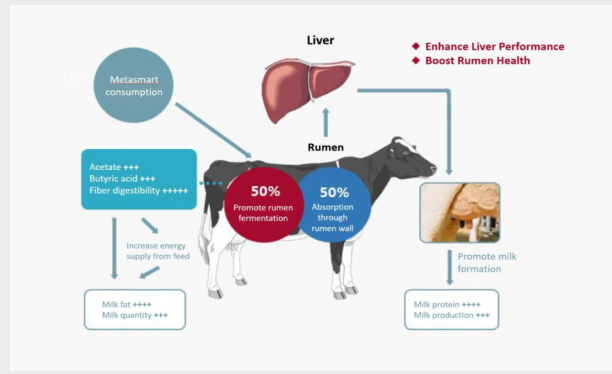
Exhibit 37: VTR's Xylanase - reduce viscosity of intestinal chyme, improve digestion and absorption of nutrients

Xylanase
Yiduozyme Xylanase Series

Yiduozyme X series are xylanase products for the hydrolysis of xylan, thus reducing intestinal chyme viscosity and releasing more nutrients from cereals.

Source: VTR Bio-Tech

Exhibit 34: Metasmart from Adisseo: designed for ruminants to be absorbed in remen directly, promoting rumen fermentation and improve the milk production and quality.



Source: Adisseo

Exhibit 36: DSM's Balancius - gut health enzyme improves broiler productivity and reduces FCR by 3%, replacing the use of antibiotic growth promoters

Balancius™
Helping tackle antimicrobial resistance

- Unique, break-through feed ingredient ("gut health enzyme") that significantly improves broiler productivity and reduces FCR by 3% consistently, replacing the use of antibiotic growth promoters
- Gut Health Enzymes established as new enzyme class facilitating digestion and nutrient absorption, developed by DSM and Novozymes ("Enzymes Alliance")
- Optimizes nutritional absorption and digestion, so broilers get more from their feed, trials show that adding Balancius of a broiler flock of 1 million birds saves 12,500 kgs of feed
- If used by the LatinAmerica chicken flock, the reduced feed requirement would amount to an annual GHG emissions reduction equivalent to that of a population of half a million people

Source: DSM

Exhibit 38: Adisseo's FeedKind - Alternative protein can be used as one sustainable feed ingredient and replacement of fish meal.

What is FeedKind?

FeedKind® Protein:
Natural, Sustainable
Alternative Protein

FeedKind protein is a family of highly digestible feed ingredients produced by a natural fermentation. Developed in Norway with more than two decades of animal studies, FeedKind protein is approved for sale in the European Union with registration processes initiated in countries worldwide.

Source: Adisseo

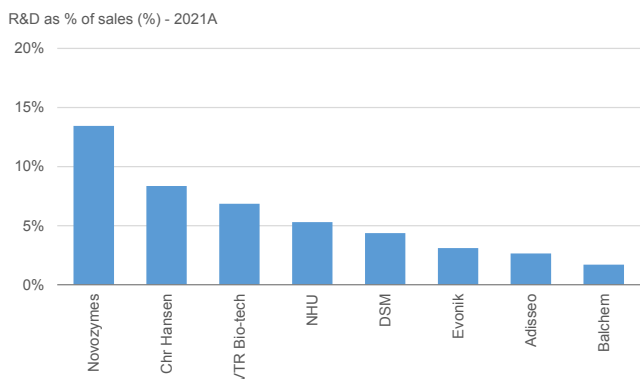
Among the feed additives, the essential products, including vitamins, minerals, amino-acids, carotenoids etc, are more commoditized among the top producers, and are cyclical in nature as supply and demand growth misaligns through time. On the other hand, we see more structural growth and higher margins in the advanced products, that function to improve feed efficiency, productivity, gut health, immunity enhancement etc. Among all, we see DSM, Adisseo, and VTR-Biotech have higher exposures.

Adisseo, the second largest producer of methionine in the global market, has improved its animal nutrition product mix through developing more specialty feed additives including enzymes, rumen-protected amino-acids, organic selenium and probiotics additives. According to the company’s disclosure, it is now the world’s leading supplier of non-starch polysaccharide enzymes and rumen-protected methionine. Adisseo highlighted its aqua alternative protein (FeedKind) product expected to come online in 2022-23E, which can be applied in aquaculture feed as replacement of fish meal.

DSM, the leading player in global advanced feed additives with diversified portfolio including carotenoids, eubiotics and enzymes, started its advanced animal products promotion in China since 2016 when the government officially started the antibiotics reduction. DSM mainly focuses on antibiotic alternatives in China and introduced several gut health eubiotics such as CRINA (essential-oil based product), VevoVital (organic-acid product) and Cylactin (probiotic product). DSM also introduced its phytase enzyme series into China, which improves phosphorus release and reduces its inclusion in feed, thus not only saves feed cost, but also reduces phosphorus losses by 30%, implying 0.18-0.23mnt phosphorus saving in China husbandry industry if widely applied.

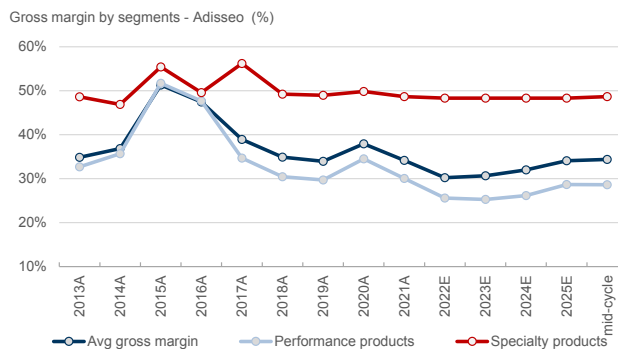
VTR-biotech is the leading producer of biological enzyme products in China, offering advanced feed additives including enzymes and gut health products. With comprehensive portfolio including xx feed enzyme products, VRT is now the largest supplier of feed enzyme products in China according to the company. In addition, VTR is the only producer of Buoluohui San (博落回散), one of the two traditional Chinese feed additive with growth-promoting function and can be used as antibiotic alternative.

Exhibit 39: R&D comparizon - animal nutrition companies



Source: Company data

Exhibit 40: Gross margins - performance versus specialty products, Adisseo



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 41: Major producers' exposures to essential and advanced feed additives

Function	Category	类别	Adisseo	Evonik	DSM	Novozymes	Chr Hansen	Balchem	VTR-Biotech
Essential products									
Bone formation, disease resistance, feed efficiency, productivity and fertility	vitamins	维生素							
Bone formation and feed efficiency	mineral	矿物质							
Feed efficiency	amino-acids	氨基酸							
Ensure consistent pigmentation of eggs and fish	carotenoids	类胡萝卜素							
Essential for cell struction formation	choline	胆碱							
Advanced products									
Feed efficiency	Carbohydrases	糖酶制剂	Rovabio Advance		Ronozyme HiStarch*				溢能宝
	Protease	蛋白酶制剂			Ronozyme ProAct*				X-3002
Productivity & quality	Rumen-protected methionine	反刍动物蛋氨酸	Smartmine						
Gut health	Probiotics	益生菌	Alterion*		CYLACTIN		Bacilli		卡福斯
	Prebiotics	益生元			Levabon Rumen E			Fibrase	
	Gut health enzymes	酶制剂			Balancius*				溢倍康
	Organic acid	有机酸	Admix Precision		VevoVital			ProAcid	威特能
	Plant extracts	植物提取物	Apex 5		CRINA				博落回散
	Precision biotic	精密生物			Symphione				
	Nitrogen	氮添加剂						NitroShure	
Immunity enhancement	Nucleotides	核苷酸			ROVIMAX				
	Organic selenium	有机硒	Selisseo						
Sustainability & Environmental benefits	Phytases	植酸酶制剂	Rovabio PhyPlus		Ronozyme® HiPhos*				迈特
	methane emission reduction in ruminants				Bovaer				
Nutrient supplement	Organic acid	有机酸			Veramaris				
Palatability		适口性添加剂	KRAVE		Digestarom				
Mycotoxib mgmt		霉菌毒素管理添加剂	UNIKE Plus Dry		Biomim CleanGrain Plus				博溢康
Silage preservation	Aerobic stability enhancement	有氧稳定性增强剂							
	Silage fermentation enhancement	青贮发酵增强剂	Biomim BioStabil				Silosolve		
Alternative feed	Alternative protein	替代蛋白	FeedKind						

* product developed in partnership with Novozymes

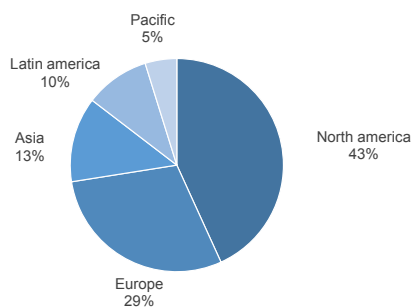
Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Companion animal health market - untapped growth

Companion animal market in China has just started to emerge, as pets ownership rises as a function of higher disposable income and demographic shifts. According to companion animal population from China Pet Industry White Paper and industry production numbers from China Veterinary Drug Association, we estimate China companion animal health market was Rmb11bn in 2021A (or US\$1.7bn), including vaccines, pharmaceutical, and diagnostics. We estimate the market to nearly triple to Rmb28bn (US\$4.3bn) by 2025, and grow to Rmb81bn (US\$12.4bn) by 2030E vs US and EU size of US\$34.3bn and US\$25.0bn in 2021A. Specifically, we expect the pet ownership should rise from current 0.15 head per urban household to 0.32 per urban household by 2030E (mid-term), while annual spending to move up from Rmb210 per head to Rmb590 per head.

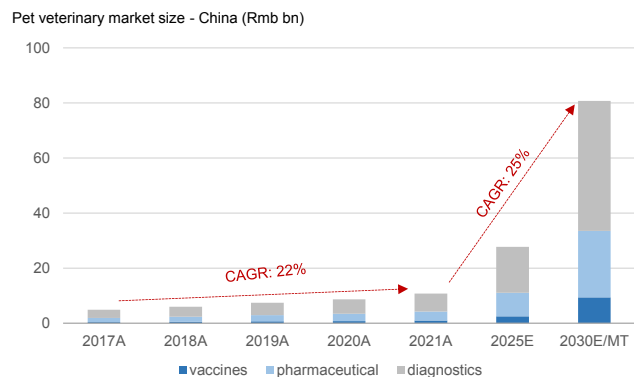
Unlike livestock market, where vaccines are now mostly developed and produced by domestic vaccine companies, we believe the pet healthcare market presents attractive long-term growth opportunities for both established global suppliers such as Zoetis, Elanco and Merck, as well as domestic vaccines companies such as Ringpu, Jinyu and CAHIC. Branding, especially for the essential pet vaccines, is more important in our view, as consumer in pet market will be less price sensitive and more concerned about vaccine safety. We estimate current imports account for 65-85% of the market shares, and likely to maintain its strong position in the long-run, while domestic companies including Jinyu, Ringpu and CAHIC, will also take 4-7% shares each in the medium term.

Exhibit 42: Global animal medicine market by region, 2021A



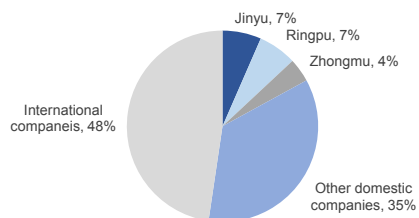
Source: Animal Health Europe, Goldman Sachs Global Investment Research

Exhibit 43: Pet veterinary market size - China



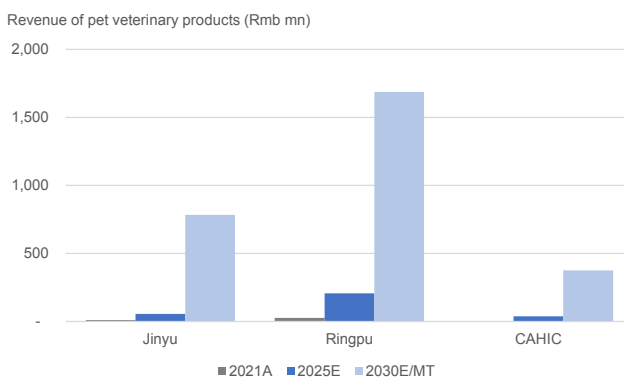
Source: China Pet Industry White Paper, China Veterinary Drug Association, NBS, Goldman Sachs Global Investment Research

Exhibit 44: Companion animal vaccine market share breakdown - Mid-term



Source: China Pet Industry White Paper, Company data, Goldman Sachs Global Investment Research

Exhibit 45: Revenue of pet veterinary products – Jinyu, Ringpu and Zhongmu

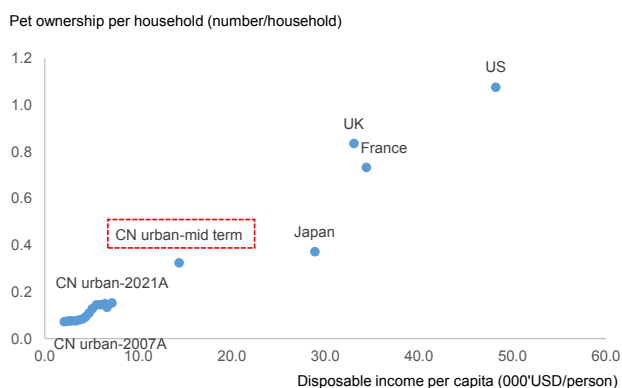


Source: Company data, Goldman Sachs Global Investment Research

Rising pet ownership and more basic spending

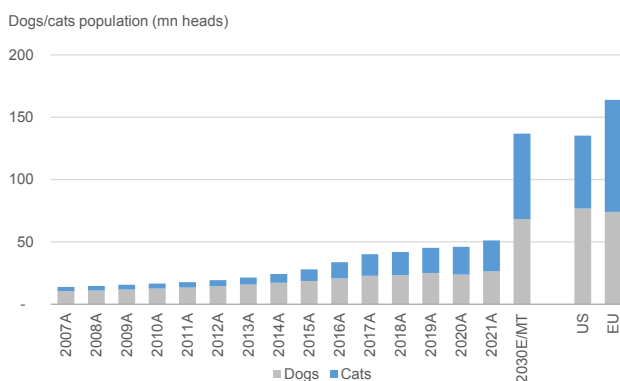
Growing disposable income in urban China has been driving the rising popularity of pet ownership and more coverage of basic health spending on companion dogs and cats. Based on pet population estimate from China Pet Industry White Paper and household numbers from NBS, we estimate pet population has been growing at an average of 11% in the past decade, and pet ownership was 0.15 per urban household in China in 2021A, versus 1.08 in the US, 0.71 in EU, and 0.37 in Japan. We expect the pet ownership could potentially rise to 0.32 by 2030E implying pet population of 137mn by 2030E, versus 135mn in US, 160mn in EU, and 20mn in Japan in 2021A. Pet ownership also appears to go beyond disposable income - for example Pet population in EU also has increased by 9% from 2012-2018, based on information from Animal Health Europe.

Exhibit 46: Pet ownership per capita - China urban versus peers



Source: OECD, American Veterinary Medical Association, Animal Health Europe, China Pet Industry White Paper, Goldman Sachs Global Investment Research

Exhibit 47: Total population of dogs/cats - urban China, versus peer countries



Source: China Pet Industry White Paper, NBS, Goldman Sachs Global Investment Research

The penetration of basic pet healthcare in China is low and provides more upside beyond the number growth - we estimate total spending on compulsory vaccines and basic drugs should cost Rmb621 per dog per year, or Rmb668 per cat per year, implying 12-14% penetration rate based on current average spending.

Why is the market not well penetrated today in China - we think due to lack of consumer awareness on both the importance of basic vaccine and drugs for pets's long-term health and the frequency they are required. According to Ringpai, the second largest chained pet hospital in China, the visit of Chinese pet owners to vet is only 13% in China, versus 75% in the US. On product quality, we estimate 65-85% of the basic vaccine and drugs are imported from overseas companies like Zoetis, MSD and Elanco.

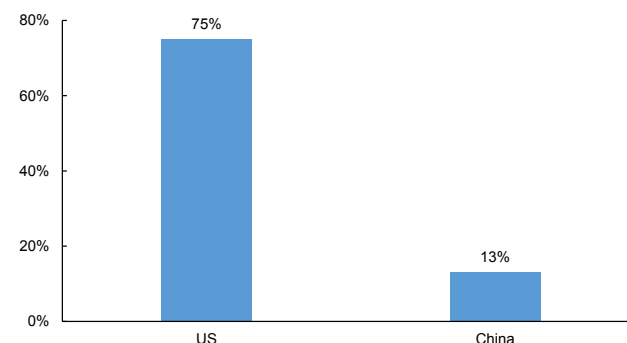
Exhibit 48: Basic pet healthcare spending - China

	if 100% penetration Rmb/head-yr	Penetration %	2021A Rmb/head-yr
Compulsory veterinary vaccines/drugs			
Rabies vaccine	32	27%	9
Carine DAPP/DHPP vaccine	41	9%	3
Feline FVRCP vaccine	127	14%	18
Carine parasiticides	274	13%	35
Feline parasiticides	255	13%	32
Cost per capita summary			
Cost of vaccines per dog per year	72	17%	12
Cost of vaccines per cat per year	158	17%	27
Cost of drugs per dog per year	549	13%	72
Cost of drugs per cat per year	510	11%	57
Basic vaccines+drugs per dog per year	621	14%	84
Basic vaccines+drugs per cat per year	668	12%	84
Cost of diagnosis per dog per year	1,286	11%	141
Cost of diagnosis per cat per year	1,014	11%	111

Source: China Pet Industry White Paper, Company data, Goldman Sachs Global Investment Research

Exhibit 49: Lower penetration rate of vet visits in China vs US - 2019A

Penetration rate of vet visit in US and China in 2019 (%)



Source: Ringpai

Focusing on basic vaccines and drugs - positioning for growth

Among the three major health spending segments, we see the highest growth in pet vaccine (compulsories with low unit cost, at 29% CAGR the coming years), at this stage of market development in China. We expect the pet vaccine market to grow potentially from Rmb1.0bn in 2021A, to Rmb2.5bn in 2025E, and Rmb9.4bn by 2030E. On drugs, we expect the growth to be at 25%, from Rmb3.3bn in 2021A, to Rmb8.5bn in 2025E, and Rmb24bn by 2030E. The basic pet healthcare products are

- *Rabies vaccine*: as rabies virus has not been decontaminated in mainland China, the vaccine is essential for both dogs and cats. The rabies vaccine prevents pets from rabies virus and also serves as an effective measure to prevent the spread of rabies to human beings.
- *Carine DAPP/DHPP vaccine*: DAPP/DHPP implies four most common and concerning diseases for dogs: Distemper(犬瘟热), Adenovirus/Hepatitis(腺病毒), Parvovirus(犬细小病毒) and Parainfluenza(犬副流感). The combination can also be duplex (distemper&parvo) or triple (distemper, parvo and adeno), and international players have developed more advanced combination as DHPPiL with covering non-core viruses including Leptospirosis (钩端螺旋体病) and carine Coronavirus (犬冠状病毒).
- *Feline FVRCP vaccine*: FVRCP implies three most common and concerning diseases for cats - Feline Viral Rhinotracheitis(猫病毒性鼻气管炎), Calicivirus(杯状病毒) and Panleukopenia(泛白细胞减少症).
- *Parasiticides*: parasiticides are the most common drugs for dogs and cats and according to our US Animal Health team, products can be segmented into

prevention products (~85% of total) and treatment products (~15%). Within the prevention category, products can be further segmented into flea/tick prevention products, heartworm prevention products and combo products.

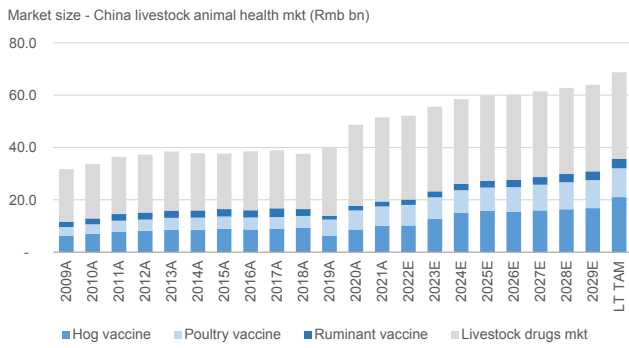
On a relative basis, we see feline FVRCP vaccine and parasiticides markets to have the higher potential market size, driven by high ASP (Rmb100/shot for imported FVRCP vaccine) and high frequency (at least 4 times per pet per year in our estimate).

While imports account for 65-85% in recent years according to China Veterinary Drug Association, we view the market presents opportunities for both international players and China companies. Based on companies' public disclosure, international companies including Zoetis and Elanco expect high-single-digit to double-digit yoy growth of their companion animal business in China, currently through imports, and could accelerate the sales with the start of domestic production (Zoetis's Suzhou factory with pet vaccine capacity currently under construction). Sales in China account for about 5% of total revenue both for Zoetis and Elanco in 2021A according to the companies, yet growth in China market is higher than in other regions - 25% in China vs. 15% of total for Zoetis in 2021A.

We believe domestic companies are still in the early stage, and strong brands yet to be established. Potential players are Jinyu, Ringpu, HiSun with approved or developing basic products. Among all, we highlight:

- Jinyu is actively developing pet vaccines under JV established with its partner Kyoritsu (共立), - the top pet health producer in Japan. The vaccine product is expected to launch by end of 2024E, potentially leveraging Kyoritsu's strong brand to quickly gain market shares in China.
- Ringpu has already developed the most advanced and comprehensive pet drug product portfolio among domestic players, with pet vaccine products in R&D pipeline. Ringpu's market expansion will potentially be accelerated through its unique distribution channel resource - Ringpai Pet Hospital, the second largest pet hospital in China which is owned by Ringpu's controlling shareholder Mr. Li Shoujun.
- HiSun owns the most popular domestic parasticide product Hailemiao (海乐妙), sales of the feline parasticide product exceeded Rmb100mn in 2021A and ranked first in the domestic market.
- CAHIC, Keqian and Jilin Fivestar are the only three domestic companies with commercialized canine DAPP vaccines yet their sales are very limited, while feline FVRCP vaccine is in many companies' R&D pipeline including Jinyu, Ringpu and Pulike, but currently no commercialized products have been developed.

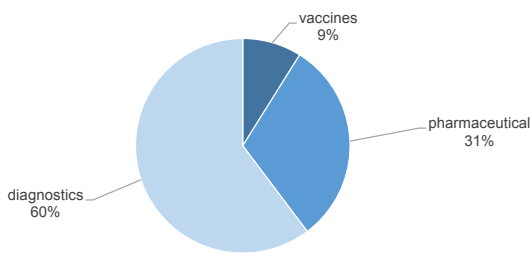
Exhibit 50: China livestock animal health: Market size and breakdown



LT TAM: Long-term Total Addressable Market where penetration reaches 100%

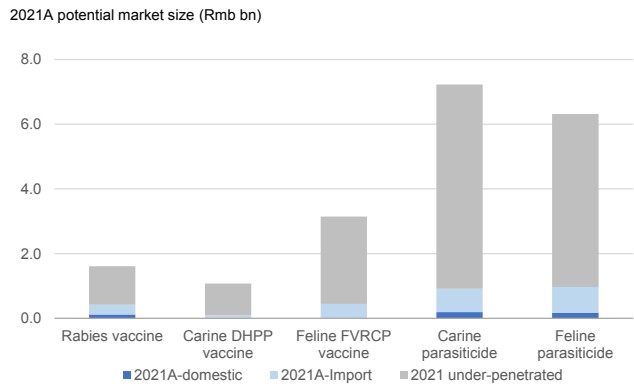
Source: China Veterinary Drug Association, Goldman Sachs Global Investment Research

Exhibit 52: Pet healthcare cost breakdown - China, 2021E



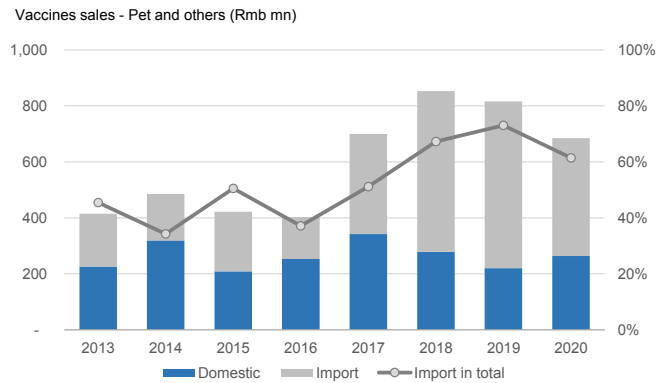
Source: China Pet Industry White Paper, Goldman Sachs Global Investment Research

Exhibit 51: Potential vs actual market size for basic pet veterinary products - 2021A



Source: China Pet Industry White Paper, Goldman Sachs Global Investment Research

Exhibit 53: Import vs Domestic pet vaccine sales in China



Source: China Veterinary Drug Association

Exhibit 54: Basic pet health product categories and key companies - companion animal health market in China, as of Jun 2022

Legends		commercial product	In development	no commercial product				
Company	Ticker	犬猫狂犬病疫苗 Rabies vaccine	犬联苗 Carine DAPP /DHPP vaccine	猫联苗 Feline FVRCP vaccine	驱虫药 Parasiticide	皮肤病药 Dermatology	抗生素 Anti-biotics	其他治疗类 Other drugs
		Compulsory	Compulsory	Compulsory	Compulsory	Non-compulsory	Non-compulsory	Non-compulsory
Importers								
Zoetis 硕腾	ZTS	瑞比克 Rabvac	卫佳细小疫苗 Vanguard CPV 卫佳5联苗 Vanguard 5 卫佳8联苗 Vanguard crLyne	妙三多疫苗 Fel-O-Vax PCT	大宠爱 Revolution 妙宠爱 Stronghold Plus 欣宠克 Simparica	爱波克 Apoquel Cytopoint	速诺 Synulox 康卫宁 Convenia	1)消炎镇痛 Anti-inflammatory and analgesic: 瑞莫迪 Rimadyl 2)止吐 Antiemetic: 赛瑞宁Cerenia
Interwave 英特威 (MSD)	MRK	宠必威-锐必威 Nobivac-Rabies	宠必威-乐必妥 (钩端螺旋体病二价疫苗) Nobivac-Lepto 宠必威-幼犬保 (2联) Nobivac-Puppy DP 宠必威-优免康 (4联) Nobivac-DHPPI		贝卫多 Bravecto			
Merial 梅里亚 (Boehringer Ingelheim)	n.a.	瑞贝康 Rabisin			福来恩Frontline 犬心保Heartgard 博来恩Broadline 尼可信 NexGard 超可信 NexGard Spectra			1)心血管疾病 Cardiovascular diseases: 勃定欣Vetmedin 2)慢性肾病 Chronic kidney diseases: 圣咪乐Semitra
Elanco/Bayer 礼蓝	ELAN				拜宠爽Drontal 拜宠清Drontal plus 爱沃克Advocate 索来多项圈Seresto		拜有利 Baytril	心血管疾病 Cardiovascular diseases: 盐酸贝纳普利片 Benazepril hydrochloride tablets
Domestic players								
Jinyu 金宇	600201.SS		临床试验 Clinical trial	申报临床试验 Applying for clinical trial				
Ringpu 瑞普	300119.SZ		临床试验 Clinical trial	临床试验 Clinical trial	派特宁 Fepronil 莫普欣 Imidacloprid moxidectin	扶倍宁 Ketoconazole	瑞克林Clindamycin phosphate、瑞畅宁 Metronimer、倍潜林 Ceforolin、速倍林Cefobalin、普康素Procincin、马波沙星注射液 Marbofloxacin (in R&D pipeline)	1)外用耳道药 Topical ear canal remedies: one new drug in registration process、倍尔舒 Flormetin 2)心脏病药物 Heart disease drugs: 贝欣宁 Bencinprin 3)干扰素 Interferon: 犬干扰素 Canine Interferon、猫干扰素 Feline Interferon (Clinical trial) 4)消炎镇痛 Anti-inflammatory and analgesi: 美喜康 Meloxicamine 5)吸入性麻醉剂 Inhaled anesthetics: 齐弗宁 Seflurin、易弗宁 Isoflurane
Keqian 科前 CAHIC 中牧	688526.SH 600195.SH			In R&D pipeline In R&D pipeline				
Pulike 普莱柯	603566.SH		申报临床试验 Applyir	申报临床试验 Applying for clinical trial	倍宠恩 Fepronil 氟雷拉那滴剂/咀嚼片 (临床试验) Fluralaner drops/tablets (clinical trial)	利拉萘酯搽剂 (临床试验) liranafate (Clinical trial)	安舒宁 Doxycycline hydrochloride 莱克霉素注射液Lactamycin (in R&D pipeline)	外用耳道药 Topical ear canal remedies: 耳舒康 Fluphenazole Metronidazole
HISUN 海正药业	600267.SH				海乐妙/海乐旺/海乐宠 MilbemycinOxime 汉宠欣 Fepronil 海乐安 Selamectin 莫爱佳 Imidacloprid moxidectin		海乐平 Enrofloxacin、君乐 amoxicillin 泰拉霉素注射液 (在研) Tulathromycin (in R&D pipeline)	1)外用耳道药 Topical ear canal remedies: 海耳净 2)消炎镇痛 Anti-inflammatory and analgesi: 海美乐 Meloxicam
Jinlin Fivestar 吉林五星	n.a.							

Source: National Veterinary Drug Basic Information Database, Company data, data compiled by Goldman Sachs Global Investment Research

Company section

Adisseo (600299.SS, Buy, 12-m TP: Rmb14.5/sh) - Global leader in feed nutrition, improving product mix

600299.SS	12m Price Target: Rmb14.5	Price: Rmb9.24	Upside: 56.9%		
Buy	GS Forecast				
		12/21	12/22E	12/23E	12/24E
Market cap: Rmb24.8bn / \$3.7bn	Revenue (Rmb mn)	12,868.7	14,666.7	15,299.2	16,613.5
Enterprise value: Rmb24.9bn / \$3.7bn	EBITDA (Rmb mn)	3,261.3	3,279.2	3,342.2	3,512.7
3m ADTV :Rmb52.4mn/ \$7.8mn	EPS (Rmb)	0.55	0.57	0.59	0.64
China	P/E (X)	22.5	16.1	15.6	14.5
China Agriculture	P/B (X)	2.4	1.6	1.5	1.4
	Dividend yield (%)	1.4	2.2	2.2	2.4
M&A Rank: 3	N debt/EBITDA (ex lease,X)	(0.4)	(0.4)	(0.6)	(0.9)
Leases incl. in net debt & EV?: No	CROCI (%)	17.5	15.0	14.8	15.3
	FCF yield (%)	0.8	2.2	5.7	5.7
		6/21	12/21	6/22E	12/22E
	EPS (Rmb)	0.32	0.25	0.30	0.29

Source: Company data, Goldman Sachs Research estimates, FactSet. Price as of 05 Aug 2022 close.

Initiate at Buy: Adisseo is a top global supplier in animal feed additive and nutrition, the second-largest producer of methionine (a key feed ingredient for livestock), with ~25% global market shares in 2021A. We view Adisseo as well positioned as a major solution provider for the more efficient, safer, and sustainable production of animal protein. Its rising presence in China as well as its strategic transformation into more specialty products will also translate to higher growth outlook, with margin and return accretion, with higher earnings resilience. We expect solid earnings growth at a 9.1% CAGR in the coming four years. The rising contribution of the specialty product segment should underpin multiple rerating of the stock in our view. We initiate on Adisseo with a Buy rating and a 12m target price of Rmb14.5/shr.

Strategic transformation on specialty products: We expect Adisseo's specialty product revenue to expand at a 16% CAGR, from Rmb3.2bn in 2021A to Rmb5.6bn in 2025E, driven by its enhanced efforts in expanding new products through R&D and potential M&A. The segment's less commoditized nature and higher average margins (20% higher than performance products) will lead to rising earnings contribution from the segment, from 35% in 2021A to 43% by 2025E.

Methionion - cyclical softness on supply additions, strong global market shares to sustain: We expect global methionion industry capacity utilization to soften from 81% in 1H22A to 77% in 2023-24E, mostly driven by supply addition (40% of which by Adisseo), leading to a weakening price and margin outlook. We forecast the unit EBITDA of Adisseo to soften from Rmb4,694/t in 1H22A to Rmb3,581-3,722/t in 2023-24E. Nevertheless, we expect a solid contribution from methionine for Adisseo, as sales volume expansion is partly offset by weaker prices. As a result, we estimate Adisseo's global market shares to remain strong at 25% in the coming years.

Valuations and target price: Our valuation is based on SOTP, including: 1) Rmb4.6/sh on performance products; 2) Rmb9.8/sh on specialty products and Rmb0.1/sh on other

business. Our target price implies a PE of 24.5x on 2023E and 22.7x on 2024E, versus peers in the 10-40x range.

Key risks: 1) Lower methionine pricing driven by worse-than-expected industry supply-demand; 2) higher production cost of methionine driven by further increase of oil and natural gas prices; 3) more-than-expected number of players entering the advanced feed additive market, which would intensify competition; 4) FX loss resulting from unfavorable CNY/USD and CNY/EUR exchange movements as Adisseo had 88% of its revenue in 2021A settled mainly in USD and EUR.

Strategic transformation on specialty products

We expect Adisseo's growth strategy in specialty products to drive not only top-line growth, but also a transformation of improving product mix leading to higher and more resilient earnings, as well as return accretion, all else equal.

Specifically, we expect its specialty products to expand at a 16% CAGR in terms of revenue, from Rmb3.2bn in 2021A to Rmb5.6bn in 2025E, driven by its enhanced efforts in expanding new products through R&D and potential M&A, as a key growth strategy of the company. As a result, we believe the earnings contribution to total gross profit by special product should grow from 35% to 43% by 2025E.

The company's specialty products focus is on improved performance of feed efficiency, disease resistance and protein quality, including rumen-protected amino-acids, enzymes, organic selenium and gut health products. These advanced feed additives are increasingly being valued in animal protein production, as they are more effective and offer safer approaches to improve efficiency. Specialty products in feed additives require more R&D efforts and customized service delivery, thus they are less commoditized in nature, possess higher customer stickiness and entry barriers, and thus higher pricing and margin. We highlight gross margins in specialty products averaged at 50%, ranging from 47-56%, over the past 10 years, versus the 30-52% range in methionine over the same period of time. In addition, we estimate Adisseo EBITDA/asset is about 55% for its specialty products, versus 20% for the cyclical part of the company's operations, making investment in specialty products more return-accretive in the long run.

On the product side, we see continued strength in the company's rumen-protected amino-acid and enzyme products, while new organic selenium, gut health and aqua products provide more visibility for future growth. Specifically, the company highlighted stronger growth in the ruminant market from the US, and general product in the Southeast Asia market. Here we highlight a few sample products:

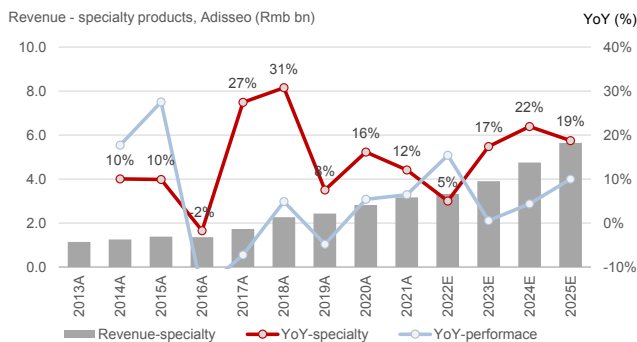
- *Rumen-protected amino acids*: Adisseo has developed rumen-protected methionine and lysine products successfully with leading technology (coating, chemical modification) to address the problem of decomposition loss of amino acids in ruminant rumen, and effectively improve milk production volume and quality, as well as the reproduction and health of cows. For example, Metasmart®, one rumen-protected methionine product, can improve milk production yield (+2.4-2.5kg/day during 0-140 lactation days), butterfat yield (+0.21-0.41%) and milk protein yield (+0.16-0.22%) and save US\$80 cost per cow per year through disease resistance enhancement.
- *Enzymes*: Adisseo is a leading player in the non-starch polysaccharide enzyme market, and has developed new phytase products in recent years. Adisseo's enzyme products can be used in poultry and hog diets and effectively improve feed efficiency, which in turn reduces feed costs as well as nitrogen and phosphorus emissions. In animal experiments, Adisseo's products are proved to increase weight gain efficiency by 2.1-5.3% and reduce feed consumption by 2.8-6.3% when applied to poultry diet, and reduce feed cost by 4.8% when applied to hog diet.
- *Aqua alternative protein (FeedKind)*: FeedKind, produced by fermenting natural gas

with a naturally occurring bacteria, is one alternative protein product that can be applied in aquaculture feed as a replacement of fish meal. The first FeedKind production facility is now under construction in Chongqing, China with 20kt capacity to come online in 2022, and a second step will bring an additional 80kt of capacity. We estimate the launch of the product would lead to a Rmb1.2bn increase in revenue and a potential 9% boost (Rmb0.6bn) on the gross profit level.

M&A is an important part of Adisseo’s growth strategy on specialty products. Acquisitions accelerate its product expansions, while leveraging its existing customer base, and sales and service infrastructure. The company acquired Nutriad (a Belgium feed additive producer with key product in mycotoxin management) in 2018, FRAmelco (a Dutch feed additive producer, with key product in organic acid for gut health) in 2020, over which period the specialty sales of Adisseo grew from Rmb1.7bn in 2017A to Rmb3.2bn in 2021A. In 2020, Adisseo also formed a JV with Calysta, a US cellular agriculture startup, to develop alternative protein products used as feed ingredients in aqua farming.

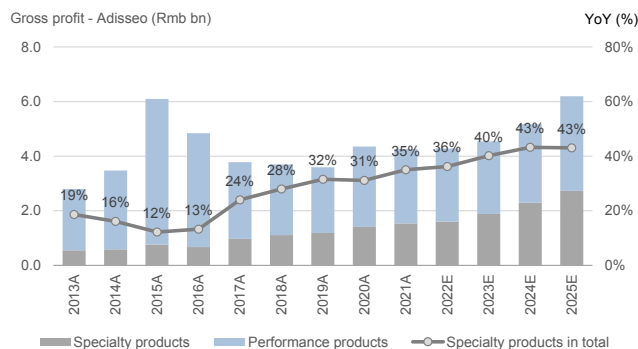
In specialty products, Adisseo competes with a limited number of producers, including DSM/Novozyme Alliance (strength in enzymes and gut health products), Balchem (strength in rumen-protected amino acids) and Alltech (strength in gut health and aqua products).

Exhibit 55: Revenue and annual growth rate - specialty products, Adisseo



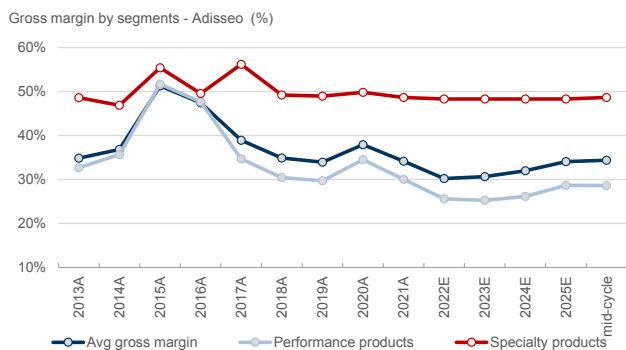
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 56: Gross profit contribution by segment - Adisseo



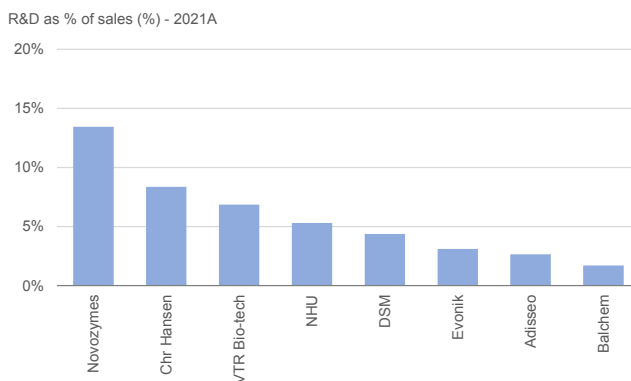
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 57: Gross margin - performance vs. specialty products



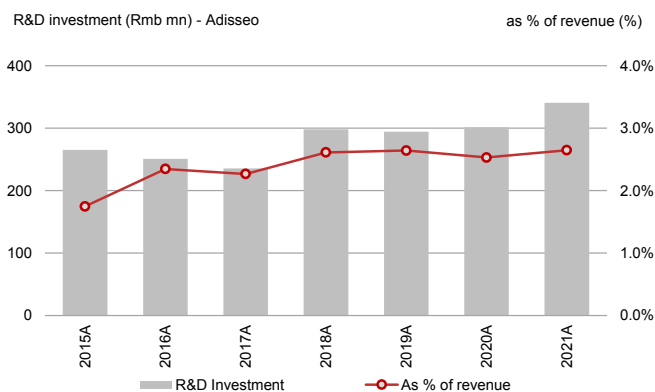
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 58: R&D spending as % of revenue - Adisseo vs others (2021A)



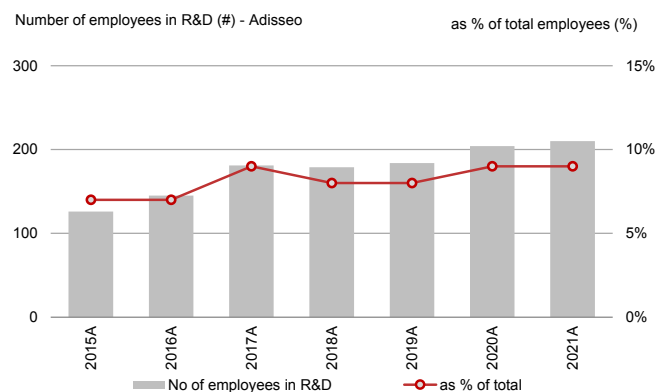
Source: Company data

Exhibit 59: R&D investment - Adisseo format



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 60: Number of employees in R&D



Source: Company data, Goldman Sachs Global Investment Research

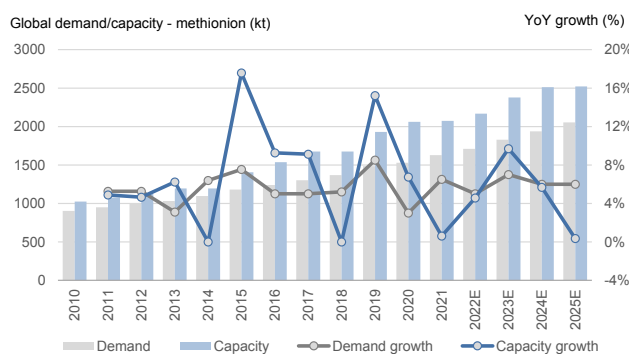
Methionion - cyclical weakness on supply additions; strong global market shares to be sustained

We expect Adisseo’s revenue in performance products to solidly grow at a 7% CAGR from Rmb9.1bn in 2021A to Rmb12.1bn in 2025E, as sales volume of methionine expand from 393kt in 2021A to 506kt in 2025E, mostly driven by its China operations, partly offset by the weaker prices in the medium term. As a result, we forecast Adisseo to maintain its global market share at 25% in 2025E.

Methionion is an essential product in animal feed to improve the feed conversion ratio (FCR) for poultry. Global demand have been growing at an average of 6% per annum in the past 10 years, and reached 1.6mnt in 2021A. We expect the growth to continue at a similar pace in the coming years, but the S/D balance is likely to soften in 2023-24E, driven mostly by supply. Specifically, we expect industry capacity to grow 9% on average in 2023E-24E, driven mainly by 160kt expansion by NHU and 135kt expansion by Adisseo in our base case. As a result, we expect industry utilization to soften from 81% in 1H22A to around 77% in 2023-24E, before reverting to 81% in 2025E, leading to a weakening price and margin outlook in the medium term. We forecast the unit EBITDA of Adisseo to soften from Rmb4,694/t in 1H22A to Rmb3,581-3,722/t in 2023-24E, versus the historical range of Rmb2,745-14,579/t. We also expect its gross margin on performance product to contract to around 26% from 30% in 2021A over the period. Nevertheless, given the limited number of producers globally and structural demand growth, we expect S/D balance of the industry to return in 2025E, taking Adisseo’s unit EBITDA and gross margin back to the mid-cycle level of Rmb4,072/t, and 29% in 2025E.

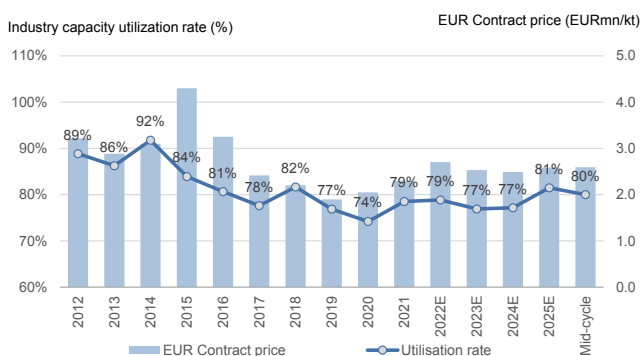
Given our assumption of stable sales volume expansion despite the medium-term weaker price, we expect the earnings contribution to remain around Rmb2.7bn in 2021-23 and reach Rmb3.5bn in 2025E.

Exhibit 61: Global demand/capacity volume and YoY growth - Methionine



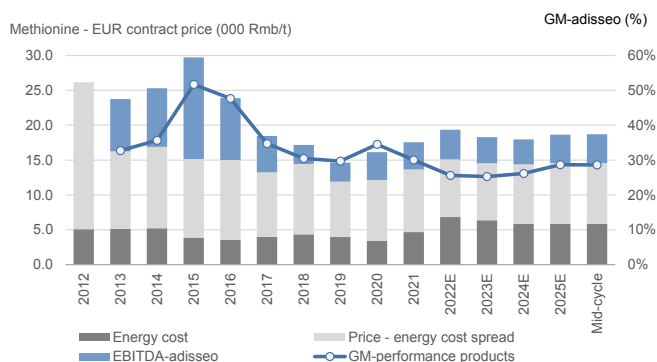
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 62: Global demand growth, utilization rate vs benchmark price - Methionine



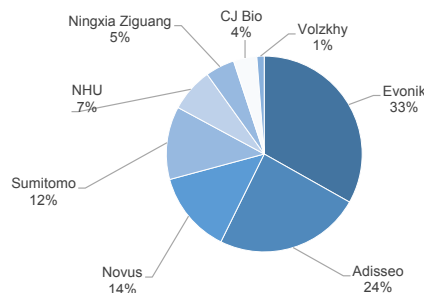
Source: Feedinfo, Company data, Goldman Sachs Global Investment Research

Exhibit 63: EUR contract price, energy cost and price-cost spread - Methionine



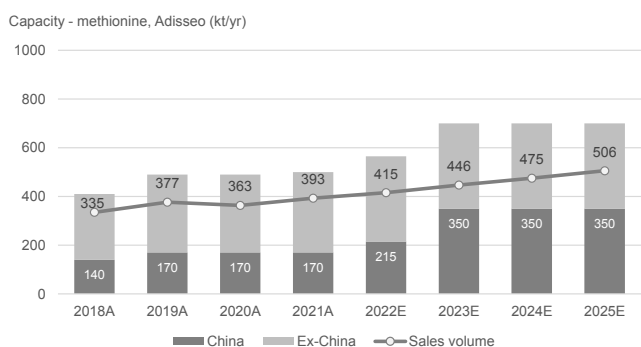
Source: Feedinfo, Wind, Company data, Goldman Sachs Global Investment Research

Exhibit 64: Global methionine market competition landscape - 2021A



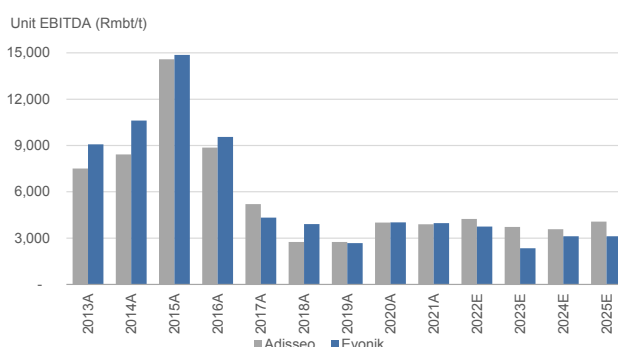
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 65: Annual sales and capacity - Methionine, Adisseo



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 66: Unit EBITDA - Adisseo vs Evonik

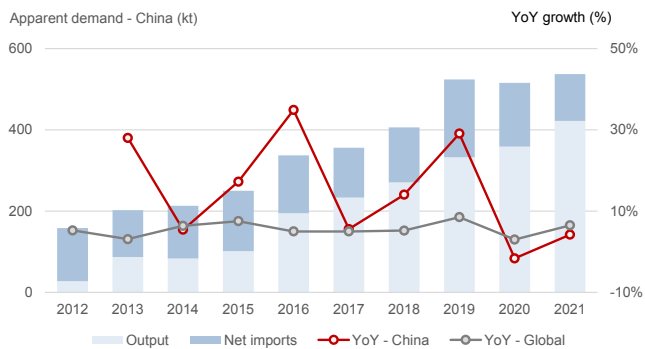


Source: Company data, Goldman Sachs Global Investment Research

We estimate apparent demand of methionine in China has been growing at a higher speed (10% CAGR in 2012-2021A) compared to the 6% CAGR for global demand in the same period, reaching 537kt in 2021A and accounting for 33% of total global demand. We estimate the penetration of methionine in China has reached about 50% in 2021A, specifically about 80% for poultry, 65% for hogs and <40% for ruminant and aquatic animals, yet there is still room to grow. Production of methionine in China grew at a 35% CAGR in 2012-21A driven by aggressive capacity expansion of local players like NHU and Adisseo, while net imports remains relatively flat.

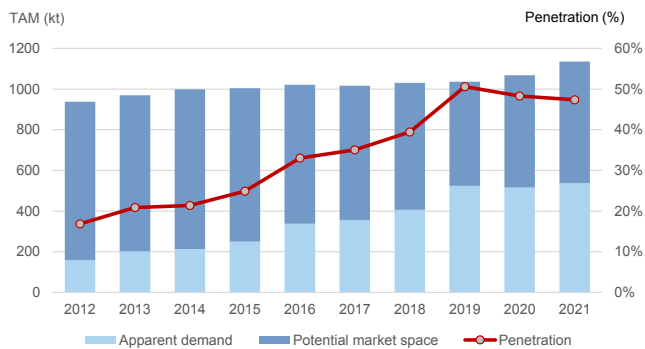
Given the higher demand growth in China and another 180kt capacity in Nanjing put into use in 4Q22E in our estimate, we forecast Adisseo's sales volume in China to grow at 7% CAGR in 2022-25E, vs. 3% in 2016-2021A, which enhances its share in the global market.

Exhibit 67: Apparent demand in China - Methionine



Source: GAC, Company data, Goldman Sachs Global Investment Research

Exhibit 68: Methionine penetration in China



Source: China Feed Industry Association, GAC, Company data, Goldman Sachs Global Investment Research

Financials and valuations - Adisseo

We initiate Adisseo with a Buy rating and a 12-month TP of Rmb14.5/shr, implying 57% upside. We expect the company to grow its top line by a 10% CAGR in the coming four years, driven by strong specialty business growth and continuous methionine sales volume additions, partly offset by cyclical weakness of methionine in 2023-24E.

Accordingly, we highlight:

Performance products: Adisseo's performance business is expected to grow steadily, driven by continuous sales volume expansion of methionine, partly offset by lower ASP and margins of methionine in 2023-24E, and a cyclical bottom for vitamin A in 2022E. We expect a 7% CAGR in revenue and a 6% CAGR in gross profit during 2022-25E, with gross margin softening from 30% in 2021A to 26% in 2022-24E and recovering to 29% in 2025E.

Specialty products: We expect Adisseo to expand its specialty business revenue at a CAGR of 16% yoy with margin staying at 48%, deliver a CAGR of 15% in gross profit and reach Rmb2.7bn in 2025E.

Overall, we expect Adisseo's net profit to increase steadily at an average of 5% yoy in 2022-24E, and grow strongly by 22% yoy in 2025E; our forecast is 13-29% below Bloomberg consensus. We also assume Adisseo to maintain its net cash position in 2022-25E as before, as we see limited capex spending ahead, after the launch of 180kt capacity in the 2nd Nanjing production base in 3Q22E, according to the company's announcement. We expect Adisseo's capex to decrease from Rmb2.3bn in 2021A to Rmb1.6bn in 2022E and Rmb1.0bn in 2023-25E, mainly on methionine expansion projects and potential specialty product project investments.

We adopt SOTP as the primary valuation methodology for Adisseo to value different segments separately, consisting of 12x 2025E P/E for performance products including methionine and vitamin production, 35x 2025E P/E for specialty products and 10x 2025E P/E for other side products, discounting back to 2023E using a discount rate of 9.5% (in line with the rest of our coverage).

Our P/E multiple for the performance product segment at 12x 2025E P/E is derived from the average of global and A-share peers such as Evonik (EVKn.DE, covered by GS European chemicals team - Georgina Fraser) and NHU (002001.SZ, Not Covered), and the P/E multiple for the specialty product segment at 35x 2025E P/E is benchmarking the global peers such as DSM (DSMN.AS), Chr. Hansen (CHRH.CO) and Novozymes (NZYMb.CO, all covered by the GS European chemicals team - Georgina Fraser).

Our target price implies 24.5x P/E for 2023E, 22.7x P/E for 2024E and 18.6x P/E for 2025E.

Exhibit 69: Key assumptions and financials - Adisseo

Key assumptions and financials - Adisseo		2020A	2021A	2022E	2023E	2024E	2025E
Methionine - total capacity	kt	490	500	565	700	700	700
Methionine - capacity in China	kt	170	170	215	350	350	350
Methionine - estimated sales volume	kt	363	393	415	446	475	506
Global market shares	%	24%	24%	24%	24%	25%	25%
Methionine - realized ASP	Rmb/t	20,872	21,166	24,244	22,499	22,106	22,941
Methionine - unit GP	Rmb/t	6,551	5,779	6,069	5,420	5,539	6,373
Methionine - unit EBITDA	Rmb/t	4,003	3,894	4,243	3,722	3,580	4,072
Revenue	Rmb mn	11,910	12,869	14,667	15,299	16,613	18,603
Performance products	Rmb mn	8,523	9,072	10,469	10,525	10,983	12,081
Specialty products	Rmb mn	2,824	3,164	3,323	3,900	4,755	5,647
% of specialty products	%	24%	25%	23%	25%	29%	30%
Gross profit	Rmb mn	4,520	4,394	4,432	4,690	5,316	6,338
Performance products	Rmb mn	2,943	2,726	2,681	2,660	2,872	3,463
Specialty products	Rmb mn	1,408	1,539	1,606	1,885	2,298	2,729
Specialty products in total	%	31%	35%	36%	40%	43%	43%
Gross margin	%	38%	34%	30%	31%	32%	34%
Performance products	%	35%	30%	26%	25%	26%	29%
Specialty products	%	50%	49%	48%	48%	48%	48%
EBIT	Rmb mn	2,145	2,065	2,103	2,160	2,326	2,814
EBITDA	Rmb mn	3,261	3,244	3,263	3,326	3,497	3,988
EBITDA-recurring	Rmb mn	3,267	3,321	3,339	3,402	3,572	4,064
Net Profit	Rmb mn	1,352	1,472	1,536	1,586	1,713	2,086
Net Profit-recurring	Rmb mn	1,357	1,549	1,611	1,662	1,788	2,162
EPS	Rmb/sh	0.504	0.549	0.573	0.591	0.639	0.778
EPS-recurring	Rmb/sh	0.506	0.577	0.601	0.620	0.667	0.806
Operating cash flow	Rmb mn	2,708	2,602	2,165	2,454	2,477	2,759
Investing cash flow	Rmb mn	(2,301)	(2,443)	(1,581)	(968)	(968)	(968)
Free cash flow	Rmb mn	408	159	584	1,486	1,509	1,791
Net debt	Rmb mn	(1,843)	(1,180)	(1,227)	(2,158)	(3,067)	(4,129)
Net debt/Equity	%	net cash	net cash	net cash	net cash	net cash	net cash
FCF/sh	Rmb/sh	0.15	0.06	0.22	0.55	0.56	0.67
BV/sh	Rmb/sh	5.20	5.26	5.63	6.01	6.43	6.93
ROE	%	10%	10%	11%	10%	10%	12%
ROE-recurring	%	10%	11%	11%	11%	11%	12%
ROIC	%	10%	9%	9%	9%	9%	11%

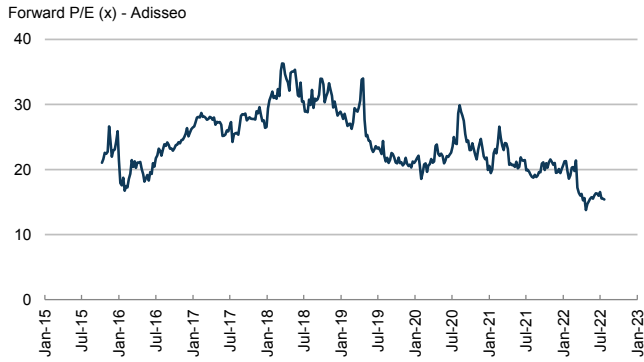
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 70: Valuation table - Adisseo

Valuations	Valuation-23E	EPS-23E	EPS-25E	Exit P/E 25E
SOTP	Rmb/sh	Rmb/sh	x	x
Performance products	4.6	0.335	0.425	12x
Specialty products	9.8	0.238	0.335	35x
Others	0.1	0.018	0.018	10x
Valuation/share	14.5			

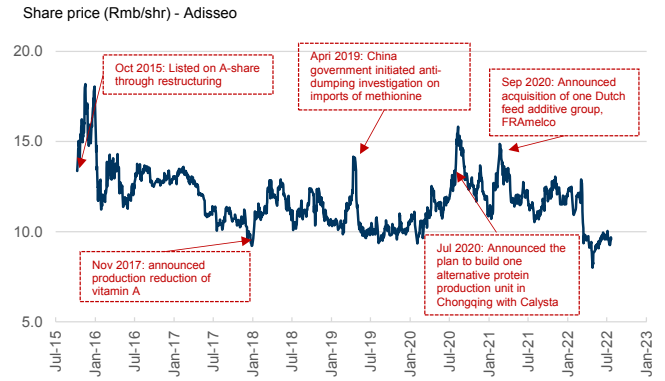
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 71: Forward P/E (x) - Adisseo



Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Exhibit 72: Share price - Adisseo



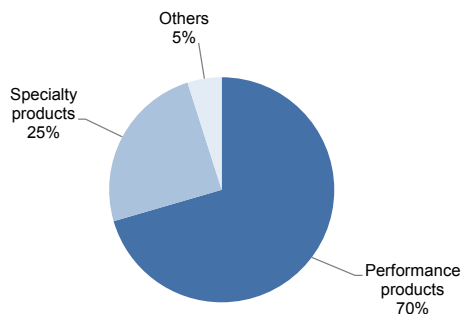
Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Company background - Adisseo

Adisseo is a top global producer in the animal feed additive and nutrition space, providing solutions in major animal protein producing category including poultry, swine, ruminants and aqua. In 2021A, the company had Rmb12.9bn in sales revenue, with 35% in EMEA, 36% in North and South America, and 27% in Asia (including 11% in China). Adisseo is the world's second largest producer of methionine (a key feed ingredient for all livestock, especially for poultry and cows), with ~25% global market shares in 2021A. As of the end of 2021A, the company has annual production capacity of 520kt/year in methionine, of which 350kt is in Europe and 170kt is in China. Adisseo has supplied a diversified animal nutrition specialty product portfolio including enzymes, rumen-protected amino-acids, organic selenium, probiotics additives, aqua & new alternative protein. According to Adisseo's annual report, the company is now the world's leading supplier of non-starch polysaccharide enzymes and rumen-protected methionine.

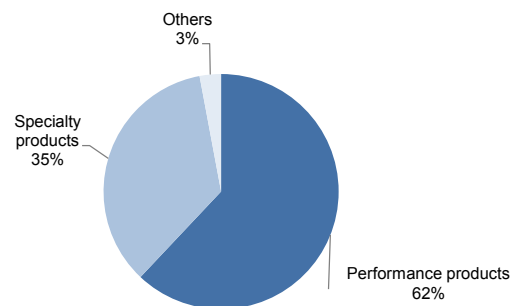
Adisseo was founded in 1939 in Commentry, France, focusing on the feed additive market. In 2006, Adisseo was acquired by BlueStar (controlled subsidiary of ChemChina). The company launched its first production unit in China of liquid methionine in 2014 and got listed on the A share market in 2015 through asset exchange whereby Adisseo replaced existing assets of BNCM (a listed vehicle under BlueStar). Adisseo is now 86%-controlled by BlueStar and thereby indirectly owned by Sinochem. Sinochem is the largest state-owned chemicals company in China formed by the merger of Sinochem and ChemChina in 2021; it is also the parent of 16 listcos including top global agriculture companies like ADAMA and Syngenta.

Exhibit 73: Revenue mix (2021A) - Adisseo



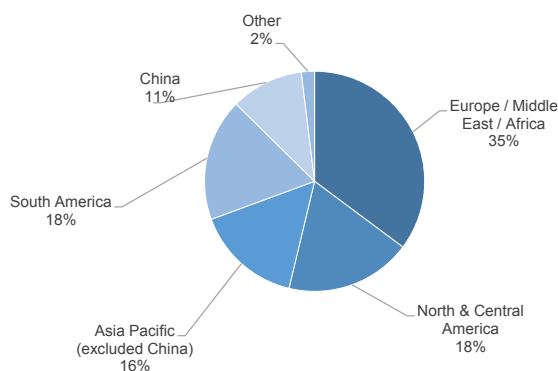
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 74: Gross profit mix (2021A) - Adisseo



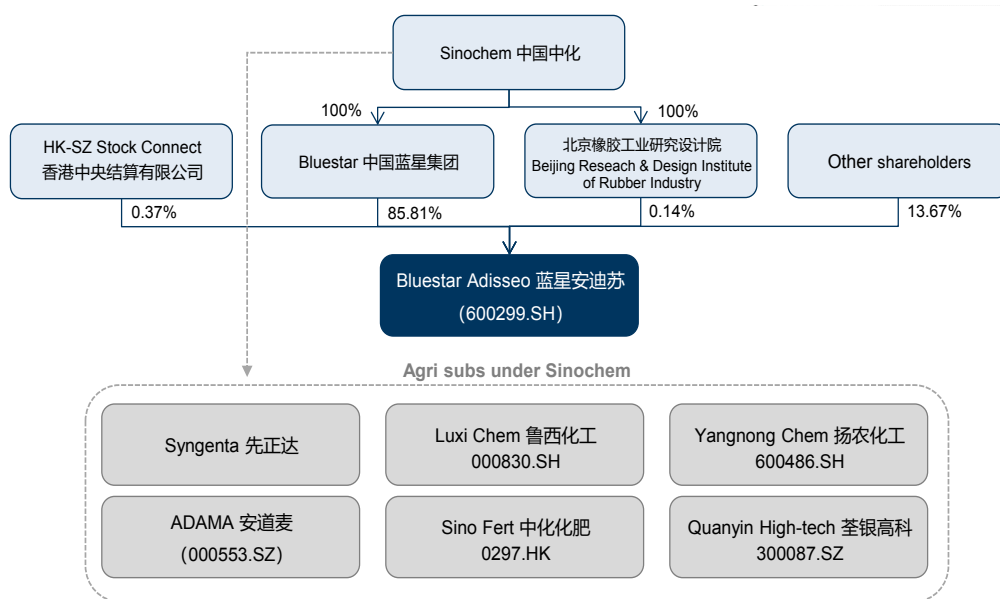
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 75: Sales by country (2021A) - Adisseo



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 76: Shareholder structure - Adisseo, 2021A



Source: Company data, Data compiled by Goldman Sachs Global Investment Research

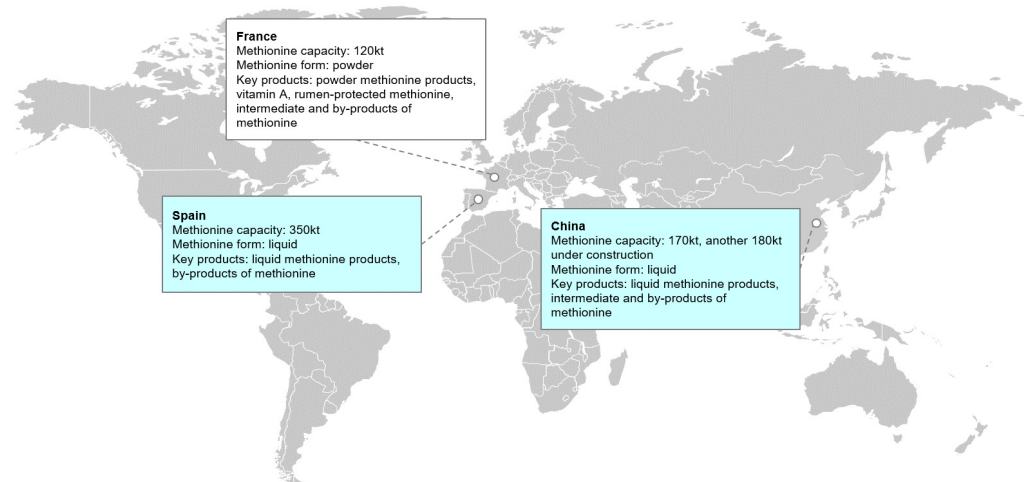
Business segments and major assets

Adisseo has two major categories of products: Performance products (including methionine and vitamins) and specialty products (mainly including rumen-protected amino-acids, enzymes, organic selenium, gut health products, and aqua products).

Performance products, which include methionine products and vitamins and other by-products, contributed 70% revenue and 62% of gross profit for Adisseo in 2021A. Adisseo one of the two global methionine producers capable of producing methionine in both liquid and powder forms, with 120kt of powder product capacity in France as well as 350kt and 170kt of liquid product capacity in Spain and Nanjing, China. The second production unit of 180kt designed liquid product capacity in Nanjing is under construction and expected to be operational by end of 2022. The company has integrated the whole production process including intermediate production both in

Europe and in China. Adisseo is also one of the world's key suppliers of vitamin A used in the feed industry, holding around 20% production capacity worldwide according to the company, and endeavors to provide a full range of vitamin offerings.

Exhibit 77: Methionine production facilities - Adisseo



Source: Company data, Goldman Sachs Global Investment Research

Specialty products contributed 25% of revenue and 35% of gross profit for Adisseo in 2021A, with a diversified animal nutrition product portfolio. Before 2014, Adisseo's specialty products mainly included non-starch polysaccharidase enzyme and rumen-protected methionine. Since 2014, the company started to accelerate its efforts in the specialty business through developing innovative products, strategic partnerships, and external acquisition. As a result, the company has enriched its enzyme and rumen-protected amino-acid product options, and expanded into more nutrition product categories including organic selenium, gut health additives (prebiotics, probiotics and organic acids), palatability and mycotoxin management products.

In 2018, Adisseo made the acquisition of Nutriad, a Belgium feed additive producer focusing on palatability and flavours, mycotoxin management and digestive efficiency. In 2018, Adisseo acquired FRAmelco, a Dutch feed additive supplier with expertise in short- and medium-chain fatty acids and lysolecithins. In 2020, Adisseo also partnered with Calysta, one US cellular agriculture startup, and established a joint venture called Calysseo, focusing on developing aqua feed solutions based on alternative protein. The first commercial scale plant funded by the joint venture is under construction in Chongqing, China.

Adisseo serves the food animal farms all across the world by direct sales to the KA customers and distributing products to small farms through its global dealer network. Specifically, the company has built strong connections with top poultry meat producers based on its leading position in the methionine industry, and its rumen-protected amino acids products have achieved huge success in American and European dairy farms. Adisseo is now actively exploring the China market for both performance and specialty products, and it is also seeking opportunities in south-east Asia aqua market.

Exhibit 78: Specialty product portfolio - Adisseo

Category	Key products	yr of launching	Key functions
Rumin-protected amino-acids	Smartmine M 斯特敏	1990s	Coated methionine designed for ruminants to be absorbed in the small intestine, can effectively increase the milk production, protein content and fat rate of dairy cows, improve the reproductive performance and health of dairy cows.
	Metasmart 美斯特	2003	Methionine designed for ruminants to be absorbed in rumen directly, promoting rumen fermentation and improve the milk production and quality.
	Rumensmart	2019	New rumin-protected methionine that promotes an increase in milk fat production in the udder
	Smartamine ML	2020	Coated methionine and lysine product designed for ruminants, promoting greater milk component/energy-corrected milk yields
Enzymes	Rovabio Advance 罗酶宝卓越型	2015	Non-starch polysaccharide enzymes used in poultry and swine diets to enhance digestibility of cereals and meals, thereby reducing feed costs (soybeans, corn, etc.)
	Rovabio Advance Phy	2019	One composite product of non-starch polysaccharide enzymes (help improve feed digestibility and utilization efficiency) and phytase enzymes (reduce nitrogen and phosphorus emissions)
	Rovabio PhyPlus	2021	Phytase enzyme product, leads to a new way of applying phytase in liquid form in the feed mixer, which will contribute to the simplification, costefficiency and safety of operations in feed mills
Organic Selenium	Selisseo 喜利硒	2014	Can improve the reproductivity, health and survival rate of poultry, pigs, and aquatic animals in adverse growth environments
Gut health products	Alterion 安泰来	2016	One probiotic product based on one bacillus subtilis strain, can inhibit the growth of a variety of pathogenic microorganisms in the gut with strong resistance, help reduce inflammation and improve production performance
	Apex 5 艾派施	2019*	One botanical product, helps balance gut microflora by controlling escherichia coli and clostridium and maintaining beneficial bacteria, thus help improve digestion and animal health
	Admix Precision 健肠宝	2019*	Developed based on Sodium Butyrate, can help promote protein digestion and absorption, reduce inflammation and enhance immunity
Aqua product	Feedkind 斐康蛋白	not available commercially	Alternative protein produced by fermenting natural gas using a naturally occurring bacteria, can be used as one sustainable feed ingredient and replacement of natural protein.
Palatability products		2018 (Nutriad)	These products stimulate feed intake and consequently support performance and health of animals (swine, ruminant, horses)
Feed preservation products		2018 (Nutriad)	These products inhibit the development of mold and bacterial pathogens in grains and feeds, thus allowing better use of feed resources and limiting waste. This product range includes also antioxidants that prevent degradation of fat and thus protect the nutritional value of feed
Mycotoxin management products		2018 (Nutriad)	These products alleviate the negative impact of mycotoxins on health, reproduction and performance of poultry, swine, ruminant, and aqua species.

*Firstly mentioned in Annual report 2019.

Source: Company data, Goldman Sachs Global Investment Research

Management background

Mr. Hao Zhihang, Chairman of the Board since 2018. Mr. Hao joined the company in 2017 as Deputy Chairman of the Board. Currently, he also works as Party Secretary and Chairman in China National BlueStar Group. Mr. Hao has served various roles within BlueStar including Deputy Party Secretary, Board Secretary and Director of Administration Office.

Mr. Jean-Marc Dublanc, Deputy Chairman of the Board since 2018. Mr. Dublanc joined the company in 2006 as Director of innovation, marketing and sales, and has been the CEO of Adisseo since 2010. Prior to joining the company, Mr. Dublanc led the personal health division at Rhône-Poulenc.

Mr. Gérard Deman, Director of the company since 2015. Mr. Deman took part alongside CVC at the leveraged buyout that made Adisseo independent in 2002, and has worked as Chairman/President of Adisseo from 2006 to 2018. Mr. Deman has nearly 45 years of experience in the global chemical industry.

Mr. Wu Jingwan, Board member of the company since 2020. Mr. Wu also serves as the CFO at the BlueStar Group. Prior to joining the firm, Mr. Wu worked as the CFO at United Technologies Corporation Asia, Legson Chemical and the Vice President of Finance at Pearson China.

Mr. Wang Hao, Board member of the company since 2021. Mr Wang joined the company in 2020 as the Executive Vice President of Adisseo Greater China and the Deputy General Manager of the company. Prior to joining the firm, Mr. Wang has served multiple management roles at a number of chemical companies for 20 years.

Mr. Ge Yougen, Board member of the company since 2018. Mr. Ge is currently the Assistant General Manager and Director of Planning and Development Department of China Bluestar Group. Prior to his position, Mr. Ge has served various roles within BlueStar Group including Deputy General Manager of China Bluestar Chemical and Director of organic silicon division of BlueStar Group.

Ms. Cai Yun, CFO of the company since 2015. Mr. Cai has been the project and internal audit director of Adisseo Nutrition Group since April 2015. Prior to her position, Ms. Cai served as Finance & HR manager, Deputy General Manager at Adisseo Life Science (Shanghai).

Brief history

1939, the company was founded in Commentry, France by Marcel Lingot, with its original name-Alimentation Equilibrée.

1971, acquired by Rhone-Poulenc and merged into its Animal Division.

2002, split from Rhône-Poulenc Group and adopted Adisseo as its name.

2006 Jan, 100% acquired by BlueStar at a total consideration of EUR0.4bn.

2013, the first production unit was launched in Nanjing, China with a designed production capacity of 140kt liquid methionine. The first phase of the project (70kt capacity) was completed and put into trial operation in 2013 and officially became operational in 2014.

2013, completed the capacity expansion of 25kt methionine in Spain, and 33kt intermediate in France.

2015 Oct, listed on A share market in 2015 through asset exchange whereby 85% stake of Adisseo Nutrition Group replaced BNCM (a listed vehicle under BlueStar)'s existing assets.

2016, concluded the second phase (70kt capacity) of the first Nanjing plant, increasing production capacity to 140kt.

2018, construction of Nanjing's 2nd production unit began, designed to increase liquid methionine production capacity by 180k tonnes.

2018 Feb, acquired 100% stake of Nutriad, one Belgium feed additive producer at a total cash consideration of USD193mn.

2018, expanded liquid methionine capacity in Europe by 50kt.

2019, expanded methionion capacity in the Nanjing plant to 170kt.

2019 Oct, controlling shareholder Bluestar issued Rmb4.5bn worth of convertible bonds equivalent to 15% of Adisseo A shares.

2020 Feb, established a joint venture, Calysseo, with a US cellular agriculture startup, Calysta and co-invested a total of USD80mn, each accounting for a 50% stake to exclusively develop alternative protein products in Asia.

2020 Apr, acquired the remaining 15% stake of Adisseo Nutrition Group from its controlling shareholder Bluestar.

2020 Dec, acquired FRAmelco, a Dutch feed additive group for a total consideration of Rmb576mn.

2021 Aug, increased capacity of liquid methionine in Spain by 30kt.

2021, the joint venture Calysseo under Adisseo's aqua product unit, started construction of its first production facility based in Chongqing, China.

China Animal Husbandry Industry (600195.SS, Buy, Rmb17.50/sh): Regaining momentum and resetting growth

600195.SS	12m Price Target: Rmb17.5	Price: Rmb12.74	Upside: 37.4%		
Buy	GS Forecast				
		12/21	12/22E	12/23E	12/24E
Market cap: Rmb12.9bn / \$1.9bn	Revenue (Rmb mn)	5,301.6	5,559.5	6,502.0	7,413.0
Enterprise value: Rmb12.5bn / \$1.8bn	EBITDA (Rmb mn)	752.4	769.7	1,070.4	1,428.8
3m ADTV :Rmb122.3mn/ \$18.2mn	EPS (Rmb)	0.51	0.52	0.75	1.02
China	P/E (X)	23.1	24.5	17.1	12.5
China Agriculture	P/B (X)	2.4	2.3	2.0	1.7
	Dividend yield (%)	1.3	1.2	1.7	2.4
M&A Rank: 3	N debt/EBITDA (ex lease,X)	(1.3)	(1.9)	(1.8)	(1.9)
Leases incl. in net debt & EV?: No	CROCI (%)	12.4	23.8	29.0	35.1
	FCF yield (%)	(0.7)	4.4	4.9	8.2
		6/21	12/21	6/22E	12/22E
	EPS (Rmb)	0.38	0.23	0.22	0.30

Source: Company data, Goldman Sachs Research estimates, FactSet. Price as of 05 Aug 2022 close.

Initiate with BUY: China Animal Husbandry Industry Co., Ltd. (CAHIC) is one of the leading state-owned animal health companies under the China National Agricultural Development Group (中国农发集团), which is owned by the central SASAC. The company engages in the development of animal vaccines against major animal diseases, and was ranked one of top 3 FMD and Avian flu vaccine producers nationwide. We see CAHIC as well positioned to capture broader sector growth opportunities in hog vaccines including FMD and potential ASF, and others including the pet market. Its successful transformation from the traditional government purchased market supplier may also drive additional positive surprises. We initiate on CAHIC with a Buy rating and a 12m target price of Rmb17.50/sh.

Regaining momentum in private vaccine sector, resetting higher LT margin: While uncertainty may still persist, CAHIC's rapid gain in market share in the private FMD sector in the past few years (from 7% in 2018A to 21% in 2021A per our estimates) provides confidence of a successful transformation of the company, that potentially may go beyond its effort on FMD. We estimate its private FMD sales to ramp up from the current 30% to nearly 90% in 2025E, driven by 80% higher ASP and earnings from the segment to nearly double over the period.

Potential ASF vaccine license winner, thrive to diversify revenue streams: We understand the development of subunit ASF vaccine has achieved more advanced stage than others, by Lanzhou Veterinary Research Institute, a close partner of CAHIC. Its potential launch for selected regions for potential outbreaks could make CAHIC one of the top three authorized producers, adding a potential Rmb300mn profit and account for 26-29% of our NP forecast for CAHIC over 2024-2025E. In addition, we note CAHIC has exposures to a wide range of vaccines and technology development, including subunit vaccine, ruminant and pet vaccine products - although the growth strategy remains unclear, yet it is well positioned in product development to capture the growth opportunity of the overall sector.

Valuation and target price: Our valuation is based on SOTP, including 1) Rmb12.6/sh on livestock vaccines; 2) Rmb0.3/sh on pet vaccines; 3) Rmb3.2/sh on veterinary drugs; 3) Rmb1.1/sh on feed additives, and Rmb0.3/sh on the trading business. Our 12m target price implies PE of 23.5x on 2023E and PE of 17.2x on 2024E, versus peers in the 20-40x range. On ex-ASF basis, our valuation would be Rmb12.5/sh, implying 21.0x 2023E P/E.

Key risks: 1) Hog diseases outbreak like ASF leading to lower-than-expected hog output, which could in turn result in lower-than-expected demand for vaccines; 2) More intensified market competition than expected could squeeze market share and margins; 3) Risks from supportive policy changes like subsidy reduction for FMD private purchase vaccines, which could result in lower-than-expected demand and pressure on ASP; 4) Biosecurity risks which could result in government penalties such as shutting of factories or suspension/revoke of licenses.

Regaining momentum in private vaccine sector, resetting higher LT margin

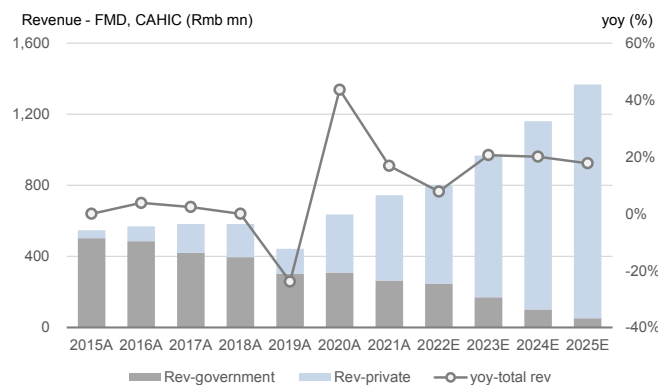
We see accelerated efforts by CAHIC to shift into the more profitable private vaccine segment, from the government purchase segment in key products such as FMD vaccine. While uncertainty may still persist, its rapid gain in market share in the private FMD sector in the past few years (from 7% in 2018A to 21% in 2021A per our estimates) provides confidence of a successful transformation of the company, that potentially may go beyond its effort in FMD. We estimate CAHIC to reach a potential 28% market share in FMD in the coming five years, with gross profit to nearly double from Rmb520mn in 2021A in FMD sales, to Rmb957mn by 2025E.

CAHIC has dominated the government-purchased vaccine segment for livestock in compulsory disease categories in the past: 35-45% in FMD and 9-13% of avian flu in 2015-2020A, per our estimates. On the other hand, CAHIC only accounted for 1-7% market shares in the private purchase segment, where higher ASP and margins were generated. Specifically, we estimate unit ASP in private purchase FMD ranged Rmb1.5-3.8/ml, versus Rmb0.5-1.2/ml in the government-purchased sector. Since 2019A, in responding to the government policy on gradually phasing out government purchased vaccine, CAHIC started to venture into the private FMD vaccine sector to offset the slowdown in government-sponsored vaccine sales, through upgrades in both production technology (transform from spinner culture to suspension culture in 2020A) and sales network. As a result, we estimate its private FMD sales volume has expanded by more than 200% since, with private sales volume accounting from 10% of its total in 2018A, to 30% by 2021A.

CAHIC has been focusing more efforts in gaining shares among large hog producers, which are sweet spots given their more aggressive expansion versus overall hog markets, and higher vaccine penetration rate. We estimate the top 20 hog producers to reach 272mn heads output by 2025E, from 136mn heads in 2021A, implying 40% of the market share in hog vaccines. Based on management comment, the company has sustainably increased its penetration into large-scale livestock producers in recent years, including 11 of the top 20 largest hog firms in the domestic market. CAHIC has started supplying Muyuan, the largest hog producer in China since 2018, and also in April 2022 established a joint venture Henan Zhongmu-Muyuan (河南中牧牧原), focusing on veterinary drug and ingredient production.

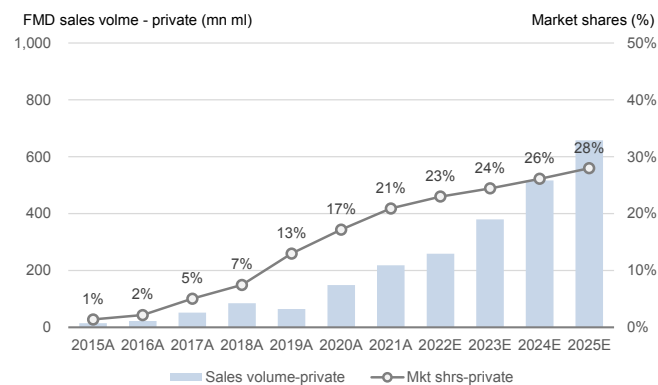
On the other hand, given the focus on market share gain among the major producers, including Jinyu, CAVET (中农威特) and Tecon (天康生物), the ASP of private purchase FMD vaccine has deteriorated from Rmb3.8/ml in 2018 to Rmb1.5-2.2/ml at present, and we expect pricing may remain depressed in this oligopoly market, and have assumed an additional 10% decline from 2021A to 2025E.

Exhibit 79: FMD revenue breakdown by government and private purchases - CAHIC



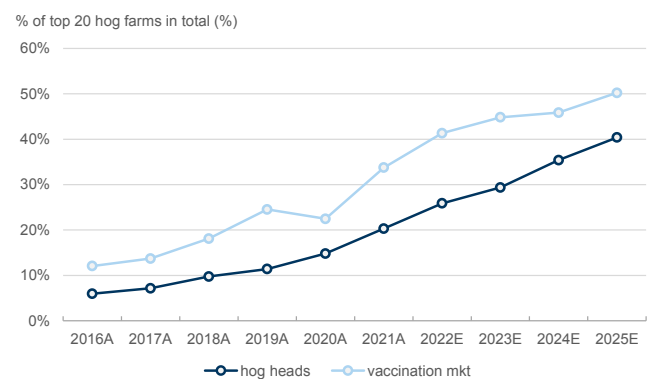
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 80: FMD private sales volume and market shares - CAHIC



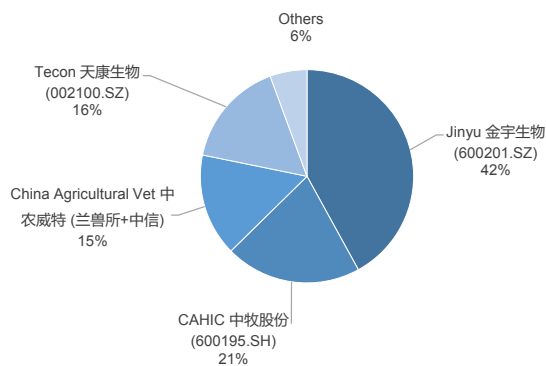
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 81: Top 20 hog farms as percentage of total industry - China



Source: MOA, Company data, Goldman Sachs Global Investment Research

Exhibit 82: Major competition - FMD vaccines, 2021A

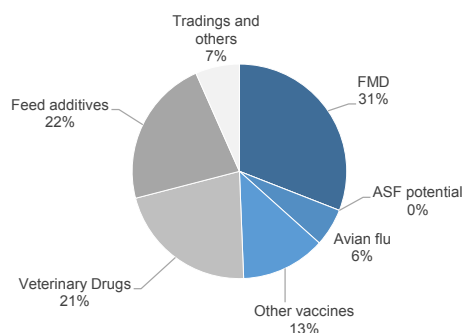


Source: China Veterinary Drug Association, Company data, Goldman Sachs Global Investment Research

Potential ASF vaccine license winner, thrive to diversify revenue stream

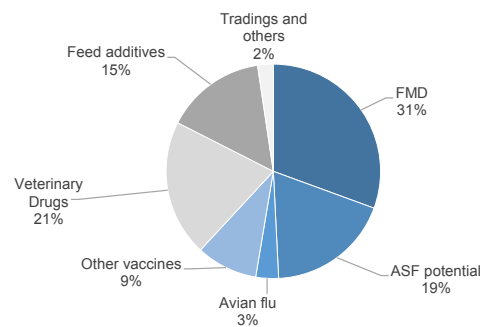
Beyond its growth outlook in FMD, we also expect CAHIC to benefit from potential ASF vaccine development, as well as diversified revenue stream. We note CAHIC has exposures to a wide range of vaccines and technology development, including subunit vaccine, ruminant and pet vaccine products - and is well positioned to capture the growth opportunity of the overall sector.

Exhibit 83: Gross profit contribution by major products - CAHIC, 2021A



Source: Company data

Exhibit 84: Gross profit contribution by major products - CAHIC, 2025E



Source: Goldman Sachs Global Investment Research

We also expect CAHIC could be one of the few among the first batch of license winners of the untapped ASF vaccine market. ASF vaccine development in China has been taking place through various technologies, including gene-deleted vaccine (基因缺失疫苗), protein subunit vaccine (亚单位疫苗), viral vector vaccine (载体疫苗), and mRNA vaccine. Based on discussion with producers and researchers, we understand that China has 1) become more cautious on live vaccines including traditional and gene-deleted live attenuated ones, given the risk of virus mutation; 2) technology and procedural barrier is high in viral vector and mRNA, 3) On a relative basis, subunit (亚单位疫苗), being developed by Lanzhou Veterinary Research Institute (兰研所) and Pulike (普莱柯) looks more promising at this stage; 4) Overall, given the lack of understanding on the vaccine impact on large population of hogs, the use of potential ASF vaccine can be only implemented for selected regions during outbreak, instead of industry-wide vaccine requirement. We estimate a 20% penetration of the potential ASF hog would lead to a potential market size of Rmb2.9bn by 2030E, and CAHIC is likely to be one of the top three authorized producers, given its partnership with Lanzhou Veterinary Research Institute and Pulike. We estimate potential launch of subunit ASF emergency vaccine could add ~Rmb300mn profit and account for 26-29% of our NP forecast for CAHIC over 2024-2025E.

We view CAHIC's well diversified product portfolio, combined with its market-focused transformation, are central for its future expansion. The company has 800 different types of products covering all major animal diseases, and mapping the universe of evolving technology routines.

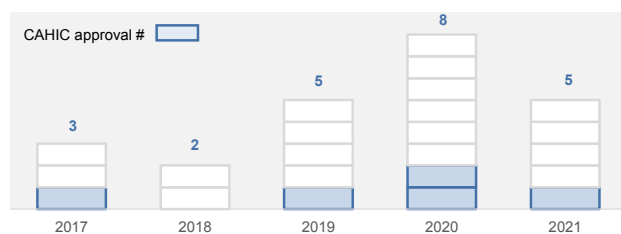
- Vaccines: Other than FMD and potential ASF products, CAHIC covers basic vaccine genres such as live attenuation and inactivation, to gene-deleted and subunit

vaccines. In 2021, the company’s PCV2 peptide-based subunit vaccine (“猪圆环病毒2型合成肽疫苗(多肽0803+0806)”) was licensed by MOA through its indigenous synthetic peptide technology (“合成肽技术”). The product is qualified as a first-in-class new veterinary product (一类新兽药), which shortens the vaccine production time versus gene-engineered vaccine and extended the protection period to 4 months with a 100% protection rate. During 2017-2021A, CAHIC has been granted 5 first-in-class veterinary drug licenses, ahead of its domestic peers among a total of 23 first-in-class licenses granted during that period. CAHIC is also looking to develop the next generation FMD vaccine with higher protection rate, as well as vaccines for ruminants.

- **Drugs and food additives:** CAHIC’s drug operation has gone through a transformation in 2018-2020A, as the company shifted from prohibitive growth-promoting antibiotics into more preventive antibiotics for digestive and respiratory diseases (三泰一氟, or Tiamulin(泰妙菌素), Tylvalosin(泰万菌素), Tylosin(泰乐菌素), and Florfennicol(氟苯尼考)) - as the prohibitive products contribution in total sales contracted from 45% of the total drug sales in 2012A to 20% in 2021A. CAHIC managed to grow its revenue at an average of 16% yoy, and we expect a 10% CAGR in the coming years mainly driven by growth of antibiotic alternative products. In feed additives, we view most of its current products (multi-vitamins(复合维生素) and premix(预混料)) as commoditized, yet we expect 7% CAGR in 2022-25E driven by bundle-sales synergy with other segments.
- **Pet products:** CAHIC has commercialized pet vaccine product in rabies vaccine (犬用/猫用狂犬病疫苗) and canine DHPP vaccine (犬四联疫苗) among the very few domestic suppliers, and has feline FVRCP vaccine (猫三联疫苗) in its R&D pipeline. While there is a lack of visibility on its sales marketing strategy, the early preparation of pet products puts CAHIC potentially ahead of its domestic competitors in our view. We have assumed 1.5% share in pet vaccine market by 2025E, or revenue of Rmb37mn in 2025E, similar to Ringpu’s share.

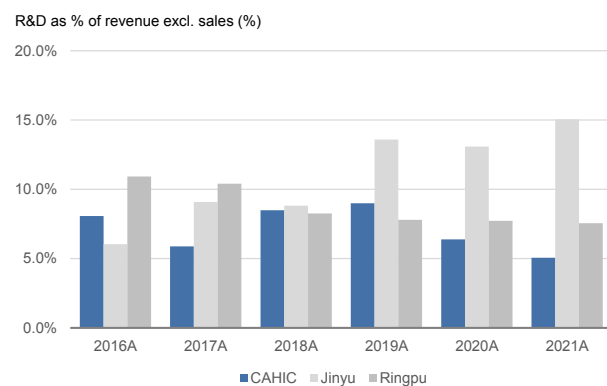
Exhibit 85: First-in-class product summary - CAHIC

English name	Chinese name	Year
Peptide-based PCV2 subunit vaccine	猪圆环病毒2型合成肽疫苗	2021
Ethanamizuril solution	沙咪珠利溶液	2020
Ethanamizuril ingredient	沙咪珠利	2020
FMD Type O, A inactivated vaccine	猪口蹄疫O型、A型二价灭活疫苗	2017



Source: MOA, Company data, Compiled by Goldman Sachs Global Investment Research

Exhibit 86: R&D expenditure and as % of revenue - CAHIC versus peers



Source: Company data, Compiled by Goldman Sachs Global Investment Research

Financials and valuations - CAHIC

We initiate on CAHIC with a Buy rating and a 12-month TP of Rmb17.50/shr, implying 37% upside. We expect the company to deliver top line growth of 10% CAGR in 2021-2025E:

Biopharmaceutical segment: we expect the company's biopharmaceutical/vaccine business to deliver a strong growth of 24% CAGR in the coming four years, driven by strong expansion of FMD private vaccine and launch of ASF vaccine from 2023E. The gross profit is expected to more than double and reach Rmb1.9bn in 2025E, with the gross margin sequentially improving from 58% in 2021A to 64% in 2025E, benefitting from transformation into the more profitable private vaccine sector.

Veterinary drugs: we expect the segment revenue to grow steadily at a CAGR of 10% based on its preventive antibiotic product mix, with the margin improvement from 30% in 2021A to 35% in 2025E after the launch of its API capacity by end of 2023E.

Feed additives: the segment is expected to grow by a 7% CAGR in the coming years with stable margins, with its GP contribution reaching Rmb286mn in 2025E.

Overall, we expect CAHIC's net profit to increase by 3% yoy in 2022E, and to accelerate in 2023/24E with 44%/36% yoy growth driven by the launch of ASF vaccine and continued share expansion in the private FMD vaccine market. Net profit is expected to reach Rmb1.2bn in 2025E, from Rmb5.1bn in 2021A. Our net profit forecast is 14% below Bloomberg consensus for 2022E, and 4%/23% higher than consensus for 2023-24E as we expect higher earnings contribution from ASF and FMD vaccines.

We expect CAHIC to maintain a net cash position as before, and assume a flat capex at Rmb500mn in the coming years, mainly on vaccine production line upgrade and API capacity expansion.

We adopt SOTP as the primary valuation methodology for CAHIC based on its comprehensive integrated business operations, and our target price consists of:

- Rmb12.6/sh for the livestock vaccine, based on 2025E EPS of Rmb0.764/sh and 20x 2025E P/E, benchmarking the domestic veterinary vaccine peers.
- Rmb0.3/sh for pet vaccine, based on 2025E EPS of Rmb0.009/sh and 40x 2025E P/E, derived from the average of 20-60x P/E range of global peers.
- Rmb3.2/sh for the veterinary drug segment, based on 2025E EPS of Rmb0.254/sh and 15x 2025E P/E, derived from the lower end P/E of China pharma industry to reflect the lower growth outlook.
- Rmb1.1/sh for the feed additive segment, based on 2025E EPS of Rmb0.113/sh and 12x 2025E P/E, derived from the average of global and A-share peers such as Evonik (EVKn.DE, covered by GS European chemicals analyst Georgina Fraser) and NHU (002001.SZ, Not Covered).
- Rmb0.3/sh for the trade segment, based on 2025E EPS of Rmb0.023/sh and 10x 2025E P/E.
- Accordingly, we derive a 12-month SOTP-based target price of Rmb17.50 (37%

upside), implying a 23.5x 2023E P/E and 17.2x 2024E P/E.

Exhibit 87: Valuations - CAHIC

Valuations SOTP	Valuation-23E Rmb/sh	EPS-23E Rmb/sh	EPS-25E Rmb/sh	Exit P/E 25E x
Livestock vaccine	12.6	0.464	0.764	20
Pet vaccine	0.3	0.002	0.009	40
Veterinary Drugs	3.2	0.158	0.254	15
Feed additives	1.1	0.090	0.113	12
Others	0.3	0.020	0.023	10
Valuation/share	17.50	0.735	1.163	

Source: Goldman Sachs Global Investment Research

Exhibit 88: Financials & valuation with / without ASF - CAHIC

CAHIC 600195.SH	Rev-2023E Rmb mn	Rev-2025E Rmb mn	NP-2023E Rmb mn	NP-2025E Rmb mn
With ASF	6,502	7,880	757	1,188
Without ASF	6,018	6,908	607	875
	Valuation-23E Rmb/sh	EPS-23E Rmb/sh	EPS-25E Rmb/sh	Implied P/E 23E x
With ASF	17.5	0.735	1.163	23.5
Without ASF	12.5	0.588	0.856	21.0

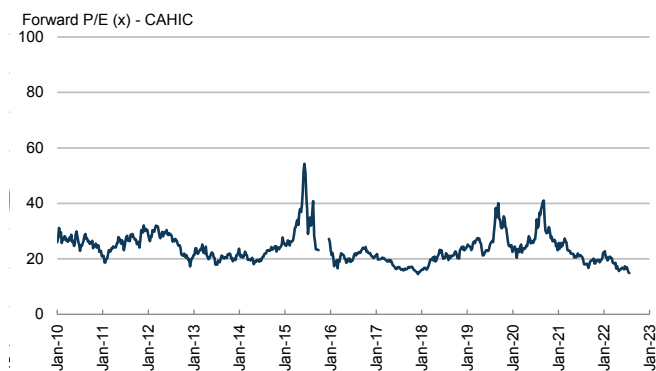
Source: Goldman Sachs Global Investment Research

Exhibit 89: Key assumptions and financials - CAHIC

Key assumptions and financials - CAHIC		2020A	2021A	2022E	2023E	2024E	2025E
Sales volume							
FMD-口蹄疫	mn ml	743	726	731	707	712	758
FMD gov-口蹄疫政府	mn ml	595	508	472	327	195	100
FMD private-口蹄疫市场	mn ml	149	218	259	379	517	657
ASF-非洲猪瘟	mn ml	-	-	-	48	97	97
Avian flu-禽流感	mn dose	1,272	835	862	886	910	934
Feed additives	kt	144.1	155.1	162.9	171.0	179.6	188.6
Multi-vitamins additives	kt	7.2	7.8	8.1	8.6	9.0	9.4
Revenue							
	Rmb mn	4,999	5,302	5,559	6,502	7,413	7,880
yoy %	%	21.4%	6.1%	4.9%	17.0%	14.0%	6.3%
Biopharmaceutical(生物制药)							
-ASF potential	Rmb mn	1,433	1,429	1,507	2,172	2,866	3,097
Veterinary Drugs (兽药)	Rmb mn	-	-	-	484	972	972
Veterinary Drugs (兽药)	Rmb mn	1,014	1,257	1,383	1,521	1,673	1,840
Feed additives (饲料添加剂)	Rmb mn	1,117	1,102	1,156	1,296	1,360	1,428
Trading	Rmb mn	1,413	1,450	1,450	1,450	1,450	1,450
Gross profit							
	Rmb mn	1,311	1,514	1,665	2,151	2,688	2,963
Biopharmaceutical(生物制药)							
-FMD	Rmb mn	754	831	923	1,339	1,776	1,937
-ASF potential	Rmb mn	445	520	561	677	813	957
-ASF potential	Rmb mn	-	-	-	291	583	583
-Avian flu	Rmb mn	146	96	99	102	105	107
-Pet	Rmb mn	-	-	4	7	10	22
-Other vaccines	Rmb mn	163	214	263	270	276	290
Veterinary Drugs (兽药)	Rmb mn	271	363	415	456	544	644
Feed additives (饲料添加剂)	Rmb mn	207	208	231	259	272	286
Tradings and others	Rmb mn	78	112	92	90	86	74
Associate income (feed additives)	Rmb mn	207	169	174	179	184	189
Gross margin							
	%	26%	29%	30%	33%	36%	38%
Biopharmaceutical							
	%	53%	58%	61%	62%	63%	64%
Veterinary Drugs							
	%	27%	29%	30%	30%	33%	35%
Feed additives							
	%	19%	19%	20%	20%	20%	20%
EBIT							
	Rmb mn	555	669	650	941	1,291	1,472
EBITDA							
	Rmb mn	743	932	944	1,249	1,613	1,807
Net Profit							
	Rmb mn	420	514	527	757	1,033	1,188
Net Profit-recurring							
	Rmb mn	432	520	544	774	1,050	1,204
EPS							
	Rmb/sh	0.453	0.506	0.519	0.746	1.018	1.169
EPS-recurring							
	Rmb/sh	0.425	0.512	0.536	0.762	1.034	1.186
Operating cash flow							
	Rmb mn	666	383	1,120	1,186	1,657	2,029
Investing cash flow							
	Rmb mn	(495)	(91)	(500)	(500)	(500)	(500)
Free cash flow							
	Rmb mn	171	292	620	686	1,157	1,529
Net debt							
	Rmb mn	(856)	(1,012)	(1,474)	(1,934)	(2,783)	(3,956)
Net debt/Equity							
	%	net cash	net cash	net cash	net cash	net cash	net cash
FCF/sh							
	Rmb/sh	0.17	0.29	0.61	0.68	1.14	1.51
BV/sh							
	%	4.41	4.84	5.51	6.41	7.65	9.12
ROE							
	%	9.8%	10.9%	10.0%	12.5%	14.5%	13.9%
ROIC							
	%	8.4%	9.5%	8.2%	10.5%	12.4%	12.0%

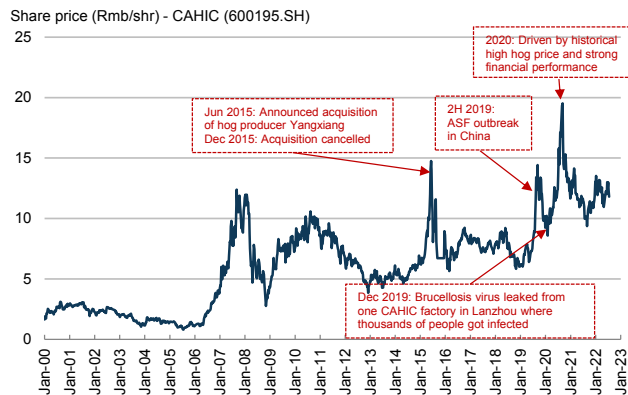
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 90: Forward P/E - CAHIC



Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Exhibit 91: Share price - CAHIC



Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Risks

- 1) Hog diseases outbreak like ASF may result in large amounts of hog herd culling, leading to lower-than-expected hog output, which could in turn result in lower-than-expected demand for vaccines; Economic loss caused by hog diseases may also result in budget cuts on vaccines.
- 2) More intensified market competition than expected could squeeze market share and margins, especially in the oligopoly FMD private market, where the ASP has deteriorated in recent years from Rmb3.8/ml in 2018 to Rmb1.5-2.2/ml.
- 3) Risks from supportive policy changes like subsidy reduction for FMD private purchase vaccines, which implies higher vaccination cost for farmers, could result in lower-than-expected demand especially from backyard farms and pressure on ASP and margins.
- 4) Biosecurity risks which could result in government penalties such as shutting of factories or suspension/voke of licenses. For example, in Dec 2019 Brucellosis virus leaked from one CAHIC factory in Lanzhou where thousands of people got infected, which led to license cancellation and millions of compensation for CAHIC.

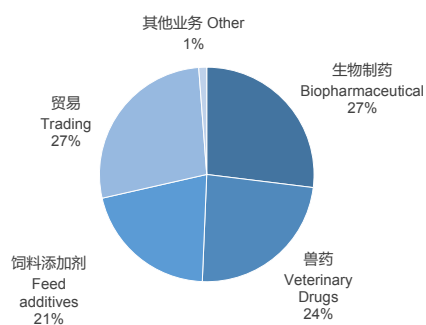
Company background - CAHIC

China Animal Husbandry Industry Co is one of the leading state-owned animal health producer active in the fields of animal vaccines, veterinary drugs, and feed & feed additives with 20+ production bases nationwide and business presence in over 60 countries and regions across the globe.

In 2011, CAHIC's revenue was Rmb5.3bn, of which 27% was from animal vaccines, 24% from veterinary drugs, 21% from feed additives, and the rest mostly in trading (of veterinary drug and feed raw materials). Among all, vaccines contributed to more than 50% of its gross profit. CAHIC is actively engaging in the development of animal vaccines against major animal diseases including FMD, avian flu, swine fever and PRRS, ranking as one of the Top 3 FMD and Avian flu vaccine producers nationwide (with 24% and 7% market share, respectively by volume per our estimates) through its proxy-controlled subsidiary QYH Biotech Co., Ltd. (“乾元浩生物”).

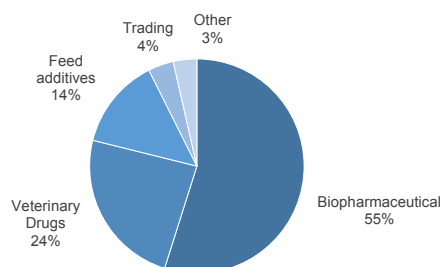
CAHIC was founded in 1998 and listed on the Shanghai Stock Exchange in 1999. The company is now 49.6% owned by China Animal Husbandry Group (“CAHG”; 中国牧工商集团) as of end of 2021A, the largest imported animal vaccine agent in China. China National Agricultural Development Group (“CNADG”; 中国农业发展集团) is CAHIC's ultimate beneficial shareholder through a 100% holding of CAHG, also the owner of ZhongNongFa Seed Industry Group (“农发种业”; 600313.SH, the largest wheat seed producer in China), and NFC Overseas Fisheries (“中水渔业”; 000798.SZ, the largest fishery company in China).

Exhibit 92: Revenue mix 2021A - CAHIC

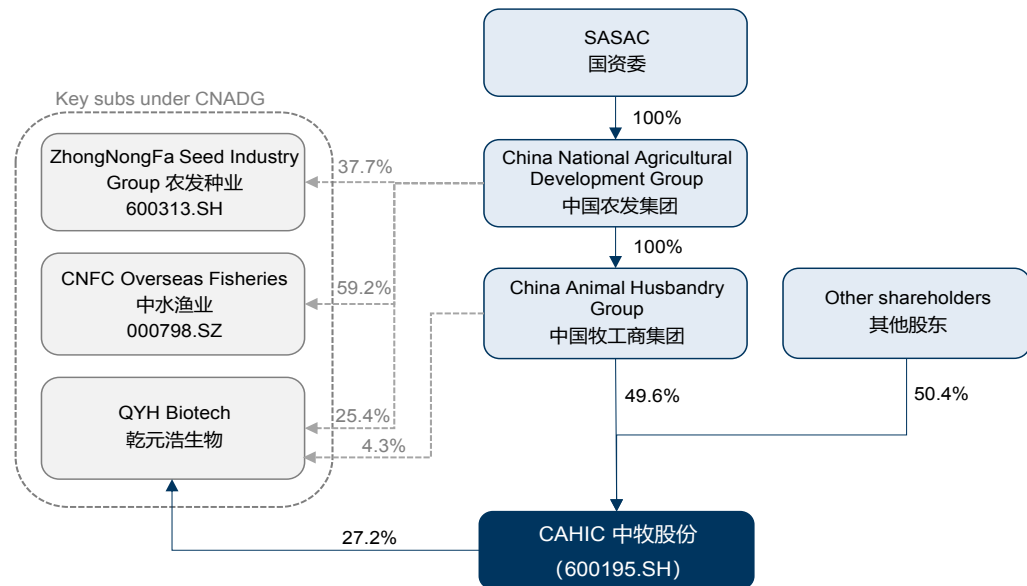


Source: Company data

Exhibit 93: Gross profit mix 2021A - CAHIC



Source: Company data

Exhibit 94: Shareholder structure - CAHIC (as of 2021A)

Source: Company data, Data compiled by Goldman Sachs Global Investment Research

Business segments and major assets

CAHIC has four major categories of products: vaccines (mainly including FMD, Avian flu, classic swine fever and PRRS vaccines), veterinary drugs (mainly including tiamulin(泰妙菌素), tylvalosin tartrate(酒石酸泰万菌素), and florfenicol(氟苯尼考), and Florfenicol(氟苯尼考)), feed additives (including multi-vitamins and premix under the brand “Hualuo” (华罗) and trading business (of drug and feed raw materials).

CAHIC is actively engaging in the development of animal vaccines against major animal diseases including FMD, Avian flu, classic swine fever and PRRS diseases: ranking as one of the Top 3 FMD vaccine producers nationwide, and second largest producer of Avian flu vaccine through its proxy-controlled subsidiary QYH Biotech Co., Ltd. (“乾元浩生物”), which is now in the A-share filing stage, with over 98% of revenue in 2021A coming from poultry vaccines.

- *Lanzhou production base* produces FMD vaccines with an annual capacity of 1.5bn doses, which is fully controlled by CAHIC and partnering with Lanzhou Veterinary Research Institute on FMD vaccine production and development.
- *Chengdu production base* mainly produces hog vaccines with a capacity of 590mn doses per year. CAHIC owns a 91% stake of the base and reported a Rmb1.5mn subsidiary loss in 2021A.
- *Nanjing and Zhengzhou production bases*, operated by QYH Biotech (“乾元浩”) mainly produce Avian flu and other poultry vaccines with annual capacity of 8.0bn doses live vaccines and 2.4bn ml inactivated vaccines in total. CAHIC owns a 27.21% stake of QYH Biotech, which reported Rmb65mn of net profit and Rmb261mn of revenue in 2021A.

For veterinary chemical and drug segment, CAHIC has established a diversified portfolio

of antibiotic products including tiamulin(泰妙菌素), tylvalosin tartrate(酒石酸泰万菌素), and florfenicol(氟苯尼考), contributing 21% of CHAIC's sales and 14% of gross profit in 2021A. Currently, CAHIC has 2 drug production bases in operation and another base under construction (estimated to launch in 2H23) for tylosin(泰乐菌素), the raw material of tiamulin. CAHIC has successfully transferred the focus of its drug business from prohibitive growth-promoting antibiotics into more preventive antibiotics that have a better growth outlook.

- *Jining production base*, operated by Shengli BioTech (“胜利生物”) produces up to Rmb300mn worth of tiamulin, enramycin, nosiheptide and flavomycin every year. CAHIC owns a 55% stake in the company which reported Rmb79mn of net profit and Rmb510mn of sales in 2021.
- *Wuxue production base*, operated by Zhongmu Anda, produces up to Rmb200mn worth of florfenicol, olaquinox, and shifenacil every year. CAHIC owns an 80% stake of the company which reported a Rmb19.6mn net loss in 2021.
- *Inner Mongolia production base* produces up to Rmb170 mn worth of flavomycin, tyvanosin tartrate and monensin per year, which is fully controlled by CAHIC and reported Rmb46mn of net profit in 2021.

For feed & feed additives, CAHIC mainly focuses on the production of multi-vitamin feed additives, premix feed, and concentrate feed, in which each has 8kt, 100kt, and 150kt of annual capacity according to the company's disclosure. In CAHIC's trading business, CAHIC trades the raw materials of its veterinary drug and feed business including corn, soybean meal, fish meal, vitamins and minerals, benefiting from lower price synergy with other segments.

Exhibit 95: CAHIC vaccine and drug summary

Product name	产品名称	Details
Vaccine segment		
FMD vaccine	口蹄疫	One of top 3 FMD vaccine producers nationwide
Avian flu vaccine	禽流感疫苗	2nd largest producer of avian flu vaccine through its proxy-controlled subsidiary QYH Biotech Co., Ltd. (“乾元浩生物”)
Other hog vaccines	其他猪用疫苗	Including CSF-猪瘟, PRRS-蓝耳, PRV-伪狂犬, PCV-猪圆环 vaccines and etc.
Rabies vaccine (for dogs/cats)	狂犬疫苗 (犬猫用)	Mainly for government purchase
Canine DHPP vaccine	犬四联疫苗	One of the only three holders of DHPP vaccines in China.
Veterinary drug segment		
Tiamulin	泰妙菌素	Mainly used for prevention and treatment of Myho-猪支原体肺炎, respiratory diseases and ileitis.
Tylosin	泰乐菌素	Raw material of tylvalosin, mainly used for streptococcal(链球菌) and staphylococcus(金黄色葡萄球菌) aureus infections and Myho-猪支原体肺炎
Tylvalosin Tartrate	酒石酸泰万菌素	With similar effects with tylosin, also effective against PRRS virus.
Florfenicol	氟苯尼考	Mainly used for prevention and treatment of Pleuropneumonia(猪传染性胸膜肺炎), Haemophilus parasuis(副猪嗜血杆菌病) and other respiratory and digestive diseases.

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 96: CAHIC feed and feed additives summary

Producer	Animal type	Capacity (kt)
Multi-vitamins additive		
Beijing Hualuo	北京华罗生产线	poultry, swine, ruminants and aqua
		8
Premix feed		
Tianjin Hualuo	天津华罗生产线	poultry and swine
Nantong Hualuo	南通华罗生产线	poultry and swine
Changchun Hualuo	长春华罗生产线	poultry, swine and aqua
Wuhan Hualuo	武汉华罗生产线	n/a
Xinxiang Hualuo	新乡华罗生产线	n/a
		20
		100
Concentrate feed		
Changchun Hualuo	长春华罗生产线	poultry and swine
Xinxiang Hualuo 1	新乡华罗生产线	n/a
Xinxiang Hualuo 2	新乡华罗生产线	n/a
		50
		50
		150
Corn and protein powder		
Tianjin Hualuo	天津华罗生产线	n/a
		2.5
		2.5

Source: Company data, Goldman Sachs Global Investment Research

Management background

Mr. Wang Jiancheng, Chairman of the Board since 2015. Prior to starting his position, Mr. Wang served as the General manager for Zhongya Animal Health Company (“中亚动物保健品总公司”) and Deputy General Manager for China Animal Husbandry Group (“中国牧工商集团”).

Mr. Wu Dongxu, General Manager since 2017. Prior to his position, Mr. Wu served as

Assistant of the General Manager and Head of Biological Products Sales of CAHIC.

Mr Guo Liang, Board Secretary since 2018. Mr. Guo served as Deputy Manager of Investment Management and Chief Officer of Administration for CAHIC. He also served as General Manager and Board Director for Huamu Poultry Breeding Center (“北京华牧家禽育种中心”), Deputy Chief Engineer for China Animal Husbandry Group, Chairman of China Nongfa Food Company (“中国农发食品”), and several other positions within the CNADG.

Mr. Su Zhiqiang, Deputy General Manager since 2017. Prior to his position, he served as assistant of the General Manager of the company, Secretary of the Discipline Committee of Zhongnongfa Seed Industry Group (600313.SS), General Manager of Huaan Food Company and several other positions within the CNADG.

Mr. Zhang Zhenghai, served as Deputy General Manager of the company since 2013, Before joining CAHIC, Mr. Zhang served as Board Director and Senior Vice President for CSPC Pharma (1093.HK).

Mr Huang Jingjian, Chief Accountant since 2018. Prior to his position, Mr. Huang served as Deputy General Manager and Board Director of Zhongnongfa Seed Industry Group. He also worked as an officer for Auditing Bureau of Ministry of Agriculture and Chief Officer of Audit for China State Farms Agribusiness Group (“中国农垦集团”) before joining CAHIC.

Brief history

1982, China Animal Husbandry Industry and Commerce United Corporation was established, which became the founder of CAHIC.

1990, Beijing Hualuo Feed Additive Factory commenced operation.

1995, China Animal Husbandry Industry and Commerce (Group) Corporation was established to engage vaccine and feed additive business.

1998, the company, China Animal Husbandry Industry Co., Ltd. was established.

1999, the company was listed on the Shanghai Stock Exchange.

2000, the company established Hubei Zhongmu Anda Pharmaceutical Co., Ltd., mainly engaged in research and development, production and sales of veterinary chemical products and drugs.

2004 January, the company established Inner Mongolia Zhongmu Bio-Pharmaceutical Co., Ltd., mainly engaging in the sales and production of veterinary chemical products and drugs.

2004 July, the company and other participants jointly established QYH Biotech Co., Ltd. (“乾元浩生物股份有限公司”)

2004 September, China National Agricultural Development Group (“CNADG”) was established, becoming the ultimate beneficial owner of the company.

2006 January, Beijing Hualuo new production base commenced in operation, becoming the first domestic feed production factory with GMP protocol adopted and ISO9001 quality management standard accredited.

2006 October, Jiangxi plant commenced operation, becoming the main production base for CAHIC's hog vaccine and high-end pet vaccine products.

2014 February, the subsidiary Shengli BioTech (“胜利生物”) was founded and ranked as one of Top 10 veterinary API manufacturers in China. Its tiamulin API was the first in China to obtain COS certificate from the European Union.

2017 July, Zhongmu Quanyao (Nanjing) Animal Medicine Co., Ltd. (“中牧全药（南京）动物药品有限公司”) was founded to expand CAHIC's global footprints for its veterinary drug business.

2018 October, Pulike Biologial Engineering, Inc (603566.SS), CITIC Agriculture Co., Ltd., and CAHIC jointly established Zhongpu BioPharmaceutical Co., Ltd. (“中普生物”) with its main business focusing on the sales, production and research on high-end FMD vaccines.

2018 November, Lanzhou production base was founded to expand CAHIC's exposure on animal health and nutrition business.

Ringpu (300119.SZ, Neutral, 12-m TP: Rmb19.0/sh): Solid growth, upside risk from potential M&A and pet market

300119.SZ	12m Price Target: Rmb19	Price: Rmb17.66	Upside: 7.6%		
Neutral	GS Forecast				
		12/21	12/22E	12/23E	12/24E
Market cap: Rmb8.3bn / \$1.2bn	Revenue (Rmb mn)	2,007.1	2,142.9	2,620.6	2,977.4
Enterprise value: Rmb8.4bn / \$1.2bn	EBITDA (Rmb mn)	584.0	510.2	608.0	682.3
3m ADTV :Rmb45.5mn/ \$6.8mn	EPS (Rmb)	0.89	0.67	0.80	0.94
China	P/E (X)	29.8	26.3	22.0	18.8
China Agriculture	P/B (X)	3.1	2.0	1.9	1.7
	Dividend yield (%)	1.3	1.5	1.8	2.1
M&A Rank: 3	N debt/EBITDA (ex lease,X)	(0.9)	(0.4)	(0.1)	(0.2)
Leases incl. in net debt & EV?: No	CROCI (%)	20.4	9.6	10.9	11.5
	FCF yield (%)	0.6	(1.9)	(0.7)	2.5
		6/21	12/21	6/22E	12/22E
	EPS (Rmb)	0.44	0.45	0.24	0.43

Source: Company data, Goldman Sachs Research estimates, FactSet. Price as of 05 Aug 2022 close.

Initiate with Neutral: Ringpu is a top integrated animal health company in China with a diversified portfolio including over 200 products in vaccines, veterinary drugs and diagnostic, covering poultry, swine, pet, and others. The company currently holds a 12% market share for poultry vaccine, and has products covering all major hog diseases except FMD. While we expect the current business segment to drive solid 15% CAGR recurring earnings growth in the coming years, potential ongoing acquisitions and its early positioning in pet healthcare market should lead to upside risks in our view. We initiate on Ringpu with a Neutral rating and 12m target price of Rmb19.0.

Solid growth driven by product expansions and penetration: Ringpu differentiates itself as a full solution provider, with wide and expanding ongoing product expansions and upgrades, supported by its strong R&D effort and ongoing acquisitions. We expect Ringpu's sales revenue to accelerate at a 14% CAGR in the coming years, versus 13% in the past 10 years, from Rmb2.0bn in 2021A, to Rmb3.4bn in 2025E. The growth should be driven by poultry vaccine segments underpinned by its strong market position, market share gains from a low base in the hog vaccine segment, and veterinary Pharma & API segment sales growth on the back of industry consolidation driven by stricter new GMP requirements, while pet segment contribution is about to emerge.

Preposition in pet market: We view the company as best positioned for the China companion animal health care market given its more advanced product development versus domestic peers, and potential leveraging of Ringpai, China's second-largest pet hospital chain, as sales and distribution channels. We estimate its earnings contribution will reach Rmb36mn in 2025E and potentially Rmb358mn in the long run, or 7-32% of the total gross profit.

Valuation and target price: Our valuation is based on SOTP, including 1) Rmb10.1/sh on livestock vaccines; 2) Rmb6.4/sh on veterinary drugs; 3) Rmb2.6/sh on pet products.

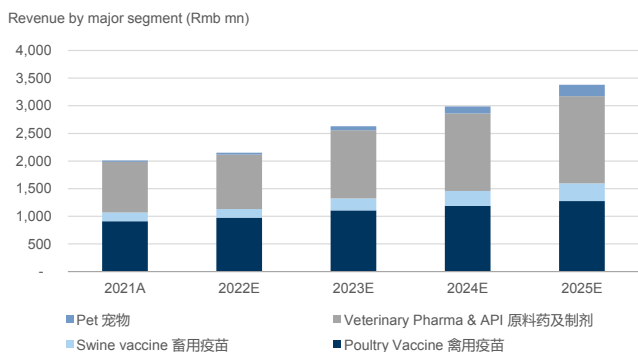
Our target price implies PE of 23.6x on 2023E and 20.2x on 2024E, versus peers of 20-40x range.

Key risks: 1) Hog/poultry diseases outbreak like ASF/Avian flu leading to lower-than-expected hog/poultry output, which could in turn result in lower-than-expected demand for vaccines; 2) More/less intensified market competition than expected could squeeze/improve market share and margins; 3) Development of pet products is faster/slower than expected; 4) Biosecurity risks which could result in government penalties such as shutting of factories or suspension/ revoke of licenses.

Solid growth driven by product expansions and penetration

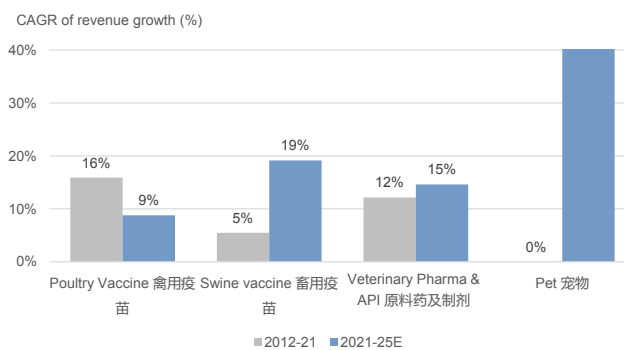
We expect Ringpu to continue its sales revenue growth at 14% CAGR in the coming years, versus 13% in the past 10 years, from Rmb2.0bn in 2021A, to Rmb3.4bn in 2025E. The growth should be driven by the poultry vaccine segment underpinned by its strong market position, market share gains from a low base in the hog vaccine segment, and veterinary Pharma & API segment sales growth on the back of industry consolidation driven by stricter new GMP requirements, while the pet segment contribution is about to emerge.

Exhibit 97: Revenue by segment - Ringpu



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 98: Revenue growth CAGR by segment - Ringpu



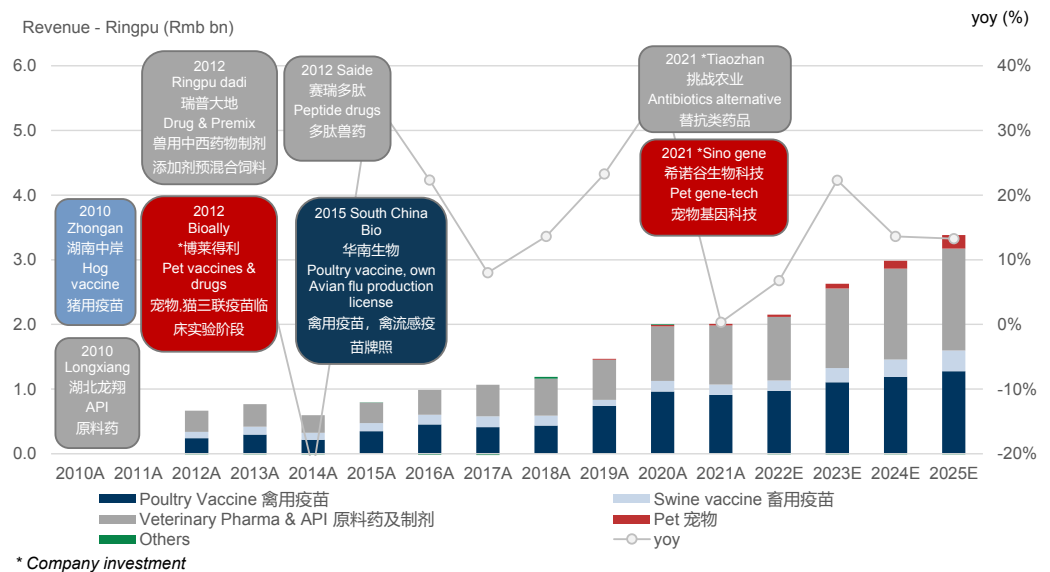
Source: Company data, Goldman Sachs Global Investment Research

Ringpu differentiates itself as a full solution provider, with wide and expanding ongoing product expansions and upgrades, supported by its strong R&D efforts and ongoing acquisitions.

- Ringpu offers a comprehensive product package including veterinary vaccines (21 for poultry, 22 for hogs), drugs (29 for poultry, 38 for hogs), disinfection products and value-added biosafety services. The combination solution of vaccines and drugs add additional values to improve the epidemic prevention effects.
- Ringpu's strong R&D effort is reflected by continuously acquiring 4-7 new veterinary product certificates each year. Ringpu has acquired 41 new veterinary product certificates in 2016-21A including 5 first-in-class veterinary drug licenses (一类新兽药), ahead of its domestic peers among a total of 27 first-in-class licenses granted during the period. Ringpu's R&D capability is also enhanced by its strategic partnership with South China Agricultural University (SCAU) through its holding subsidiary South China Biological Medicine, which was owned by SCAU and whose majority share was acquired by Ringpu in 2015A, earning Ringpu rich R&D resources in the animal health area including the production license of Avian flu vaccine. We note Ringpu's R&D pipeline covers nearly 67% of the major livestock diseases, higher than most peers.
- Ringpu accelerated its product expansion through successful acquisitions, and we expect the trend will continue to boost its future growth. The company has made 7 acquisitions in the past 12 years, including Longxiang in 2010A which largely increased the API capacity for veterinary drugs and thereby improved margins, Zhongan in 2010A which expanded the hog vaccine categories and especially

brought the top JEV (猪乙脑) vaccine with 32% market share (by volume in our estimate) to Ringpu's portfolio, and South China Bio in 2015A which has earned Ringpu rich resources in poultry vaccine as mentioned before. In 2021A, Ringpu invested in Tiaozhan (20% equity) and Sino Gene (5% equity), which are specialized in antibiotics-alternative feed additives and pet animal health, respectively, where we see higher growth potential vs livestock veterinary products, and we expect Ringpu to gain benefits based on its investments and potential acquisitions.

Exhibit 99: Historical acquisitions by year and products acquired - Ringpu



Source: Company data, Goldman Sachs Global Investment Research

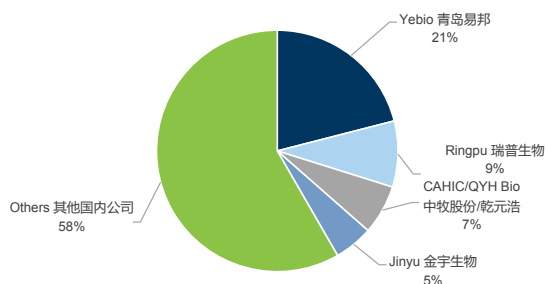
Going forward, we expect key products in poultry to continue to drive solid revenue growth, while the hog segment is likely to accelerate from a low base:

- **Poultry vaccine:** Leveraging its strong market position in poultry vaccine (12% market share in 2021A per our estimates), enhanced by its comprehensive solution with veterinary pharma, we expect the company to continue its solid growth in the poultry vaccine segment. We expect revenue to grow by a 9% CAGR from Rmb911mn in 2021A to Rmb1.3bn by 2025E, as market share steadily grows to 14%, driven by poultry output increase (3% CAGR in 2021-25E in our estimates) and extra growth from expansion in the yellow-feather chicken and waterfowl market, where Ringpu has put more R&D and marketing efforts in, and the penetration is lower compared to the mature white-feather chicken market.
- **Swine vaccine:** While Ringpu's market shares are relatively low at 1.0%-2.3% for PED/PCV/PRRS vaccines in 2021A, we expect the hog segment sales to grow by 21% CAGR in 2021-25E from Rmb150mn in 2021A to Rmb320mn in 2025E, and the strong growth to be mainly driven by market share expansion amid the low base, with the key products PED/PCV/PRRS/CSF taking 1.4-4.2% market share in 2025E. Ringpu has reallocated its sales force from the poultry segment to the hog segment to accelerate the growth, based on Ringpu's coverage of all important hog vaccines expect FMD (patent-required) and R&D strength including 6 gene-engineering hog

vaccines under development, well ahead of its peers. We also note that Ringpu has put FMD vaccine in its R&D pipeline, and its related-party South China Agricultural University is well positioned in ASF vaccine development. While we have not included FMD and ASF contribution in our base case, we estimate 10% share in the FMD and ASF market would each add Rmb440mn/Rmb300mn revenue, and Rmb120mn/Rmb80mn NP in 2025E.

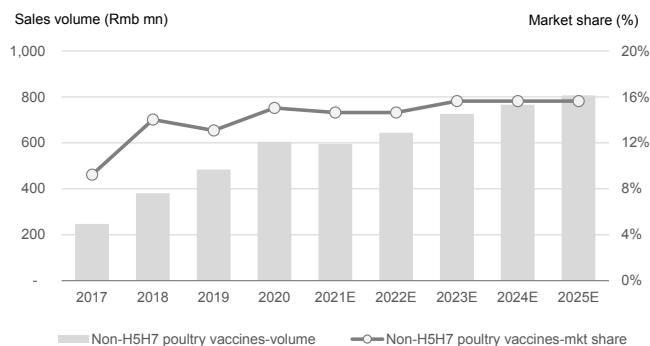
- *Veterinary drugs:* given Ringpu’s consistent “vaccine+drug” bundle sales strategy, we expect the poultry and hog medication sales to grow at the same pace with poultry and hog vaccines, and in total reach Rmb1.6bn of sales in 2025E.
- *API segment:* Considering the Longxiang new factory with Rmb0.8-1.0bn production value at max (vs. Rmb0.3mn of the old factory) has launched in 1Q22, we expect the capacity expansion will drive the revenue growth of API segment to reach 17% CAGR in 2021-25E, applying an increasing utilization rate from 30% in 2022E to 50% in 2025E.
- *Potential entrance in special feed additive:* Based on the company’s 20% share in Tiaozhan, we estimate the first try in the special feed additive area added Rmb3.4mn investment gain in 2021A for Ringpu, which could increase to Rmb5.6mn in 2025E applying a 13% CAGR benchmarking the growth of Adisseo’s speciality products, or turn to NP of Rmb28mn if Tiaozhan gets fully acquired.

Exhibit 100: Breakdown of poultry vaccine market, 2021A



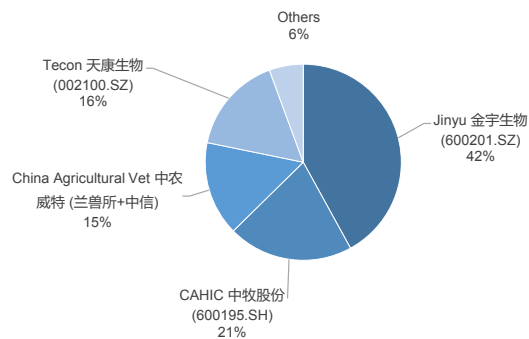
Source: China Veterinary Drug Association, Company data

Exhibit 101: Poultry segment - Sales growth in non-H5H7 vaccine, Ringpu



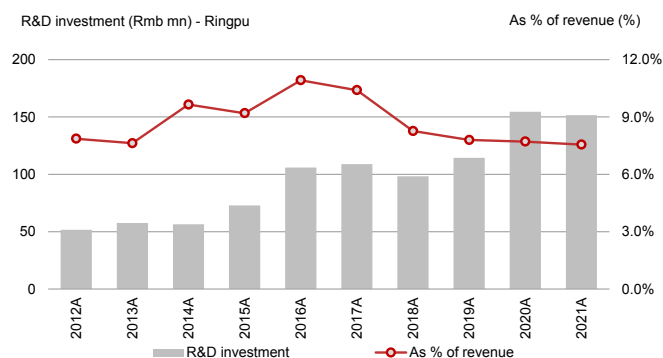
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 102: Breakdown of FMD vaccine market - 2021A



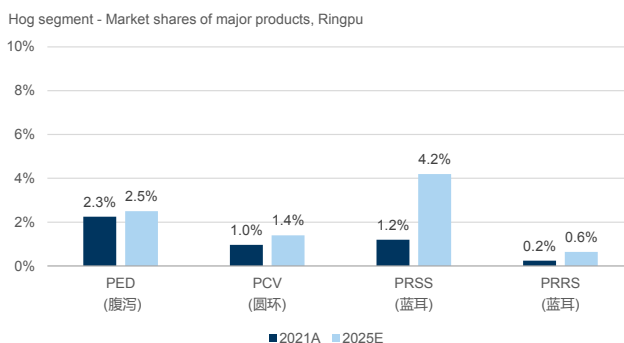
Source: China Veterinary Drug Association, Company data

Exhibit 104: Ringpu's R&D investment



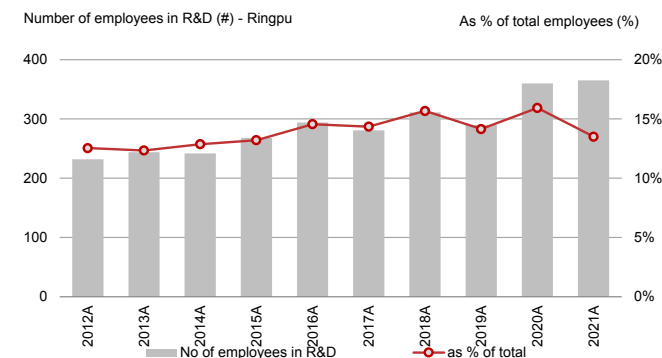
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 103: Market shares of major hog vaccine products - Ringpu, 2021A vs 2025E



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 105: No. of employees in R&D - Ringpu



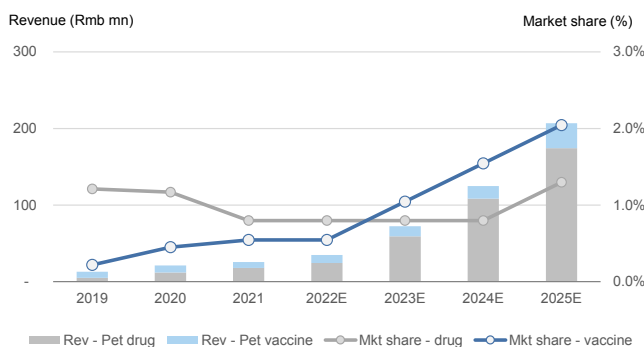
Source: Company data, Goldman Sachs Global Investment Research

Preposition in pet market

We are optimistic on the outlook of the companion animal healthcare market in China, and estimate the market size to grow from Rmb11bn in 2021A to Rmb28bn in 2025E, and Rmb81bn in the longer run. We view Ringpu as best positioned for the China companion animal health care market given its more advanced product development versus domestic peers, and potential leveraging of Ringpai as sales and distribution channels. As a result, we expect the pet segment to grow its revenue from Rmb26mn in 2021A, to Rmb207mn, or ~1% market share by 2025E, and Rm1.7bn or 2-3% market share in longer run. Earnings contribution should reach Rmb36mn in 2025E and potentially Rmb358mn in the long run, or 7-32% of the total gross profit, in our estimates.

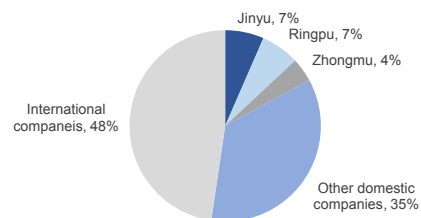
Ringpu is actively expanding its vaccine and drug products in companion animals. For pet vaccines, we expect the two key products - canine DHPP and feline FVRCP vaccines, will be commercialized in 2024-25E. As Ringpu is one of the few local companies which have entered the clinical trial stage for the two vaccines, we assume the first-mover advantage, along with the strong intrinsic growth of the market, can help boost Ringpu’s pet vaccine sales from Rmb8mn in 2021A to Rmb32mn in 2025A, or ~1% market share, and further to ~Rmb600mn, or 6% market share in the longer term. As for pet drugs, Ringpu led the market with the most comprehensive product mix covering all major categories among local players. With the introduction of three important products in 2021-22E (莫普欣-parasiticide, 瑞克林-Clindamycin phosphate and 复方制霉菌素软膏 - ear canal remedy), we expect the revenue to grow from Rmb18mn in 2021A to Rmb174mn in 2025A, or ~2% market share, and further to ~Rmb1.1bn, or 4-5% market share in the longer term. In addition, we believe Ringpu’s market expansion in the pet market is enhanced by its unique distribution channel resource - Ringpai Pet Hospital, the second largest pet hospital in China owned by Ringpu’s controlling shareholder Mr. Li Shoujun.

Exhibit 106: Revenue and market share of companion animal healthcare segment - Ringpu



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 107: Companion animal vaccine market share breakdown - Mid-term



Source: Company data, Goldman Sachs Global Investment Research

Financials and valuations

We initiate coverage on Ringpu with a Neutral rating and a 12-month TP of Rmb19.0/shr, implying 8% upside. We expect the company to grow its top line by a 14% CAGR in the coming four years, mainly driven by solid growth driven by product expansions and penetration. Accordingly, we highlight:

Poultry vaccine: We expect Ringpu's poultry vaccine to deliver steady top line growth of 9% in 2021-25E leveraging its strong market share with the gross margin staying at 62%, and reach Rmb794mn gross profit in 2025E from Rmb566mn in 2021A.

Hog vaccine: The hog vaccine segment is expected to grow strongly at a CAGR of 21% in 2021-25E, mainly driven by market share expansion amid a low base. We expect the segment to more than double its gross profit contribution from Rmb99mn in 2021A to Rmb211mn in 2025E, with the gross margin stable at 66%.

Veterinary drugs and API: We expect the segment to grow at a 15% CAGR in the coming four years driven by bundle sales synergy and API capacity expansion. The growth margin is expected to improve by 1% to 47% in 2022E benefitting from the launch of the new API factory and stay stable ahead.

Pet segment: Though the segment is still in the early stage, we expect its gross profit contribution can take off in the coming years from Rmb16mn in 2021A to Rmb127mn in 2025E, or 2% to 7% of gross profit.

Overall, We expect Ringpu's recurring net profit to increase by 9% yoy in 2022E and grow by an average 17% yoy in 2023-25E, driven by solid market expansion as the hog and poultry farming industry recovery starts in 2Q22. The recurring net profit is expected to reach Rmb517mn in 2025E, from Rmb299mn in 2021A. Our net profit forecast is 25-28% lower than Bloomberg consensus for 2022-24E as we assume slower market share expansion in livestock vaccine business given the intensified market competition.

We expect Ringpu to maintain a net cash position in 2022-25E, and Ringpu's capex is expected to increase from Rmb306mn in 2021A to Rmb592mn/Rmb406mn in 2022/23E, according to its detailed capex plan disclosed in its private placement in 2021A, mainly on capacity expansion and production line upgrade.

We adopt SOTP as the primary valuation methodology for Ringpu based on its comprehensive integrated business operations, and our target price consists of:

- Rm10.0/sh for the hog and poultry vaccine business, based on 2025E EPS of Rmb0.613/sh and 20x 2025E P/E, benchmarking domestic veterinary vaccine peers such as Jinyu (600201.SH, in our coverage) and Keqian (688526.SH, Not Covered).
- Rmb6.4/sh for the veterinary drug segment, based on 2025E EPS of Rmb0.388/sh and 20x 2025E P/E, derived from the average P/E of the China Pharma industry.
- Rmb2.6/sh for the pet segment, based on 2025E EPS of Rmb0.078/sh and 40x 2025E P/E, derived from average P/E of global veterinary peers.
- Accordingly, we derive a 12-month SOTP-based target price of Rmb19.0 (8% upside), implying a 23.6x 2023E P/E, a 20.2x 2024E P/E and a 17.6x 2025E P/E.

Exhibit 108: Valuation - Ringpu

Valuations SOTP	Valuation-23E Rmb/sh	EPS-23E Rmb/sh	EPS-25E Rmb/sh	Exit P/E 25E x
Vaccines	10.1	0.489	0.613	20x
Drugs	6.4	0.289	0.388	20x
Pet	2.6	0.026	0.078	40x
Valuation/share	19.00	0.804	1.078	

Source: Goldman Sachs Global Investment Research

Exhibit 109: Key assumptions and financials - Ringpu

Key assumptions and financials		2020A	2021A	2022E	2023E	2024E	2025E
Poultry vaccine 禽用疫苗	Rmb mn	955	911	975	1,107	1,189	1,276
Poultry medication 禽用药品	Rmb mn	360	430	460	523	562	603
Swine vaccine 畜用疫苗	Rmb mn	154	150	158	217	268	320
Swine medication 畜用药品	Rmb mn	186	270	284	391	482	576
API Segment 原料药及制剂	Rmb mn	295	215	240	320	360	400
Pet Segment	Rmb mn	21	26	35	72	125	207
Sales Volume							
H5H7-禽流感 gov't	mn ml	588	518	421	400	378	355
H5H7-禽流感 private	mn ml	670	595	728	894	1,042	1,197
PED-腹泻	mn doses	2.6	2.5	1.4	2.4	3.5	4.6
PCD-圆环	mn doses	2.9	2.9	2.5	3.7	5.1	6.6
PRRS-蓝耳	mn doses	3.3	3.2	6.0	9.3	11.4	13.5
JEV-乙脑	mn doses	8.7	9.2	9.1	9.2	9.3	9.4
Market shares							
H5H7-禽流感 gov't	%	6%	6%	6%	6%	6%	6%
H5H7-禽流感 private	%	24%	17%	17%	18%	18%	18%
PED-腹泻	%	1.9%	2.3%	1.0%	1.5%	2.0%	2.5%
PCD-圆环	%	1.1%	1.0%	0.8%	1.0%	1.2%	1.4%
PRRS-蓝耳	%	1.6%	1.2%	2.2%	3.2%	3.7%	4.2%
JEV-乙脑	%	32%	32%	32%	32%	32%	32%
Gross profit	Rmb mn	1,081	1,040	1,124	1,368	1,556	1,768
Poultry vaccine	Rmb mn	616	566	606	688	740	794
Swine vaccine	Rmb mn	101	99	104	143	177	211
Poultry & hog medication	Rmb mn	260	321	350	429	491	554
API	Rmb mn	74	54	60	80	90	100
Pet	Rmb mn	14	16	22	45	76	127
Gross margin							
Poultry vaccine	%	65%	62%	62%	62%	62%	62%
Swine vaccine	%	65%	66%	66%	66%	66%	66%
Poultry & hog medication	%	48%	46%	47%	47%	47%	47%
API	%	25%	25%	25%	25%	25%	25%
Pet	%	64%	63%	63%	62%	61%	62%
EBIT-recurring	Rmb mn	431	392	404	486	554	632
EBITDA-recurring	Rmb mn	528	477	515	612	687	772
Net Profit	Rmb mn	398	413	314	377	440	505
Net Profit-recurring	Rmb mn	293	299	326	388	452	517
EPS	Rmb/sh	0.995	0.889	0.670	0.804	0.940	1.078
EPS-recurring	Rmb/sh	0.724	0.638	0.695	0.829	0.965	1.103
Operating cash flow	Rmb mn	388	383	427	345	457	520
Investing cash flow	Rmb mn	(243)	(627)	(592)	(406)	(238)	(238)
Free cash flow	Rmb mn	129	77	(165)	(61)	219	281
Net debt	Rmb mn	296	(552)	(225)	(40)	(111)	(219)
Net gearing	%	8%	net cash	net cash	net cash	net cash	net cash
FCF	Rmb/sh	0.28	0.16	(0.35)	(0.13)	0.47	0.60
BV	Rmb/sh	6.07	8.61	8.93	9.47	10.10	10.81
ROE	%	17.4%	11.7%	7.1%	8.1%	9.0%	9.6%
ROE recurring	%	12.8%	8.5%	7.4%	8.4%	9.2%	9.8%
ROIC	%	16.9%	8.9%	6.4%	7.2%	8.1%	8.7%

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 110: Forward P/E (x) - Ringpu

Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Exhibit 111: Historical share price movement - Ringpu

Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Key risks:

- 1) Hog diseases outbreak like ASF may result in large amounts of hog herd culling, leading to lower-than-expected hog output, which could in turn result in lower-than-expected demand for vaccines; Economic loss caused by hog diseases may also result in budget cuts on vaccines.
- 2) More/less intensified market competition than expected could squeeze/improve market share and margins. We see major domestic vaccine producers are enhancing their R&D, marketing and after-sales service to gain more market shares which may intensify the competition and deteriorate growth and margins. However, we assume unique products with technology breakthrough can earn strong competitive edge for vaccine companies and improve their financial performance.
- 3) Development of pet products is faster/slower than expected. We consider the launch of new pet products especially the canine DAPP/feline FVRCP vaccines will strongly boost Ringpu's earnings from the pet segment, which is expected to be the main growth driver in the longer term for the company. The timeline of the product development remains uncertain.
- 4) Risks of policy changes: Any unexpected policy change regarding vaccines could have an impact on the company. For example, the Vaccination now, Reimburse later scheme gained traction since 2020 and has significantly increased the market TAM of FMD/Avian flu vaccine.

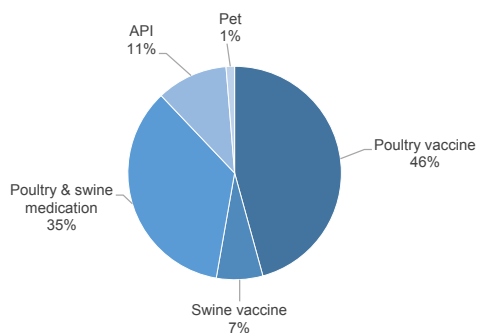
Company background - Ringpu

Ringpu is a top integrated animal health company in China with a diversified portfolio with over 200 products in vaccines, veterinary drugs and diagnostic, mainly covering poultry, hog and companion animals. Through acquisitions and its unique vaccine+drug combo sales strategy, the company has become the second-largest poultry vaccine company in China, currently holding ~12% market share per our estimates. Ringpu also has hog vaccine products covering major hog diseases except FMD, with 1.0%-2.3% shares in PED/PCV/PRRS vaccines market in our estimates, and is actively striving to gain market shares. Ringpu also holds a 9.45% stake in Ringpai Pet Hospital, which is China’s second-largest pet hospital chain with ~400 outlets nationwide. The company has recently added specialty feed additives exposure (including enzyme and probiotics products) through acquiring 20% share of Tiaozhan in 2021A.

In 2021A, Ringpu achieved revenue of Rmb2.0bn, of which 46% was from poultry vaccines, 7% from swine vaccines, 35% from related medications, 11% from API, and 1% from pet products. Among all, poultry vaccine contributed 53% of the profit, followed by poultry/swine medications at 30%. We estimate pet revenue was Rmb26mn, or less than 1%, with gross profit of Rmb17mn, or 2% of the total.

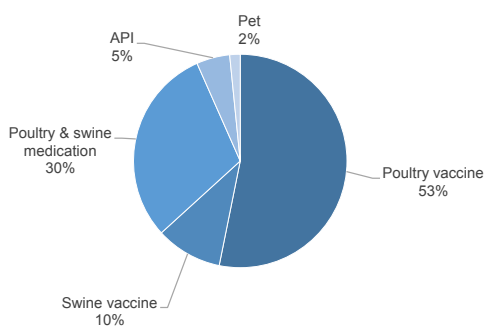
Ringpu was founded in 1998 by Mr. Li Shoujun and other shareholders, and listed on the SSE Star Market in 2010. Ringpu is now 36% owned by Mr. Li, who is also the founder of Ringpai Pet Hospital and now owns 19% equity of Ringpai.

Exhibit 112: Revenue breakdown 2021A - Ringpu

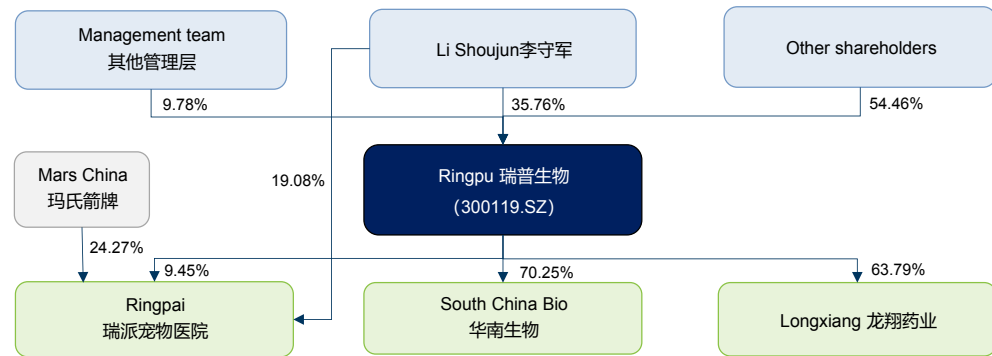


Source: Company data

Exhibit 113: Gross profit breakdown 2021A - Ringpu



Source: Company data

Exhibit 114: Shareholding structure - Ringpu (as of 2021A)

Source: Company data, Data compiled by Goldman Sachs Global Investment Research and Gao Hua Securities Research

Key business segments

Poultry vaccine: Ringpu is the second-largest producer in Chinese poultry vaccine space with 12% share. Poultry vaccine contributed 45% of revenue, and 54% of gross profit in 2021A. Before 2015, the company's poultry vaccine focused on private purchase categories such as Newcastle disease, Infectious Bursal Disease etc. In 2015A, Ringpu acquired South China Biological Medicine, which is licensed to produce avian flu vaccines and has a priority R&D partnership with South China Agricultural University, a government designated institution to conduct avian flu's pathogenic studies. In 2019, Ringpu's H5+H7 trivalent avian flu vaccine received registration and started sales under both government and private purchase channels. Under the private purchase channel, there are about 60% of the vaccines distributed under direct sales to large scale poultry farms, and 40% distributed through dealers networks, per management estimate.

Hog vaccine: Ringpu's hog vaccines portfolio covers most of the common hog diseases in the private purchase segment (i.e. except FMD vaccines), e.g. PED, PRV, PRRS. The hog vaccine segment contributed 8% of revenue and 10% of gross profit in 2021A. Ringpu has relatively low market shares in the hog vaccine space, with 1.0%-2.3% shares for PED/PCV/PRRS vaccines in our estimate, and is striving for higher market shares through allocating more R&D and sales force. Sales split under direct sales and dealers channels is about 40/60, per management estimate.

Veterinary drug & API: Ringpu provides veterinary drugs together with its vaccine products for customers, and has expanded its supply chain to API production. The veterinary drug and API segment contributed 46% of revenue and 36% of gross profit in 2021A. Ringpu's new API factory has been put into use in 1Q22A and the capacity has increased from Rmb0.3bn to Rmb0.8-1.0bn equivalent API value.

Pet segment: Ringpu has both pet vaccine and pet drug products in its portfolio, and the pet segment contributed 1% of revenue and 2% of gross profit in 2021A. For pet vaccines, the company now has two rabies vaccines commercialized and canine DHPP, feline FVRCP vaccines in the R&D pipeline. For pet drugs, Ringpu covers all major pet drug categories including parasiticides, dermatology and antibiotics.

Exhibit 115: Key poultry and hog products - Ringpu

Poultry vaccines 禽用疫苗			Hog vaccine 畜用疫苗		
重组禽流感病毒(H5+H7)三价灭活疫苗 Reassortant Avian Influenza (H5+H7) Vaccine, Inactivated	重组新城疫、禽流感病毒(H9亚型)二联灭活疫苗 Recombinant Newcastle Disease Virus and Avian Influenza (Subtype H9) Vaccine, Inactivated	鸡新城疫、传染性支气管炎二联灭活疫苗 Combined Newcastle Disease and Infectious Bronchitis Vaccine, Live	猪传染性胃肠炎、猪流行性腹泻二联活疫苗 Transmissible Gastroenteritis and Porcine Epidemic Diarrhea Vaccine, Live	猪瘟活疫苗 Classical Swine Fever Vaccine, Live	链球菌与副猪嗜血杆菌亚单位疫苗 Swine Streptococcus Disease and Haemophilus Parasuis Subunit Vaccine
					
Poultry medication 禽用药品			Hog medication 畜用药品		
氟苯尼考可溶性粉 Florfenicol Soluble Powder	替米考星可溶性粉 Tilmicosin Soluble	酒石酸泰万菌素预混剂 Tylvalosin Tartrate Premix	头孢噻呋注射液 Ceftiofur Injection	替米考星肠溶颗粒 Tilmicosin Enteric-coated Granules	盐酸沃尼妙林预混剂 Valnemulin Hydrochloride Premix
					

Source: Company data, Goldman Sachs Global Investment Research

Major associates and subsidiaries

Exhibit 116: Major associates, subsidiaries and investments - Ringpu

Chn Name	Eng Name	Effective Interest (%)	Revenue 2021 (Rmb mn)	Net Profit 2021 (Rmb mn)	Major Business
瑞普保定	Ringpu Baoding	100%	329	105	Poultry, hog vaccines
瑞普天津	Ringpu Tianjin	100%	513	104.6	Poultry, hog and pet drugs
华南生物	South China Biological Medicine	70%	310	38.7	Avian flu vaccine; Rabies vaccine
龙翔药业	Longxiang Pharma	64%	219	(11.7)	API for veterinary drugs
瑞派宠物	Ruipai pet	9%	n.a.	n.a.	Pet hospital
湖南中岸	Hunan Zhongan	68%	n.a.	n.a.	Hog vaccines

Source: Company data, Goldman Sachs Global Investment Research

History and major events

1998: The company was founded by Li Shoujun and other investors.

2001: Ringpu entered the biological product industry by setting up Ringpu (Baoding) Biological Veterinary Co Ltd.

2002: The company received GMP approval, its first vaccine for La Sota Disease was put into the market.

2007: Acquired and established Ringpu Tianjin Hi-tech Biological Veterinary Co Ltd, which specialized in R&D, production and sales of animal biological products.

2008: Entered medicine raw materials business by setting up Hubei Longxiang Veterinary Co Ltd.

2010: The company was listed on SSE Star Market.

2011: Ringpu's Porcine circovirus 2-dcap-elisa antibody detection kit was put into market, the first in China.

2015: The company entered the Companion Animal hospital business by setting up Ringpai Pet Hospital Management Co Ltd.

2015: Acquired South China Biological Medicine Co Ltd, focusing on production, marketing and technical services of veterinary products, especially Avian Influenza Vaccines and companion animals vaccines.

2019: The company's Reassortant Avian Influenza Virus (H5+H7) Trivalent Vaccine received government approval.

2020: Established Zhongliang Ruichuang with Ringpu owning 60% interest and founder Li Shoujun owning a 2% interest. In order to further strengthen its distribution channel, Ringpu created this platform to align its interests with provincial dealers.

2021: Acquired 20% equity of Tiaozhan, a specialty feed additive producer whose products mainly include enzyme and probiotics and can act as antibiotics alternative. Invested in Sino Gene (6% equity share), a start-up that specializes in pet gene tech.

Management profile

LI Shoujun: Founder and chairman of the company. Mr Li is also the dean of animal hospital of South China Agricultural University. Mr Li has a doctorate degree in veterinary medicine.

BAO Endong: Director. Mr Bao is a professor at Nanjing Agricultural University College of Veterinary Medicine. He also works as an officer at International Society for Animal Hygiene (ISAH).

XU Jian: Secretary of the Board and director. Ms Xu joined the company in 2008 and worked as the company's internal audit manager and IR manager. Ms Xu also participated in company's previous restructuring and IPO process.

LI Rui: Director. Ms Li worked at the company's production center in the Tianjin Free Trade Zone Tianjin Airport Economic Area before joining the board. Ms Li is also the daughter of chairman Li Shoujun.

LI Ya: Director. Dr Li has experiences in equity financing, corporate governance from internet, health, education and financial industries and served as management consultant for different private companies. Dr Li has a doctorate degree in Economics.

Jinyu (600201.SS, Neutral, 12-m TP: Rmb10.30/sh): Competition persists, potential benefit from ASF and pet

600201.SS	12m Price Target: Rmb10.3	Price: Rmb8.5	Upside: 21.2%		
Neutral	GS Forecast				
		12/21	12/22E	12/23E	12/24E
Market cap: Rmb9.6bn / \$1.4bn	Revenue (Rmb mn)	1,776.3	1,707.2	2,572.9	3,391.5
Enterprise value: Rmb8.5bn / \$1.3bn	EBITDA (Rmb mn)	559.7	497.6	683.0	899.5
3m ADTV :Rmb222.7mn/ \$33.2mn	EPS (Rmb)	0.34	0.27	0.39	0.55
China	P/E (X)	54.1	31.3	21.9	15.5
China Agriculture	P/B (X)	3.9	1.8	1.7	1.5
	Dividend yield (%)	0.6	1.0	1.5	2.1
M&A Rank: 3	N debt/EBITDA (ex lease,X)	(2.1)	(2.6)	(1.6)	(1.2)
Leases incl. in net debt & EV?: No	CROCI (%)	3.6	8.7	9.3	11.3
	FCF yield (%)	0.8	2.6	(1.1)	1.5
		3/22	6/22E	9/22E	12/22E
	EPS (Rmb)	0.07	--	--	--

Source: Company data, Goldman Sachs Research estimates, FactSet. Price as of 05 Aug 2022 close.

Maintain Neutral. We further revise down Jinyu's earnings by 26%-30% in 2022E and 2023E to reflect lower-than-expected sales volume and margin in its FMD vaccine, partly offset by improvement in the poultry vaccine segment. While we see the hog cycle bottomed cyclically, we believe ongoing competition will continue to curb market share gains of Jinyu in the hog FMD market. Nevertheless, potential progress in ASF vaccine development, and its preparation for pet health products through its Japanese JV partner Kyoritsu, should provide support to earnings and valuations. Maintain Neutral with a revised target price of Rmb10.30 (from Rmb12.0).

FMD - competition persists: Our recent update with the company suggests that FMD sales in 1H remained depressed with 20% yoy decrease. We expect the market shares in FMD private to soften further from 42% in 2021A to 39% in the coming four years, amid continuing absolute volume growth at 18% each year. We expect its gross margin to stabilize at ~60%, where it converges with key competitors.

Upside from ASF and pet vaccines: Jinyu continues to focus its effort on ASF mRNA vaccine and management is optimistic on progress ahead. We have included potential ASF vaccine contribution starting 2023E, with potential one-third of the market shares on 20% penetration of the industry. We estimate ~Rmb630mn gross profit contribution, or 29%-32% of total GP estimates in 2024E-25E. Jinyu is also actively working with its Japanese partner Kyoritsu (共立) on pet vaccine development, which is expected to launch by the end of 2024E, with sales strategy to leverage the joint brand.

Valuations and target price: We maintain Neutral on Jinyu. Our new 12-m target price for Jinyu is Rmb10.30/sh (prior Rmb12.0/sh), based on our revised target price methodology from P/E multiple to SOTP to separate the valuation of the company's pet business, including: 1) Rmb10.0/sh from livestock vaccines; 2) Rmb0.3/sh from the pet business. Our target price implies P/E of 26.4x on 2023E and P/E of 18.8x on 2024E. On ex-ASF basis, our theoretical share value would be Rmb6.9/sh, implying 23.0x 2023E

P/E.

Key risks: (1) ASF resurgence uncertainties could affect the recovery pattern of hog output, which could in turn result in either higher or lower-than-expected demand for vaccines; (2) uncertainty in government tender policy could result in either higher or lower APS shocks for government purchase products; (3) faster-than-expected technology advancement of competitors could add competition and squeeze margins; and (4) bio-safety risks could result in government penalties such as shutting of factories or suspension/revoke of license.

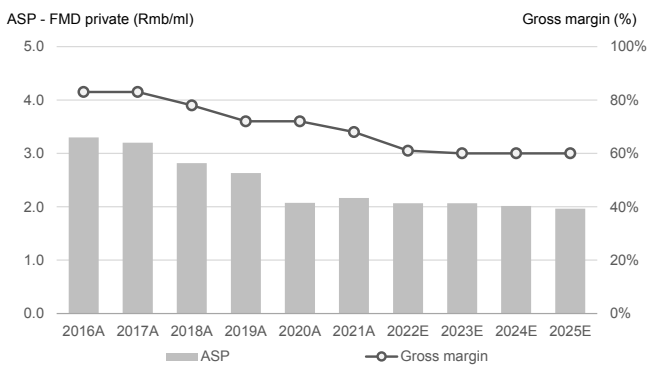
FMD - competition persists

We believe the long-term growth outlook of Jinyu will remain positive, driven by rising demand for animal health as China’s livestock farming industry consolidates. Nevertheless, the lingering trend of Jinyu’s market shares in 2019-2021A suggest supply competition persists, imposing risk to Jinyu’s long-term growth rate. We expect the market shares in FMD private to soften further from 42% in 2021A to 39% in the coming four years, amid continuing absolute volume growth at 18% CAGR in 2021-25E.

In addition, we also note the sequentially weakening ASP and margin, as competitors catches up in production technology of suspension culture, and rise of large customers in the context of government purchase phasing out. In 1H22A, we estimate Jinyu’s gross margin of FMD products weakened to 61%, 5% lower versus a year ago, while peers like CAHIC improved from 55% to 61%. We assume FMD gross margin to stabilize at ~60%, where it converges with key competitors.

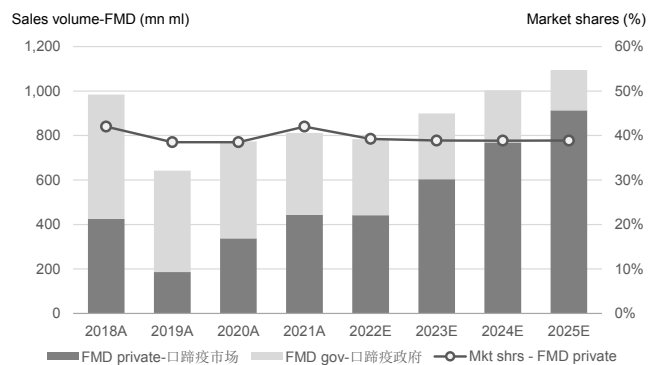
Our recent update with the company suggests that FMD sales in 1H remained depressed with 20% yoy decrease, while in 2Q22 the yoy growth of private and government purchase have both returned to positive benefiting from the recovering hog farming industry. We expect single-digit increase in 2H22 and substantial recovery in sales volume in 2023E.

Exhibit 117: FMD private sales - ASP and gross margin, Jinyu



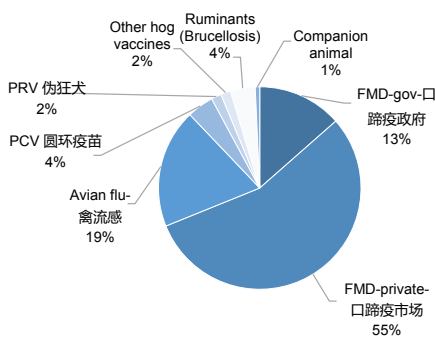
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 118: FMD vaccine sales and market shares - Jinyu



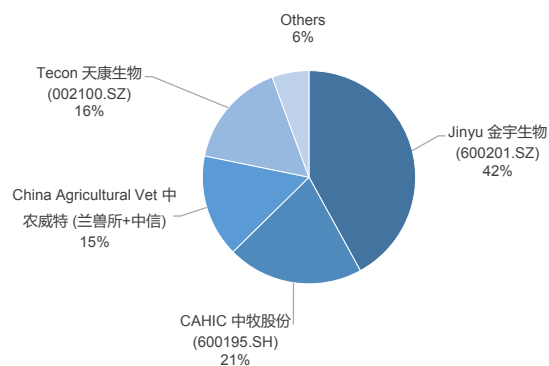
Source: Company data, Goldman Sachs Global Investment Research

Exhibit 119: Revenue breakdown (2022E) - Jinyu



Source: Goldman Sachs Global Investment Research

Exhibit 120: Breakdown of FMD vaccine market, 2021A



Source: China Veterinary Drug Association, Company data

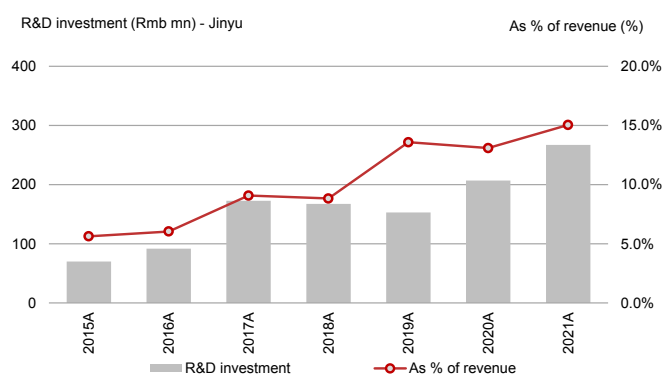
Upside from ASF and pet vaccines

Our recent update with the company suggests poultry sales increased about 30% yoy in 1H22, which goes beyond our expectation and is mainly driven by rapid growth of the Avian flu private purchase market. We estimate 30%-40% decrease in other vaccine sales mostly affected by the hog cycle bottom in 1Q22, while the company suggested the other hog vaccines have shown significant recovery in 2Q22.

As for ASF vaccine under development, Jinyu continues to focus on the mRNA vaccine and expect process ahead. Given Jinyu’s strong technology track record, we expect the company to be a key player in the potential ASF market, where we estimate a 20% penetration of hogs, leading to potential market size of Rmb2.9bn by 2030E. We estimate potential launch of ASF vaccine could add ~Rmb630mn gross profit accounting for 29%-32% of our estimates for Jinyu’s GP over 2024E-2025E. We also apply an additional 5% gross profit increase based on our base case assumption of 60% GPM for ASF vaccines, to reflect the additional patent fee Jinyu can gain from authorizing ASF vaccine production to other producers.

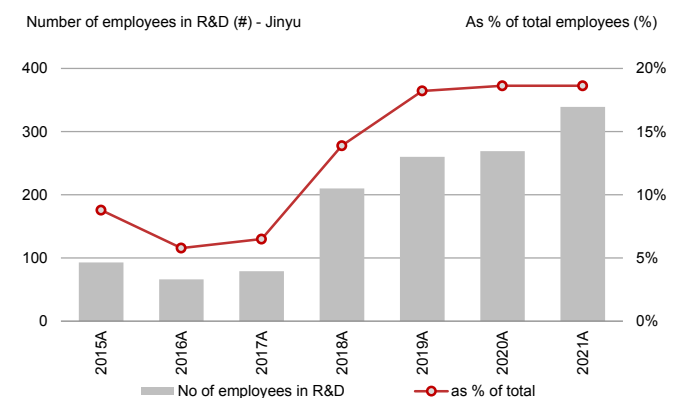
The company is also working actively with its Japanese partner Kyoritsu (共立) on pet vaccines which is expected to launch by the end of 2024E. Jinyu has started building up its marketing team for the pet segment, and is also planning to import more pet products from Kyoritsu to enrich its product portfolio.

Exhibit 121: R&D Investment - Jinyu



Source: Company data

Exhibit 122: No. of employees in R&D - Jinyu



Source: Company data

Financials and valuation - Jinyu

We revise our earnings forecast by 26%-30% in 2022E-23E to reflect lower-than-expected sales volume and margin in its FMD vaccine, partly offset by improvement in the poultry vaccine segment.

We maintain Neutral on Jinyu. Our new 12-m target price for Jinyu is Rmb10.30/sh (prior Rmb12.0/sh), based on our revised target price methodology from P/E multiple to SOTP to separate the valuation of the company's pet business: 1) Rmb10.0/sh from the livestock vaccine business based on 2025E P/E of 20X (unchanged), discounted back to 2023E, at a 9.5% discount rate (unchanged); and 2) Rmb0.3/sh from the pet business based on 2025E P/E of 40X (derived from average P/E of global veterinary peers), discounted back to 2023E, at a 9.5% discount rate.

Risks: (1) ASF resurgence uncertainties could affect the recovery pattern of hog output, which could in turn result in either higher or lower-than-expected demand for vaccine; (2) uncertainty in government tender policy could result in either higher or lower ASP shocks for government purchase products; (3) faster-than-expected technology advancement of competitors could add competition and squeeze margins; and (4) bio-safety risks could result in government penalties such as shutting of factory or suspension/revoke of license.

Exhibit 123: Valuation - Jinyu

Valuations SOTP	Valuation-23E Rmb/sh	EPS-23E Rmb/sh	EPS-25E Rmb/sh	Exit P/E 25E x
Vaccines	10.1	0.489	0.613	20x
Drugs	6.4	0.289	0.388	20x
Pet	2.6	0.026	0.078	40x
Valuation/share	19.00	0.804	1.078	

Source: Goldman Sachs Global Investment Research

Exhibit 124: Key assumptions and financials - Jinyu

Key assumptions and financials		2020A	2021A	2022E	2023E	2024E	2025E
Revenue	Rmb mn	1,582	1,776	1,707	2,573	3,392	3,682
yoy %	%	40%	12%	-4%	51%	32%	9%
FMD-gov-口蹄疫政府	Rmb mn	300	240	223	192	153	118
FMD-private-口蹄疫市场	Rmb mn	700	960	912	1,247	1,550	1,796
Avian flu-禽流感	Rmb mn	300	240	313	335	358	374
Other vaccine-其他疫苗	Rmb mn	200	277	200	255	300	363
- ASF vaccine	Rmb mn	-	-	-	484	972	972
Sales volume							
FMD-口蹄疫	mn ml	773	812	784	899	1,004	1,094
FMD gov-口蹄疫政府	mn ml	436	369	342	296	235	181
FMD private-口蹄疫市场	mn ml	338	443	442	603	769	914
Avian flu-禽流感	mn ml	931	655	813	866	921	954
ASP							
FMD gov-口蹄疫政府	Rmb/ml	0.7	0.7	0.7	0.7	0.7	0.7
FMD private-口蹄疫市场	Rmb/ml	2.1	2.2	2.1	2.1	2.0	2.0
Avian flu-禽流感	Rmb/ml	0.24	0.25	0.25	0.26	0.26	0.26
Market shares (by volume)							
FMD-口蹄疫	%	31%	26%	26%	28%	31%	33%
FMD gov-口蹄疫政府	%	27%	18%	18%	18%	18%	18%
FMD private-口蹄疫市场	%	39%	42%	39%	39%	39%	39%
Avian flu-禽流感	%	7%	5%	6%	6%	7%	7%
Gross profit	Rmb mn	974	1,099	946	1,474	1,986	2,157
FMD gov-口蹄疫政府	Rmb mn	189	146	136	117	93	72
FMD private-口蹄疫市场	Rmb mn	504	653	556	748	930	1,077
Avian flu-禽流感	Rmb mn	135	108	130	137	147	154
Other vaccines-其他疫苗	Rmb mn	127	171	103	136	164	202
- ASF vaccine	Rmb mn	-	-	-	315	632	632
Gross margin	%	62%	62%	55%	57%	59%	59%
FMD gov-口蹄疫政府	%	63%	61%	61%	61%	61%	61%
FMD private-口蹄疫市场	%	72%	68%	61%	60%	60%	60%
Avian flu-禽流感	%	45%	45%	42%	41%	41%	41%
Other vaccines-其他疫苗	%	64%	62%	52%	53%	55%	56%
EBIT	Rmb mn	420	407	289	458	653	710
EBITDA	Rmb mn	594	599	498	683	899	983
Net Profit	Rmb mn	406	382	306	438	617	688
Net Profit-core	Rmb mn	370	416	301	433	612	683
EPS	Rmb/sh	0.363	0.341	0.272	0.389	0.548	0.611
EPS-core	Rmb/sh	0.328	0.370	0.267	0.384	0.543	0.607
Operating cash flow	Rmb mn	700	533	711	390	603	873
Investing cash flow	Rmb mn	(386)	(548)	(451)	(501)	(452)	(468)
Free cash flow	Rmb mn	314	(15)	259	(110)	151	405
Net debt	Rmb mn	(1,921)	(1,345)	(1,481)	(1,272)	(1,282)	(1,488)
Net gearing	% net cash	net cash	net cash	net cash	net cash	net cash	net cash
ROE	%	8.0%	7.1%	5.4%	7.4%	9.7%	10.1%
ROE recurring	%	7.3%	7.7%	5.3%	7.3%	9.7%	10.0%
ROIC	%	7.7%	6.3%	4.8%	6.2%	7.6%	7.8%

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 125: Share price - Jinyu

Share price (Rmb/sh) - Jinyu



Source: Thomson Reuters

Exhibit 126: Forward P/E - Jinyu

Forward P/E (x) - Jinyu



Source: Bloomberg, Company data, Goldman Sachs Global Investment Research

Risks

- (1) ASF resurgence uncertainties could affect the recovery pattern of hog output, which could in turn result in either higher or lower-than-expected demand for vaccines;
- (2) Uncertainty in government tender policy could result in either higher or lower APS shocks for government purchase products;
- (3) Faster-than-expected technology advancement of competitors could add competition and squeeze margins;
- (4) Bio-safety risks could result in government penalties such as shutting of factories or suspension/revoke of license.

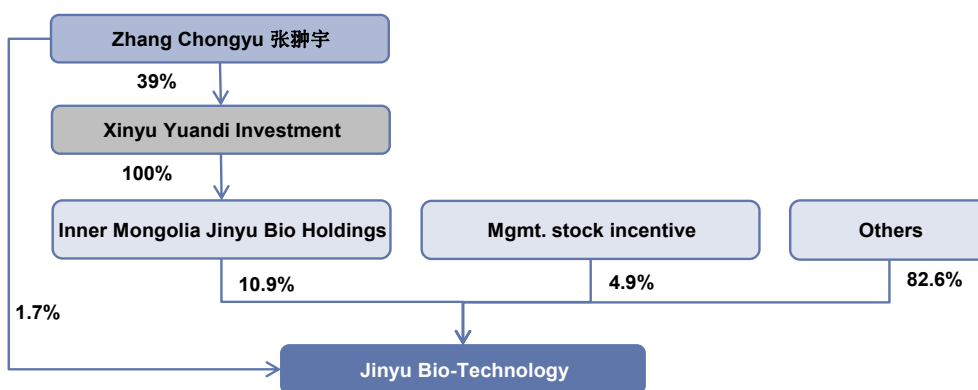
Company background - Jinyu

Jinyu Bio-Technology (“Jinyu”) is a leader in China’s animal health industry, with c.42% market share in private-purchased FMD vaccines by volume as of FY21. In 2021A, Jinyu derived 68% of its revenue from FMD sales, 14% from poultry vaccines mainly including Avian flu vaccines, and another 16% from other hog vaccines, ruminant and pet vaccines. According to Jinyu’s management, roughly 30% of its FMD sales come from government tenders with the remaining 70% comprising market purchases from livestock producers and distributors.

Jinyu listed on the Shanghai Stock Exchange in 1998 and shifted its focus to animal bio-pharmaceuticals as its core business in 2002. The company currently has no controlling shareholder.

Jinyu issued one incentive plan in Sept 2020 which set 2020-2022 earnings targets as 80%+/170%+/360%+ NP growth based on 2019A net profit of Rmb221mn. The company has met the target in 2020A but missed the 2021A target; we still see low potential the company can meet the 2022A target of Rmb1.0bn in our estimate.

Exhibit 127: Shareholding structure - Jinyu, 2021A



Note: Zhang Chongyu is the Chairman of Jinyu Bio-Technology.

Source: Company data

M&A framework

Across our global coverage, we examine stocks using an M&A framework, considering both qualitative factors and quantitative factors (which may vary across sectors and regions) to incorporate the potential that certain companies could be acquired. We then assign an M&A rank as a means of scoring companies under our rated coverage from 1 to 3, with 1 representing high (30%-50%) probability of the company becoming an acquisition target, 2 representing medium (15%-30%) probability and 3 representing low (0%-15%) probability. For companies ranked 1 or 2, in line with our standard departmental guidelines we incorporate an M&A component into our target price. M&A rank of 3 is considered immaterial and therefore does not factor into our price target, and may or may not be discussed in research.

We consider the factors detailed below to evaluate the potential that certain companies

could be acquired at a premium to current share prices.

1. Strategic asset: These include considerations of industry growth profile, gains in pricing power, cost saving synergies, blockbuster products, access to channels, etc. Animal health and nutrition companies usually have long pipelines and tend not to have blockbuster products. In addition, we consider weak pricing power for both animal health and nutrition products especially during the downcycle of food animal farming industry. Hence, we assign a score of 3 to CAHIC, Ringpu and Adisseo.

2. Shareholding structure: The voting power of large shareholders and the management team matters to the probability of a company being acquired. Private companies are more likely to become acquisition targets; acquisition of an SOE is difficult unless it is backed by the government. Given Adisseo and CAHIC are SOEs while Ringpu is 36% owned by Mr. Li Shoujun by end of 2021A, we assign a score of 3 to Adisseo and CAHIC, assign a score of 2 to Ringpu.

3. Regulatory risks: Agriculture is highly regulated in China, and acquisitions taking place globally generally involve regulatory scrutiny on agriculture resources and anti-trust. Accordingly, we assign a score of 3 to CAHIC, Ringpu and Adisseo.

4. Company size: We consider the relative size of company in its respective industry, as potential acquirers are more likely to target small players in the industry. CAHIC and Ringpu are the top 3 largest players in the domestic animal vaccine industry. Adisseo is the second largest methionine producer worldwide. Hence, we assign a score of 3 to the three companies.

We have assigned different weights to each of these factors to show their relative importance to driving M&A: Industry consolidation: 30% to strategic asset and shareholding structure, and 20% to regulation risks and size. By applying this framework, CAHIC, Ringpu and Adisseo all rank 3, and accordingly we factor no M&A value into our target price.

Exhibit 128: M&A framework for Adisseo, CAHIC and Ringpu

Ticker	Company name	Rating	1) Strategic assets	2) Shareholding structure	3) Regulation risks	4) Size	Final M&A Rank (1=high prob: 3=low prob)
			Weight	30%	30%	20%	20%
600299.SS	Adisseo	Buy	3	3	3	3	3
600195.SS	CN Husbandry	Buy	3	3	3	3	3
300119.SZ	Ringpu Bio-tech	Neutral	3	2	3	3	3

Source: Goldman Sachs Global Investment Research

Glossary - Main animal diseases

Exhibit 129: Main animal diseases

Name of disease	Abbreviation	疾病名称	Main infected animal
Foot-and-mouth Disease	FMD	口蹄疫	Hog, Ruminant
African Swine Fever	ASF	非洲猪瘟	Hog
Classical Swine Fever	CSF	经典猪瘟	Hog
Pseudorabies Virus	PRV	伪狂犬病	Hog
Porcine Reproductive and Respiratory Syndrome	PRRS	蓝耳病	Hog
Porcine Circovirus	PCV	猪圆环	Hog
Porcine Epidemic Diarrhea	PED	猪腹泻	Hog
Mycoplasma hyopneumoniae	Myco	猪支原体肺炎	Hog
Haemophilus parasuis	HPS	副猪嗜血杆菌病	Hog
Porcine Parvovirus	PPV	猪细小病	Hog
Japanese Encephalitis Virus	JEV	猪乙型脑炎病	Hog
Lawsonia intracellularis	LI	胞内劳森菌病	Hog
Leptospirosis	Lepto	钩端螺旋体病	Hog, dog
Avian Influenza	AI	禽流感	Poultry
Infections Bursal Disease	IBD	鸡传染性法氏囊炎/甘布罗病	Poultry
Avian Infectious Bronchitis	IB	鸡传染性支气管炎	Poultry
Newcastle Disease	ND	新城疫	Poultry
Marek's Disease	MD	鸡马立克氏病	Poultry
Brucellosis	N/A	布鲁氏菌病	Ruminant, Hog
Peste-des-petits-ruminants	N/A	小反刍兽疫	Ruminant
Canine distemper	CDV	犬瘟热	Dog
Canine Adenovirus Type 1 / Infectious Hepatitis	CAdV-1	犬腺病毒I型-犬肝炎	Dog
Canine Adenovirus Type 2 / Tracheobronchitis	CAdV-2	犬腺病毒II型-犬气管支气管炎	Dog
Canine Parvovirus	CPV	犬细小病毒	Dog
Canine Parainfluenza	CPIV	犬副流感	Dog
Canine Coronavirus	CCoV	犬冠状病毒病	Dog
Feline viral rhinotracheitis	FVR	猫病毒性鼻气管炎	Cat
Feline Calicivirus	FCV	猫杯状病毒病	Cat
Feline Panleukopenia	FPV	猫泛白细胞减少症	Cat

Source: Data compiled by Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

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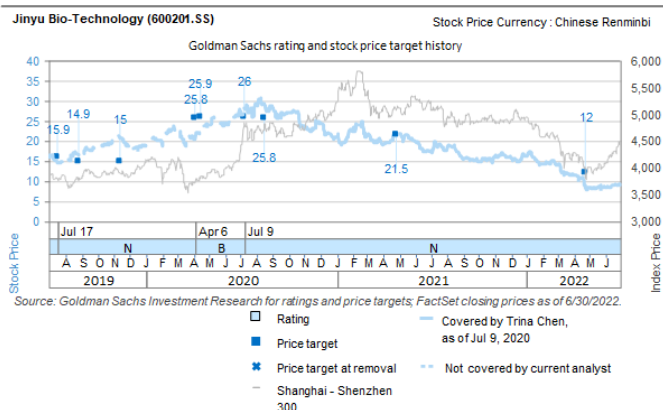
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