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CREDIT OPINION
17 September 2020

Update

Rate this Research

RATINGS

Formosa Petrochemical Corporation

Domicile	Taiwan
Long Term Rating	A3
Type	LT Issuer Rating - Fgn Curr
Outlook	Stable

Please see the ratings section at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

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Formosa Petrochemical Corporation

Update to credit analysis

Summary

The A3 ratings of the four key group companies — Formosa Plastics Corporation, Nan Ya Plastics Corporation, Formosa Chemicals & Fibre Corporation and Formosa Petrochemical Corporation (Formosa Petrochemical) — reflect their long track records, large operating scales, integrated business models and strong positions in the domestic petrochemical market. The ratings also reflect the group's strong access to funding channels in Taiwan (Aa3 stable) and modest debt leverage.

However, most of the group's products are commodity petrochemicals, which are exposed to strong industry competition and high cyclicality. This cyclicality is partly mitigated by the group's diversified product mix and end-markets, and its stringent cost control.

In assigning the A3 ratings, we have treated each of the four rated companies as an integral part of the group.

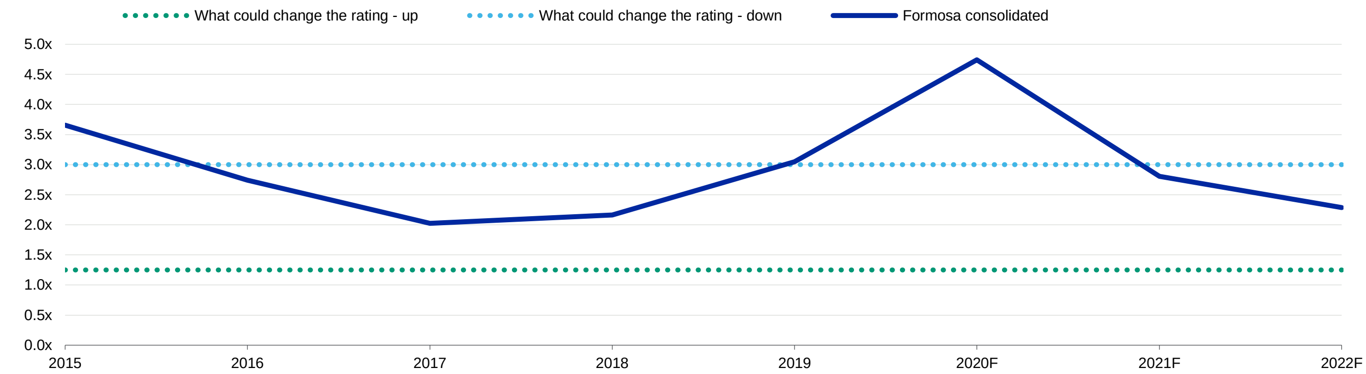
Accordingly, the ratings reflect the combined strength of the four companies, each of which is assigned the same rating as the group.

This rating approach is based on the following considerations: the four rated companies share business strategies and have jointly invested in and guaranteed the debt of associated companies, such as Formosa Ha Tinh Steel Corporation; their operations are highly integrated, with each entity housing processes that form part of an overall value chain; the four entities share an intertwined cross-shareholding structure; and there is a long track record of common management control and significant beneficial ownership by their major shareholders.

Accordingly, the rating drivers and the combined quantitative financial measurements are applied on a group basis.

We expect the companies' Moody's-adjusted debt/EBITDA to improve to around 2.3x-2.5x over the next two years from 5.4x for the 12 months that ended 30 June 2020, largely driven by continued debt reduction and a gradual improvement in earnings. This level of leverage is appropriate for the group's A3 rating.

Exhibit 1
Debt leverage will improve gradually over the next two years
Moody's-adjusted debt/EBITDA



Sources: Moody's Financial Metrics™ and Moody's Investors Service estimates

Credit strengths

» Large business scale and long operating track record

» Dominant domestic positions

» Integrated operations, offering diversified products

» Modest debt leverage and robust interest coverage

Credit challenges

» Significant cyclicality in operations

Rating outlook

The stable rating outlook reflects our expectation that the credit profiles of the four companies, on a combined basis, will likely remain strong through the cycle and offer resilience to the volatile business conditions facing the chemicals industry and the group's investment needs over time.

Factors that could lead to an upgrade

Upward rating pressure could emerge over time if the group continues to deliver robust earnings and cash flow even in a volatile oil price environment, remains prudent in its investment spending and capital commitments for business expansion, and continues to improve its financial profile, such that its adjusted debt/EBITDA remains below 1.5x on a sustained basis.

Factors that could lead to a downgrade

The ratings could be downgraded if the group's EBITDA or operating cash flow weakens significantly on a sustained basis and debt leverage deteriorates, such that its adjusted debt/EBITDA remains above 2.5x-3.0x on a sustained basis because of debt-funded business expansion or a deterioration in its operations.

Key indicators

Exhibit 2
Four Formosa companies [1]

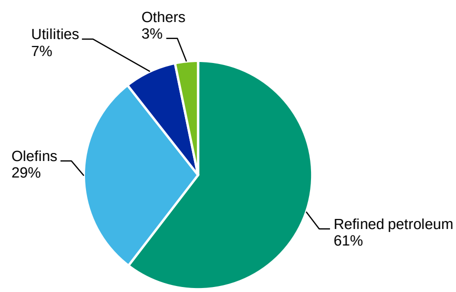
	12/31/2016	12/31/2017	12/31/2018	12/31/2019	6/30/2020 (LTM)	12/31/2020 (F)	12/31/2021 (F)
EBITDA (in USD billions)	7.4	8.7	8.0	5.3	3.2	3.5	5.3
ROA - EBIT / Average Assets	9.7%	11.2%	9.9%	6.1%	2.4%	3.4%	6.4%
Debt / EBITDA	2.7x	2.0x	2.2x	3.1x	5.4x	4.6x	2.8x
Retained Cash Flow / Debt	19.6%	21.5%	16.2%	6.4%	-4.8%	5.0%	21.0%
EBITDA / Interest Expense	28.4x	31.9x	30.2x	21.8x	13.9x	14.2x	21.7x

[1] All ratios are based on Formosa Petrochemical Corporation, Formosa Plastics Corporation, Formosa Chemicals & Fibre Corporation and Nan Ya Plastics Corporation's 'Adjusted' financial data, and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations, as well as Moody's estimates for intragroup eliminations.
Sources: Moody's Financial Metrics™ and Moody's Investors Service estimates

Profile

Formosa Petrochemical Corporation (Formosa Petrochemical) was incorporated in 1992. It engages in petroleum refining and the integrated manufacture of hydrocarbon products.

Exhibit 3
Formosa Petrochemical's revenue breakdown by segment for the first half of 2020



Source: Company information

Detailed credit considerations

Large business scale and long operating track record

The group has sizable operations, comparable with those of other global companies in the industry that we rate.

The four companies, as a group, have a successful and long operating history of more than 60 years in petrochemical processing and more than 20 years in refining.

Formosa Plastics Corporation was founded in 1954. Since then, polyvinyl chloride (PVC) has been its key product. In 1958, Nan Ya Plastics Corporation was formed to facilitate the consumption of PVC resins to produce PVC pipes, PVC film and plastic leather.

The group diversified into textiles in 1965 by setting up Formosa Chemicals & Fibre Corporation, producing rayon staple fiber, yarn, fabric and garments. Formosa Plastics Corporation further integrated its upstream activities in 1992 when Formosa Petrochemical was formed, and its sixth naphtha cracker complex was built to produce petrochemical products for its downstream-related companies.

This group of companies can manage its large scale and diversity using the experience gained from past accidents and unplanned outages, which had significantly disrupted its operating performance.

For example, in 2011, a fire broke out at a common pipeline at the sixth naphtha cracker complex, triggering an areawide suspension of production to allow safety checks. The suspension hurt the companies' results in 2011-12. Following this incident, substantial capital was invested to improve the plant.

Dominant domestic positions

At present, the group is one of the largest manufacturers in Taiwan of many of its key petrochemical products. We expect the regulatory environment in Taiwan to remain favorable for the group because it is an important industrial group for the local economy.

As Taiwan is a net exporter of petrochemical products and some refining or petrochemical products are subject to import tariffs, it is more beneficial for the suppliers to sell their products onshore.

There are entry barriers for any potential domestic and foreign competitors seeking to take market share from the group.

The group of four companies operates a vertically integrated business model that ensures, within the group, a supply of raw materials for its downstream production lines. This, in turn, provides the group with good control over the quality of its raw materials and ensures a stable supply without reliance on imports. The group's in-house cogeneration power plants have also helped it lower its cost of production.

Significant cyclicality, mitigated by diversified products and stringent cost controls

The group is exposed to volatility in crude oil prices. Formosa Petrochemical purchases crude oil and naphtha as raw inputs and any rise in their prices increases its working capital needs. This, in turn, hurts the group's liquidity and cash flow requirements.

In addition, the group is a price-taker for commodity petrochemical products and is exposed to volatility in end-product prices.

However, this risk is mitigated by the wide range of products the group offers, targeted at a diversified end-user base. The group's product applications range from automobiles, electronic appliances and textiles to construction, telecommunication hardware and toys.

The group's strengthened business operations, as reflected in its continued focus on product diversification, stringent cost controls and cautious operational management in view of business expansion and an increasingly diversified sales distribution network, will mitigate the pressure on its EBITDA amid volatile business conditions.

The group's adjusted EBITDA of around $3.2 billion for the 12 months that ended 30 June 2020 was down 40% from that in 2019, driven by large inventory losses in the refining business, particularly in H1 2020 because of a sharp drop in oil prices; further tightened spreads for its petrochemical and chemical products; and weak demand for many of its downstream products because of the coronavirus pandemic.

However, we expect the companies' adjusted EBTIDA to gradually improve to around $6.0 billion-$6.5 billion over the next two years, supported by a gradual recovery in refining margins and spreads for petrochemical and chemicals products from the very weak levels in 2019 and H1 2020; improving downstream demand for its products from Taiwan, mainland China and South Asia; lower feedstock prices; strong fundamental demand for its electronic material products; new capacity and increased product diversification; and a track record of stringent cost control.

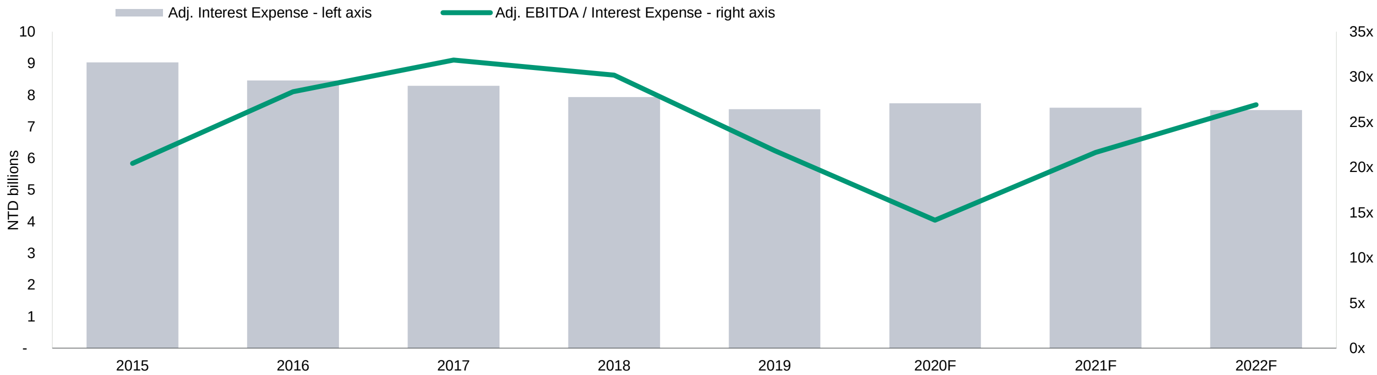
Strong interest coverage

This group of four companies is an important industrial enterprise in Taiwan. The group's long history, track record, scale and good financial management support its good access to the equity and banking markets in the country. Therefore, the group has low refinancing risk and funding assurance to take on important capital spending to maintain its competitive position.

Given its strong credit profile, the group has low average borrowing costs.

Accordingly, the group's adjusted EBITDA/interest remained strong at around 14x for the 12 months that ended 30 June 2020, compared with 22x in 2019, despite the group's softened earnings. We expect the interest coverage ratio to improve to 20x-25x over the next two years, driven by better earnings, which is similar to the range above 20x over 2015-19 and supports the group's A3 rating.

Exhibit 4
Solid adjusted EBITDA/interest supported by low funding costs



Sources: Moody's Financial Metrics™ and Moody's Investors Service estimates

The group has managed its debt maturity risk well, as reflected in its evenly spread debt repayments over the next five years.

Modest debt leverage

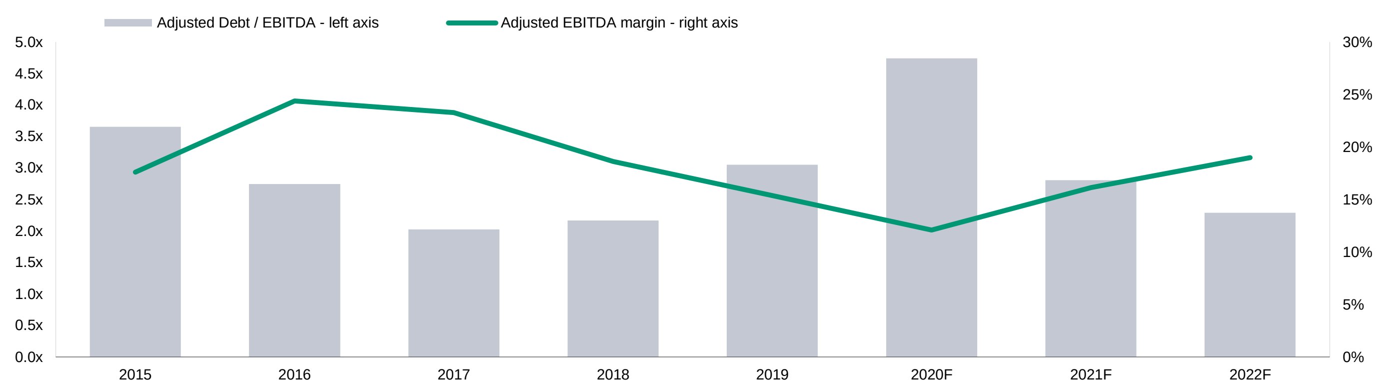
We expect the companies' adjusted debt/EBITDA to improve gradually to 2.3x-2.5x over the next two years from 5.4x for the 12 months that ended 30 June 2020, largely driven by a gradual improvement in earnings and continued debt reduction. This level of leverage is appropriate for the group's A3 rating.

The companies' adjusted debt/EBITDA increased to around 5.4x for the 12 months that ended 30 June 2020 from 3.1x in 2019, mainly because of weak earnings as a result of weakened industry conditions, in particular exacerbated by the coronavirus pandemic and a sharp drop in oil prices in H1 2020.

The group will continue to prudently manage its overall debt levels. The group's strong cash flow will serve as an important source for funding business expansion, including sizable new investments in the US. We expect the group's total adjusted debt to decline slightly over the next 12-18 months from NTD532 billion as of 30 June 2020, driven by solid positive free cash flow from strong working capital inflow in 2020, lower dividend payments and more prudent investments, as well as a continued reduction in guarantees in the Ha Tinh steel business.

The group's total adjusted debt increased to NTD532 billion as of 30 June 2020, up NTD29 billion from that as of year-end 2019 to support a higher cash balance. Its cash balance increased by NTD34 billion to NTD143 billion as of the end of June 2020 from NTD109 billion as of year-end 2019 to help weather the difficult economic environment. Its adjusted net debt decreased to NTD390 billion as of the end of June 2020 from NTD394 billion as of year-end 2019.

Exhibit 5
Adjusted debt/EBITDA to improve to 2.3x-2.5x over the next two years



Sources: Moody's Financial Metrics™ and Moody's Investors Service estimates

On a standalone basis, Formosa Petrochemical has exhibited weaker operating performance because of industry volatility. The company's adjusted EBITDA margin declined to 2.5% for the 12 months that ended 30 June 2020 from 8.9% in 2019 mainly because of large refining inventory losses and tightened spreads for its petrochemical products. As a result, the company's debt leverage, as measured by its adjusted debt/EBITDA, increased to 5.3x for the 12 months that ended 30 June 2020 from 1.1x in 2019.

ESG considerations

Environmental, social and governance (ESG) issues that are material to the rating outcome were assessed as follows.

First, the group is exposed to increasing environmental regulations and safety risks stemming from its refinery, petrochemical, and chemical businesses, and its steel plant in Vietnam. In 2016, the Government of Vietnam (Ba3 negative) claimed that Formosa Ha Tinh Steel Corporation had discharged toxic waste, resulting in mass fish deaths. Formosa Ha Tinh Steel paid penalties of around $500 million to the relevant authority for the alleged breach. Since then, the Formosa group has been working closely with the government on remedial actions and maintaining a record of environmental compliance. Nevertheless, these environmental and safety risks are somewhat mitigated by the group's solid operational and financial capabilities.

Second, the ratings factor in the companies' good corporate governance track record, as reflected in their good liquidity and disciplined investments.

Liquidity analysis

On a combined basis, the companies held NTD143 billion in cash as of 30 June 2020. This cash balance, together with our estimate of around NTD135 billion-NTD140 billion in operating cash inflow over the next 12 months, will be sufficient to cover the companies' short-term debt of NTD171 billion, committed capital spending and dividend payments over the next 12 months.

The companies have strong access to domestic funding, given their significant economic contributions and long operating history in the country.

Other considerations

Other businesses

The group has equity interests in a number of entities, including Nan Ya Technology Corporation, Nan Ya Printed Circuit Board Corporation, Formosa Sumco Technology Corporation, Formosa Taffeta Co., Limited, Formosa Advanced Technologies Co., Ltd, Formosa Plastics Corp., U.S.A., Formosa Ha Tinh Steel Corporation, Formosa Resources Corporation and Mai-Liao Power Corporation.

Many of these companies are engaged in non-petrochemical businesses, such as power generation, semiconductor manufacturing, packaging, steel manufacturing and semiconductor testing. These companies add a certain degree of business diversification.

Nan Ya Technology, Formosa Sumco Technology and Mai-Liao Power have been providing the group with dividend income streams.

The group has injected capital into its dynamic random access memory businesses during difficult times in the past. However, we do not expect the group to further inject large amounts into these businesses as they have undergone restructuring to improve their financial performance.

We have not factored in any capital call from Formosa Plastics Corp., U.S.A. because this business has the ability to source funding for its expansion by itself.

The group's A3 rating reflects lower business risks from its steel plant in Vietnam, as reflected in the commencement of operations at its second blast furnace in May 2018. Formosa Ha Tinh Steel Corporation notably increased its production in 2019 and generated significant operating cash flow to support its own operations.

The significant improvement in the financial profile of Formosa Ha Tinh Steel Corporation, the steel plant operations of the group, will strengthen its access to funding, which, in turn, will lower the contingent liabilities of the four Formosa companies over the next 12-18 months, in view of their provision of guarantees to the steel plant's operations.

Methodology and scorecard

The principal methodology used for rating the group is the Chemical Industry rating methodology, published in March 2019.

We have followed the approach of assessing the four companies on a group basis and have combined their financials for assessing the subfactors in the methodology scorecard.

The scorecard-indicated outcome of Baa1 is based on the group's forward-looking financials, one-notch lower than its issuer rating. The difference reflects the group's dominant positions in its home market of Taiwan, strong access to funding, and diversity in its products and businesses.

Exhibit 6

Rating factors

Four Formosa companies

	Current 12/31/2019		2021F [2]	
Chemical Industry Grid [1]	**Measure**	**Score**	**Measure**	**Score**
Factor 1 : Scale (20%)				
a) Revenues (in USD Billions)	$35.8	A	$34.02	A
b) PP&E (net) (in USD Billions)	$15.7	A	$16.1	A
Factor 2 : Business Profile (20%)				
a) Business Profile	A	A	A	A
Factor 3 : Profitability (10%)				
a) EBITDA Margin %	15.4%	Baa	16.0%	Baa
b) ROA (Return on Average Assets)	6.1%	B	6.5%	B
Factor 3 : Leverage and Coverage (30%)				
a) Debt / EBITDA	3.1x	Ba	2.8x	Baa
c) RCF / Debt	6.4%	B	22.4%	Baa
b) EBITDA / Interest Expense	21.8x	A	21.6x	A
Factor 4 : Financial Policy (20%)				
a) Financial Policy	Baa	Baa	Baa	Baa
Rating:				
a) Scorecard-Indicated Rating	Baa2		Baa1	
b) Actual Rating Assigned	A3		A3	

[1] All ratios are based on Formosa Petrochemical Corporation, Formosa Plastics Corporation, Formosa Chemicals & Fibre and Nan Ya Plastics Corporation's 'Adjusted' financial data, and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations, as well as Moody's estimates for intragroup eliminations.
[2] This represents Moody's forward view, not the view of the issuer.
Sources: Moody's Financial Metrics™ and Moody's Investors Service estimates

Appendix

Exhibit 7

Peer comparison

(in USD billions)	Four Formosa Companies [1] A3 Stable			LG Chem, Ltd. Baa1 Negative			Dow Chemical Company Baa2 Stable		
	FYE Dec-18	FYE Dec-19	LTM Jun-20	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-18	FYE Dec-19	LTM Jun-20
Revenue	42.7	35.8	29.4	22.7	25.6	24.6	49.6	43.0	39.1
Net Property Plant and Equipment	14.9	15.7	15.9	10.7	12.6	16.1	23.6	20.9	22.4
EBITDA Margin %	18.6%	15.4%	10.9%	17.1%	13.8%	9.8%	19.7%	17.5%	15.7%
ROA - EBIT / Average Assets	9.9%	6.1%	2.4%	12.7%	8.4%	2.9%	7.4%	5.7%	4.6%
Debt / EBITDA	2.2x	3.1x	5.4x	0.8x	1.7x	3.4x	3.5x	4.2x	5.2x
RCF / Debt	16.2%	6.4%	-4.8%	91.8%	42.6%	23.1%	11.0%	16.9%	7.4%
EBITDA / Interest Expense	30.2x	21.8x	13.9x	36.7x	22.0x	11.6x	6.0x	5.4x	4.6x

[1] All ratios are based on Formosa Petrochemical Corporation, Formosa Plastics Corporation, Formosa Chemicals & Fibre Corporation and Nan Ya Plastics Corporation's 'Adjusted' financial data, and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations, as well as Moody's estimates for intragroup eliminations.
Source: Moody's Financial Metrics™

Exhibit 8

Four Formosa companies
Moody's-adjusted debt breakdown

in NTD billions	FYE Dec-16	FYE Dec-17	FYE Dec-18	FYE Dec-19	LTM Jun-20
As Reported Debt	**420**	**321**	**311**	**327**	**361**
Pensions	43	41	41	40	40
Operating Leases	0	0	0	0	0
Analyst Adjustments	194	173	167	135	131
Moody's-Adjusted Debt	**658**	**535**	**519**	**503**	**532**

Source: Moody's Financial Metrics™

Ratings

Exhibit 9

Category	Moody's Rating
FORMOSA PETROCHEMICAL CORPORATION	
Outlook	Stable
Issuer Rating	A3

Source: Moody's Investors Service

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