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CREDIT OPINION
22 October 2021

Update

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RATINGS

Merck KGaA

Domicile	Darmstadt, Germany
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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Merck KGaA

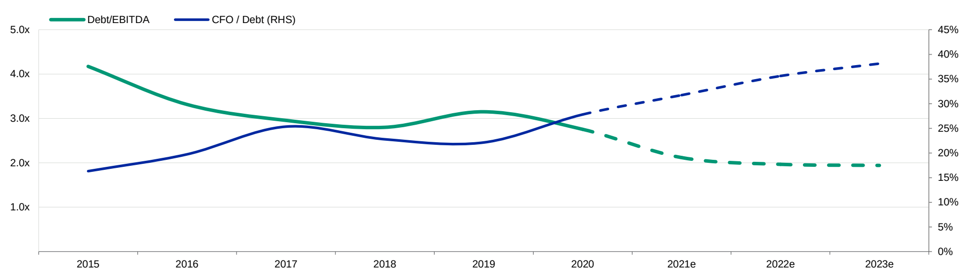
Update following upgrade to A3

Summary

Merck KGaA's (Merck) A3 rating reflects its long-standing good operational diversification because of its presence in three different industries, namely pharmaceutical equipment with its Life Science division (43% of 2020 revenue), pharmaceuticals with its Healthcare division (38%), and semiconductors and displays with its Electronics division (19%); solid and steady growth prospects of its business sectors, which drive satisfactory cash flow generation; a portfolio of new drugs skewed toward biopharmaceuticals and, consequently, less exposed to generic competition; and a track record of conservative financial policies.

However, the A3 rating also factors in increasing competitive pressure on Merck's largest-selling drugs, namely Rebif and Erbitux; strong competition in the Liquid Crystal segment, a subsegment of the Electronics division; and a degree of event risk related to future strategic investments.

Exhibit 1
We expect Merck's credit ratios to further improve over the next 18 months
Moody's-adjusted debt/EBITDA and CFO/debt



Projected ratios represent Moody's forward view, not the view of the issuer, and do not incorporate significant acquisitions or divestitures.
Source: Moody's Financial Metrics and Moody's Investors Service estimates

Credit strengths

» Good operational diversification with a presence in three business sectors

» Solid and steady growth prospects of its business sectors, which drive satisfactory cash flow generation

» Portfolio of new drugs skewed toward biopharmaceuticals

» Track record of conservative financial policies

Credit challenges

» Largest-selling drugs face increasing competition

» Falling prices of liquid crystals, which weigh on the performance of its Electronics division

» Degree of event risk related to future strategic investments

Rating outlook

The stable rating outlook reflects our expectation that Merck will continue to grow its earnings and that future strategic investments will continue to fuel revenue growth in the mid- to high-single digits in percentage terms while maintaining a Moody's-adjusted EBITDA margin above 25% and stable free cash flow (FCF) generation. We expect the company to maintain its conservative financial policies and also expect any significant increases in leverage to fund strategic M&A to result in weaker metrics only for a temporary period of time.

Factors that could lead to an upgrade

Upward rating pressure could develop if Merck's Moody's-adjusted debt/EBITDA trends toward 2.0x and Moody's-adjusted cash flow from operations (CFO)/debt is above 35% on a sustained basis. An upgrade would also require that Merck maintains its diversified business profile, a track record of solid operating performance at its three business sectors and conservative financial policies.

Factors that could lead to a downgrade

Downward rating pressure could develop if Merck's Moody's-adjusted debt/EBITDA increases above 3.0x or its Moody's-adjusted CFO/debt remains below 25%. Negative pressure could also develop if the company's financial policies become more aggressive or its liquidity weakens.

Key indicators

Exhibit 2
Merck KGaA

	Dec-17	Dec-18	Dec-19	Dec-20	12-18 months Forward View
Revenue (EUR Billion)	€14.5	€14.8	€16.2	€17.5	€20 - €21
Debt / EBITDA	3.0x	2.8x	3.2x	2.8x	2.0x - 2.5x
CFO / Debt	25.3%	22.8%	22.1%	27.8%	27% - 32%
Pharmaceutical Cash Coverage of Debt	6%	3%	18%	4%	8% - 15%

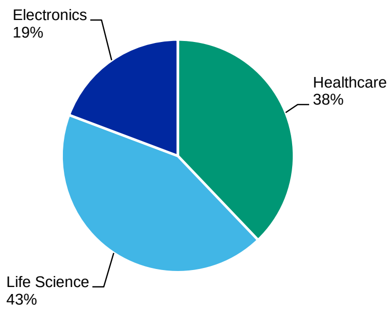
Projected ratios represent Moody's forward view, not the view of the issuer, and do not incorporate significant acquisitions or divestitures. All ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations.
Source: Moody's Financial Metrics and Moody's Investors Service estimates

Profile

Founded in 1668 and based in Darmstadt, Germany, Merck is a diversified global healthcare, life sciences and electronics company. It develops and manufactures original drugs, healthcare products, specialty value-added chemicals, semiconductor materials and life science solutions. Merck generated €17.5 billion of revenue in 2020. The Merck family owns 70% of the group's capital, with the rest being listed.

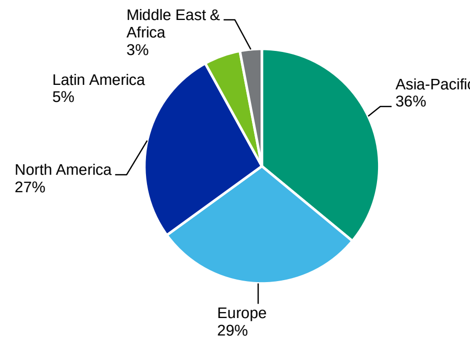
As Exhibits 3 and 4 show, Merck has good operational and geographic diversification.

Exhibit 3
Good operational diversification supports Merck's credit quality
Breakdown of 2020 revenue by division



Source: Company 2020 annual report

Exhibit 4
Merck's earnings are well diversified geographically
Breakdown of 2020 revenue by geography



Source: Company 2020 annual report

Detailed credit considerations

Operational diversification in business sectors with solid growth prospects will continue to support Merck's business profile

Merck has maintained a diversified operating profile and continued to develop its three business sectors in recent years. In 2019, Merck acquired Versum Materials, Inc. (Versum), a leading supplier of semiconductor materials, gases and equipment. This transaction enabled Merck to become a leading provider of electronic materials for the semiconductor and display industries and to add a new segment to its Electronics division.

In the Life Science division, growth has been mostly organic in recent years, with Merck's presence in several high-growth segments, such as bioprocessing, and boosted by the coronavirus pandemic since 2020. This resulted in the Life Science division becoming the largest business sector of the group with a contribution of 43% to the 2020 group revenue.

In the Healthcare sector, Merck has been facing increasing competition for its two largest-selling drugs, Rebif for multiple sclerosis and Erbitux for certain types of cancer, but has been able to mitigate it with the launch of two new drugs in the same therapeutic areas, Mavenclad for multiple sclerosis and Bavencio, which has already been approved for kidney and bladder cancer. We expect the new products, as well as Merck's established products in fertility (Gonal-F) and Cardiovascular Metabolism & Endocrinology, to enable Merck to offset the declining sales of Rebif and Erbitux.

Investments will increase over 2021-25 but an M&A strategy now more focused on bolt-on transactions mitigates execution risks

Merck's new strategic plan involves an increase of about 50% of its investments (including acquisitions) over 2021-25 compared with investments made in the past five years (2016-20). Most of these investments (at least 70%) will be directed to segments with high growth prospects: Process Solutions in Life Science, new products in Healthcare, and Semiconductor Solutions. We expect that the group's financial profile could therefore soften somewhat in 2022-23, but would still remain adequate for the A3 rating. We project that leverage (Moody's-adjusted gross debt/EBITDA) will be around 2x as of year-end 2021 and Moody's-adjusted CFO/debt will be in the low 30s in percentage terms, which will leave Merck with some flexibility for incremental investments.

These investments will include additional capital spending of about €500 million annually, which will be mainly allocated to capacity expansion at its Life Science division. We also expect Merck to invest in late-stage molecules to strengthen its Healthcare pipeline, either through acquisitions or in-licensing transactions. With regard to M&A, the company has announced a shift in its acquisition strategy with a focus on bolt-on transactions for future acquisitions rather than the larger, and sometimes transforming, deals that Merck used to make in the past, which overall is likely to reduce related execution risks.

Earnings growth to continue in 2021-22

Over the next 12-18 months, we forecast sales to increase by about 6%, driven by all three divisions of Merck's portfolio. The performance of the Life Science division was strong in 2020, with organic growth in revenue and company EBITDA of 12% and 17%, respectively. The strong growth was mainly fueled by a surge in demand for products used in COVID-19 vaccines, therapies and diagnostics. Over the next 12-18 months, we expect the Life Science division to grow at high-single digits in percentage terms, driven, in particular, by Process Solutions. Growth in the latter will continue to be boosted in 2021-22 by the demand for critical materials for COVID-19 vaccine and therapy production.

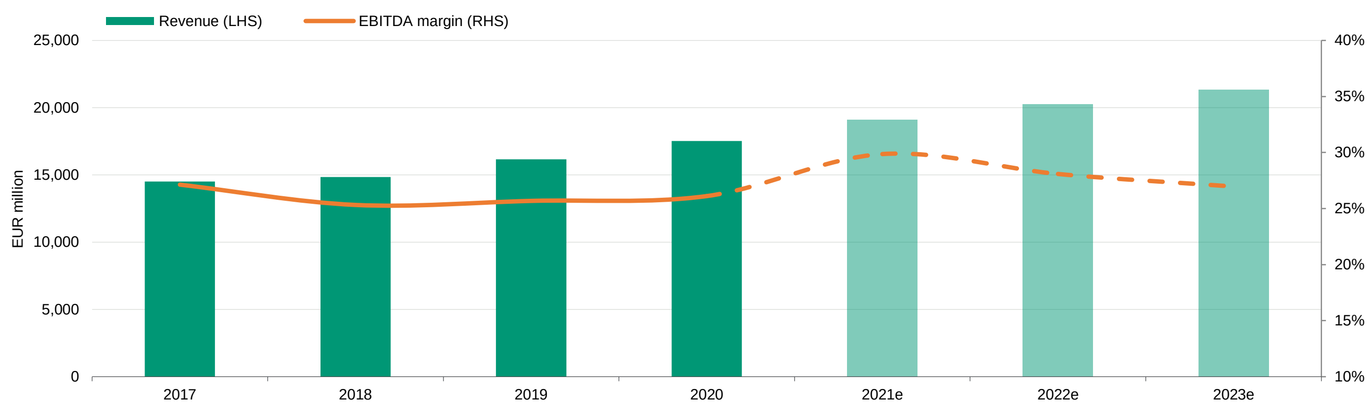
We expect the Healthcare division to report growth in the mid-single digits in percentage terms over the next 12-18 months, driven by the continued recovery in the fertility segment and the continued rollout of new products, such as Mavenclad and Bavencio, which will offset the pressure on the existing drugs that have lost patent protection.

The Electronics division, which reported a moderate decline (-3.2% on an organic basis) in 2020, has returned to growth and, over the next 12-18 months, we expect it to record low single-digit organic growth in percentage terms, driven by an improvement in the Semiconductor Solutions business, while liquid crystals sales will continue to decline.

Exhibit 5

We expect revenue growth in 2021-23, supported by all three divisions

Revenue and Moody's-adjusted EBITDA margin



Source: Moody's Financial Metrics and Moody's Investors Service estimates

Moderate exposure to generic competition, but competition is increasing for Rebif and Erbitux

Although Merck's two main drugs, Rebif and Erbitux, have already faced patent expiration on their active ingredients and will continue to do so over the next few years, the group has employed active life cycle management, notably with the new formulation of Rebif (patent expiry in 2024) and Rebidose, a new single-use pre-filled pen for the self-administration of Rebif. In addition, both Erbitux (for which the European Union patent expired in June 2014) and Rebif are biological drugs, which have been difficult to copy so far. However, with an increasing number of biosimilars being launched, we expect these products to face increasing competition.

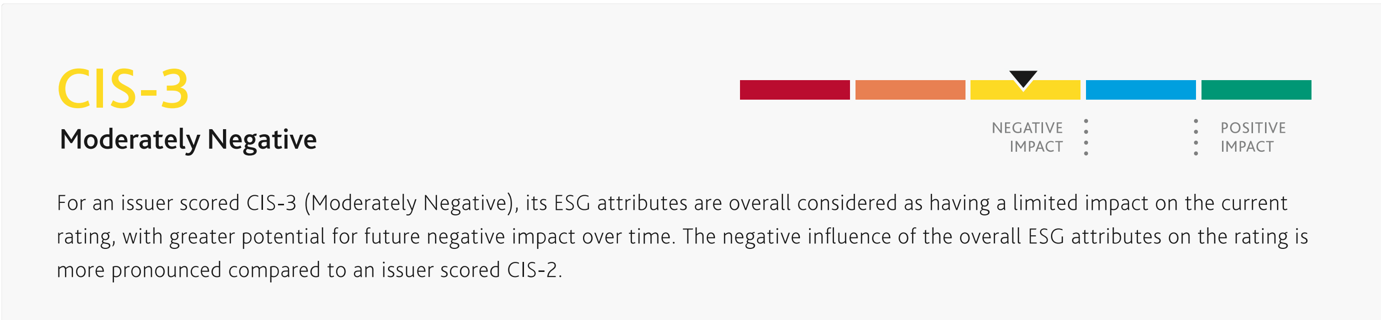
In 2020, Rebif's revenue fell by 9% at a constant exchange rate, and we expect future sales to decline by about 10% per year. Competition has been increasing in multiple sclerosis, with the launch of Zeposia (manufactured by Bristol-Myers Squibb Company [A2 stable]) and Vumerity (Biogen Inc. [Baa1 stable]) in recent years. Merck's new multiple sclerosis drug Mavenclad has returned to solid growth since the third quarter of 2020, after a pandemic-induced slowdown in its ramp-up, and has been offsetting Rebif's sales decline. Sales of Erbitux, one of Merck's largest pharmaceutical products, grew in 2020, benefiting from a temporary supply agreement with Eli Lilly and Company (A2 stable), but its sales are likely to decline over the next few years because of pricing pressure and increasing competition. We expect Bavencio, Merck's new drug to treat several forms of cancer, to mitigate the future drop in Erbitux's sales.

Merck's fertility products, including Gonal-F, were affected by the pandemic and their sales declined in 2020 (Gonal-F sales declined 12.7% organically in 2020) but they have recovered during 2021 as the pandemic subsides. Gonal-F is facing biosimilar competition in some markets, but it has continued to perform strongly.

ESG considerations

Merck's ESG Credit Impact Score is moderately negative CIS-3

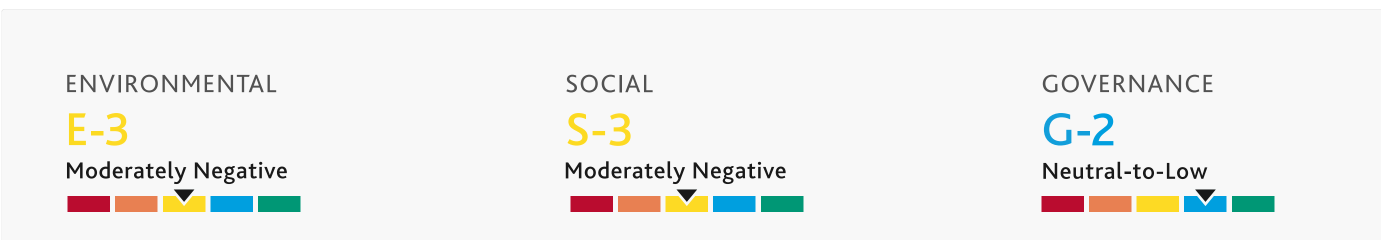
Exhibit 6
ESG Credit Impact Score



Source: Moody's Investors Service

CIS-3. Merck's ESG Credit Impact Score is Moderately Negative (**CIS-3**). There has been a limited credit impact to date, but there is a potential for social risk factors to strain the rating over time. The company's diversified businesses, which in addition to branded pharma include life sciences, surface materials and electronics, mitigate these risks.

Exhibit 7
ESG Issuer Profile Scores



Source: Moody's Investors Service

Environmental

E-3. Merck's score reflects its moderate exposure to waste and pollution risks, with the company recognizing environmental protection liabilities on its balance sheet.

Social

S-3. Merck has moderate exposure to social risks. It has large businesses in life sciences (about 40% of its revenue) and electronics (about 20%), which are less exposed to litigation risk and policy risk related to pricing than branded pharma businesses.

Governance

G-2. Merck's exposure to governance risks is neutral to low. Although there is a high ownership concentration, it is mitigated by the company's long track record of conservative financial policies, illustrated by a moderate dividend payout and the inclusion of some hybrid funding for large acquisitions. Merck has an active acquisition strategy, but it has a track record of focusing on rapid leverage reduction after large transactions.

ESG Issuer Profile Scores and Credit Impact Scores for the rated entity/transaction are available on Moodys.com. To view the latest scores, please click here to go to the landing page for the entity/transaction on MDC and view the ESG Scores section.

Liquidity analysis

Merck has a solid liquidity. As of June 2021, it had €1.8 billion of cash on balance sheet and access to a fully undrawn €2.0 billion revolving credit facility maturing in 2025 without a maintenance covenant or a significant adverse change clause. We project that

Merck will generate FCF of about €1 billion annually on average in 2021-23. Merck's debt maturity profile is well spread, and its next debt maturities are $1 billion and €550 million bonds that mature in 2022.

Structural considerations

The Baa2 junior subordinate rating assigned to Merck's hybrid notes is two notches below its A3 issuer rating. This difference reflects the deeply subordinated nature of the hybrid securities in relation to the senior unsecured obligations of the company and its subsidiaries, while the hybrid securities are only senior to common shares. The hybrid securities have a maturity of at least 60 years and no events of default. The hybrid notes qualify for basket C and a 50% equity treatment of the borrowing for our calculations of the credit ratios.

Methodology and scorecard

The principal methodology used was our Pharmaceutical Industry rating methodology, published in June 2017. Merck's actual long-term issuer rating is in line with the scorecard-indicated outcome of A3.

Merck's Life Science business sector has been increasing its contribution to group revenue and EBITDA in recent years and is now the largest contributor, slightly ahead of the Healthcare division. Should Life Science remain the clear largest contributor in the coming years, we could consider shifting Merck from the Pharmaceutical Industry methodology to the Medical Products and Devices methodology.

Exhibit 8
Rating factors
Merck KGaA

Pharmaceutical Industry Scorecard [1][2]	Current LTM 6/30/2021		Moody's 12-18 Month Forward View As of October 2021 [3]	
Factor 1 : Scale (25%)	**Measure**	**Score**	**Measure**	**Score**
a) Revenue (USD Billion)	$22.1	A	$23 - $24	A
Factor 2 : Business Profile (40%)				
a) Product and Therapeutic Diversity	A	A	A	A
b) Geographic Diversity	Aa	Aa	Aa	Aa
c) Patent Exposures	A	A	A	A
d) Pipeline Quality	Ba	Ba	Ba	Ba
Factor 3 : Leverage & Cash Coverage (25%)				
a) Debt / EBITDA	2.3x	A	2.0x - 2.5x	A
b) (Cash Flow from Operation) / Debt	36.6%	A	27% - 32%	Baa
c) Pharmaceutical Cash Coverage of Debt	18.9%	Baa	8% - 15%	Ba
Factor 4 : Financial Policy (10%)				
a) Financial Policy	A	A	A	A
Rating:				
a) Scorecard-Indicated Outcome		A3		A3
b) Actual Rating Assigned		A3		A3

(1) All ratios are based on adjusted financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations. (2) As of LTM 6/30/2021. (3) This represents Moody's forward view, not the view of the issuer, and unless noted in the text, does not incorporate significant acquisitions and divestitures.
Source: Moody's Financial Metrics and Moody's Investors Service estimates

Ratings

Exhibit 9

Category	Moody's Rating
MERCK KGAA	
Outlook	Stable
Issuer Rating	A3
Senior Unsecured MTN -Dom Curr	(P)A3
Jr Subordinate -Dom Curr	Baa2
Other Short Term -Dom Curr	(P)P-2
MERCK FINANCIAL SERVICES GMBH	
Outlook	Stable
Bkd Senior Unsecured -Dom Curr	A3
Bkd Other Short Term -Dom Curr	(P)P-2
EMD FINANCE LLC	
Outlook	Stable
Bkd Senior Unsecured	A3

Source: Moody's Investors Service

Appendix

Exhibit 10

Peer comparison

Merck KGaA

	Merck KGaA A3 Stable			Danaher Corporation Baa1 Stable			Thermo Fisher Scientific Inc. Baa1 Stable			Eli Lilly and Company A2 Stable			Bristol-Myers Squibb Company A2 Stable		
(in USD million)	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21	FYE Dec-19	FYE Dec-20	LTM Jun-21
Revenue	18,082	20,012	22,118	17,911	22,284	26,720	25,542	32,218	38,250	22,320	24,540	26,726	26,145	42,518	44,384
EBITDA	4,645	5,226	6,366	4,903	6,855	9,511	6,964	10,337	13,173	7,769	8,212	8,131	9,765	18,202	18,584
Total Debt	14,691	15,434	14,875	23,728	23,601	22,820	20,519	24,420	21,251	22,424	24,363	24,222	49,735	53,856	50,231
Cash + Marketable Securities	640	1,372	1,926	19,912	6,035	7,322	2,399	10,325	7,023	2,439	3,681	3,271	15,393	16,450	14,016
EBITDA Margin %	25.7%	26.1%	28.8%	27.4%	30.8%	35.6%	27.3%	32.1%	34.4%	34.8%	33.5%	30.4%	37.3%	42.8%	41.9%
EBITDA / Interest Expense	9.2x	11.4x	14.1x	30.7x	20.8x	29.2x	9.7x	17.4x	22.8x	15.3x	17.6x	17.8x	13.9x	12.4x	13.0x
Pharmaceutical Cash Coverage of Debt	4.4%	8.9%	18.9%	83.9%	25.6%	32.1%	11.7%	42.3%	33.0%	13.3%	17.0%	27.9%	32.5%	31.3%	28.2%
Debt / EBITDA	3.2x	2.8x	2.3x	4.8x	3.4x	2.4x	2.9x	2.4x	1.6x	2.9x	3.0x	3.0x	5.1x	3.0x	2.7x
CFO / Debt	22.1%	27.8%	36.6%	17.5%	27.7%	36.3%	25.2%	35.0%	49.5%	23.1%	27.2%	29.8%	18.2%	27.9%	26.3%

All figures and ratios are calculated using Moody's estimates and standard adjustments. FYE = Financial year end. LTM = Last 12 months.
Source: Moody's Financial Metrics™

Exhibit 11

Debt adjustment breakdown

Merck KGaA

(in EUR million)	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-20	LTM Jun-21
As Reported Total Debt	10,709	8,805	13,119	12,039	11,968
Pensions	1,105	1,966	1,461	2,069	2,069
Leases	476	494	0	0	0
Hybrid Securities	(745)	(746)	(1,493)	(1,494)	(1,494)
Non-Standard Public Adjustments	99	0	0	0	0
Moody's Adjusted Total Debt	11,644	10,519	13,088	12,614	12,543

All figures are calculated using Moody's estimates and standard adjustments.
Source: Moody's Financial Metrics™

Exhibit 12

EBITDA adjustment breakdown

Merck KGaA

(in EUR million)	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-20	LTM Jun-21
As Reported EBITDA	4,220	3,591	4,111	4,958	5,717
Unusual Items - Income Statement	(427)	28	(20)	(424)	(424)
Pensions	0	(15)	58	45	45
Leases	146	153	0	0	0
Moody's Adjusted EBITDA	3,939	3,757	4,149	4,579	5,338

All figures are calculated using Moody's estimates and standard adjustments.
Source: Moody's Financial Metrics™

Exhibit 13

Summary ratios historical and Moody's projected

Merck KGaA

(in EUR million)	FYE Dec-17	FYE Dec-18	FYE Dec-19	FYE Dec-20	Dec-21 (F)	Dec-22 (F)	Dec-23 (F)
INCOME STATEMENT							
Revenue	14,517	14,836	16,152	17,534	19,117	20,248	21,354
EBITDA	3,939	3,757	4,149	4,579	5,709	5,687	5,759
EBITDA margin %	27.1%	25.3%	25.7%	26.1%	29.9%	28.1%	27.0%
EBITA	3,293	3,109	3,441	3,738	4,851	4,847	4,939
EBITA margin %	22.7%	21.0%	21.3%	21.3%	25.4%	23.9%	23.1%
BALANCE SHEET							
Cash & Cash Equivalents	386	1,883	570	1,109	1,834	1,699	2,771
Total Debt	11,644	10,519	13,088	12,614	12,093	11,182	11,182
CASH FLOW							
Capital Expenditures	(1,441)	(1,147)	(1,157)	(1,707)	(1,785)	(2,189)	(2,364)
Retained Cash Flow (RCF)	2,825	2,071	2,728	3,075	3,579	3,604	3,560
Free Cash Flow (FCF)	863	459	1,010	1,083	1,269	915	1,016
FINANCIAL RATIOS							
Debt / EBITDA	3.0x	2.8x	3.2x	2.8x	2.1x	2.0x	1.9x
Cash Flow from Operations (CFO) / Debt	25.3%	22.8%	22.1%	27.8%	31.7%	35.6%	38.1%
Pharmaceutical Cash Coverage of Debt	3.3%	17.9%	4.4%	8.9%	15.3%	15.3%	24.9%
RCF / Net Debt	25.1%	24.0%	21.8%	26.7%	34.9%	38.0%	42.3%
FCF / Debt	7.4%	4.4%	7.7%	8.6%	10.5%	8.2%	9.1%

Projected ratios represent Moody's forward view, not the view of the issuer, and do not incorporate significant acquisitions or divestitures.
Source: Moody's Financial Metrics and Moody's Investors Service estimates

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