



Business
Intelligence

2023 PACKAGING MACHINERY

QUARTERLY UPDATE – Q2 2023

pmmi.org



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INTRODUCTION

Interact Analysis is now collaborating with PMMI to produce the annual State of the Industry report. They have worked with PMMI for a number of years on several projects and are delighted to have the opportunity to deliver gold standard insight on the packaging machinery market to its members. Many of those reading this may have already been approached by Interact Analysis to partake in research interviews. This information, along with data from Interact Analysis' Manufacturing industry Output tracker make up the contents of this quarterly update.

As Interact Analysis begins to build a foundation of data to trend and report from, the contents of this quarterly update will shift and show changes in what is being reported to us by the PMMI's members.

What data is shown in this quarterly update?

- 1** As part of this quarterly update, we will be displaying data from Interact Analysis' Manufacturing Industry Output (MIO) tracker. The goal of the quarterly updated MIO dataset is to provide a perspective for how manufacturing is performing across a number of different sectors. It is important to recognize that the packaging machinery market size produced in the State of the Industry report, will be different than what the MIO shows in this quarterly update. Machine types included in the State of the Industry report are excluded from the packaging machinery definition in the MIO.
- 2** In addition to data from the MIO, Interact Analysis has already conducted dozens of interviews with the PMMI's membership as part of the new edition of the State of the Industry report. We will touch on what has been shared with us up to this point in the research cycle.

WHAT IS THE MIO?

The Manufacturing Industry Output Tracker measures the relative value of manufacturing output. It does so across:

- 38** Regions, including most major economies of the world
- 46** Industry and machinery verticals (per region)
- 16** Historic years and five years of forecast (2007-2027)

An additional 40 deeper segments (per region) within selected industries and verticals are also included.

Methodology

The data is derived and aggregated from annual surveys of manufacturing published by official statistics bureaus.

- > The survey data can be incompatible and needs careful organization to make like-for-like comparisons.
- > The surveys may be incomplete and missing data must be modeled.
- > We use monthly series to inform our data model of the most recent trends, as annual surveys are published up to 3 years after the year of study.

REVISITING PREVIOUS ESTIMATES WITHIN THE STATE OF THE INDUSTRY REPORT

The Challenge in Producing a Quarterly Update With Limited Historic Data

As Interact Analysis begins their first edition of PMMI's State of the Industry, it's important to highlight their approach for conducting this analysis. While they may rely on prior work as a starting point to analyze the packaging machinery market, independently reaching their own conclusions serves as the best method to attain an accurate view of the market. In doing so, they are likely to arrive at numbers which do not align perfectly with the work previously done. This issue is outlined in more detail below:

1. We have limited visibility into how exactly estimates were derived in previous editions. As such, we cannot speak to their accuracy and must independently validate these estimates using our own methods and expertise. In doing so, we are likely to find differences in how the two parties view the same market historically and looking forward. While some differences may be miniscule and have minimal impact on the consensus view of an entire market, larger disparities in findings can drastically shift the narrative and understanding for how a market has evolved over time.
2. We have elected to perform a bottom-up analysis of the market for our first edition to re-measure the market size. We know from experience that this is the best method for calculating an accurate market size and it is a method we employ across many research topics. A bottom-up methodology implies making estimates for every company active in the marketplace in an effort to count every dollar associated with machinery sales.
3. For the historic perspective, we are relying on information housed in a dataset maintained by Interact Analysis called the Manufacturing Industry Output (MIO) tracker. Within the MIO, there is data which tracks the dollar value of packaging machinery produced around the world. This data is updated as part of the US Census' Economic Survey and is a good barometer for how the industry has performed. There is a lag in this data set of about 3 years, therefore it should be noted that estimates for packaging machinery put forth in the MIO dataset are estimated within a historic window of 3 years (e.g. final packaging numbers from the census bureau for 2020 released in 2023).

AN EXAMPLE OF THIS DISCREPANCY: 2020

The Story of 2020 is Being Retold with New Data

THE PREVIOUS ESTIMATE

In the previous edition of the state of the industry report, it was reported that the packaging machinery industry grew 14.7% in 2020 and 8.2% for 2021.

From our understanding, there were several sources used to derive this estimate including a self reported survey, although we cannot speak to the exact methodology for how the number determined as we have limited visibility into the previous organization's models.

In our efforts to independently validate previous estimates, we utilized our Manufacturing Industry Output tracker and found a different story for 2020 was emerging. This is explained below:

INTERACT ANALYSIS' ESTIMATE

As opposed to showing growth of 14.7% in 2020, MIO data suggests only modest growth in packaging machinery production of 0.27%. With this difference in mind, MIO data suggests a larger recovery in 2021 than was previously reported, showing a growth rate of 16.4% compared to 8.2%.

In our opinion, this better represents the reality of the packaging machinery market in 2020. Although packaging machinery as an industry did perform better in 2020 than most other machinery sectors, the data still shows a slow year. We believe orders for packaging machinery were strong in the back half of 2020 as consumer buying habits shifted heavily towards products rather than services. However, supply chain constraints during that period likely led to surging backlogs and an inability to realize the full value of the sale until well after the order was placed. This 'delayed fuse' was present in most machinery markets during this time period and resulted in the majority of market growth being seen in 2021 as opposed to 2020 when many of the orders were placed.

Further validating this point is the end-of-year financials posted by many publicly held packaging companies. Overwhelmingly these companies indicated a decrease in revenues between 2019 and 2020. In these public end-of-year reports, many firms reported growth in late Q3 and Q4 of 2020, but troubles in delivering orders due to lack of availability of components needed for production. This again supports the idea of a 'delayed fuse' resulting from high-demand amongst strong supply chain constraints.

WHERE THE US STANDS TODAY – DATA FROM MANUFACTURING INDUSTRY OUTPUT TRACKER

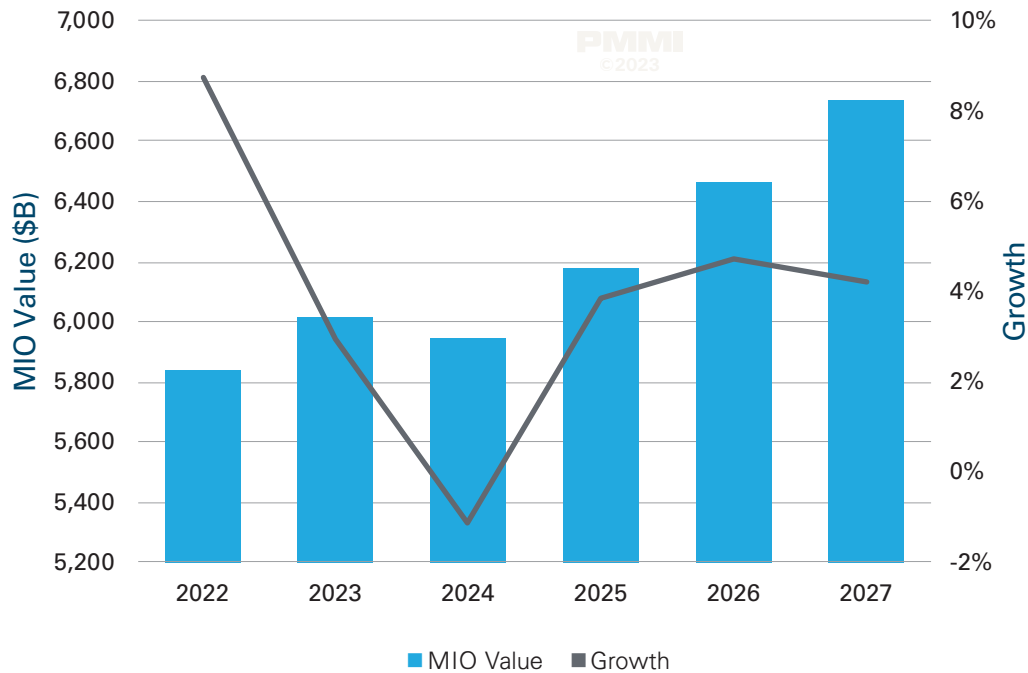
US shipment data in the M3 report from the US census bureau is very positive. These shipments usually correlate to within a few percent with the annual manufacturing survey (ASM), which is the source for the US figures presented in the MIO.

Inflation will ease over time and the US government is using interest rate hikes to reduce inflationary pressure. Products that are highly inflated such as food and raw materials should start come down slowly in time. There is some concern about inflation becoming entrenched, and if we look at the bond yields, we are now seeing an inversion larger than before any other slowdown in the last 10 years. Given that, it's possible that the US government have pushed short-term interest rates beyond what the market can bear, however, consumers coming off strong debts are in more manageable positions compared to the '09 recession. As interest rate increases trickle through to consumers, this will provoke a recession – not a big one, but technically still a recession.

The labor market is in an odd spot, coastal tech sectors are shedding jobs, whereas more centrally located manufacturing companies are struggling to get people.

Most industries that did well in the initial covid outbreak and benefited from lower interest rates are expected to struggle slightly more during 2024.

USA MIO Value vs % YoY Growth (USD Fixed)



WHAT HISTORY TELLS US ABOUT THE CURRENT PACKAGING MACHINERY BUSINESS CYCLE

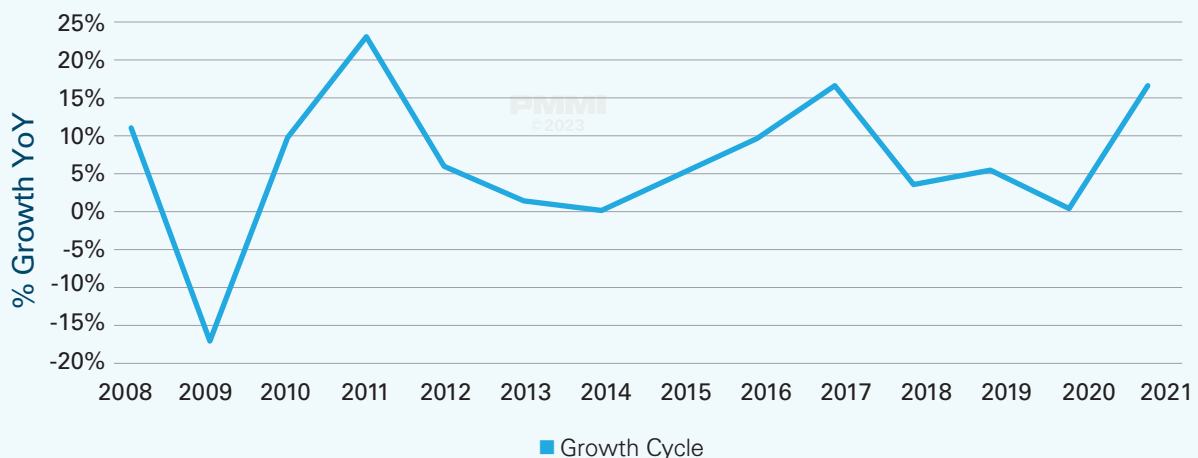
The below graph is showing the historic performance of packaging machinery production dating back to 2007. The choice to show this data back to 2007 is significant. With the data stretching back to 2007, we are able to see how a full economic cycle manifests within the packaging machinery market.

The financial crisis and resulting economic fall out led to a ~17% decline in production during 2009. As the industry recovered, the next 10 years clearly demonstrated the cycle which we've come to expect in high-capital good markets: a peak and a trough roughly every 3-5 years. The packaging machinery market peaked in growth in 2011, bottomed out in 2014, and found another peak in 2017.

The market was in the midst of another cycle with an expected trough to be seen in 2020 when it was interrupted by the COVID-19 pandemic. The industry drastically recovered in 2021 and we are now beginning to see a familiar shape bear out in the data. Following a peak in growth in 2021, we are forecasting a bottoming out in 2024 with growth returning in the latter parts of our forecast. A nearly identical, albeit more dramatic, growth cycle to what we saw post financial crash.

2023 will benefit from robust order backlogs which have propped up growth amidst stiff economic headwinds. However, as we explore in more detail in later slides, this backlog is expected to dry up as we move through 2024. This, coupled with increasing interest rates and instability within the financial sector has led us to project more modest growth in the latter portions of our forecast.

Historic Perspective – % Growth Annually in Packaging Machinery



Source: 2023 Interact Analysis

MACROECONOMIC INFLUENCES FOR PACKAGING MACHINERY IN Q1 2023

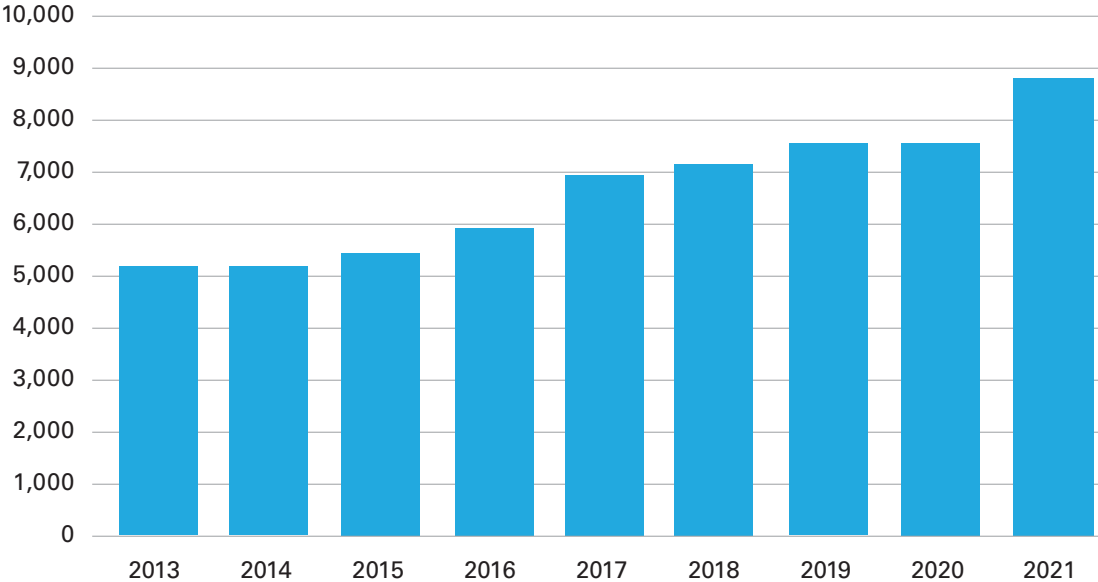
Fed Policy in Late 2023 Poses Biggest Risk to Forecast

As reported by the U.S. Census Bureau, the U.S value of capital goods shipments reached a trough in April 2020, declining 27% overall from 2018. Since then, we'd seen the value of shipments grow at a rapid pace of 31%, peaking in Dec 2022. Since this peak, Jan & Feb of 2023 have shown a slight decline of 2.55%. Higher interest rates and struggles in the banking and financial sector have also created a challenging business environment for firms seeking investment to expand production and improve productivity amid tighter lending conditions.

Following a FOMC meeting in late March, with a unanimous approval for raising the primary credit rate by 25 basis points to 5%, the Fed is undertaking market operations necessary to maintain the federal funds rate in a target range of 4.75 – 5%. Policymakers see inflation falling to 3.3% by Q4 with an expectation of an overall cooling of labor market struggles and further interest rate cuts in 2024.

As supply chain issues linger throughout the year, a greater degree of market share is being passed on the basis of lead times. As the supply and cost of raw materials continue to slow the speed of production, those companies able to produce like for like machines in a shorter amount of time are converting new customers at a higher rate.

Packaging Machinery Size According to US Census Bureau



The above data represents the value of packaging machinery production as published by under the NAICS code 333993. This value is only intended to give directional guidance on how Packaging Machinery has performed historically according to our Manufacturing Industry Output Tracker. Our final market size will likely be larger than this as a greater number of machines are included under the scope of the State of the Industry Report.

KEY TRENDS MENTIONED IN EARLY INTERVIEWS FOR STATE OF THE INDUSTRY REPORT



1 Although delivery times are still inflated compared to pre-COVID levels, we've seen gradual improvements in the supply chain for packaging machinery vendors during Q1 of 2023. However, most firms are still experiencing limited access to a wide array of electrical components with microprocessor chips being most impacted. As this trend persists, vendors will continue struggling to meet delivery times and assess new business opportunities. As lead times continue being one of the largest buying considerations, those who can compete based on lead times will put themselves in the most favorable position moving forward.



2 Backlogs in recent years have represented an increased proportion of overall revenue as demand for packaging machinery grew following COVID, despite a damaged supply chain impacting delivery times. Looking forward, as this demand declines, we expect these inflated backlogs to dwindle as firms look to fill their funnel with new business opportunities. With economic uncertainties in 2023, it's been more important than ever to be diligent in planning for and accepting new projects. This too, ultimately creating a tougher challenge to approach when managing tighter budgets.



3 A labor shortage has also forced packaging machinery vendors to be more creative. Especially for smaller firms, hiring and retaining service technicians and white-collar roles like sales and marketing executives has been difficult. From collaborating with local colleges in hopes of attracting younger talent to hiring veterans and other non-packaging technicians with the intention to train them, everyone has been forced to be creative. As labor market struggles persist and the workforce within packaging ages, the demand for skilled labor will continue being a trend to watch.

Key Trends Mentioned in Early Interviews for State of The Industry Report (continued)



4

As the supply chain & financial sector have struggled, ultimately leading to higher prices of packaging machinery, finding fair and reliable payment terms is often creating more of a strain for machine builders. Although some have been consistent with industry standards, it's been common to see more demanding payment terms. This is putting more emphasis on managing increased lead times when assessing new opportunities.



5

In a fragmented industry like packaging, we've seen a consistent trend of consolidation in recent years as a growth and differentiation tactic. Many firms are looking to create full-line packaging solutions that simplify the process of designing, purchasing, and servicing a suite of machines. M&A activity saw a peak off the heels of COVID with an increased demand for packaging across multiple industries. Despite macroeconomic uncertainties expected to persist throughout the year, we expect acquisition activity to continue but at a lower level compared to years prior.



6

We've seen increased levels of automation throughout the entire packaging process. As many are looking to create more comprehensive packaging offerings that drive cost and energy efficiencies, automation within EOL & secondary packaging in medium-sized companies act as a major driver. As large packaging firms look to create a "one stop shop" to support an entire packaging line, smaller firms who can offer optimization for a piece of the packaging line are also finding success.



7

As more firms specialize in full-line packaging solutions, contract packaging will continue being an effective solution for those looking to outsource their packaging process. As the supply chain continues to have gaps along with macroeconomic uncertainty, we expect contract packaging to continue serving as a reliable and cost-effective approach that will grow in future years.

MERGERS & ACQUISITIONS DURING Q1 2023

MASSMAN COMPANIES ACQUIRED ULTRA PACKAGING INC.

JANUARY 2022



In looking to create simplified, full-line solutions for their customers to improve output and lower costs, this acquisition serves to broaden & pair with Massman's portfolio of machines.

SIDEL INC. ACQUIRED MAKRO LABELLING

FEBRUARY 2022



As stated by Monica Gimre, CEO and President of Sidel, this helps "offer enriched labelling expertise and even greater flexibility to our customers, strengthening our position in labeling solutions and broadening our reach in dynamic markets."

FLEXPAC ACQUIRED MIDWEST PACKAGING SOLUTIONS

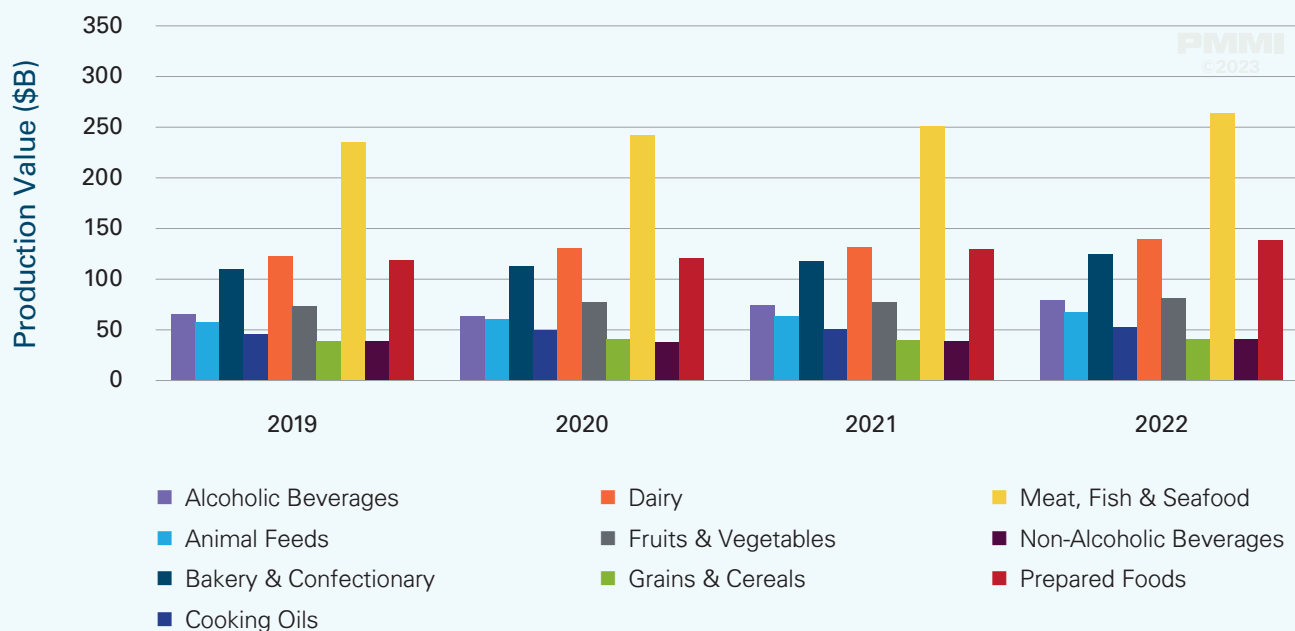
FEBRUARY 2022



As stated by Blaine Dinwiddie, President of FlexPAC, this move highlights how "the synergies of product, processes, values, and staff will significantly enhance our opportunities to serve our customers."

FOOD & BEVERAGE MIO FORECAST US

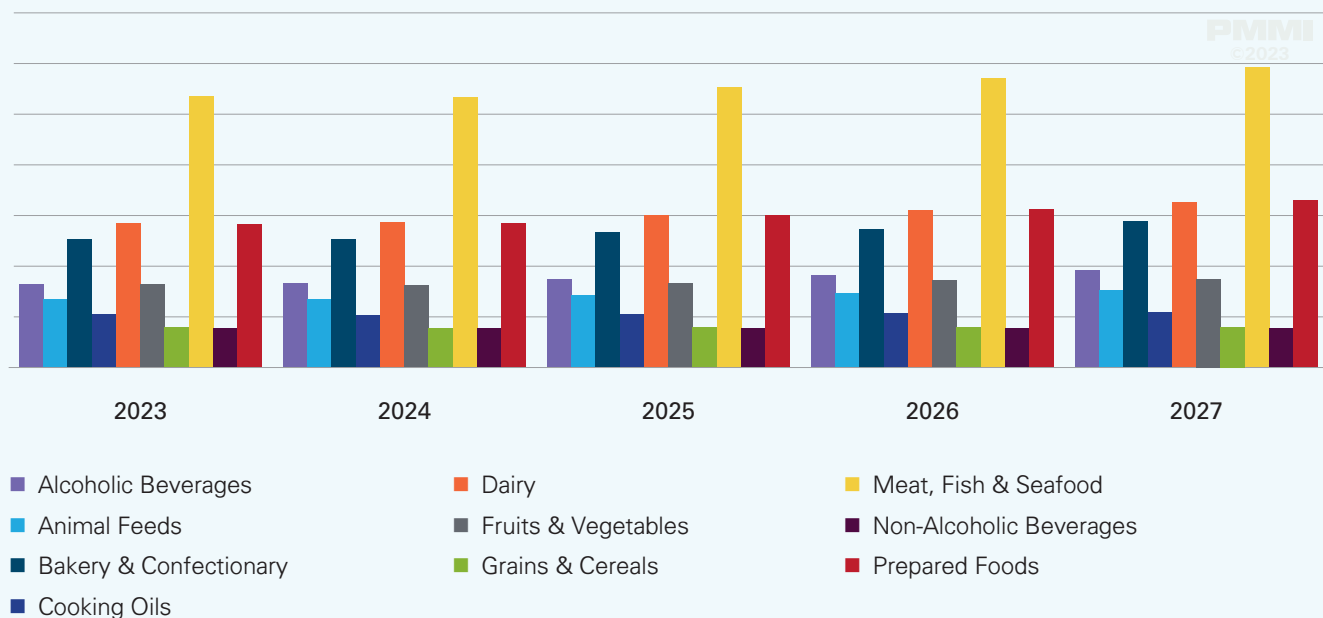
Food & Beverage MIO Value 2019 to 2022 – \$B



Growth of Food & Beverage Production by Sub Sector Growth YoY 2019 to 2022

	2019	2020	2021	2022
Food & Beverage	0.8%	3.3%	3.9%	5.5%
Alcoholic Beverages	-1.4%	-3.5%	18.7%	7.0%
Animal Feeds	0.5%	6.1%	4.1%	5.6%
Bakery & Confectionary	2.1%	1.8%	4.3%	5.8%
Cooking Oils	-7.7%	10.7%	1.3%	3.8%
Dairy	4.2%	5.9%	0.7%	6.1%
Fruits & Vegetables	-2.0%	5.6%	-0.1%	4.6%
Grains & Cereals	0.7%	5.3%	-1.7%	2.4%
Meat, Fish & Seafood	1.5%	3.1%	3.4%	5.3%
Non-Alcoholic Beverages	1.4%	-2.1%	1.5%	3.3%
Prepared Foods	0.9%	2.0%	6.7%	6.7%

Food & Beverage MIO Value 2023 to 2027 – \$B

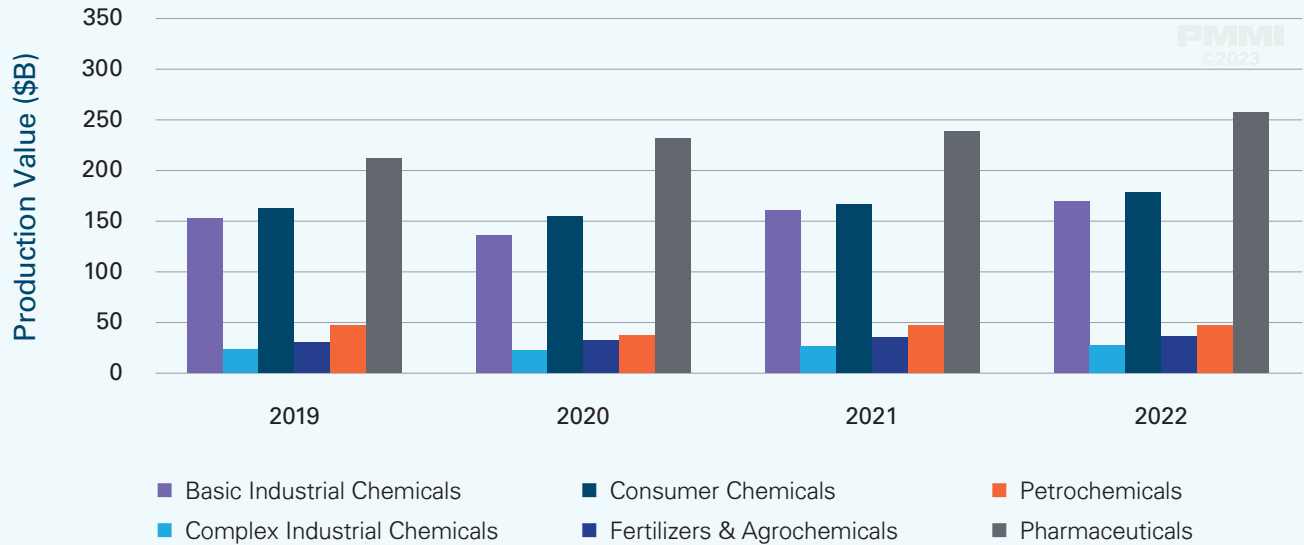


Growth of Food & Beverage Production by Sub Sector Growth YoY 2023 to 2027

	2023	2024	2025	2026	2027
Food & Beverage	1.8%	-0.2%	3.9%	3.0%	4.4%
Alcoholic Beverages	3.2%	1.2%	5.4%	4.4%	5.8%
Animal Feeds	1.9%	-0.1%	4.1%	3.2%	4.6%
Bakery & Confectionary	2.1%	0.1%	4.3%	3.4%	4.8%
Cooking Oils	0.1%	-1.9%	2.2%	1.2%	2.6%
Dairy	2.4%	0.4%	4.6%	3.7%	5.1%
Fruits & Vegetables	0.9%	-1.1%	3.0%	2.1%	3.5%
Grains & Cereals	-1.3%	-3.4%	0.6%	-0.4%	0.8%
Meat, Fish & Seafood	1.6%	-0.4%	3.7%	2.8%	4.2%
Non-Alcoholic Beverages	-0.4%	-2.4%	1.6%	0.7%	2.0%
Prepared Foods	3.0%	1.0%	5.2%	4.2%	5.6%

CHEMICAL & PHARMACEUTICAL MIO FORECAST - US

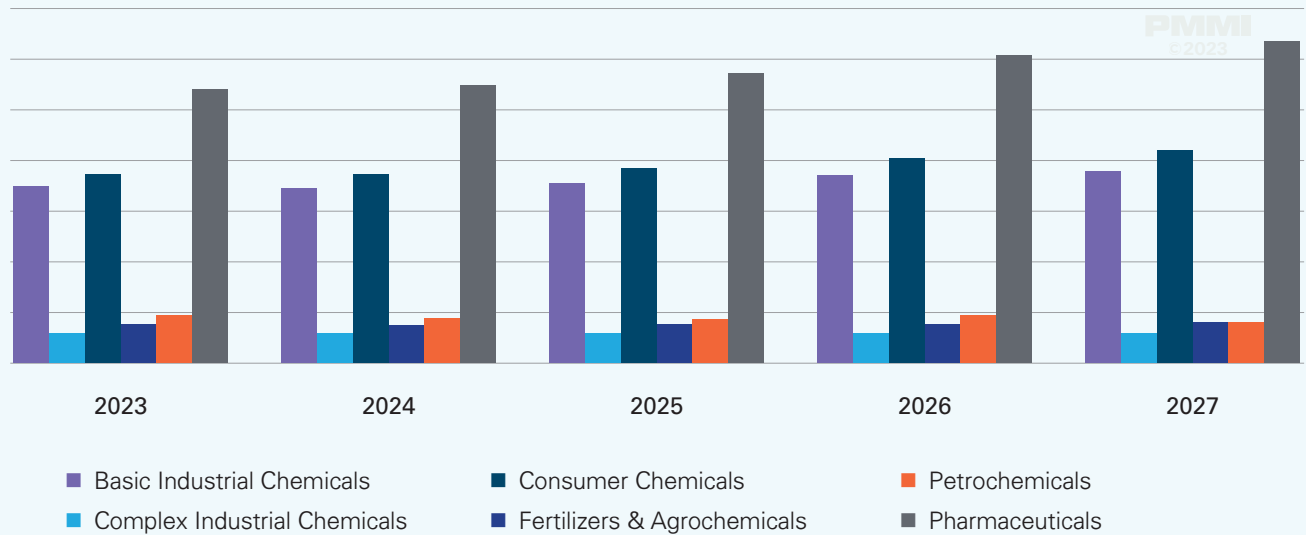
Chemical & Pharmaceutical MIO Value 2019 to 2022 – \$B



Growth of Chemical & Pharmaceutical Production by Sub Sector Growth YoY 2019 to 2022

	2019	2020	2021	2022
Chemicals & Pharmaceuticals	-4.3%	-2.8%	9.8%	6.3%
Basic Industrial Chemicals	-6.5%	-11.3%	17.8%	5.7%
Complex Industrial Chemicals	-9.3%	-9.3%	18.6%	4.8%
Consumer Chemicals	1.0%	5.6%	8.2%	6.8%
Fertilizers & Agrochemicals	-4.8%	3.1%	7.9%	4.7%
Petrochemicals	-18.6%	-21.3%	27.4%	0.3%
Pharmaceuticals	-2.0%	9.7%	2.7%	7.9%

Chemical & Pharmaceutical MIO Value 2023 to 2027 – \$B



Growth of Chemical & Pharmaceutical Production by Sub Sector Growth YoY 2023 to 2027

	2023	2024	2025	2026	2027
Chemicals & Pharmaceuticals	3.5%	-0.1%	3.0%	4.5%	3.3%
Basic Industrial Chemicals	3.0%	-0.6%	2.4%	3.9%	2.8%
Complex Industrial Chemicals	2.0%	-1.6%	1.4%	2.9%	1.7%
Consumer Chemicals	4.0%	0.4%	3.5%	5.0%	3.8%
Fertilizers & Agrochemicals	1.9%	-1.7%	1.3%	2.8%	1.6%
Petrochemicals	-2.7%	-6.4%	-4.0%	-3.1%	-4.8%
Pharmaceuticals	5.1%	1.4%	4.5%	6.0%	4.8%



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