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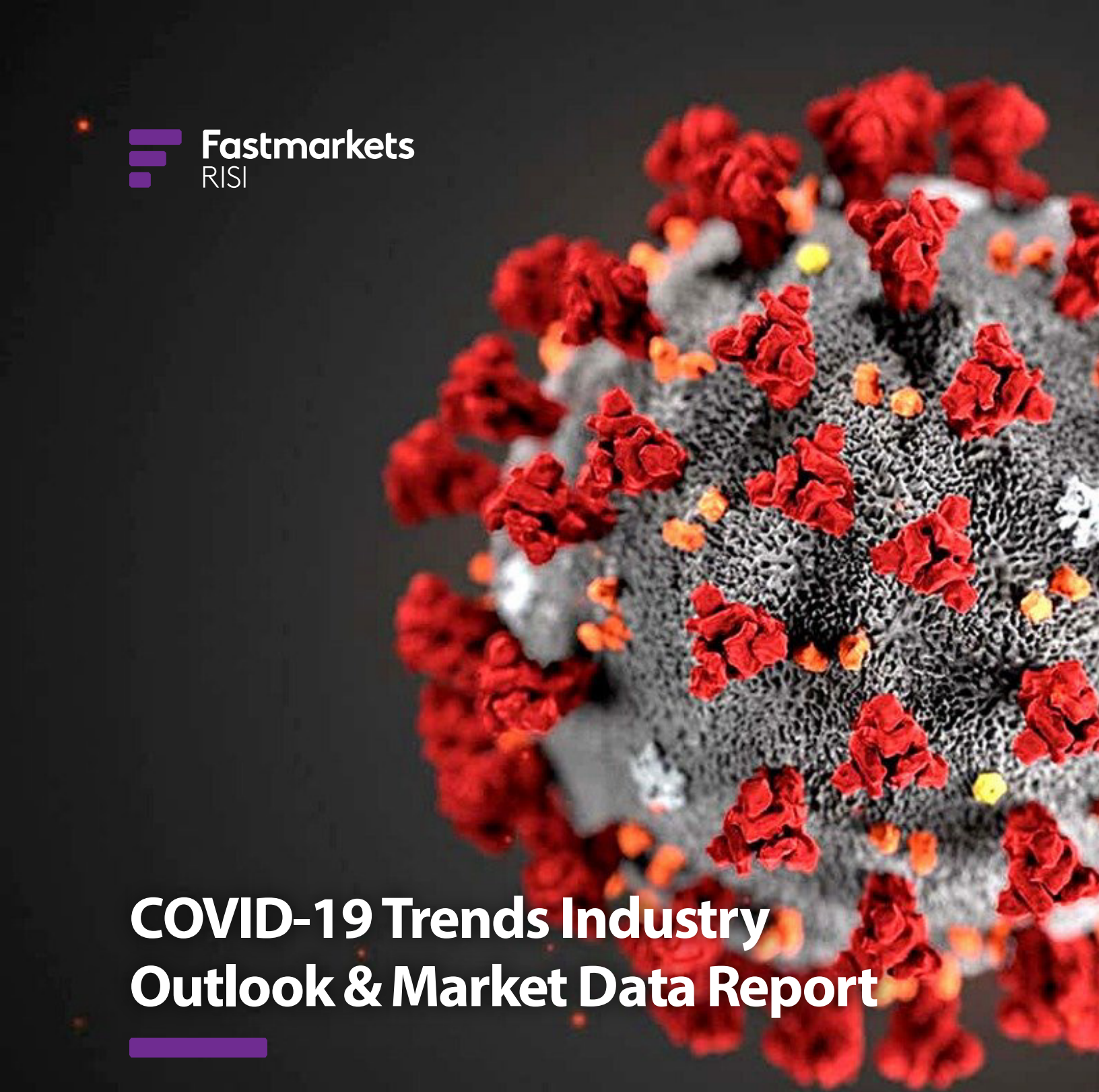

COVID-19 Trends Industry Outlook & Market Data Report

2020

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A message from Fastmarkets RISI

Specializing in the paperboard packaging industry and recognized worldwide as the premier source for economic analysis in all segments of the international forest products industry, Fastmarkets RISI prepared the outlook and forecast sections of this report.

Our forecasts are based on a solid foundation of data and industry knowledge. Drawing upon the experience of professional economists utilizing datasets developed over the last 30+ years, we maintain state-of-the-art models to generate forecasts for each sector: pulp, paper, solid wood products, timber and recovered paper. These models are then dynamically linked to provide a fully integrated analysis that is consistent across markets and geographical areas. The forecasts capture complex interactions and substitution effects across the industry in response to shifts in technology, government regulations, economic growth and consumer preferences.

Price forecasts are an integral part of Fastmarkets RISI's models for each segment of the pulp and paper market, reflecting demand and supply balances for each segment as well as changes in production costs due to increases or decreases in raw material prices. Additionally, the price forecasts are directly tied into the demand forecasts, since changing real prices for the various paper grades have a clear impact on long-term demand. This is especially true for the cartonboard markets, which have exhibited extreme price sensitivity over time. Because of this, to build the five-year forecasts for the individual segments of the carton market, Fastmarkets RISI has projected changes in real folding carton values per ton, formulated from Fastmarkets RISI databases and industry knowledge. Forecasts have not been commented upon or revised by the staff or members of the Paperboard Packaging Council (PPC). For a more complete description of our methodology, see Appendix A.

We welcome comments or suggestions on the methodology and content used to generate this report. Please direct your remarks to the PPC, who will compile recommendations for our consideration.

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Chapter 1
Executive summary

Overview

The past decade has been a challenging one for converters in the folding carton industry, with average annual growth declining by 1.2% on a tonnage basis. Since the recession, this downward trend was halted only twice, in 2014 and 2017. In the last five years, growth declined 2.0% in 2015 and 0.7% in 2016, largely due to the ongoing headwinds facing major processed food and consumer product companies. Further contractions in shipments of 2.1% and 0.2% were recorded in 2018 and 2019, respectively. In aggregate, folding carton demand has eroded 17.4% from its pre-recession peak in 2007.

The flat to negative trend in folding carton shipments has been completely reversed with COVID-19 and the associated trends in consumer spending on processed food and industrial production. In 2020, the performance of folding carton shipments has been nothing short of extraordinary, recording 5.6% and 8.2% growth in the first two quarters of the year, respectively. Fastmarkets RISI is forecasting year-over-year shipment volume growth will finish the year at 4%. However, the impact of the pandemic has not been unified across end-use markets. Strong growth was evident in cereals, dry foods, frozen foods and cleaning supplies. Meanwhile, food service is one of the most depressed end users of folding carton, as consumer spending at limited service eating places is projected to plummet 11.9% for the year.

Following the acceleration of shipments in 2020, Fastmarkets RISI forecasts that folding carton shipments will continue their positive trend given the anticipated improvement in economic conditions and the ongoing environmental tailwinds. Our macroeconomic outlook calls for the economy to expand at a 1.2% average annual growth rate from 2021-2024. This recovery will be associated with downward pressure on unemployment rates, which will resonate in the broader consumer spending dynamics. However, the growth in discretionary household spending will face some resistance by a more conservative consumer psychology following the pandemic and the recession.

End-use market summary

While more favorable macroeconomic factors will result in carton demand growth over the forecast, the carton pricing environment will limit carton demand relative to other packaging alternatives, particularly in the sectors that use recycled boxboard. Over the forecast period of 2020-2024, we estimate that folding carton demand growth will average 1.9% annually. Following the anticipated 4.0% demand shock in 2020, folding carton shipment growth is forecast to stabilize at an average annual rate of 1.3% in 2021-2024.

Gains in folding carton demand are mainly driven by the restocking seen during the lockdowns as well as the ongoing war on plastic packaging, especially in the food service and retail carry-out sector. Although food service has been significantly impacted by the pandemic, the improving demand for takeout leveled off the free-fall in shipments. Headwinds will come from the increasing competition with e-commerce and corrugated packaging taking share. Additional headwinds include changing consumer behavior and the increasing demand for non-carton-intensive products, such liquid soaps and detergents.

Table 1

Growth of folding carton shipments

Percentage change

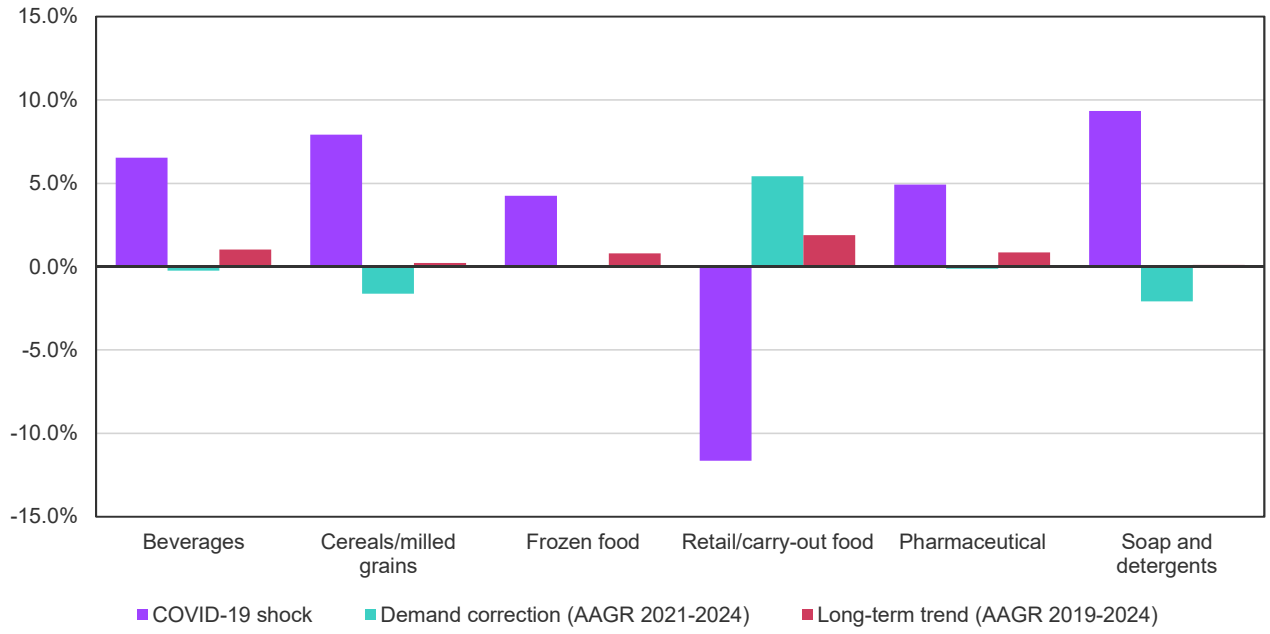
	2010-2014	2015-2019	2020-2024
Thousand tons	-1.5%	-1.0%	1.9%
Million dollars	0.3%	-0.3%	3.9%
Average value per ton	1.8%	0.7%	2.0%

All forecasts and analysis presented by Fastmarkets RISI, Inc.

Figure 1

A wide range of growth potential exists between the various markets

Annual and average annual growth in carton shipments



Market	COVID-19 shock	Demand correction (AAGR 2021-2024)	Long-term trend (AAGR 2019-2024)
Beverages	6.5%	-0.3%	1.0%
Cereals/milled grains	7.9%	-1.6%	0.2%
Frozen food	4.2%	-0.1%	0.8%
Retail/carry-out food	-11.7%	5.4%	1.9%
Pharmaceutical	4.9%	-0.1%	0.9%
Soap and detergents	9.3%	-2.1%	0.1%

Chapter 2
Business conditions

Please note that the macroeconomic forecast upon which this report is built was compiled in late June. Due to the COVID-19 pandemic, this forecast contains heightened risks and could see major changes and revisions later on. At the time of this writing, the outlook is still constantly evolving and can differ from what it was when the forecast was completed.

Global overview

The outlook for 2020 at the beginning of this year was good, as the détente in the trade war provided some momentum for the US and China and European consumption was at a healthy level. However, the outbreak of COVID-19 changed the economic scenery completely around the globe. The US economy is in deep recession, with Europe even harder hit, and China's economy will also slow down significantly to just barely growing, although it is still projected to remain positive. The forecast sees the global economy in recession in 2020, when measured at purchase power parity terms.

Overall, the outlook for 2020 is very pessimistic, but the expectation for 2021 is much more positive as the rebound from a bad year boosted with unprecedented stimulus by the large central banks and pent-up consumer demand will spur growth. However, the risks are substantial, and there is potential for unexpected moves in the various economies, as well as in the financial markets, that might disrupt expectations. Longer term, the economic growth cycle beginning in 2021 is expected continue over the next five years both in the US and around the globe. The Chinese economy is expected to continue its gradual decelerating growth after the rebound next year, but still play a significant role in global growth. The European economy is expected to grow as well, but at a slower rate than that of the US.

Outlook summary

The US consumer continued to be in the driver's seat of the US economy through 2019. The gains in employment drove the unemployment rate to a multi-decade low of less than 4% in 2018, where it remained until the COVID-19 crisis hit in March-April 2020. Unemployment soared with the lockdowns, peaking at 14.7% in April, and then gradually declined to 10.2% in July. Before the crisis hit, household net worth was at all-time highs and rising, as increases in housing prices were driving up the asset side of the consumer balance sheet. With the impact of COVID-19, balance sheets of households and nonprofit organizations declined in the first quarter of 2020 by 4.8% compared to the final quarter of 2019, but total assets still remained higher in the first quarter of 2020 than they were in the first quarter of 2019, growing year-over-year by 0.2%. Additionally, the debt service ratio remained near the multi-decade lows reached before the ongoing crisis and actually improved a bit in the first quarter of 2020. Despite the recovery that has started, the economic situation will continue to see significant challenges during 2020. While unemployment is expected to gradually decline with the economy slowly re-opening, a significant amount of consumption was lost due to the lockdowns, which can be seen in the dramatic drop in GDP as well as in the significant impact on the services industry. The consumption lost in services cannot fully be recovered and has the potential to have a longer-lasting impact, particularly on the travel and hospitality industries, depending on the length of the pandemic and its influence on the pace of growth.

The Trump administration's first term is almost complete, and the election campaigns are moving at full speed despite the pandemic. While the administration has had its challenges, and its policies have increased risks, it had managed to produce economic growth until the COVID-19 pandemic. The changes to the economy have come in the areas of regulation, taxation and trade.

Outside of the tax reform that was finally passed in late 2017, the administration's policies have caused a great deal of uncertainty, particularly in the area of trade and economic growth. The introduction of protective tariffs significantly increased uncertainty in the business environment as the initial tariffs escalated to a tit-for-tat trade war. Although the tariffs provided support for US industries in the short term before the crisis hit, the increased costs could hurt them later on, although much depends on global growth. In the medium term, certain policy changes could be positive for the US economy, especially a lighter regulatory regime that would reduce compliance costs. The corporate tax reform and fiscal stimulus boosted the economy to a strong pace until the pandemic sent it into recession. For the US economy overall, the changes put in place by the Trump administration had the potential of producing slightly higher GDP growth, inflation and interest rates, but the ability to see this potential was lost in the COVID-19 pandemic. The risks in the immediate future are to the downside as the course of the pandemic and its resulting economic and political consequences remain highly uncertain. But after this health crisis, the risks are to the upside, although much depends on the pace of recovery from the 2020 drop.

Annual growth of the US economy in 2018 came in at 2.9% but slipped to 2.3% in 2019. In our forecast from late June 2020, we expected the US economy to grow by -6.0% in 2020 and rebound to 4.9% in 2021. Over the five-year forecast horizon ending in 2025, we project real GDP growth will average 1.4% per year, a low figure due to the deep recession in 2020.

West Texas Intermediate crude prices averaged $65/barrel in 2018 and $57/barrel in 2019, with the reduction mainly linked to lower global demand brought on by decelerating Chinese growth. With the rapid loss of demand due to COVID-19 and the simultaneous oil price war, prices plummeted in early 2020 to low single digits and briefly less than zero. After supply restrictions returned and demand gradually improved, prices picked up, though they remain well below previous years. In this forecast from late June 2020, we estimate that oil prices will remain relatively low in the medium term, although due to the high levels of uncertainty in the markets at the moment, the risk of volatility is higher. WTI prices averaged $51/barrel in 2017, $65/barrel in 2018 and $57/barrel in 2019. Our forecast shows prices averaging $39/barrel in 2020 and $45/barrel in 2021. Natural gas prices, meanwhile, averaged $2.57/MMBtu in 2019 and are expected to decrease slightly to $1.96/MMBtu in 2020 and then rebound to $2.53/MMBtu in 2021.

Demand

Long-term context

Over the longer term, the US economic growth should emerge from the COVID-19-induced recession in 2021 with a rebound in growth that will spill over to the following year and then gradually slow. Consumer spending will continue to be the driver of the US economy. In this forecast from late June, we anticipate real GDP will retreat by -6.0% in 2020 and advance by 4.9% in 2021. Over the course of our five-year forecast horizon through 2025, we expect GDP to average 1.4% per year (Figure 1). Consumer spending has been significantly reduced by COVID-19, although some sectors have seen booming growth. Looking beyond the temporary reduction in 2020, consumption is projected to rebound strongly in 2021 and continue to be relatively healthy though gradually declining. Consumption will be boosted by the central banks' unprecedented amount of stimulus, low interest rates and multi-decade-low consumer debt service ratios. Our forecast from late June shows spending will grow -7.5% in 2020 due to the pandemic, then rebound to 8.0% in 2021. Over the five-year period ending in 2025, we project consumption will average 1.9% (Figure 2).

Industrial production growth was just 0.9% in 2019 and we expect it to tumble in 2020 due to COVID-19. One of the growth drivers for US industrial production was the domestic oil sector and its related industries, for which we expect slower growth in near and medium term due to lower global oil prices. This lowers the growth expectations somewhat for the entire industrial production sector as well, but also has the potential for upward risks. Our forecast from late June shows industrial production growth dropping to -10.1% in 2020 due to the pandemic and low oil prices but then improving to 4.6% in 2021. Over the

Figure 1

US real GDP growth

Annual percentage change

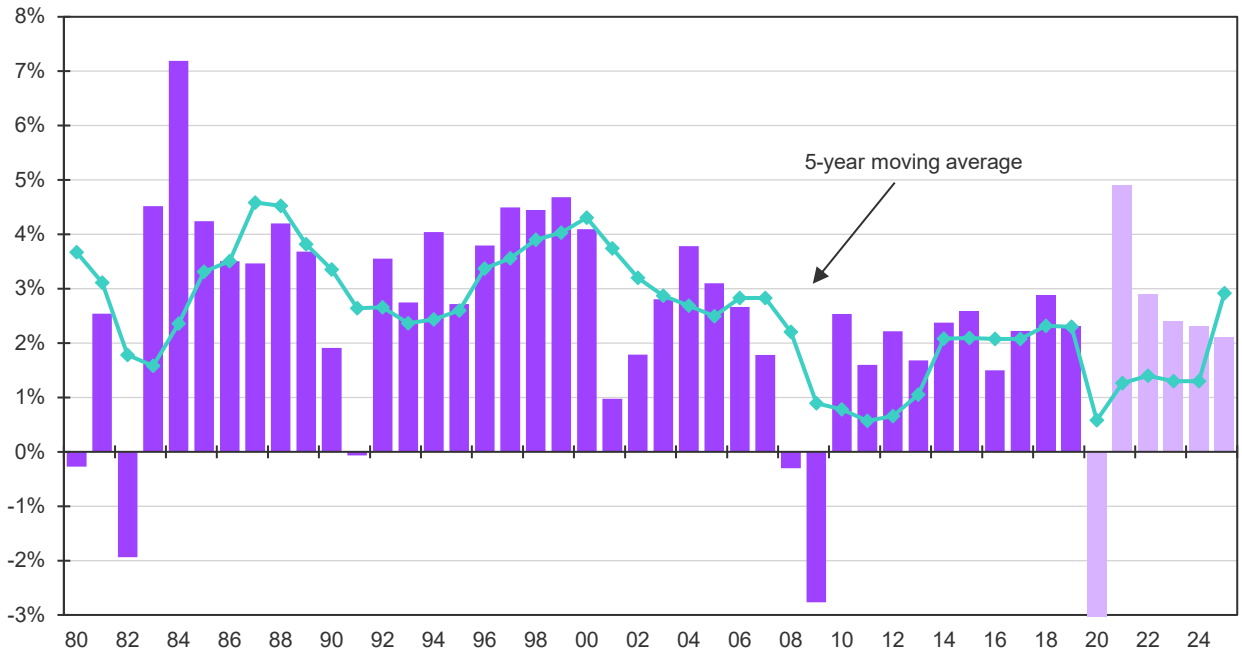
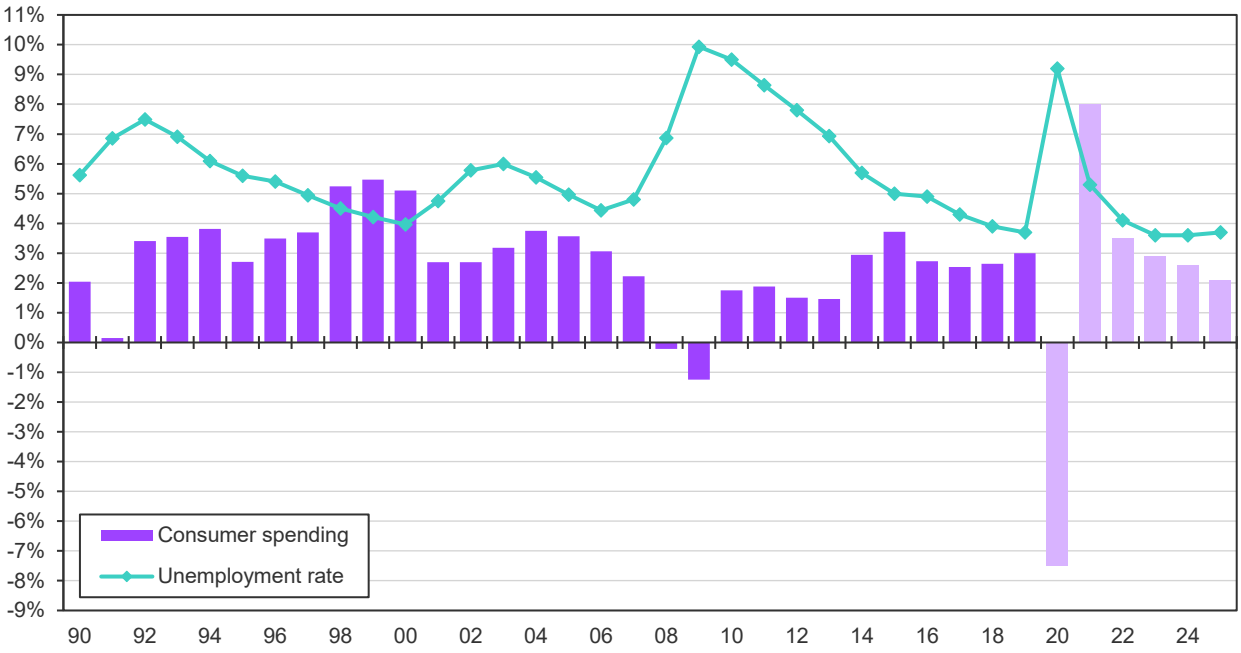


Figure 2

Consumer spending drives US economy

Annual consumer spending and unemployment rate



 The forecasts and outlook analyses contained in the Report are prepared solely and exclusively by Fastmarkets RISI without input from PPC or its members.

Table 1

US economic outlook

	2017	2018	2019	2020	2021	2022	2023	2024	2025
GDP, billion 2012 $	18,109	18,639	19,074	17,935	18,811	19,360	19,825	20,284	20,709
Real % ch	2.4	2.9	2.3	-6.0	4.9	2.9	2.4	2.3	2.1
Consumption, billion 2012 $	12,560	12,892	13,281	12,290	13,275	13,742	14,135	14,504	14,804
Real % ch	2.5	2.6	3.0	-7.5	8.0	3.5	2.9	2.6	2.1
Industrial production, % ch	2.3	3.9	0.9	-10.1	4.7	3.5	3.2	3.7	3.1
Housing starts, million units	1.21	1.25	1.30	1.15	1.28	1.37	1.41	1.50	1.63
Trade deficit, billion US dollars	-550	-580	-577	-478	-501	-511	-521	-512	-501
Consumer prices, % ch	2.1	2.4	1.8	0.3	1.8	1.9	1.9	1.8	1.5
Producer prices, % ch	3.2	3.0	0.8	-0.4	2.2	1.8	2.0	1.5	0.9
West Texas Int. oil price, $/bbl	51	65	57	39	45	47	53	58	58
Natural gas, Henry Hub, $/Mbtu	2.99	3.17	2.56	1.96	2.53	3.03	3.45	3.72	3.85
Fed. funds interest rate, %	1.0	1.8	2.2	0.5	0.3	0.3	1.3	2.1	2.4
Prime rate, %	4.1	4.9	5.3	3.5	3.3	3.3	4.3	5.1	5.4
10-year T-bond yield, %	2.3	2.9	2.1	1.0	1.2	1.8	2.2	2.5	2.7

five-year period ending in 2025, we project industrial production will average only 1.4%.

With lower consumption, imports are expected to decrease in 2020, which should improve the US trade account significantly. The trade deficit will then increase somewhat, but is expected to settle at around 2.5% of GDP by 2025. Trade depends heavily on both the strength of the US dollar and trade wars. In this forecast, the US dollar was expected to remain stronger, but the tides changed and the dollar lost strength significantly in July. This, along with returning global growth, should help US exports in the near and medium term. The trade war seemed to be at least partially improving until it was buried under the COVID-19 crisis. The initial deal between the US and China is now expected to be followed by alternating moments of escalation and détente in the medium term.

The housing market for 2020 started very well but then was shackled by COVID-19 (Figure 3). The market has upward potential in the medium term due to the stimulus and pent-up demand in the housing market. However, challenges in economic growth and employment could have negative effects. In this forecast, we anticipated that starts would drop to 1.15 million units in 2020 and rebound to 1.28 million units in 2021. Through 2025, starts are forecast to average 1.39 million units per year.

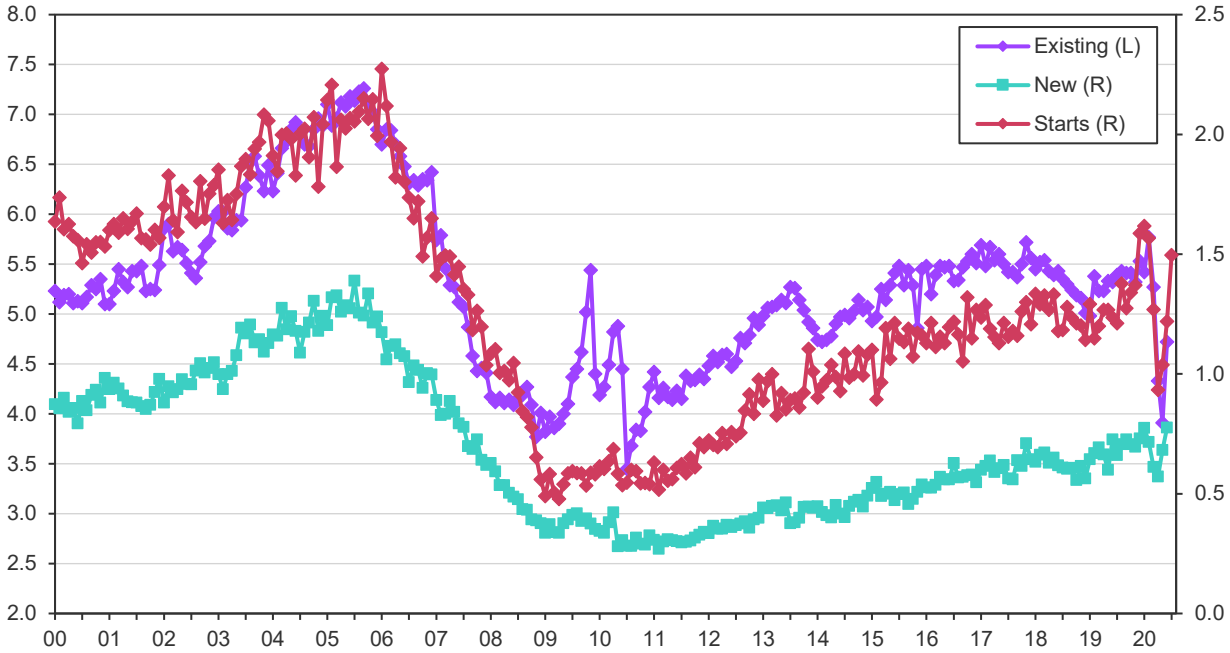
Business investment had been a drag on US economic growth, although it improved in the last few years before the COVID-19 pandemic struck. Investment growth slipped to just 2.1% in 2019 after reaching 6.4% in 2018. Our forecast shows business investment averaging -0.4% over our forecast period through 2025, significantly reduced by the events in 2020.

Federal government spending jumped due to COVID-19, but in the medium term we expect government spending growth to gradually decrease. The forecast shows increases of 3.3% and 1.5% in 2020 and 2021, respectively, although these are now likely rather low estimates.

Figure 3

Housing market also sees COVID-19 impact

Millions of existing and new single-family home sales and housing starts, SAAR



Source: NAR, Census.

COVID-19 trends

The direct impact of the pandemic on US real GDP growth was seen very quickly, with real GDP in the first quarter dropping by -5.0% annualized and the advance estimate of the second quarter released at the end of July showing a decline of -32.9% annualized. Our forecast from the end of June anticipated the second quarter would fall by -27.8%, so it currently appears a bit too optimistic, although the released advance estimate could still change due the unprecedented nature of the economic situation. In this forecast, we project annualized growth of 0.43% for the third quarter and 5.77% for the final quarter. The first quarter of 2021 should then see much higher growth of over 15% annualized (Figure 4). A great deal depends on how many sectors of the economy can open up for business. Consumption has been buoyed by the support schemes, which have helped those under economic stress due to layoffs. However, should those layoffs become permanent, consumption could remain somewhat subdued until the economy picks up.

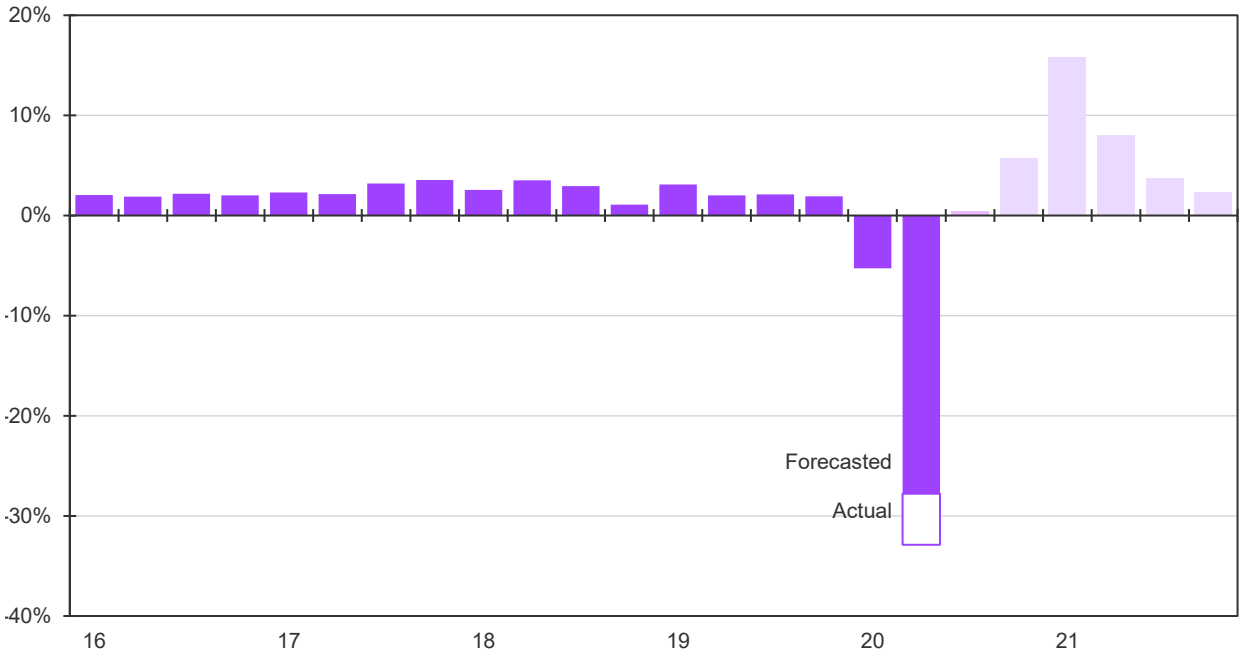
Industrial production was also significantly affected by the pandemic due to facilities being closed, cuts in oil production because of the huge drop in oil prices and investments being put on hold due to uncertainty about the future. At the time of this writing, the latest data available was for July, which showed overall industrial production was down 8.2% compared to July 2019, but May, June and July all showed month-over-month growth. The sharpest year-over-year declines were seen in mining (-17.0%) and business equipment (-13.9%), while consumer goods were down only 2.2%. The outlook for industrial production will depend on business sentiment and consumption as they drive demand for consumer and investment goods. The expected lower oil prices will cut oil sector related investments in the short and possibly the medium term.

Housing starts dropped from 1.567 million (SAAR) in January to just 934,000 in April but rose to 1.496 million in July, which is promising. This could change, however, as some projects might have been rolled over to July and the overall outlook of the economy

Figure 4

US real GDP growth

Quarter-over-quarter growth rate, annualized



is critical for construction. The new home sales figures exceeded the January level in June. Low interest rates and availability of money are helping the housing market.

Supply-side indicators

Long-term context

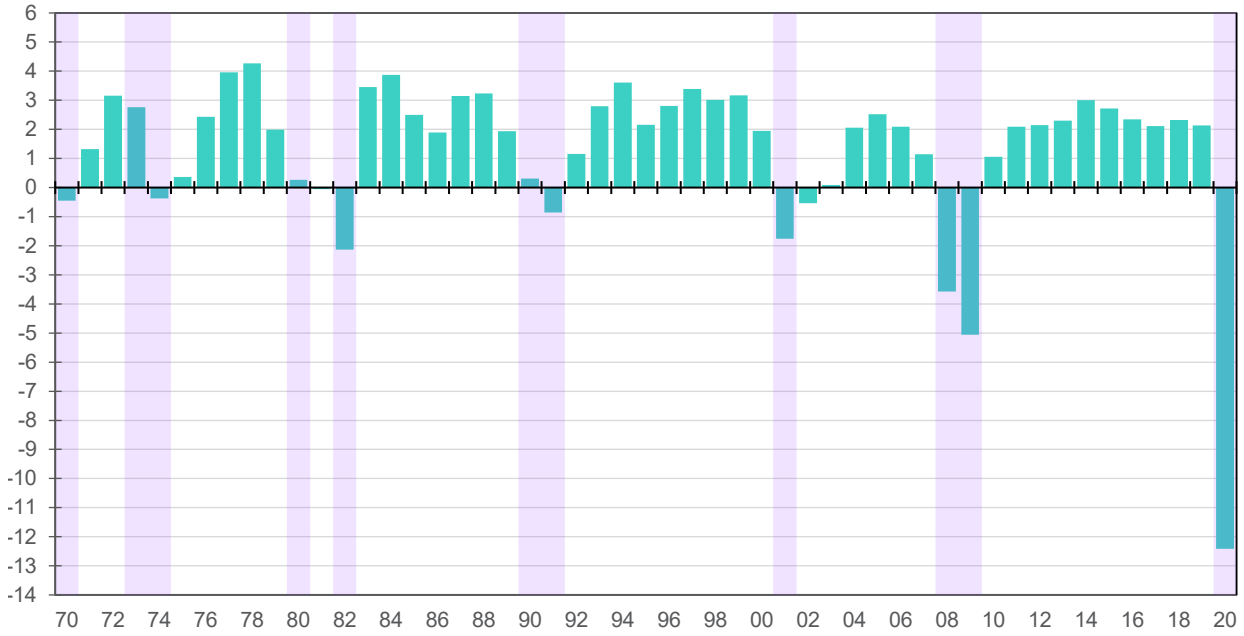
The labor market added 2.3 million jobs in 2016, 2.2 million jobs in 2017, 2.7 million jobs in 2018 and 2.1 million jobs in 2019, all less than in 2014-2015 but still definitely strong enough to continue to support consumption growth had there not been the COVID-19 pandemic with lockdowns and massive job losses in early 2020. During March and April 2020, 22.2 million jobs were lost, of which 9.3 million had been recovered by July (Figure 5). The unemployment rate reached 14.7% in April but had dropped to 10.2% by July. In our forecast from late June, we expect unemployment to average 9.2% for 2020 and 5.3% in 2021. The unemployment rate is anticipated to gradually decline to less than 4% during the forecast period through 2025.

By December 2018, the Federal Reserve had raised short-term rates nine times since the Great Recession. The federal funds upper limit rate gradually increased from 0.25% in November 2015 to 2.5% in December 2018. After four hikes in 2018, the Fed's projections showed it increasing rates two to three times in 2019, but it altered this plan as the economy seemed to hit the brakes. In the beginning of August 2019, the Fed decided to cut the rate by 0.25 percentage point, which was anticipated but expected to be bigger. The third and last Fed rate cut occurred at the beginning of November, after which the cuts were said to be on hold for the time being. However, the pandemic crisis that hit the world economy in 2020 compelled the Fed to make an emergency rate cut, dropping the rate to 0.25%. This forecast from late July sees the fed funds rate averaging 0.5% for 2020 (the higher rate at the beginning of the year raises the average) and staying at 0.25% in 2021. We expect the Fed to be very accommodative with its policy targets, work with an all-in approach to support the US economy as it emerges from the COVID-19 pandemic crisis and maintain a low rate until 2022. Long-term interest rates also dropped with the Fed's aggressive rate cuts and "unlimited" stimulus available with the pandemic. This forecast sees the ten-year T-bond yield averaging

Figure 5

Huge job losses due to COVID-19 pandemic

Change in non-farm payroll employment, millions



Shaded areas = recessions. 2020 = January-July

1.00% in 2020 and 1.19% in 2021. Due to the very high uncertainty in the performance of the global economy, major changes in the interest rate landscape are possible.

US headline consumer inflation rose by 2.1% in 2017, due to the rally in oil prices, and 2.4% in 2018 as the rally continued for most of the year. In 2019, inflation averaged 1.8%. Although we had not anticipated high inflation at any time over the course of our previous forecasts, this forecast anticipates that inflation will drop significantly due to reduced energy prices and lower overall demand. We expect consumer inflation to decelerate to 0.3% in 2020 and rebound to 1.8% in 2021, with this forecast seeing lower oil prices for the medium term. Over the five-year forecast period, we anticipate consumer price inflation will average 1.5%.

WTI crude prices averaged $65/barrel in 2018 and $57/barrel in 2019, with reduction mainly linked to slowing global demand because of decelerating Chinese growth. With the rapid loss of demand due to COVID-19 and the simultaneous oil price war between Saudi Arabia and Russia after they disagreed on oil production cuts in the OPEC+ context, oil prices plummeted in early 2020 to low single digits and briefly less than zero. With supply restrictions returning and demand gradually improving, prices also picked up, though they remain well below the 2019 level. In this forecast from late June 2020, we estimate that oil prices will remain relatively low in the medium term, although due to the high levels of uncertainty in the markets at the moment, the risk of volatility is greater. WTI prices averaged $51/barrel in 2017, $65/barrel in 2018 and $57/barrel in 2019. Our forecast shows prices averaging $39/barrel in 2020 and $45/barrel in 2021. We see crude oil prices averaging $50/barrel over the next five years.

COVID-19 trends

The US labor market saw an unprecedented job losses in March and April 2020 due to COVID-19. In total 22.2 million jobs were lost in those two months, of which 9.3 million had been recovered by July. The unemployment rate peaked at 14.7% in April but had dropped to 10.2% by July. Much of the potential economic damage due to such a huge increase in unemployment was countered by government support programs. For the near term, the potential of regaining these

jobs hinges on the ability of the economy to open up and gain traction from improving consumer sentiment. Should this traction not be found, the unemployment rate might not improve as expected, which could significantly affect the economy. However, in that case the continuation of government schemes to support the unemployed could have a considerable impact. The ability of the economy to create jobs is based on demand on both the services and industrial sides of investment goods, although getting the consumer out using the service industries again depends on perceived safety. Interest rates should support consumption in the near term, as will the low leverage of US households. Low fuel prices should keep inflation low and also lend support to near-term consumption.

Risk assessment

The immediate, unforeseen and unprecedented nature of the COVID-19 pandemic and the economic impact of the measures taken to tackle it have resulted in significant risks to our near- and medium-term forecast. In addition to the actual direct economic impact, the speed of the recovery has the potential for consequential risks on the political front as leaders strive to find sources for support in their electorate around the world after a huge recession.

The fact that the central banks have actively engaged to support their economies will help, but at the same time will add potential for systemic problems. The high stimulus will increase the amount of debt for both governments and the private sector, and should there be problems in the recovery or the recovery is not able to start due to a second or even a third wave of the pandemic, issues could accumulate and economic troubles along with them. Such events could then lead to further political instability.

While the news is filled with COVID-19-related crisis management, the geopolitical risks have not vanished, but instead continue to lurk underneath. These risks remain high as well, with ongoing and pulsating conflicts in the Middle East, tensions in the South China Sea, an unpredictable North Korea, and continued Russian adventurism and opportunism in Europe. Domestic political tensions all around the world are heightened in times of economic trouble, creating the potential for the rise of extreme political parties and polarizing politics along with finding enemies abroad.

Some of Europe's banks and national economies continue to remain in poor health, a situation which is not helped by this magnitude of a crisis. A banking crisis there could ignite yet another financial crisis in Europe.

In China, the strict control of the party and the government allows it to manage the situation differently than Europe and North America, but this also has risks. While effective, further regional or even national lockdowns will reduce domestic Chinese demand and put China's role in the global supply chain at risk. China is a key trading partner for both Europe and the US but is also engaged in trade war with the US, which was not fully settled before the pandemic took over the agenda.

Low oil prices support oil consumers but can cause instability in oil-producing countries. This can then lead to increased uncertainty and higher volatility in the oil market, at least from a global perspective. The US oil supply gained self-sufficiency in 2019, at least temporarily, which again reduces global demand for oil, but can also affect Canada, where some oil producing regions might not be able to export their oil at the prices seen earlier.

Domestically, a large near-term risk for the US economy, on both the upside and the downside, is the housing market. Growth there will be one of the main drivers of overall US economic growth in the recovery, if the hurdles can be overcome. If the Fed holds rate low, they could provide positive momentum for the US housing market should the economy be otherwise able to support lending in the recovery from COVID-19.

Chapter 3
Folding carton industry outlook

Folding carton outlook

Long-term context

The past decade has been a challenging one for converters in the folding carton industry, with average annual growth declining by 1.2% on a tonnage basis. Since the recession, this downward trend was halted only twice, in 2014 and 2017. In the last five years, growth declined 2.0% in 2015 and 0.7% in 2016, largely due to the continued headwinds facing major processed food and consumer product companies. Further contractions in shipments of 2.1% and 0.2% were recorded in 2018 and 2019, respectively. In aggregate, folding carton demand has eroded 17.4% from its pre-recession peak in 2007.

In total dollar value terms, total carton spending remained effectively flat between 2010 and 2019. The market was fairly healthy for a brief period leading up to the recession years; shipments (in tons) increased at a 2.7% average annual rate between 2004 and 2006 due to exceptionally strong growth in consumer spending, which in hindsight proved to be unsustainable. The dollar value of shipments increased at a slightly more robust 3.3% during this period. Even so, average carton values per ton did not increase as fast as boxboard costs, indicating that margins for carton converters suffered during this period. Over the past ten years, folding carton demand has recorded flat or declining growth.

Due to the deteriorating economic circumstances in 2008 and 2009, folding carton shipments plummeted by more than 3% each year, leading to a drop of almost 380,000 tons over the two-year period. These losses eased somewhat in 2010, with shipments declining just 0.8%; however, demand only held up this well due in large part to inventory restocking throughout the consumer product supply chain during the year. Shipments fell by roughly 3% a year in 2011 and 2012, despite the improvement in consumer spending and/or industrial production in a number of key end-use markets during these two years. However, shipments stabilized in the following two years, echoing the further improvements in demand in many crucial spending categories, which translated, albeit slowly, into improved demand for folding cartons, as reflected in the less drastic decline of 0.5% in 2013, and finally crossed over into marginal growth in 2014 for the first time since the recession years.

However, just as the folding carton market appeared to be mending and at least establishing some sort of stability in output, carton shipments logged another rough performance in 2015, declining by 2.0% year-over-year. The drastic change in the exchange rate and the stronger US dollar created an unfavorable environment for US producers and reduced their competitiveness in the international market. As a result, industrial production contracted by 1.0% year-over-year in 2015, resulting in lower demand for folding cartons for the year. Carton shipments saw another, albeit smaller, decline in 2016 of 0.7%. Carton shipments finally stabilized in 2017 with a flat growth rate. However, the recovery did not continue as the demand side was weakened, particularly on the recycled carton side, lowering shipments by 2.1% year-over-year in 2018 to levels not seen since the mid-1990s, before registering nearly flat growth in 2019 at -0.2%.

Many consumer product companies have reported challenging conditions for processed foods and other consumer goods that are critical to the folding carton industry. Non-perishable dry foods face notable pressures from plastic packaging substitution, especially given the increasing prices of boxboard and the drop in input costs for plastic resins as oil prices were basically cut in half in 2015 compared to 2014 levels and remain relatively low. Additionally, e-commerce is a growing force in the dry foods and household supplies sectors. The emerging digital retail model has gained momentum with the acquisition

of Whole Foods Market by Amazon. The rise of e-commerce in the cereal and household supplies markets will limit the growth of folding carton shipments in these sectors, allowing corrugated boxes to gain share in the long run.

The challenging conditions for folding cartons in several markets have been increasingly offset by the growing pressure to substitute plastic packaging with folding cartons, mainly in food services. Plastic's environmentally unfriendly image and its non-biodegradable qualities have led a growing number of restaurants and fast food establishments to set scheduled transitional plans from plastic to other renewable sources, such as paper packaging. Negative sentiment toward polystyrene foam and plastic bags has also led to legislation banning the use of such products in several cities and municipalities across the country.

On top of the shifts in the packaging materials affecting some key end-use markets, consumer preferences are playing a pivotal role in the folding carton shipments outlook. During the past five years, consumer spending patterns showed that expenditures on food consumed away from home (e.g. at restaurants) has been growing strongly, while spending on food consumed at home (e.g. bought at grocery stores) has advanced at a slightly slower pace. Shifts of this degree are quite rare; we have seen just three in the last 45 years. Additionally, during the past five of years, the demand for frozen food has been noticeably growing again. One explanation is the improving labor market and employment environment, which imposed time constraints on the working population, pushing them toward greater consumption of frozen food. Additionally, millennials have significantly contributed to the recent rebound in the frozen food market, which offers convenient, less expensive options for young and single consumers. Improvements in the retail carryout and frozen food sectors are expected to boost folding carton shipments to these areas, which will offset the stagnation and declines in other end-use markets. The soaps and detergent market displayed another example of changing consumer preferences and how those are shaping the folding carton demand outlook. The incursion of liquid soap and detergent products on retailers' shelves has placed increasing downward pressure on the demand for traditional bar soap and powder detergents, both of which are packaged in folding cartons. The greater consumption of liquid soaps and detergents has increased the presence of plastic packaging, which has dampened folding carton demand and limited its growth potentials in this market.

On the pricing front, the situation is somewhat challenging, particularly for independent converters, mainly due to cartonboard prices consistently outpacing actual folding carton prices for several years. To provide some perspective, market prices for cartonboard grades increased at a 2.9% average annual rate from 2010-2019; over that same ten-year span, folding carton average values per ton increased by an average of 1.3% annually. Coming out of the recession, average carton values were relatively stable in 2009 and 2010, but average boxboard prices in 2010 rose 6.2% higher than 2008 levels. After boxboard costs increased another 7.5% in 2011, converters were forced to raise folding carton prices to prevent any further margin erosion. Market conditions at this time were still fairly weak, meaning these price increases likely generated some additional substitution pressure from alternative packaging products such as plastics, magnifying already poor demand fundamentals on the consumer side.

The average value per ton for folding cartons eased modestly in 2013, reflecting the softness that had developed in boxboard prices in late 2012. Paperboard price increases that were pushed through late in 2013 catalyzed into a folding carton price increase of 1.9% in 2014. However, given how late it materialized, the full effect of the 2013 boxboard price increase really only came through in 2014, when average cartonboard prices rose roughly 5.3% year-over-year. In 2015, carton prices dipped 0.6%, indicating further margin erosion for converters exposed to the market price of cartonboard. A silver lining for converters, however, was that the average boxboard price increases remained relatively minimal in 2015, at 0.4%, although stories varied across the three primary boxboard subgrades. Both boxboard and folding carton prices declined in 2016, sliding 1.5% and 0.7%, respectively. Folding carton prices saw further declines in 2017, falling 2.4%, while boxboard prices rose 2%. The 2018 price hikes in the boxboard grades of 6.5% were partially reflected in the converters' carton value increase of 3.4% year-over-year. Average boxboard prices, weighted

by capacity, increased 5.5% in 2019, which allowed carton values per ton to grow by 3.8%.

Prices for the folding cartonboard grades came under downward pressure during 2015 and 2016, due to the combined effects of weak demand from the processed foods sector, a persistent threat from imports and gradual declines in production costs for all grades. Boxboard prices turned upward in 2017 by about 2% year-over-year and then rose again in 2018, although the movement was not uniform across the different substrates. SBS continued to face competitive pressure from virgin boxboard imports from Europe and Asia during much of the year. Clay coated bleached folding boxboard prices increased from an average of $1,025/ton in 2017 to $1,062/ton in 2018, and remained at that level in 2019. This was by far the weakest performance of any folding cartonboard substrate.

The coated recycled boxboard (CRB) market was much tighter than the SBS market in the last couple of years, since unmade orders spent much of the previous years setting new record peaks. Some converting operations shifted over to CUK following the Santa Clara closure, creating exceptionally tight conditions for this grade. Prices for coated recycled boxboard increased from $753/ton in 2017 to $808/ton in 2018, before settling at $880/ton in 2019. In August 2018, CUK prices rose above SBS prices for the first time ever, and the gap has since widened. This is expected to eventually push some folding cartonboard demand over to SBS. The average gap between CUK and SBS stood at $74/ton in 2019.

The flood of folding boxboard coming into the global market has temporarily provided some added leverage to independent converters in pricing negotiations with suppliers, alleviating part of the margin compression the market has seen for some time now. However, the recent mill closures and reduced capacity have stabilized prices, swaying the market back in favor of integrated producers and sellers of boxboard to the open market. Capacity reductions primarily occurred in the recycled market. Paperworks Industries decided to shutter its Philadelphia, Pennsylvania, mill in April 2017, removing another 135,000 tons of capacity from the coated recycled market. Graphic Packaging followed by closing its Santa Clara, California, mill in December 2017. These closures resulted in an 11% reduction in coated recycled boxboard (CRB) capacity, illustrating the degree of demand losses that this grade has suffered during the last couple of years. In June 2020, Graphic Packaging shut its coated recycled board (CRB) mill in White Pigeon, Michigan, with capacity of 70,000 tons per year. The company plans to close four other coated recycled machines when it starts up the new CRB machine at its Kalamazoo, Michigan, mill in 2022, but the net effect of these should be zero change in effective capacity.

COVID-19 trends

Overall, the performance of folding carton shipments has been nothing short of extraordinary, recording 5.6% and 8.2% growth in the first two quarters of the year, respectively. The pandemic and the associated trends in consumer spending and nondurable industrial production have completely reversed the flat to negative growth developments in shipments registered over the last decade. The impact of the pandemic has not been unified across end users, however. Strong growth was evident in cereals, dry foods, frozen foods and cleaning supplies. Meanwhile, food service is one of the most depressed end users of folding carton, as consumer spending at limited service eating places is projected to plummet 11.9% for the year.

Fastmarkets RISI is forecasting year-over-year shipment volume growth will finish the year at 4%. The gains in folding carton demand will mainly be driven by the restocking seen during the lockdowns as well as the ongoing war on plastic packaging, especially in the food service and retail carry-out sector. Although food service has been significantly impacted by the pandemic, the improving demand for takeout leveled off the free-fall in shipments. Headwinds will come from the increasing competition with e-commerce and corrugated packaging taking share. Additional headwinds include changing consumer behavior and the increasing demand for non-carton-intensive products, such liquid soaps and detergents.

Following the acceleration of shipments in 2020, Fastmarkets RISI expects that folding carton shipments will continue their positive trend given the anticipated improvement in economic conditions and the ongoing environmental tailwinds. Our macroeconomic

outlook calls for the economy to grow at a 1.2% average annual growth rate from 2021-2024. This recovery will be associated with downward pressure on unemployment rates, which will resonate in the broader consumer spending dynamics. However, the growth in discretionary household spending will face some resistance by a more conservative consumer psychology following the pandemic and the recession.

Carton shipments are expected to accelerate by 4% in 2020 and continue growing by 1.2% and 0.8% in the next two years. While more favorable macroeconomic factors will result in carton demand growth in 2021, the carton pricing environment will limit carton demand relative to other packaging alternatives, particularly in the sectors that use recycled boxboard. Over the forecast period of 2020-2024, we estimate that folding carton demand growth will average 1.9% annually. Following the anticipated 4.0% demand shock in 2020, folding carton shipment growth is forecast to stabilize at an average annual rate of 1.3% in 2021-2024.

Table 1

Growth in folding carton shipments

Change in percentage

	2010-2014	2015-2019	2020-2024
Thousand tons	-1.5%	-1.0%	1.9%
Million dollars	0.3%	-0.3%	3.9%
Average value per ton	1.8%	0.7%	2.0%

All forecasts and analysis presented by Fastmarkets RISI, Inc.

Table 2

US folding carton shipments

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f
Thousand tons	1,252	1,286	1,292	1,154	4,985	5,046	5,084	5,163	5,255
%	5.6%	8.2%	0.8%	1.5%	4.0%	1.2%	0.8%	1.6%	1.8%
Million dollars	2,444	2,344	2,360	2,108	9,255	9,545	9,954	10,268	10,650
%	5.9%	5.2%	4.3%	4.8%	5.1%	3.1%	4.3%	3.1%	3.7%
Average value per ton	1,951	1,823	1,826	1,827	1,857	1,892	1,958	1,989	2,027
%	0.2%	-2.7%	3.5%	3.3%	1.0%	1.9%	3.5%	1.6%	1.9%
Real carton value per ton (2015$)	1,837	1,736	1,732	1,716	1,756	1,750	1,780	1,773	1,780
%	-0.7%	-5.5%	-0.2%	-0.9%	1.4%	-0.3%	1.7%	-0.4%	0.4%

All forecasts and analysis presented by Fastmarkets RISI, Inc.

Note: r = revised, e = estimate, f = forecast.

Table 3

US folding carton market

Million US dollars

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f
Shipments	2,443.7	2,343.7	2,359.7	2,108.3	9,255.4	9,544.7	9,954.4	10,267.9	10,650.1
Imports	205.6	192.1	190.8	213.6	802.2	777.9	745.8	723.1	697.1
Exports	110.4	103.4	104.1	93.0	410.9	423.8	442.0	455.9	472.9
Consumption	2,538.9	2,432.4	2,446.4	2,228.8	9,646.6	9,898.8	10,258.3	10,535.1	10,874.3
Import penetration (imports percentage of consumption)	8.1%	7.9%	7.8%	9.6%	8.3%	7.9%	7.3%	6.9%	6.4%
Exports as a percentage of shipments	4.5%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%

All forecasts and analysis presented by Fastmarkets RISI, Inc.

Note: r = revised, e = estimate, f = forecast.

Table 4

Total folding carton and cartonboard

Thousand tons

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f
Folding carton shipments	1,252	1,286	1,292	1,154	4,985	5,046	5,084	5,163	5,255
% Change	5.6%	8.2%	0.8%	1.5%	4.0%	1.2%	0.8%	1.6%	1.8%
Converting loss at carton plants	147	151	152	135	585	592	596	606	617
Board consumption at carton plants	1,399	1,437	1,444	1,290	5,569	5,638	5,681	5,769	5,871
Board consumption, all other uses	241	270	214	381	1,106	1,138	1,192	1,239	1,271
Domestic cartonboard demand	1,640	1,707	1,658	1,670	6,675	6,776	6,873	7,008	7,142
Cartonboard net exports	44	5	12	1	63	-38	-83	-137	-165
Cartonboard production	1,685	1,712	1,670	1,671	6,738	6,738	6,790	6,872	6,977
% Folding carton shipments/domestic demand	76.4%	75.3%	77.9%	69.1%	74.7%	74.5%	74.0%	73.7%	73.6%

All forecasts and analysis presented by Fastmarkets RISI, Inc.

Note: r = revised, e = estimate, f = forecast.

Table 5

Folding carton shipment risk matrix

	COVID-19 shock	Demand correction (AAGR 2021-2024)	Long-term trend (AAGR 2019-2024)	Risks to folding carton shipments outlook
Beverage	6.5%	-0.3%	1.0%	**Upside:** Expanded cartonboard uses in premium beverages **Downside:** Possible increase in unbleached coated board imports
Cereal	7.9%	-1.6%	0.2%	**Upside:** Demand for cereal increases during economic downturns **Downside:** E-commerce (corrugated), plastic packaging (cereal in bulk quantity) and other breakfast options
Frozen foods	4.2%	-0.1%	0.8%	**Upside:** Improved economic/labor market conditions and a substitute to food service **Downside:** Increased FBB imports from Europe
Retail carry-out	-11.7%	5.4%	1.9%	**Upside:** Improved economic conditions; paperboard replaces plastic packaging in food service and takeout **Downside:** Increased FBB imports from Europe, a weak labor market significantly hurts demand
Pharmaceuticals	4.9%	-0.1%	0.9%	**Upside:** Aging baby boomers, new drug developments and rising healthcare coverage **Downside:** Increased FBB imports from Europe, increased trade deficit due to soaring prescription drug costs in the US
Soap & detergent	9.3%	-2.1%	0.1%	**Upside:** Greater hygiene awareness and standards increases demand **Downside:** The incursion of liquid soap and detergent products, which favor plastic packaging over cartons

Figure 1

US folding carton shipments growth outlook

Thousand tonnes, percentage growth

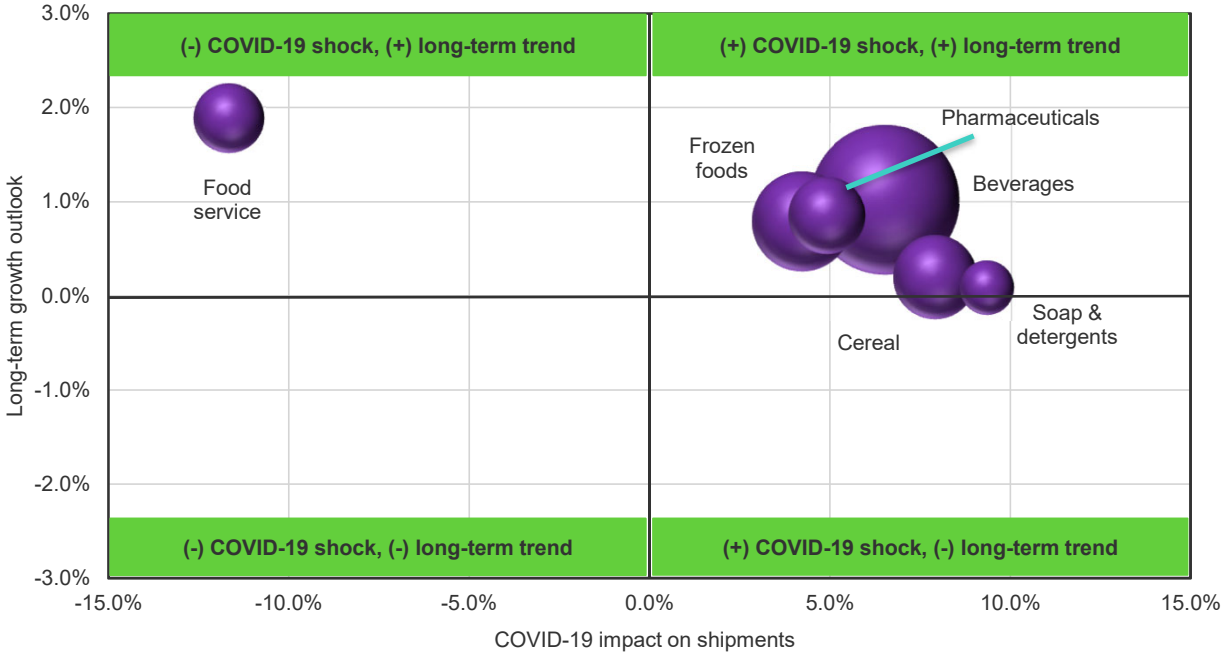
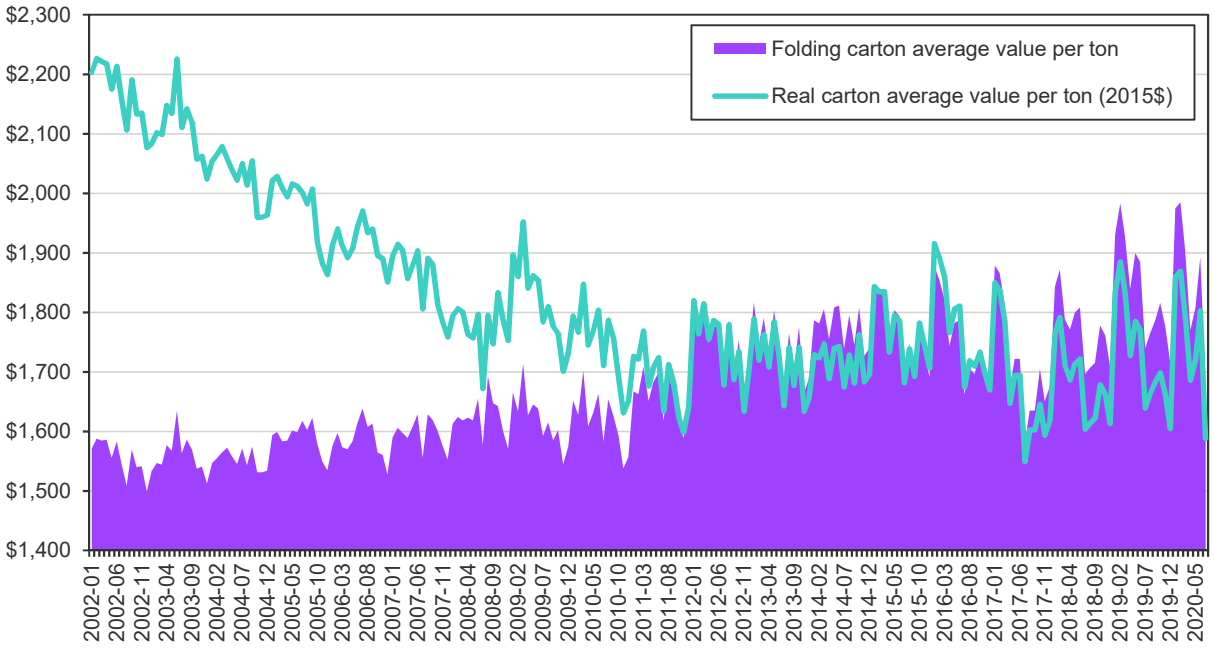


Figure 2

Real folding carton average values have been falling for decades

Dollars per ton

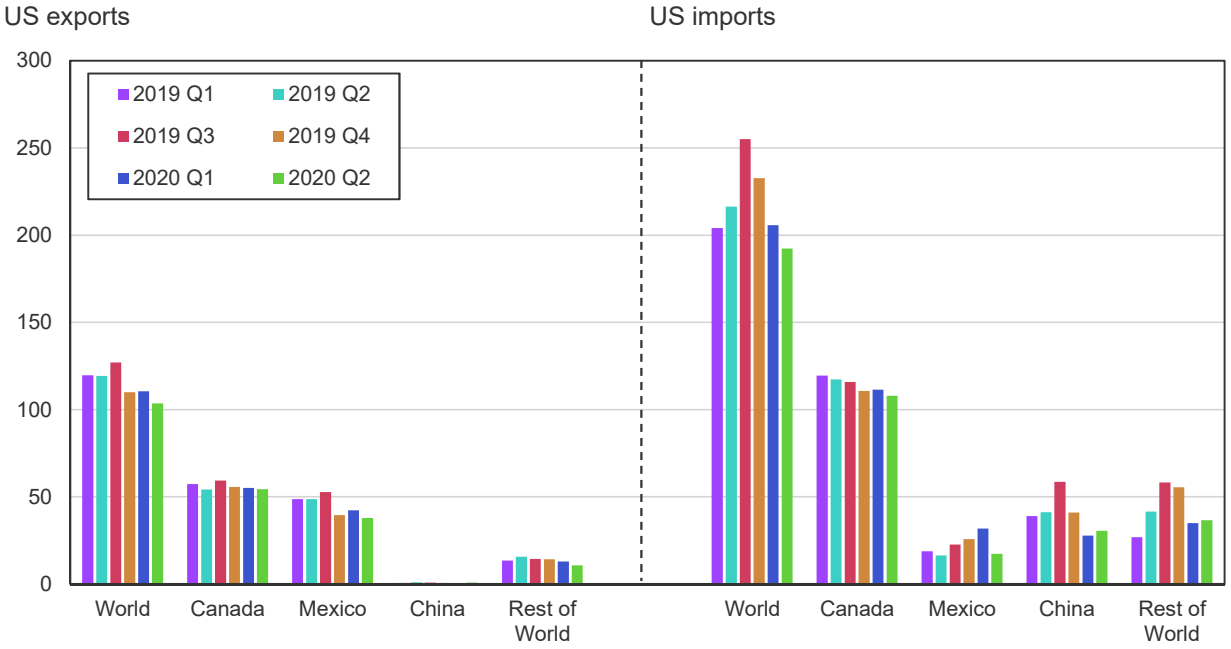


Source: Fastmarkets RISI, Inc.

Figure 3

US folding carton exports and imports

Millions of US dollars



Source: Fastmarkets RISI, Inc., US Customs trade data.

Folding boxboard outlook

From 2009 through 2017, apparent consumption of US folding boxboard fluctuated between 6.3 million tons and 6.5 million tons per year. Demand climbed toward 6.6 million tons in 2018, fueled by exceptionally strong growth in industrial production of processed foods. Growing resistance to single-use plastic packaging was likely another factor supporting cartonboard demand, since this presented some opportunities for cartons to make inroads into the away-from-home segment that had been supplied by blown polystyrene products. Processed food production retreated in late 2018 and early 2019, leading to a 1.5% decline in demand during the year. Even so, apparent consumption came in at 6.5 million tons for the year, which was at the upper bound for the demand range prior to 2018. It appears that the COVID-19 crisis is having a mixed impact on the folding cartonboard market, with strong growth in the grocery store related market segments being offset by collapsing demand from the nonessential segments. Our forecast calls for demand to remain exceptionally volatile for the remainder of the year, as total demand for the year is expected to grow by 2.6% above the 2019 level. Growth should continue in 2021, and we show apparent consumption increasing at a 1.7% average annual rate between 2021 and 2024. Total apparent consumption of folding cartonboard is expected to climb toward 7.1 million tons by 2024.

Much of the growth in folding cartonboard demand will likely be met by increased imports of board produced overseas. We project that imports will grow at a 5.5% average annual rate during the next five years, while domestic production expands just 1.3% annually. What is driving this forecast? To a large degree, it is our projections that prices for domestic cartonboard will remain at or near historical peaks during much of this period. North American producers are actively managing capacity in order to keep supply balanced with demand, which supports profitability at levels they deem acceptable. However, capacity expansion is going to be much more robust in the overseas markets. It seems likely that producers in Europe or Asia will be eager to sell some product into the North American market, if they can find converters who are willing to shift away from domestically produced board.

The best performance among the three main folding cartonboard substrates is expected to be in the coated unbleached segment. Demand is forecast to grow 2.3% per year during the next five years, fueled largely by gains in the beverage carrier segment. The resilience of coated unbleached demand over the last year, despite the record-setting premium for CUK prices relative to SBS, seems to indicate there is a perception that bleached board is less environmentally desirable than the other substrates. The most recent data suggest that any substitution for unbleached is flowing toward recycled folding rather than bleached, perhaps because CRB can deliver a punch based on its use of recycled fiber. However, coated recycled demand faces some headwinds, since it has historically been used most heavily to package processed foods and other nondurable goods delivered via traditional retail channels. The shift in consumer spending patterns toward fresh foods and the delivery of products to consumers via the e-commerce channel are likely to undermine CRB demand in many traditional end-use markets. We project that domestic production of recycled folding cartonboard will be effectively flat during the next five years. This would still be slower than the projected 1.2% average annual growth in bleached folding cartonboard demand.

Boxboard producers adopted an aggressive capacity management stance during the last decade, when they recognized that they were facing difficult conditions in both the domestic and export markets. Total North American capacity fell from 17.4 million tons in 2005 to 15.4 million tons in 2017 and 2018. The total capacity withdrawn from the market during this period was even larger than this, but these closures were partially offset by incremental expansions on the remaining machines.

Overall industry capacity remained close to this level in 2019, as Georgia-Pacific's closure of its Crossett, Arkansas, mill offset most of the capacity added when Sappi continued to ramp up the converted graphic paper machine at its Skowhegan mill in Maine to bleached packaging grades.

Three closures have been announced for 2020: Graphic Packaging's CRB mill in White Pigeon, Michigan; Sonoco's uncoated recycled mill in Trent Valley, Ontario; and Sonoco's PM3 at its large Hartsville, South Carolina, mill. Graphic Packaging plans to close four other coated recycled machines when it starts up the new CRB machine at its Kalamazoo, Michigan, mill in 2022, but the net effect of these should be zero change in effective capacity. In a similar vein, Sonoco has announced it will close some of its older uncoated recycled capacity when it converts the corrugating medium machine over to uncoated recycled in 2022.

Our projections show folding cartonboard capacity levels increasing from 7.2 million tons in 2019 to nearly 7.4 million tons in 2024. This would average out to only 0.4% per year for the full five-year period, which would be well below the demand growth outlook of 1.9% annually. This is understandable given the strong potential growth of imports over the forecast at 5.5% on average annually. Operating rates are expected to remain close to 93.6% for the next five years. While this figure would be relatively low for the containerboard market, it would be very well in line with the 92% average that was recorded during the prior 30 years in the boxboard market.

Prices for the various boxboard grades came under downward pressure beginning in late 2019 due to the deterioration in demand during the middle of the year, extraordinarily weak recovered paper prices and competition from some new supply. Prices for clay coated bleached board and clay coated recycled declined $30/ton in early 2020, capturing the softness that developed for these segments in late 2019. Prices for clay coated unbleached folding boxboard were unchanged.

The dynamics for boxboard pricing are shifting dramatically during the COVID-19 crisis. Demand is drying up in some sectors of the market but expanding dramatically in others, recovered paper prices are spiking, and capacity closures, permanent and temporary, are shifting the balances between supply and demand. We project that SBS prices will trend upward starting in the first quarter of 2021, followed by CRB in the second quarter, then CUK in the third.

Table 6

Boxboard data by board grade

Thousand tons

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f
Apparent consumption									
Total	1,640	1,707	1,658	1,670	6,675	6,776	6,873	7,008	7,142
%	-0.5%	4.0%	-2.9%	0.7%	2.0%	1.5%	1.4%	2.0%	1.9%
Bleached	411	433	411	416	1,671	1,675	1,667	1,668	1,676
Recycled (including multi-ply)	677	681	667	674	2,698	2,750	2,785	2,883	2,950
Unbleached	553	593	580	581	2,306	2,351	2,421	2,458	2,516
Imports									
Total	220	242	238	245	945	1,022	1,056	1,104	1,151
%	4.2%	9.8%	-1.6%	2.8%	7.2%	8.2%	3.4%	4.5%	4.2%
Bleached	6	8	7	6	26	23	24	25	26
Recycled (including multi-ply)	183	192	191	199	764	832	860	900	938
Unbleached	31	42	40	40	154	167	172	180	187
Exports									
Total	265	247	250	245	1,007	984	973	968	986
%	4.4%	-6.6%	1.2%	-1.9%	-0.8%	-2.3%	-1.1%	-0.6%	1.9%
Bleached	100	98	91	87	377	352	340	337	351
Recycled	29	26	25	24	105	85	88	89	88
Unbleached	135	123	134	134	526	548	546	541	547
Production									
Total	1,685	1,712	1,670	1,671	6,738	6,738	6,790	6,872	6,977
%	-0.3%	1.6%	-2.5%	0.1%	0.8%	0.0%	0.8%	1.2%	1.5%
Bleached	505	523	495	498	2,021	2,003	1,984	1,980	2,001
Recycled	524	515	502	499	2,039	2,003	2,012	2,072	2,100
Unbleached	656	674	673	674	2,677	2,732	2,795	2,819	2,876
Capacity									
Total	1,818	1,819	1,811	1,804	7,252	7,239	7,279	7,327	7,367
%	0.6%	0.0%	-0.4%	-0.4%	0.4%	-0.2%	0.6%	0.7%	0.5%
Bleached	545	540	550	540	2,175	2,160	2,160	2,160	2,160
Recycled	561	561	543	543	2,207	2,172	2,172	2,180	2,180
Unbleached	713	718	718	721	2,870	2,907	2,947	2,987	3,027
Operating rate									
Total	92.6%	94.1%	92.2%	92.6%	92.9%	93.1%	93.3%	93.8%	94.7%
Bleached	92.6%	96.9%	90.1%	92.2%	92.9%	92.7%	91.8%	91.7%	92.6%
Recycled	93.4%	91.9%	92.4%	91.9%	92.4%	92.2%	92.6%	95.0%	96.3%
Unbleached	92.0%	93.9%	93.7%	93.5%	93.3%	94.0%	94.8%	94.4%	95.0%

Source: Fastmarkets RISI, Inc.

Note: r = revised, e = estimate, f = forecast.

Table 7

Boxboard prices by board grade

US dollars per ton

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f
Bleached board	1,040	1,030	1,030	1,030	1,032	1,060	1,103	1,128	1,141
%	-1.9%	-1.0%	0.0%	0.1%	-2.7%	2.7%	4.0%	2.3%	1.2%
Unbleached	1,140	1,140	1,140	1,140	1,140	1,152	1,186	1,186	1,177
%	0.0%	0.0%	0.1%	0.0%	0.4%	1.1%	2.9%	0.0%	-0.8%
Coated recycled	860	850	850	850	852	868	900	930	998
%	-2.3%	-1.2%	0.0%	0.0%	-3.1%	1.8%	3.7%	3.3%	7.4%
All grades, weighted by capacity	1,024	1,018	1,020	1,020	1,020	1,039	1,076	1,093	1,114
%	-1.1%	-0.6%	0.2%	0.0%	-1.4%	1.9%	3.5%	1.6%	1.9%

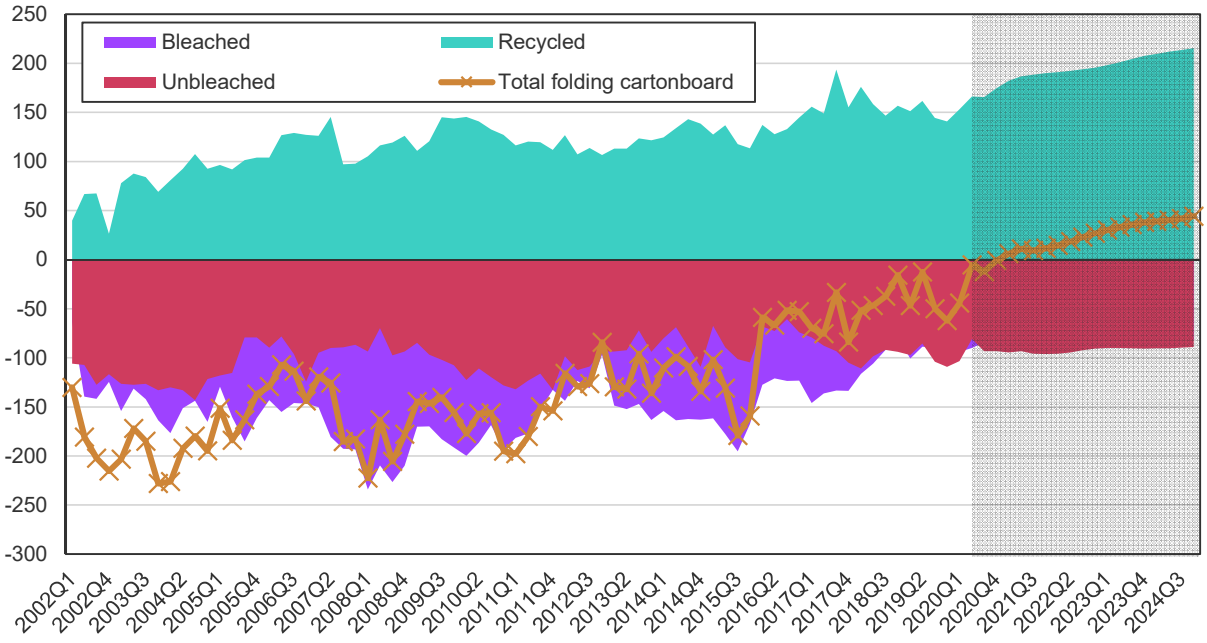
Source: Fastmarkets RISI, Inc.

Note: r = revised, e = estimate, f = forecast.

Figure 4

US folding cartonboard net imports on the decline

Thousand tons

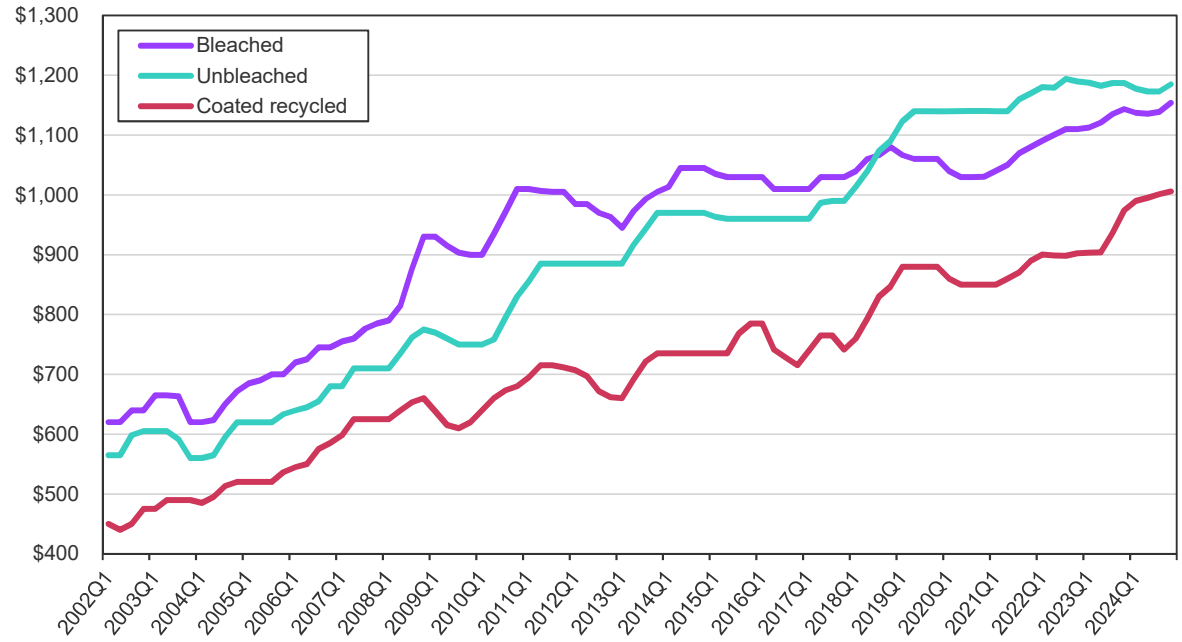


Source: Fastmarkets RISI, Inc.

Figure 5

Boxboard prices by board grade

Dollars per ton



Source: Fastmarkets RISI, Inc.

Fastmarkets RISI's forecast methodology ensures that the growth and decline in folding carton apparent consumption is estimated using underlying boxboard demand. Full details of the methodology used to balance the two forecasts can be found in Appendix A. This year's analysis shows the range of board consumption at various carton plants and boxboard apparent consumption growing to over 1 million tons in 2019. The projected increase in imports is one factor suggesting that non-carton uses will rise over time, since the import data for folding boxboard includes an expanding amount of clay coated white top linerboard that is consumed outside of the folding carton system. Inventory accumulation and depletion cycles also play a role in the difference between cartonboard demand folding carton shipments.

Chapter 4
Beverages

The beverage market is still by far the largest end user of folding cartons in the US, estimated at 597,000 tons (23.5%) of total carton shipments in the first half of 2020. Because of its substantial share of total folding carton demand, the beverage sector plays a critical role in determining the overall growth profile of the folding carton industry for the US. Shipments of folding cartons to the beverage segment expanded by 4.1% in the first quarter and 1.4% in the second quarter of 2020. The strong demand pull seen in March was a result of the restocking that took place at the beginning of the lockdown. The growth in folding carton shipments reflects the demand shift from beverage consumption at food services to consumption at home.

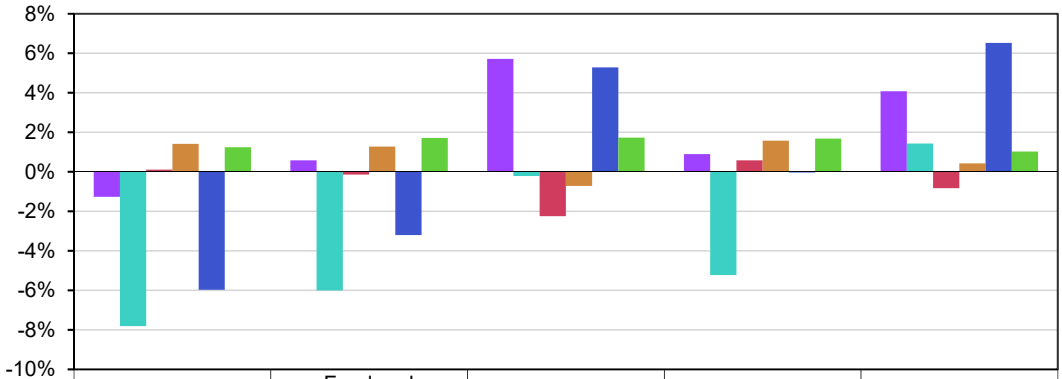
Spending on alcohol for off-premises consumption will be the main driver for folding carton demand growth in beverages for the remainder of the year and over the forecast horizon. Prior to the pandemic, carbonated beverage demand struggled to grow with heightened health awareness. Wine and spirits generally experienced modest positive growth, while beer spending was relatively soft despite accounting for the lion's share of carton demand in the alcohol segment. This outlook changed drastically with at home consumption surging during the pandemic.

The uncertainty surrounding economic growth in the forecast, and the US consumer subsequently opting for at-home beverage products as a result, will translate to stronger growth in beverage folding carton shipments of 6.5% by the end of 2020. Uncertainty regarding folding cartonboard shipments is expected to gradually phase out over the forecast, limiting growth to an average annual rate of 1.0% from 2020-2024.

Figure 1

Beverage end-use market indicators

Quarterly, annual and five-year average annual growth rates



	GDP	Food and beverage spending	Beverage spending	Beverage production	Carton shipments
2020 Q1 (e)	-1.3%	0.6%	5.7%	0.9%	4.1%
2020 Q2 (e)	-7.8%	-6.0%	-0.2%	-5.2%	1.4%
2020 Q3 (f)	0.1%	-0.1%	-2.2%	0.6%	-0.8%
2020 Q4 (f)	1.4%	1.3%	-0.7%	1.6%	0.4%
2020f	-6.0%	-3.2%	5.3%	0.0%	6.5%
2020-2024 (f)	1.2%	1.7%	1.7%	1.7%	1.0%

Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

Spending trends

Long-term context

The beverage industry was growing at a fairly steady clip prior to the pandemic at an average annual rate of 3.2% from 2015-2019, much faster than the 1.8% average growth registered during the five years immediately following the financial recession. Beverage spending has grown nearly in line with overall food spending; beverages as a share of non-service food and beverage spending was nearly 31.5% in 2019. As a share of US total nondurables spending, beverages accounted for 10.6% in 2019.

The Bureau of Economic Analysis (BEA) tracks spending on beverages for off-premises consumption in two major categories: (1) mineral waters, soft drinks and juices and (2) alcoholic beverages including spirits, wine and beer. Spending on mineral waters, soft drinks and juices have had more difficulty recovering from the depths of the 2008/2009 recession than alcoholic beverages. After dropping 5.3% in 2009, spending showed a mixed performance until 2014, leaving the average growth rate between 2009 and 2013 at 1.2% and steadily losing share to alcoholic beverages. After 2014, spending performed steadily, growing by 2.4% annually between 2015 and 2019. Total spending on mineral waters, soft drinks and juices as a category reached nearly $80.7 billion (2012$) in 2019, reflecting some growth, albeit relatively slow compared with other beverage categories. The main culprit for the weakness in the category is crashing per capita consumption of carbonated soft drinks (CSD) as health awareness rises; *IBISWorld* estimated that 2019's US soft drink consumption per capita has fallen 17.6% since 2000.

Spending on alcohol has been a strong driver of the robust beverage spending over the past decade. Even during 2008-2009, spending on alcohol for at-home consumption was relatively resistant to the effects of the recession, declining just 2.2% during those two years. Demand for spirits and wine held stable in 2009 at $23 billion and $30 billion (2012$), respectively, and accelerated strongly in 2010 as growth in overall spending returned to normal. Beer consumption was hit the hardest during the recession, falling 8.1% below its 2006 peak by 2009. The economic downturn meant further market share gains by spirits and wine sales over beer, which seems to have been happening for well over a decade and appears to be continuing. This is likely due to shifting perceptions on the health benefits for moderate consumption of wine and spirits compared to beer (e.g., lower calorie intake, heart benefits, etc.). Ten years ago, spending on beer accounted for just over half of total alcohol spending (off-premises consumption) but has since slid to just under 45% in recent years. Meanwhile, the share of consumer spending on wine increased from 27% of the total in 2005 to 32.8% in 2019 and spirits from 21% to 23% over the same time frame.

The strong growth in alcohol spending also appears to have translated over to restaurant spending as well, although spending on alcohol in purchased meals during the Great Recession was not nearly as resilient compared to at-home spending. During the downturn, consumers were forced to cut back on dining out and cook at home, causing spending on alcohol in purchased meals to fall from the 2007 peak of $78 billion to $75 billion (2012$) by 2010, a 3.7% decline. Spending on alcohol at restaurants returned to growth in 2011 and exhibited real strength in the last couple of years. In 2016, alcohol spending purchased in meals grew 3.5%, and continued its accelerated growth well into 2019 when it expanded by 3% year-on-year, a reflection of some level of normalization post-recession and upward pressure on real wages driving consumers to opt to dine out more.

COVID-19 trends

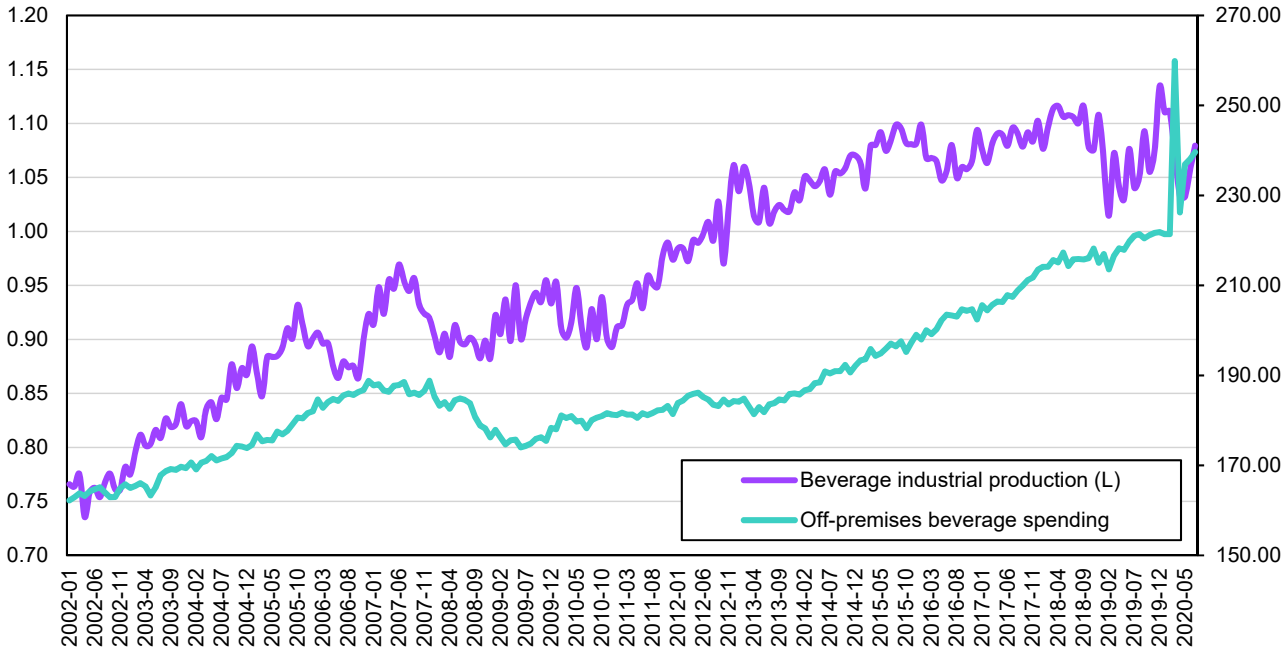
The pandemic has directly impacted consumer spending in the beverage industry and shifted demand between the categories. According to the BEA, beverage spending in March 2020 rose to about $331 billion (2012$, seasonally adjusted), representing a 2.4% increase month-to-month. Spending declined considerably in April to about $273 billion (2012$, seasonally adjusted), representing an 17.5% monthly decline. The sharp volatility in consumer spending is attributed to several factors. First, beverage segments have reacted differently to the pandemic. Second, restocking has created additional demand that is essentially borrowed from future demand. Third, the uncertainty surrounding consumer incomes has also contributed to the overall trend.

Due to the general lockdown, spending on alcohol in purchased meals saw a significant

Figure 2

Beverage industrial production and consumer spending

Industrial production index (2012 = 1.00) and spending in billions of 2012$



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

decline of 30.1% month-to-month in March. This downward pressure continued into April, registering another 34.3% contraction. During the past five years, alcohol in purchased meals has maintained an average share of nearly 32%, while the remaining categories accounted for 68% of the total beverage spending. The recent contraction in spending on alcohol in purchased meals was reflected in its diminishing share, which declined to 21.5% in March and 17.1% in April 2020.

The demand loss in alcohol on purchased meals was captured by the exceptional growth of at-home beverage spending, which climbed sharply to about $260 billion (2012$, seasonally adjusted), registering 17.4% growth in March. However, this strong demand pull was short-lived, as it contracted by 13% in April, although the levels remain higher than pre-COVID trends. The at-home beverage spending level seen in April accounted for nearly 83% of total beverage spending, a big jump from the five-year average of 68%.

Overall beverage spending rebounded in May by 9.1% following April's 17.5% decline in expenditure, due to the easing of restrictions. May's spending on alcohol in purchased meals rose to $60.9 billion (2012$, seasonally adjusted), an increase of 30.4%, but still 40.1% below its February 2020 level. At-home beverage spending also rebounded in May by 4.7%, with spirits and wine scoring highest in terms of spending growth (7.7% and 5.9%, respectively).

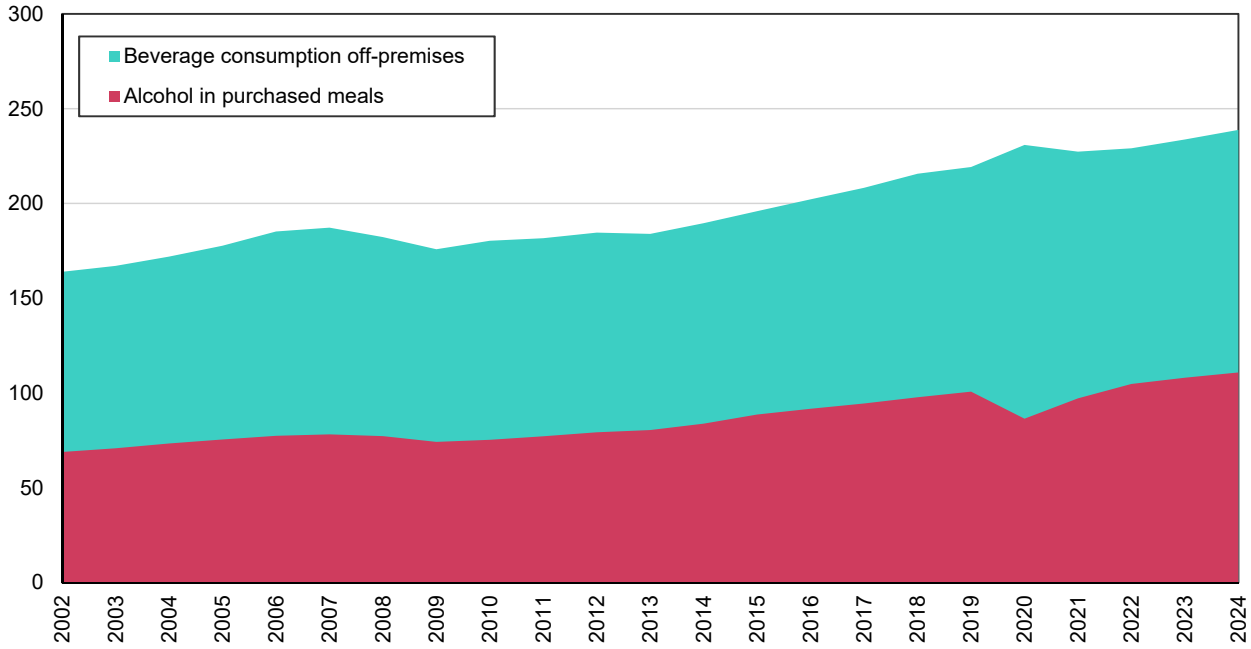
June beverage spending showed a continued recovery of 4.4%. Most of the positive gains stemmed from the strong performance in spending on alcohol in purchased meals, which rose to nearly $73 billion (2012$, seasonally adjusted), growing 19.6% but still about 28.3% lower than the pre-COVID level. However, spending on at-home beverages stagnated and showed 0.5% growth in June. This flat performance continued into the first month of the second half of the year, with spending in July expanding only 0.7%.

March spending on at-home beverages provided a strong tailwind, allowing first quarter gains to register a 5.7% growth rate. This growth level offset the 9.7% decline in spending on alcohol with purchased meals over the same time period, setting the first quarter at a 0.9% growth level for

Figure 3

Beverage spending categories

Off-premises beverage spending vs. alcohol in purchased meals (billions of 2012 US dollars)

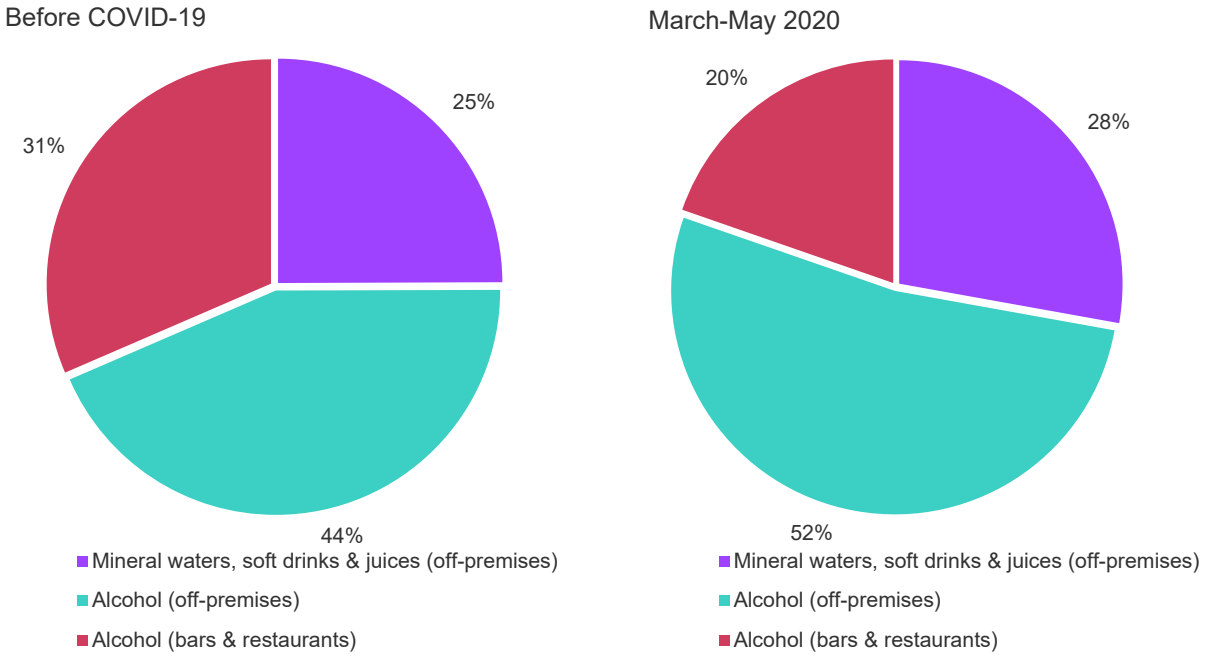


Source: Fastmarkets RISI, Inc. using US BEA Real Personal Income Expenditures.

Figure 4

Beverage spending by major category

Percentage of total



Source: Fastmarkets RISI, Inc. using US BEA Real Personal Income Expenditures.

all beverage spending. The second quarter saw a 9.8% contraction in overall beverage spending—the net of a 34.4% decline in away-from-home alcohol spending and a nearly flat quarter-to-quarter growth rate of -0.2% in at-home expenditures.

Fastmarkets RISI forecasts that overall beverage spending will decline less dramatically in the third quarter and the fourth quarter at 2.2% and 0.7%, respectively. This is due to the continued recovery in food service spending and a decline in at-home spending following periods of stocking. On an annual level, at-home beverage spending is anticipated to grow by 5.3% by end of 2020. Growth will stabilize over the next four years to 0.9% annually, reaching $238.8 billion (2012$, seasonally adjusted) by 2024.

Trade trends

Long-term context

The overall trend in the beverage sector has been a ballooning trade deficit as American appetites for foreign products continue to grow, mainly as more sophisticated food preferences have taken hold. Looking back prior to the recession, the trade deficit in the beverage market from 2000-2007 was growing by nearly double-digit rates on average as consumer spending on imported alcohol boomed. The trade deficit peaked at over $14.8 billion (2012$) in 2007, but quickly reversed in 2008 as consumption was undermined by the recession, pushing the trade deficit down to $11.4 billion (2012$) by 2009. With the improving economic outlook after the recession, net imports accelerated to $20.1 billion (2012$) by 2019.

Despite the global slump, US exports of beverage products experienced solid growth in 2008, although the effects of the recession eventually caught up and resulted in declines the following year. In the past decade, exports have played a more significant role in the market, doubling from $3.3 billion (2009$) in 2005 to $6.6 billion (2009$) in 2018, ultimately increasing the export share of total beverage production. A weakening US dollar also provided a boost for domestic producers competing abroad for many years, although major shifts in monetary policy in 2015 and 2016 have caused the US dollar to strengthen dramatically more recently. Unsurprisingly, beverage export growth in 2015 slowed significantly to just 1.9%, far lower than the double-digit growth rates experienced in previous years, and posted a negative rate of growth in 2016, declining 4.1%. The slightly weaker dollar in 2017 and 2018 allowed beverage exports to grow by 2.4% and 0.5%, respectively, before contracting again in 2019 by 5.1% as the dollar strengthened again. Exports are expected to continue the overall growth trajectory in the forecast, despite some headwinds due to the slow growth in the export markets.

American appetites for foreign and exotic goods continue to expand, which helps explain the strong growth in beverage imports since 2010 when the US economy started moving out of crisis mode. Average import growth in the past decade was 5.3%, which on a percentage basis was a slightly stronger pace than US beverage exports (3.6%), but on a volume basis import growth was vastly larger than export growth, ballooning the trade deficit back above $20.1 billion (2012$) by 2019. The import share of consumer spending for beverages rose from 8.2% in 2018 to 8.3% in 2019 as real income growth gained traction and household tastes for foreign alcoholic beverages continued to flourish.

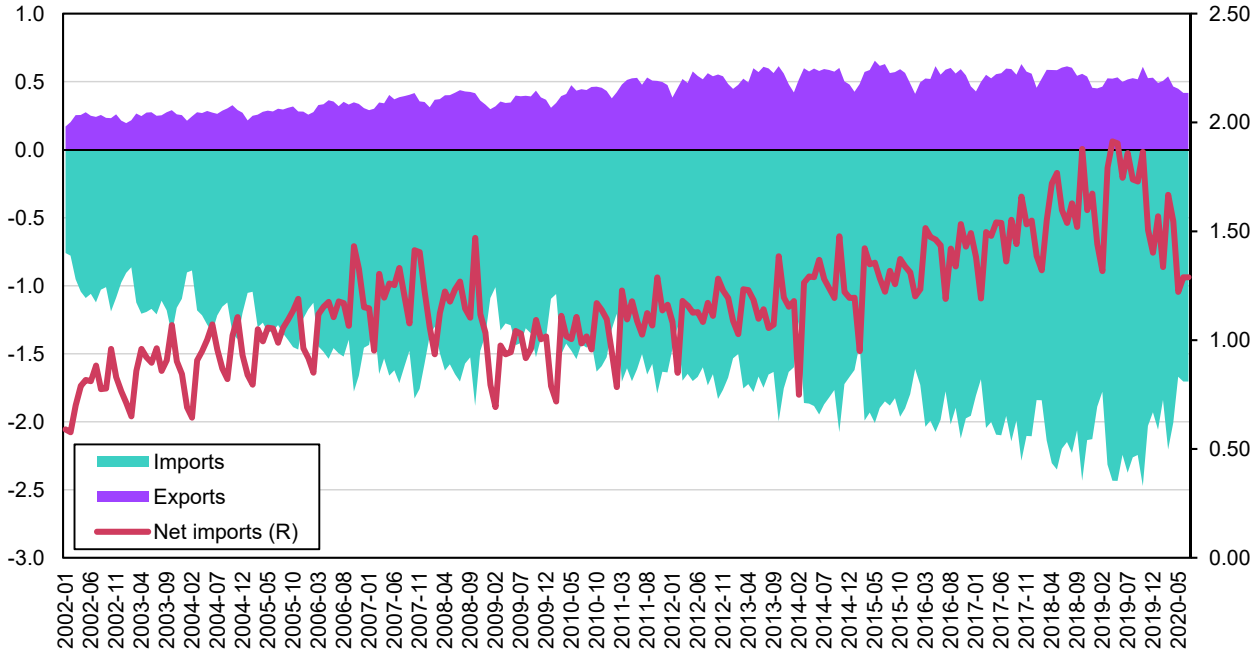
COVID-19 trends

The trade outlook changed in the first few months of the pandemic. We estimate that 2020 exports will decline by 1.1%, while imports will see a dramatic loss of 6.8%. The weakness in imports is mainly attributed to the changing consumer spending behavior and the volatility witnessed on a monthly basis. While at-home beverage spending is called to grow by 5.3% by year-end, overall beverage expenditures are expected to contract by 6.8% due to the significant blow to spending on alcohol in purchased meals. On the exports side, the export markets have weakened due to the pandemic and the associated economic uncertainty abroad. This is expected to contribute to the anticipated flat performance of industrial production by the end of the year. The trade deficit is expected to decline in 2020 by 8.6%, and, due to the favorable exchange rate environment, it will continue falling through 2024, hitting $17.4 billion (2012$) by the end of the forecast.

Figure 5

Beverage market trade deficit

Trade in billions of 2012 US dollars



Source: US Census and Fastmarkets RISI, Inc.

Production trends

Long-term context

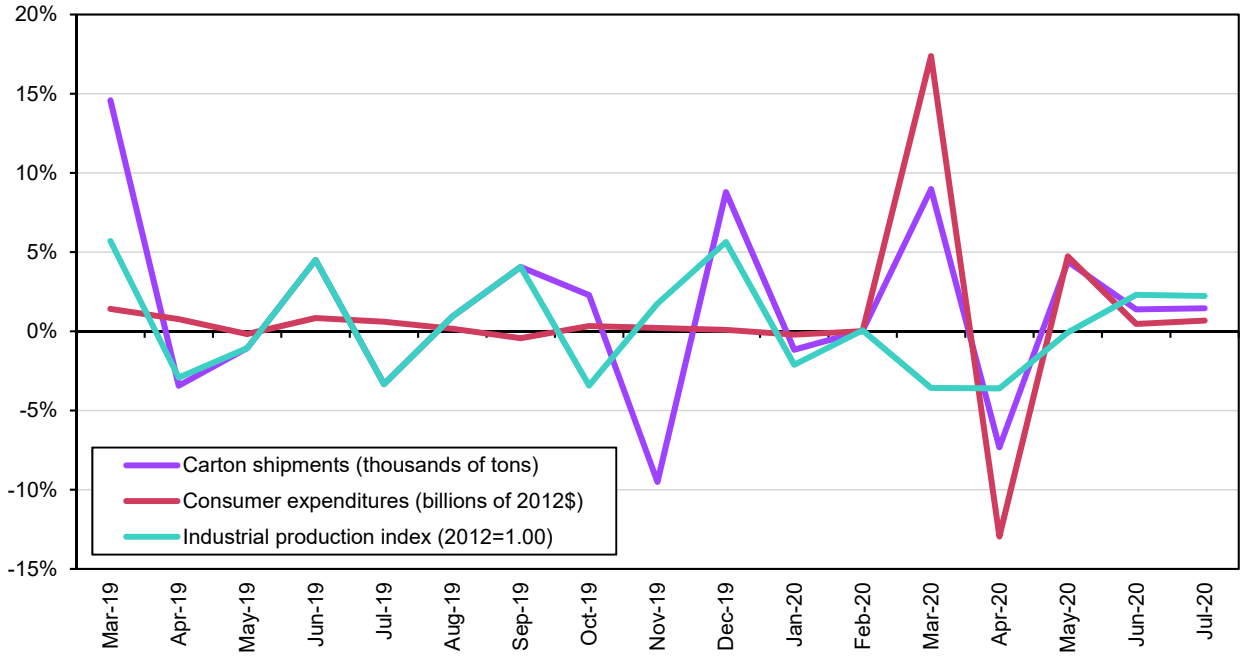
Beverage production as measured by the Federal Reserve's industrial production index has remained fairly robust compared to other manufacturing categories plagued by the global financial recession. Beverage production has grown on average by 1.4% annually over the last ten years (2010-2019), which is far better than overall nondurables production, which has struggled to recover past pre-recession highs. Beverage production has been less robust for the last five years, averaging 0.2% annually, although 2016 saw a decline of 1.1% followed by a strong increase of 1.6% in 2017 and 1.4% in 2018. The 2016 data point seems to conflict with the consumer spending data, which indicated another steady year of spending growth. It is possible that some of the weakness was driven by a more challenging export environment due to the strong dollar, which is reflected in the 4.1% decline in exports and the 4.9% growth in imports in that year. However, this is a relatively small proportion of the market. Last year saw consumer spending numbers for beverages in the US grow by 2.1%, while industrial production numbers declined by 3.5%.

COVID-19 trends

We expect production to remain flat in 2020. Part of this flat trend is attributed to the expected weak economic environment in the export markets, highlighted by the potential 1.1% decline in exports. This decline is also associated with an estimated contraction in total beverage spending of 6.8% year-on-year and the volatility of the monthly spending numbers due to the pandemic. Production is expected to record a positive recovery over the forecast through 2024 as some of the negative pressures on beverage production ease later in the forecast, thanks to more favorable spending numbers and a rebounding export market. The four-year output forecast will average 2.1% annually from 2021 to 2024.

Figure 6

Beverage growth in shipments, consumer spending and industrial production



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

Folding carton trends

Long-term context

The beverage market is the single largest end-use channel for the folding carton market and was one of the fastest growing segments for the industry during the last decade. Shipments to the beverage industry grew from 16% of total folding carton shipments in 2001 to 23.5% in 2019. Prior to the recession, folding carton shipments in the beverage segment grew at a swift pace, averaging close to 4% annually in the years leading up to 2008. However, carton shipments were significantly impacted by the recessionary drag on spending and declined 9.7% during 2008-2009. Half of these losses were recovered in 2010, but growth in this segment was tepid between 2009 and 2013 at 0.5%. However, over the last five years, shipments have rebounded, growing on average by 1.4% between 2015 and 2019.

Shipments of beverage cartons rose to almost 1.13 million tons in 2019, which we estimate is about 23,000 tons above the levels in 2018. Based on Fastmarkets RISI's macroeconomic outlook, we expect beverage shipments to grow at a 1.0% average annual rate over the forecast period, reaching 1.19 million tons by 2024. As previously mentioned, the lack of growth in the non-alcoholic segments (soda, juices, etc.) within the broader beverage category as well as the overall economic outlook in the forecast are the main headwinds holding back more robust growth prospects. Additionally, some of the relatively stronger spending growth is coming from less carton-intensive categories such as wines and spirits, which does not bode favorably for beverage carrier producers heavily dependent on the beer and CSD segments for growth. On the other hand, if it persists, this trend could favor "luxury" folding carton or rigid box producers for the wine and spirits industry. The pattern of "trading up" to premium beverage products, particularly in the alcohol segment, could also undermine volumes if people are still somewhat budget constrained when going out to eat or heading into the grocery store.

Due to the outlined challenges and risks to the forecast, overall spending's tepid growth across all the beverage categories will translate to beverage carton shipments accounting for a smaller share of 22.6% of total shipments by 2024.

COVID-19 trends

Folding carton shipments sharply increased in the early stages of the lockdown due to the pandemic. The following months saw a mixed performance and volatility with stock build-up and depletion cycles. March's seasonally adjusted beverage carton shipments climbed sharply by 9%, accelerating the first quarter's growth outlook to 4.1% quarter-to-quarter and 297,600 tons. The increased shipment level echoes the consumer spending behavior which shifted away from alcohol in purchased meals to off-premises consumption.

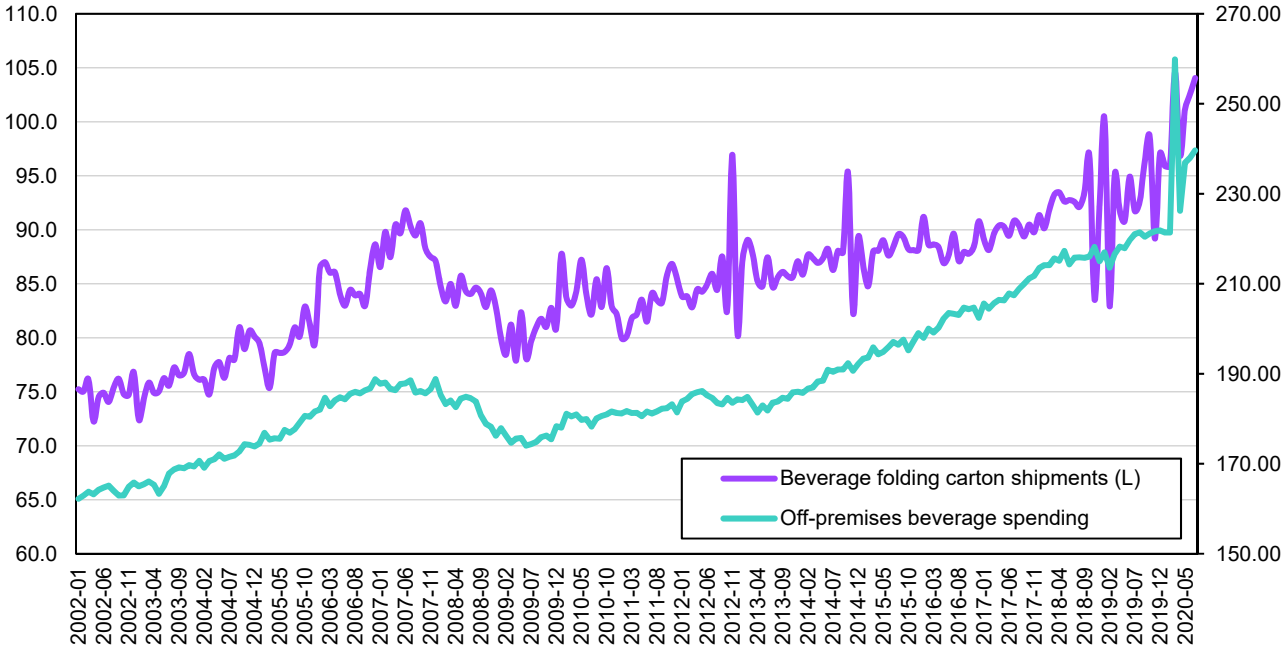
The second quarter witnessed slower shipment growth of 1.4%, which reflects April's 7.3% decline, before May and June's 4.4% and 1.4% rebound. We forecast that the third and fourth quarters will have mild growth fluctuations of -0.8% and 0.4%, respectively. This is in line with the anticipated gradual shift toward beverage consumption away from home and the associated growth correction of 3% and 4.1% in the food service industry for the third and fourth quarters, respectively.

On an annual basis, beverage folding carton shipments are called to finish the year with 6.5% growth year-on-year, fueled by the stocking cycles and increased spending on at-home beverages. Shipments will partially correct in 2021, before balancing in the following three years. Our five-year forecast, including the volatility caused by the pandemic, indicates that beverage folding carton shipments will record growth of 1.0% annually, allowing shipments to reach 1.19 million tons by 2024.

Figure 7

Beverage folding carton shipments and consumer spending

Shipment in thousand tons and spending in billions of 2012 US dollars

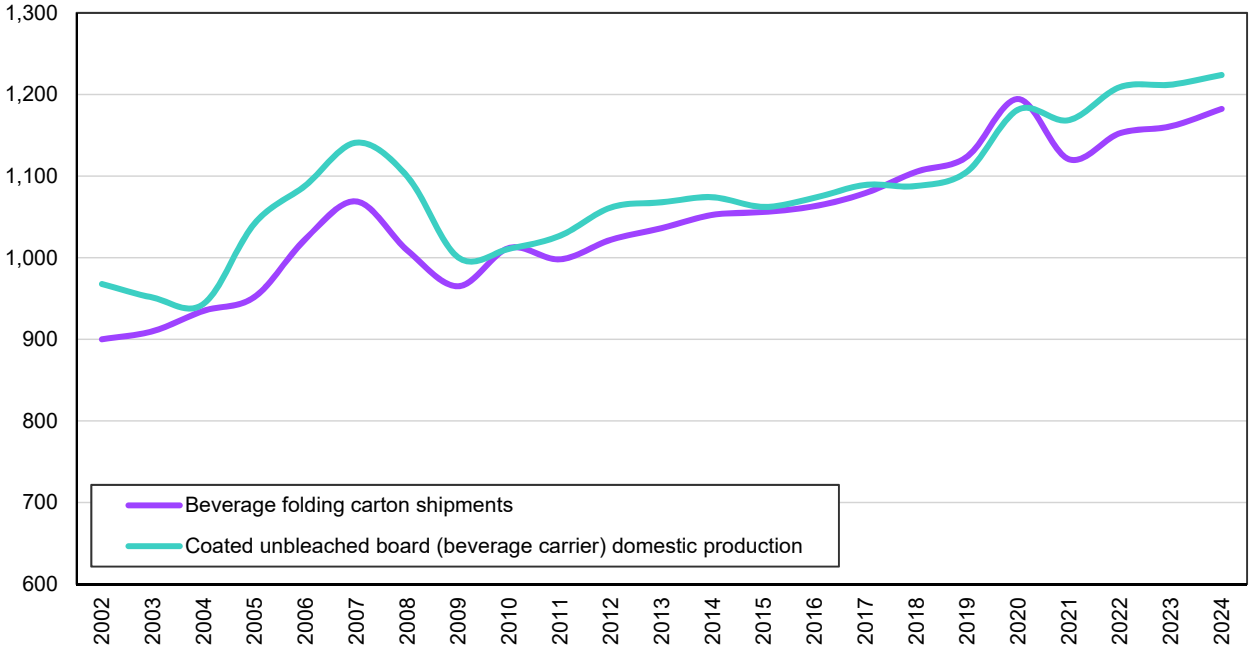


Source: Fastmarkets RISI, Inc. using US BEA data.

Figure 8

Beverage folding carton shipments and domestic production of beverage carrier coated unbleached board

Thousand tons



Source: Fastmarkets RISI, Inc.

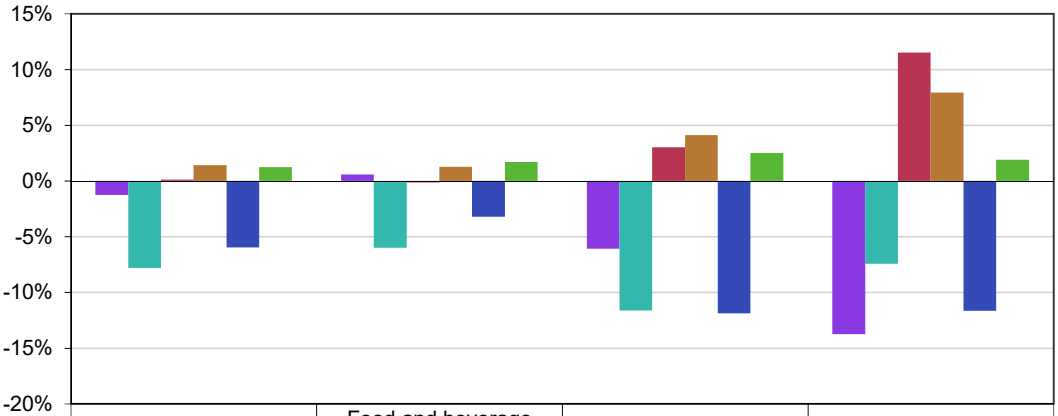
Chapter 5
Retail carry-out

Retail carry-out had been a promising market for folding carton producers thanks to the long-term trend of away-from-home food spending gaining share from grocery stores for at-home food consumption. However, despite good long-term secular trends in consumer spending data prior to the pandemic, folding carton shipments to food service establishments has eroded since peaking at 321,000 tons in 2006. Although there has been some loss in demand, exceptionally strong consumer spending at restaurants and fast food establishments drove growth in folding carton shipments, putting demand at 295,000 tons in 2019, or 6.2% of the total folding carton market. Despite the 2019 improvements in the shipment outlook with more Americans eating away from home, shifting demand preferences in terms of food purchased at such establishments still creating tremendous challenges for carton producers serving the segment. However, the topic of packaging materials in food services has recently been brought into the spotlight, focusing on its image and its potential impact on the environment. There has been growing environmental pressure to move away from plastic packaging in retail carry-out to paper-based products. The video of the sea turtle with a 4-inch straw in his nostril that went viral highlighted plastic's non-biodegradable nature and its long-term impact on the environment. As the war on plastics heats up, there is strong potential that folding cartons will gain a greater share in the retail carry-out market over the forecast. For instance, McDonald's has made commitments that will shape its packaging and environmental strategy. By 2025, McDonald's aims to source 100% of its primary fiber-based guest packaging from

Figure 1

Retail carry-out end-use market indicators

Quarterly, annual and five-year average annual growth rates



	GDP	Food and beverage spending	Retail food spending	Carton shipments
2020 Q1 (e)	-1.3%	0.6%	-6.1%	-13.8%
2020 Q2 (e)	-7.8%	-6.0%	-11.6%	-7.4%
2020 Q3 (f)	0.1%	-0.1%	3.0%	11.5%
2020 Q4 (f)	1.4%	1.3%	4.1%	7.9%
2020f	-6.0%	-3.2%	-11.9%	-11.7%
2020-2024 (f)	1.2%	1.7%	2.5%	1.9%

Source: Fastmarkets RISI using US BEA data.

recycled or certified sources. The interim target was to source 100% of primary fiber-based guest packaging from recycled or certified sources where no deforestation occurs by 2020. As of 2018, the company announced that it was 60% of the way toward its 2025 goal and had achieved 80% of its interim target globally.

In another example, Dunkin' Donuts started eliminating its polystyrene foam cups in its global supply chain starting in the spring of 2018, and in May 2020 Dunkin' Donuts said farewell to foam, announcing that 100% of its restaurants globally have transitioned from polystyrene foam cups to double-walled paper cups.

COVID-19 has significantly changed the demand environment for retail carry-out during the past few months. Restaurants' balance sheets had to absorb a devastating demand shock that put an end to the accelerating growth in away-from-home spending. Consumer spending in March 2020 witnessed a dramatic 20% decrease, while shipments dropped by 17.7%. The considerable contraction in March demand left first quarter consumer spending down 6.1% and folding carton shipments in retail carry out down 13.8%. The second quarter saw further declines in spending and carton shipments, which dropped by 11.6% and 7.4%, respectively. We anticipate some recovery in the coming years, albeit slow, to bring growth back into its historical range. Prospects for retail carry-out spending and folding carton shipments will grow from 2021-2024, averaging 6.4% and 5.4% per annum, respectively.

The growth is mainly due to environmental pressures to move away from non-recyclable materials in the retail carry-out industry nationwide. However, this growth outlook is constrained by the continued softness in the economy, which should limit dining out options in customers' budgets. The positive growth outlook will be sufficient to push shipments to 324,000 tons in 2024, surpassing its 2006 peak.

Spending trends

Long-term context

The Bureau of Economic Analysis (BEA) considers expenditures at limited service restaurants, fast food chains and all other dining establishments as food services, which is separate from consumer spending on food and beverages for at-home (or "off-premises") consumption. Consumer spending on food services experienced steady growth during the early part of the new millennium, rising 2-3% annually on average and reaching $683 billion (2012$) in 2007. In comparison, growth in spending on food for off-premises consumption grew roughly 0.5 percentage point slower over the same period, accounting for $845 billion (2012$) in spending in 2007. Consumers' preference for convenience was benefiting food service establishments, especially fast food and take-out restaurants, helping close the gap between service-related food spending and off-premises spending over that period.

However, food service spending faced challenges during the recession, declining 0.8% in 2008 and 3.4% in 2009 as American households slashed spending to prop up their balance sheets. In 2010, food service spending recovered by 2.3%, with the majority of growth concentrated at fast food establishments. Between 2011 and 2019, food service spending held steady, growing at an average annual pace of 2.8% annually, which outpaced off-premises food consumption by about 0.7 percentage point over the same period. Buoyant signs of a convergence between at-home and restaurant/fast food spending appeared between 2011 and 2015. Spending at food services saw average annual growth of 2.9%, while at-home processed food spending grew 1.1% over the same period. This trend slowed between 2016 and 2019, indicating the industry was nearing maturity for that time period. In the past five years, carry-out spending has increased 3.0% annually on average, which reflected a growing trend by consumers to trade hard-earned income for saved time and convenience as budgets became less constrained and more people were heading back to work.

The improved spending prior to COVID-19 was associated with rapid growth in "fast, casual dining" establishments, which attracted consumers looking for a quick meal. Such establishments are generally perceived to produce a higher-quality product with more natural ingredients compared to legacy fast food chains, and this appears to resonate with consumers, especially among the younger

demographics. As a result, average spending per meal rose as these establishments gained market share. Large fast food chains were being forced to adapt to the new competitive environment by introducing menus that catered to the growing desire for options that were both convenient and healthy, a trend which was unlikely to yield in the medium term.

Additionally, fast food and take-out spending typically gains steam when unemployment falls. This was the case with 2019 unemployment falling to its lowest level since the years leading up to the Great Recession (an average of 3.7% for 2019), a stark contrast to unemployment levels that approached 10% in the depths of the recession.

COVID-19 trends

Consumer expenditures in food service have historically been directly tied to the economic conditions and the performance in the labor market. According to the BEA, overall food service spending in March 2020 dropped to about $616.1 billion (2012$, seasonally adjusted), representing a 27.1% decline month-to-month. Specifically, meals at limited service eating places, which captures the movement in retail carry-out establishments, declined by nearly 20% to about $245.5 billion (2012$). Spending dropped considerably in April to about $205.6 billion (2012$, seasonally adjusted), representing another 16.2% monthly decline. Despite average growth in January and February, the significant decline in spending in March drove first quarter losses to 6.1%.

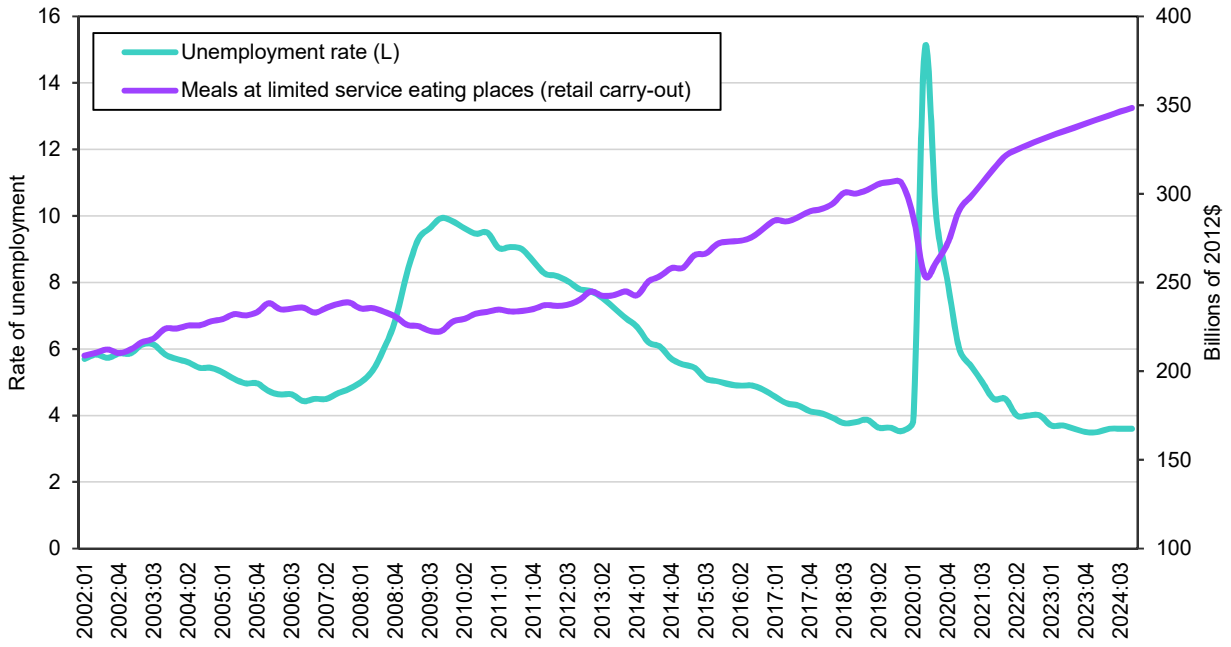
Retail carry-out spending bounced back from its dreadful performance in April, growing 24.3% in May and 17.6% in June. Although this turnaround reduced the shock, the second quarter witnessed another decline of 11.6%, dropping to $254 billion (2012$). Growth slowed somewhat in July to 2.8%, reaching nearly $309 billion (2012$).

The pandemic resulted in widespread lockdowns, a situation that has tremendously disrupted the restaurant business and kept customers out of food service establishments. As towns go through phases of reopening,

Figure 2

Retail carry out consumer spending and unemployment rate

Percent, billions of 2012 US dollars

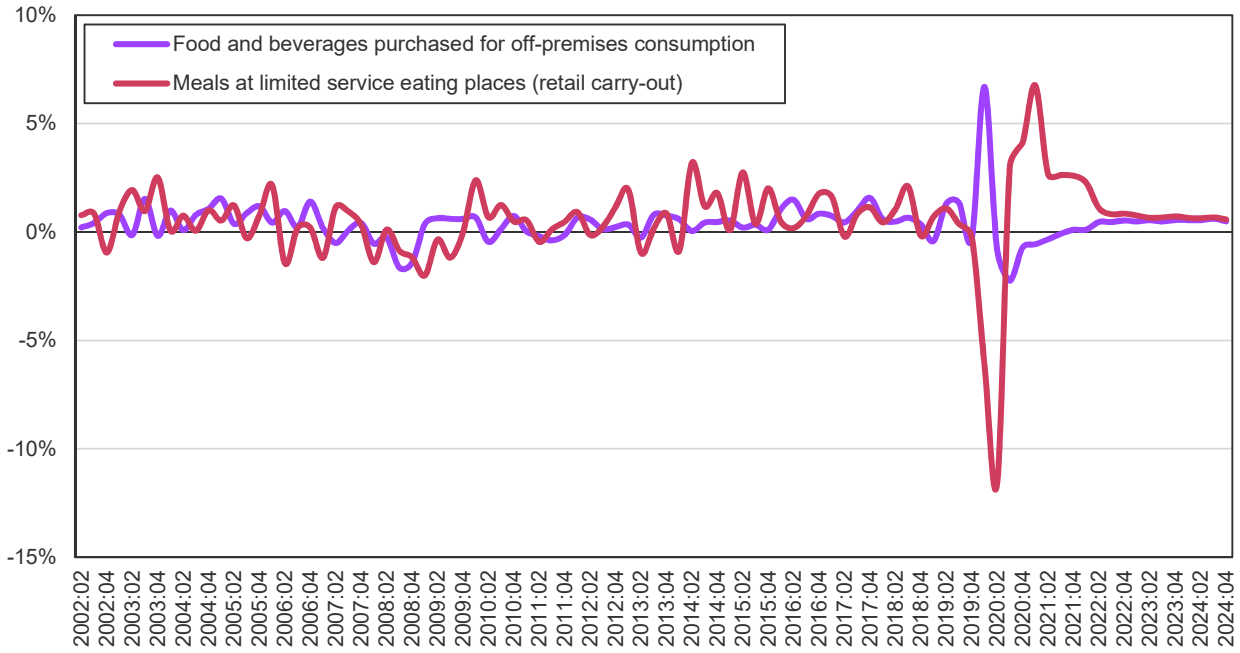


Source: Fastmarkets RISI and US BEA Real Personal Income Expenditures.

Figure 3

Growth in consumer spending at retail/carry-out vs. off-premises

Percentage change in spending



Source: Fastmarkets RISI, Inc. using US BEA Real Personal Income Expenditures.

restaurants are applying the recommendations from the Centers for Disease Control and Prevention (CDC) to ensure the safety of staff and customers. This step is expected to earn restaurants consumer confidence, although that will take some time to be reflected in the bottom line. Food services face additional headwinds from the weak economic situation and high unemployment; both have proven to play a pivotal role in restaurant performance. This new reality has meant frozen foods and cooking at home are now preferred to eating out, a trend that is expected to continue in the next couple of years.

Fastmarkets RISI forecasts that retail carry-out spending will recover in the third and fourth quarters by 3% and 4.1%, respectively. This recovery is slow compared to losses seen in the first half of the year, so retail carry-outs spending is called to shrink by 11.9% for the year. The gradual recovery is expected to continue through the next four years at an average annual rate of 6.4%, reaching $344.9 billion (2012$, seasonally adjusted) by 2024. The long-term outlook, including the COVID-19 demand shock and correction, indicates average annual growth of 2.5% over the next five years.

Folding carton trends

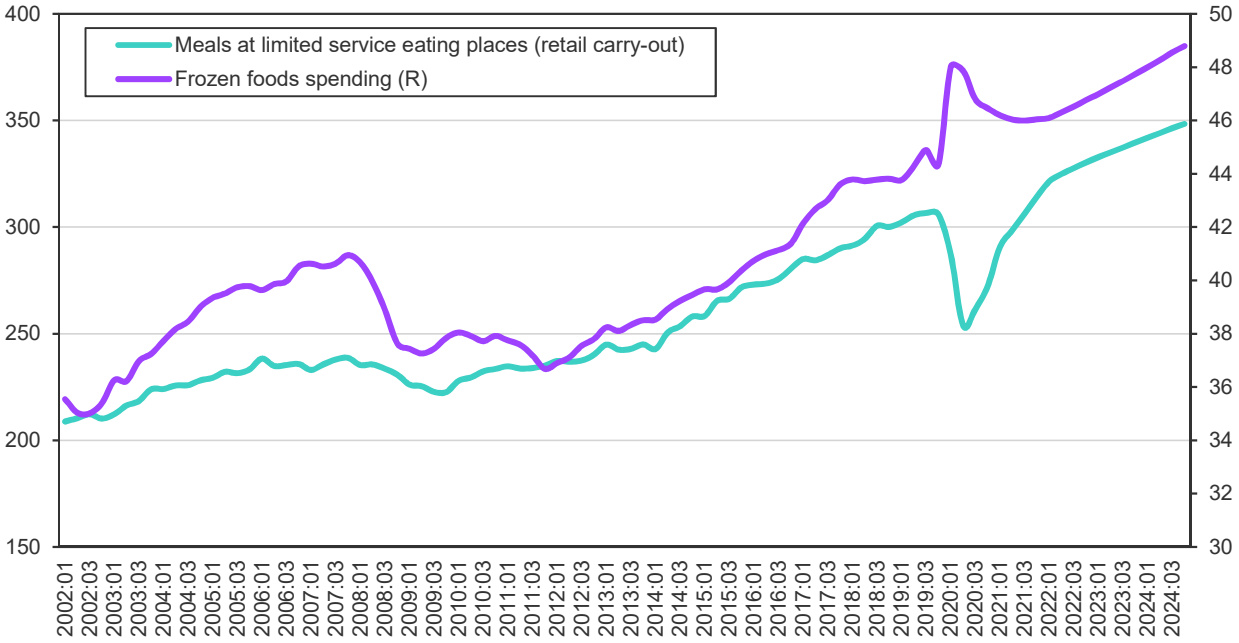
Long-term context

Shipments of folding cartons to the fast food and related industries faced some challenges over the last decade despite the positive outlook for restaurant and away-from-home spending. The downturn in spending on fast food from early 2007 into 2009 undermined demand, and folding carton shipments plummeted 9.0% from the 2006 peak. Post-recession carton demand struggled to gain traction despite a healthy rebound in consumer spending, widening the gap between the growth in consumer spending and carton shipments considerably compared to history. After increasing 1.7% in 2010, shipments contracted by another 9% from 2011-2013. Despite these difficulties, shipments changed course in the following years; cartons for fast food and related industries returned to growth in 2014 and accelerated further in 2015, growing 0.7% and 1.5%, respectively. Following two years

Figure 4

Consumer spending at retail/carry-out vs. frozen foods

Billion of 2012 US dollars



Source: Fastmarkets RISI Inc. and US BEA Real Personal Income Expenditures.

of moderate growth, 2016 saw a slight drawback of 0.8%, with total tonnage for that year slipping to 274,000 tons. Shipments accelerated again in 2017, recording a growth rate of 1.9% and reaching 279,000 tons. Shipment tonnage quickly approached its 2010 peak thanks to strong 2.9% growth in 2018, registering 287,000 tons. In 2019, shipments nearly hit the peak again with 295,000 tons. More robust away-from-home spending paved the way for recent gains on the carton side, although shipments are still well below the pre-recession peak of 321,000 tons.

COVID-19 trends

This is an unprecedented situation in the food service industry, where shifts not only happened across industries (i.e., from retail carry-out to frozen food), but also within the food service establishment between eat-in and takeout. Although retail carry-out folding carton shipments were heavily impacted by the pandemic, the ongoing demand for takeout leveled off the free-fall in shipments.

Folding carton shipments dropped sharply in March and April by 17.7% and 16.2%, respectively. First quarter seasonally adjusted shipments fell to 64,400 tons, 13.8% lower than the previous quarter. The second quarter registered another decline of 7.4%, much less than the demand contraction seen in consumer spending of 11.6%. This divergence could be explained by the different performances of eat-in establishments compared to takeout: more restaurants have increased their presence in food delivery and takeout during the lockdown. This shift has provided folding cartons with a relatively smoother recovery during these highly uncertain times.

We project that the third and fourth quarters will rebound by 11.5% and 7.9%, respectively. The forecasted growth in folding carton shipments over the second half of the year is based on the anticipated increase in consumer spending of 3% and 4.1% in the third and fourth quarters, respectively. In addition, takeout's increased presence in restaurant

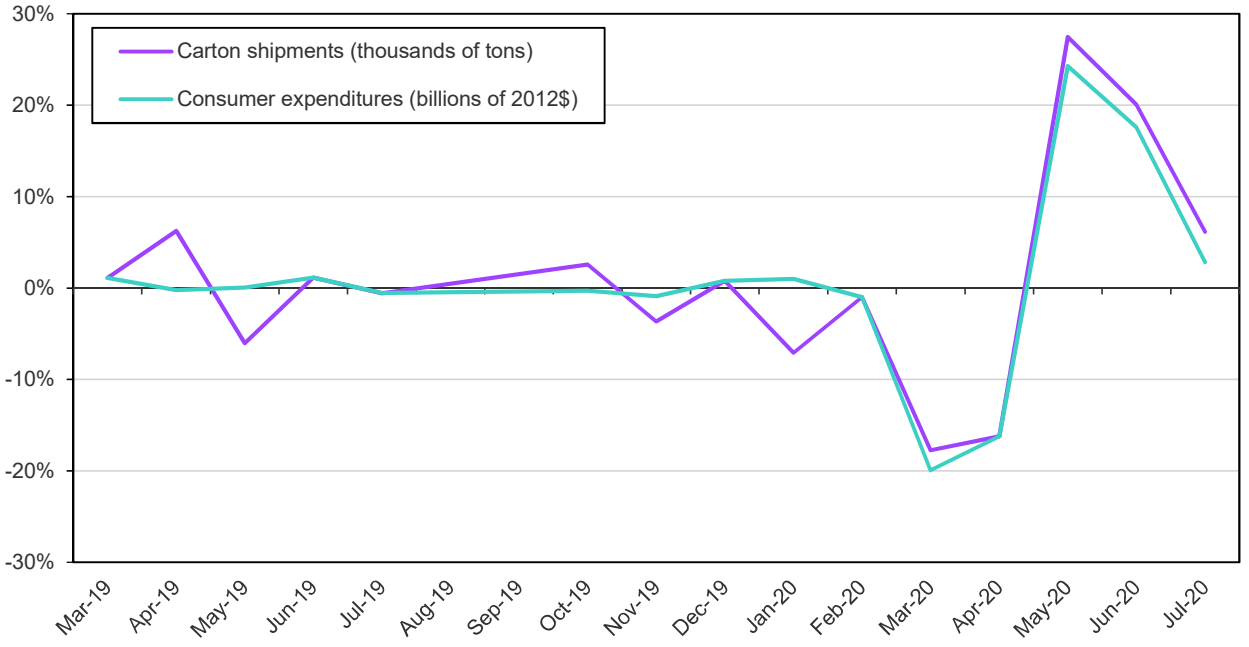
operations will provide folding carton demand with some protection against sharp volatility.

On an annual basis, retail carry-out folding carton shipments are called to finish the year with an 11.7% decline year-on-year. This contraction is a result of an 11.9% reduction in consumer spending and the associated shifts to other alternatives, such as frozen foods or cooking at home. We anticipate that takeout's share of away-from-home demand will continue to grow, which is expected to reduce the demand shock on retail carry-out folding carton shipments.

We believe that consumer spending growth in the fast-food sector will be maintained through the forecast, translating into accelerating folding carton demand for this segment, especially with the substitution pressures and efforts to reduce waste at many restaurant chains. The other benefit for folding carton producers comes from the positive environmental credentials of their product; negative sentiment toward polystyrene foam and plastic bags has led to legislation banning the use of such products in several cities and municipalities across the country. Overall, as the war on plastic is heated up by legislative campaigns and business decisions, there will be further opportunities for folding cartons to benefit from the green movement, at least in this sector, as the large food service chains are quite mindful of their reputations. Fastmarkets RISI projects that carton shipments to the retail food sector will increase at a 1.9% average annual rate during the next five years, accounting for both the demand loss due to COVID-19 and the subsequent recovery anticipated afterward, reaching 324,000 tons by 2024.

Figure 5

Retail carry out growth in shipments and consumer spending



Source: Fastmarkets RISI, Inc. using US BEA data.

Figure 6

Retail carry out folding carton shipments and consumer spending

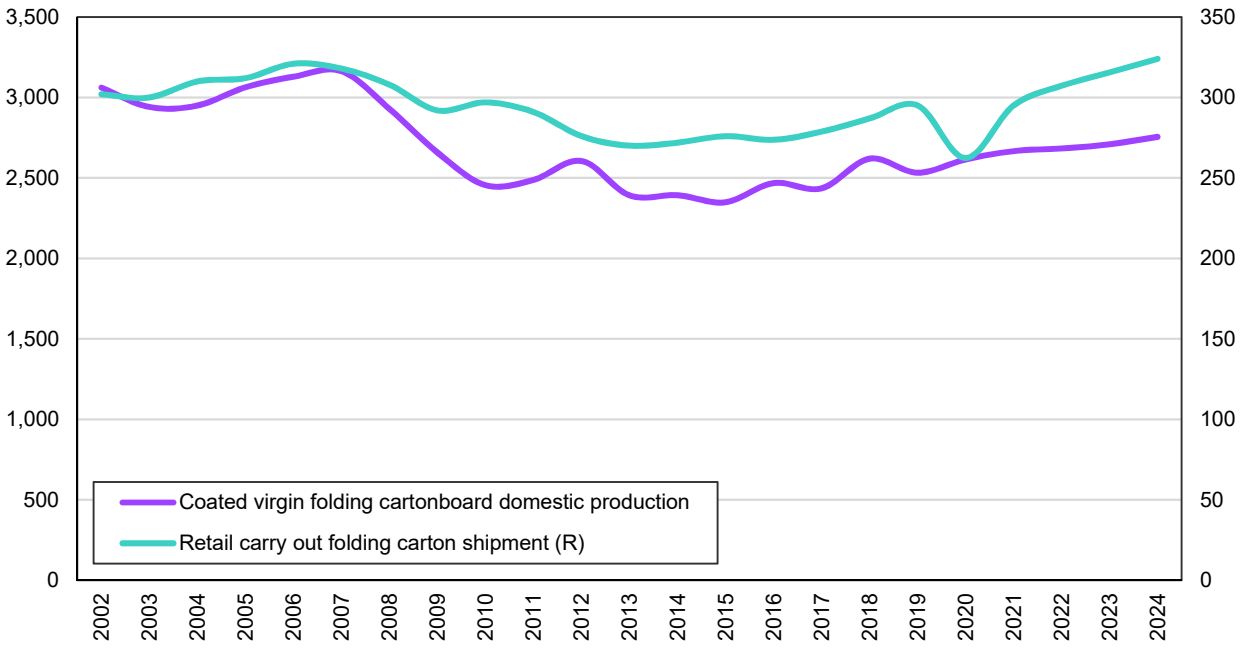
Shipments in thousand tons, spending in billions of 2012 US dollars

Source: Fastmarkets RISI Inc. and US BEA Real Personal Income Expenditures.

Figure 7

Retail carry out folding carton shipments and domestic production of coated virgin board

Thousand tons



Source: Fastmarkets RISI.

Chapter 6
Frozen foods

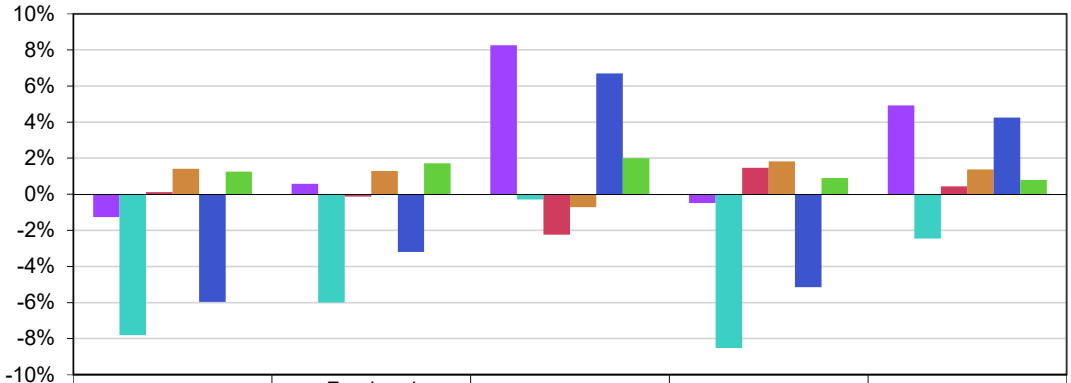
The frozen food market was challenging for folding carton producers for a number of years, largely because of consumer spending shifting toward healthier, on-the-go food options. Prior to the Great Recession, frozen foods were one of the fastest growth segments for the folding carton industry; quick and convenient appeared to outweigh fresh and homemade at that time. However, there was some change in preferences among consumers, who exhibited a growing distaste for frozen foods due to health perceptions and chose to consume fresher, locally sourced food. There was also a possibility that the effects of the Great Recession may have forced households to reduce their budgets so dramatically that not only was away-from-home dining cut, but also convenient frozen dinner options were no longer options, as people instead bought the bare necessities to be prepped and cooked at home. As a result, carton shipments to the frozen food segment recorded slow growth over the last ten years of an average annual rate of 0.9%. During the past five years, demand for frozen food has been noticeably growing again, allowing carton shipments to rise at a 1.6% average annual rate. One explanation is the improving labor market and employment environment, which is imposing time constraints on the working population, pushing them toward greater consumption of frozen food. Additionally, millennials have significantly contributed to the recent rebound in the frozen food market, which offers convenient and less expensive options for young and single consumers. Younger consumers typically wait longer to form families and do not have the time to make fresh meals on a daily basis, making frozen food an appealing option.

COVID-19 has significantly changed the demand environment for frozen foods during

Figure 1

Frozen foods end-use market indicators

Quarterly, annual and five-year average annual growth rates



	GDP	Food and beverage spending	Frozen food spending	Frozen food production	Carton shipments
2020 Q1 (e)	-1.3%	0.6%	8.3%	-0.5%	4.9%
2020 Q2 (e)	-7.8%	-6.0%	-0.3%	-8.5%	-2.5%
2020 Q3 (f)	0.1%	-0.1%	-2.2%	1.5%	0.4%
2020 Q4 (f)	1.4%	1.3%	-0.7%	1.8%	1.4%
2020f	-6.0%	-3.2%	6.7%	-5.2%	4.2%
2020-2024 (f)	1.2%	1.7%	2.0%	0.9%	0.8%

Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

the past few months. Consumer spending in March 2020 witnessed a dramatic 25.2% increase, mostly fueled by restocking at the beginning of the lockdown. This strong demand pull in the last month of the first quarter pushed growth rates for the whole quarter up to 8.3% in consumer spending and 4.9% in folding carton shipments. Subsequent quarters are expected to see correction forces to bring growth back into its historical range. Prospects for frozen food carton shipments will grow in the forecast, averaging 0.8% per annum over the next five years as total food spending maintains its moderate growth stance thanks to changing consumption dynamics.

Spending trends

Long-term context

Spending on frozen foods is a challenging category to track because there is currently no explicit breakout available in the Bureau of Economic Analysis (BEA) data. Following the 2012 revision to the BEA national income account data, several categories that had been tracked in earlier versions of the report were eliminated. Consumer spending in this category is now estimated using a combination of series, including processed fruits and vegetables, as well as fish and seafood.

Frozen food spending has grown on average by 0.9% annually since 2009. Before the recession, frozen food spending grew at a solid pace as consumers' busy lives favored ready-made meals over home cooking. Quick-serve frozen meals, including pizza, breakfast foods and desserts, grew in popularity, and consumer product companies were quick to develop new products to meet demand. However, demand for frozen foods was not immune to the recession and spending declined 3.4% in 2008 and 4.6% in 2009. Post-recession growth in frozen food consumption remained tepid, averaging around 0.8% annually, before it accelerated again in the last five years since 2015. Consumer spending on frozen foods based on Fastmarkets RISI's proxy categories was $44.3 billion (2012$) in 2019, $3.6 billion (2012$) above pre-recession peak spending levels in 2007.

The trend toward natural, unprocessed foods continues to drive many of the trends in grocery store aisles and has come mostly at the detriment of frozen food producers. Major retailers have responded to consumer demand by increasing their offerings in the fresh and organic segments and are leveraging their scale to put downward pressure on pricing. Smaller, trendier retailers who have been specifically targeting these markets for years are reporting increased competition from these mega-retailers and, as a result, are being forced to lower their price points on many products to defend market share. Fresh, organic foods are thus becoming more available and affordable as an alternative to premade meals.

To counter some of the negative impressions that consumers may have, major players in the frozen food industry, such as Nestle and ConAgra Foods, have increased their efforts to raise awareness on the benefits of frozen foods, including promoting research that freezing fruits and vegetables better preserves nutrients than unprocessed food often classified as "fresh." Improvements in freezing technology and efforts to improve frozen meal quality could also help stem the tide of consumers forsaking frozen foods. One growth area in the frozen food segment is consumption of frozen fruit for homemade smoothies and juices. There appears to be a growing number of Americans investing in blenders and food processers to make their own smoothies, juices and energy drinks for nutritious, on-the-go sustenance, which has fed into strong demand for frozen fruits.

The overall economic improvement and persistently low unemployment environment helped frozen food spending increase during the past five years at 2.6% annually on average. During that period, average work hours rose in the labor force, which translated to less time to prepare meals. Additionally, millennials were a major driver of the recent and strong growth in frozen food consumption, which presented an appealing option for convenient and affordable meals. However, wage increases and higher incomes were associated with dining out more frequently and rising preferences for healthier foods, which presented a headwind for frozen food growth. Initial estimates for spending in 2019 reflect the headwinds presented by dining out, as growth in frozen foods spending slowed to 1.2% year-over-year.

COVID-19 trends

The pandemic's impact on frozen foods spending has been different from previous recessions. Historically, consumer expenditures on frozen foods has been directly tied to the performance in the labor market. According to the BEA, frozen foods spending in March 2020 rose to about $55.5 billion (2012$, seasonally adjusted), representing a 25.2% increase month-to-month. Spending then declined 14.7% on a month-over month basis in April to about $47.3 billion (2012$, seasonally adjusted. Frozen foods spending recovered slightly in May by 2.3%, before stabilizing in June and July at -1% and 0.9%, respectively.

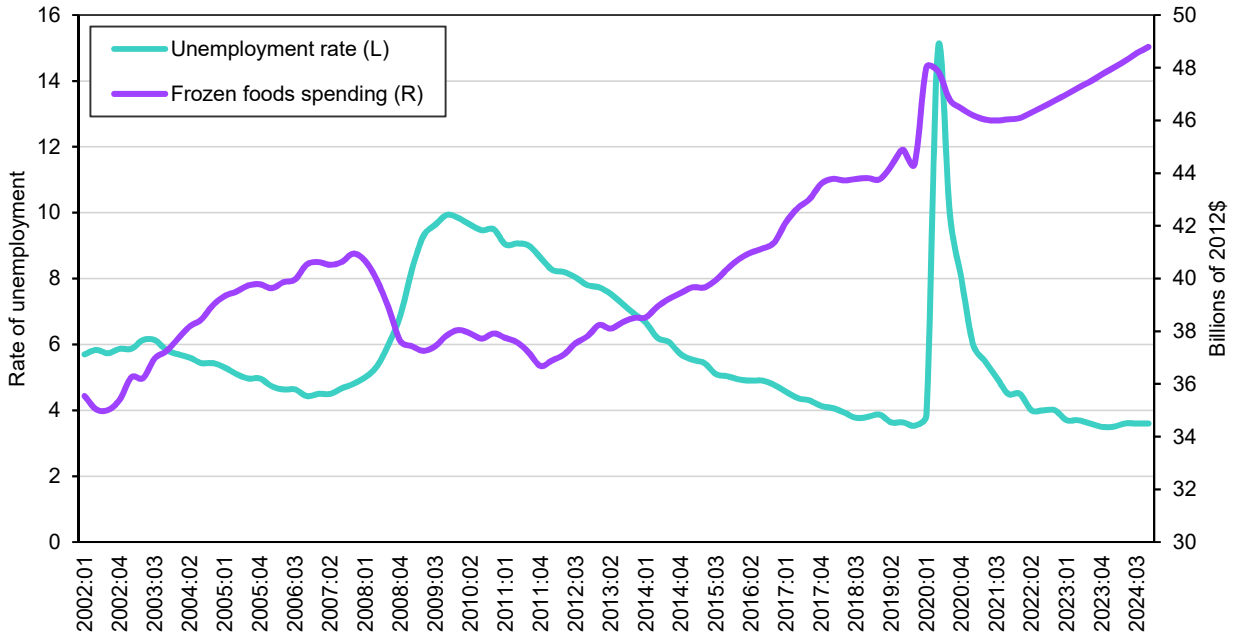
The sharp volatility in the monthly consumer spending trend is attributed to the mixed signals from key factors impacting this market: challenges in the labor market and uncertainty surrounding the pandemic. First, while a weak labor market likely dampened consumer spending on frozen foods, limited incomes caused some shift away from spending at food service to the frozen foods option. Second, the uncertainty of the pandemic has provided tailwinds for a certain level of restocking, less than in March but higher than pre-COVID levels, which is periodically benefitting frozen foods.

Despite average growth in January and February, the strong spending in March drove first quarter gains to an 8.3% growth rate. The second quarter showed flat growth at the previously achieved $48 billion (2012$, seasonally adjusted), which is nearly 8% higher than pre-COVID levels. Fastmarkets RISI forecasts that frozen foods spending will decline in the third and fourth quarters by 2.2% and 0.7%, respectively. This is due to the expected gradual recovery in food service spending and a decline in at-home spending following periods of stocking. On an annual level, 2020 frozen foods spending is called to grow by 6.7%, before slowing in the next four years at an average annual growth rate of 0.9%, reaching $48.9 billion (2012$, seasonally adjusted) by 2024. The long-term outlook, including the COVID-19 demand shock and correction, indicates average annual growth of 2% over the next five years.

Figure 2

Frozen foods consumer spending and unemployment rate

Percent, billion of 2012 US dollars

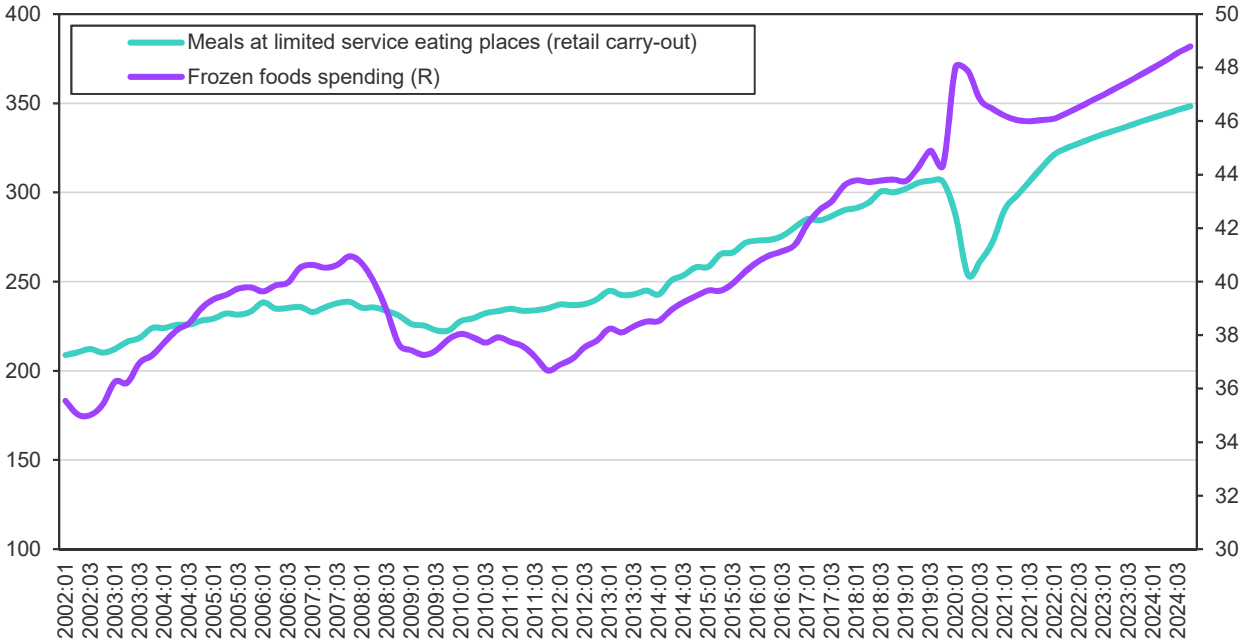


Source: Fastmarkets RISI, Inc. and US BEA Real Personal Income Expenditures.

Figure 3

Consumer spending at frozen foods vs. retail/carry-out

Billions of 2012 US dollars



Source: Fastmarkets RISI Inc. and US BEA Real Personal Income Expenditures.

Trade trends

Long-term context

Between 2005 and 2009, exports and imports of frozen foods were nearly balanced. Both were growing rapidly prior to the recession, as rising US spending spilled over into import demand, and overseas markets demanded US frozen foods as their economies boomed. However, this parallel performance quickly changed with the onset of the recession years; US exports proved more resilient during the downturn compared to imports as the US consumer slashed spending. In 2010, frozen food imports increased 9.3%, almost keeping pace with the 9.7% increase in exports. The relatively weak dollar supported strong growth in exports during 2011 and the trade surplus was restored to levels experienced in the early years of the new century. Between 2012 and 2014, export growth continued to expand by more than double the rate of imports, pushing the trade surplus to $3.1 billion in real terms (2012$) by 2014. However, the sharp strengthening of the dollar in 2015 nearly halted export growth, allowing import growth to outpace export growth in the following three years. The last two years saw significant changes in the growth directions of imports and exports that reversed the trade surplus into a deficit. In 2017, exports declined by 0.6% while imports gained 8.2%. Imports growth was even stronger in 2018 at a record high 34.1%, compared to exports growing at 5.4% for the year. As a result, the trade surplus of $1.8 billion (2012$) in 2017 turned into a trade deficit of $1.3 billion (2012$) in 2018 and 2019. Over the forecast horizon, we anticipate the trade deficit will tighten due to the expected weakening of the US dollar. Import demand is projected to increase at a 0.6% average annual rate. Exports, meanwhile, will grow 2.3% annually on average, given the favorable exchange rate and the anticipated recovery in foreign demand thanks to the expected post-COVID-19 rebound over the forecast. As a result, the total trade deficit for frozen foods will noticeably deflate over the period, slipping to $100 million (2012$) by 2024.

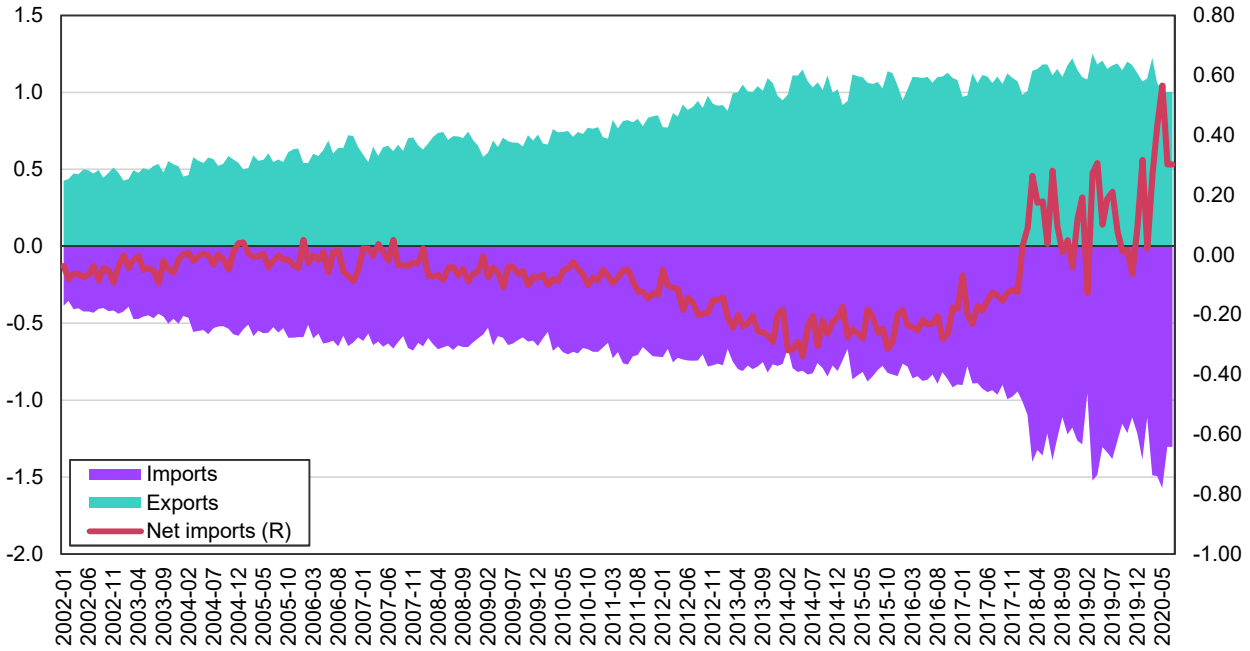
COVID-19 trends

The trade outlook changed during the past few months of the pandemic. We estimate that 2020 exports will decline by 3%, while

Figure 4

Frozen foods market trade outlook

Trade in billions of 2012 US dollars



Source: US Census and Fastmarkets RISI, Inc.

imports will see an increase of 4.1%. The growth in imports is mainly the result of surging consumer spending, despite the overall monthly volatility. Meanwhile, the export markets have weakened due to the pandemic and the associated economic uncertainty abroad. This is expected to contribute to the anticipated decline in industrial production by the end of the year. Despite the projected inflation in the trade deficit in 2020, the deficit will contract through 2024, hitting $100 million (2012$) by the end of the forecast.

Production trends

Long-term context

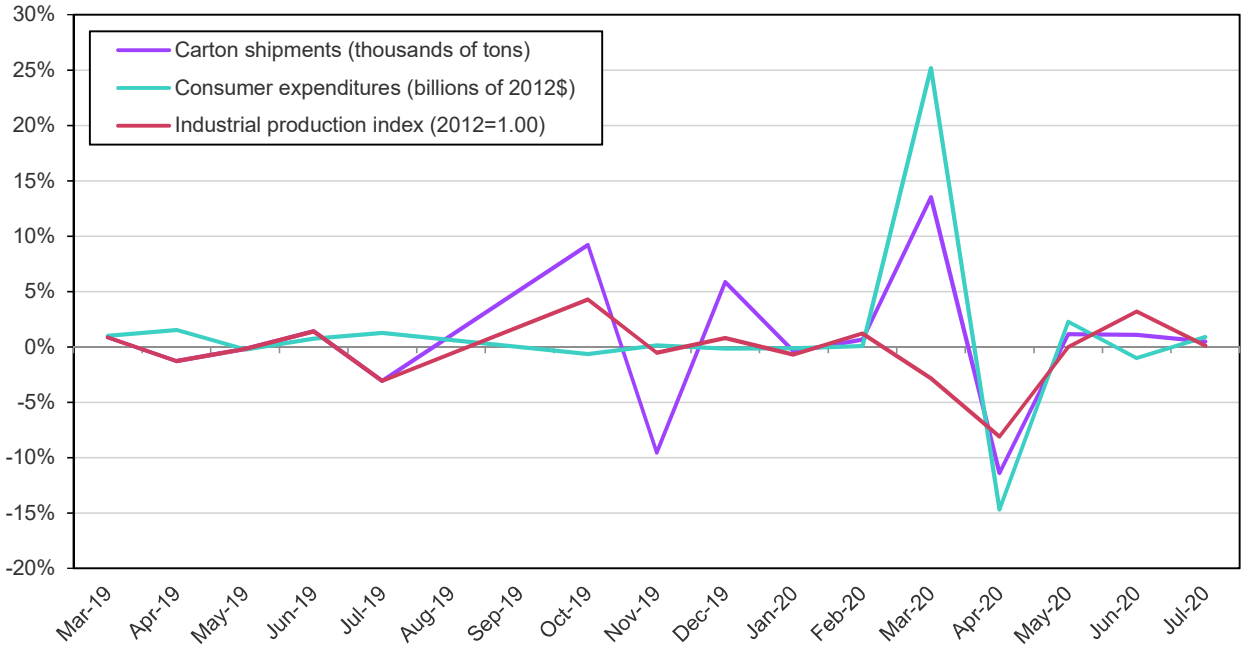
For producers of processed fruits, vegetables and other foods, the last decade was characterized by fairly flat output, largely in line with overall processed food production. Output in frozen goods experienced three consecutive years of decline starting in 2008, dropping 4.9% in total. Production then shifted to growth in 2011 and continued to gain momentum through 2014, providing some hope that consumers were finally coming back to the frozen food aisles. Despite no change in spending, production growth slowed dramatically in 2015 to 0.2%, in line with the tepid growth in exports of 0.7% for the year due to the sharp strengthening of the US dollar. The last three years saw production recover, growing by 2.2% in 2016 before accelerating to 7.7% in 2017 and eventually stabilizing at 2.1% and -1.1% in 2018 and 2019, respectively. The five-year outlook for frozen food production is expected to maintain 0.9% average annual growth as improvements in overall food spending help carry frozen food spending upward.

COVID-19 trends

We expect production to shrink by 5.2% in 2020. Part of this negative trend is attributed to the tilted trade balance that reflects the weak export markets and stronger import environment. Exports are predicted to decline by 3% by the end of the year. Thanks to the tailwinds provided by the weakening dollar over the forecast, exports will surge by an average annual growth rate of 3.6% from 2021-2024. As a result, production is called to record a recovery over the same period

Figure 5

Frozen foods growth in shipments, consumer spending and industrial production



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

through 2024 of 2.5% on average annually. The five-year outlook projects average annual growth of 0.9% from 2020-2024, which includes the volatility caused by COVID-19 in 2020 and the expected recovery.

Folding carton trends

Long-term context

Over the last 20 years, the frozen food segment has experienced one of the biggest trend reversals of any of the categories covered in this report. Folding carton shipments to the frozen food industry experienced stellar growth from 1996-2000, increasing at a 6.1% average annual pace, and gains in shipments far outpaced those in consumer spending and industrial production. Carton trends fell more in line with spending and production during the last ten years. From 2006-2010, shipments barely increased on net due to the major declines experienced in 2008 and 2009 of 2.6% and 4.0%, respectively. Carton shipments to the frozen segment struggled to recover after the recession but saw stronger growth of 1.6% annually over the last five years as consumer spending on frozen foods increased due to improving labor market conditions. By 2019, folding carton shipments for frozen goods were 503,000 tons, nearly 12,000 tons above the pre-recession peak set in 2007. The folding carton market is set for a year of outstanding growth in 2020 based on the accelerated spending growth due to the pandemic, which Fastmarkets RISI believes will put the gains in carton shipments to the frozen food sector up 4.2% year-over-year. The overall growth profile for the period from 2020-2024 is 0.8% on average annually, which combines a strong 2020 and a correction contraction in 2021 before growth stabilizes from 2022 onward.

COVID-19 trends

Folding carton shipments increased sharply at the early stages of the lockdown as restocking gained momentum. March's seasonally adjusted shipments of folding cartons for frozen foods jumped 13.5%, accelerating the first quarter's growth outlook to 4.9% quarter-to-quarter and nearly 133,000 tons. The increased shipment level echoes the consumer spending behavior, which rose by 8.3% by the end of the quarter.

The second quarter witnessed a decline in shipments of 2.5%, which reflects the 11.4% decline in April, before growth stabilized in May and June at 1.1%. We forecast that the third and fourth quarters will have mild growth fluctuations of 0.4% and 1.4%, respectively. The forecasted growth in folding carton shipments over the second half of the year is based on the anticipated decline in consumer spending of 2.2% and 0.7% in the third and fourth quarter, respectively, and gains in production of 1.5% and 1.8%.

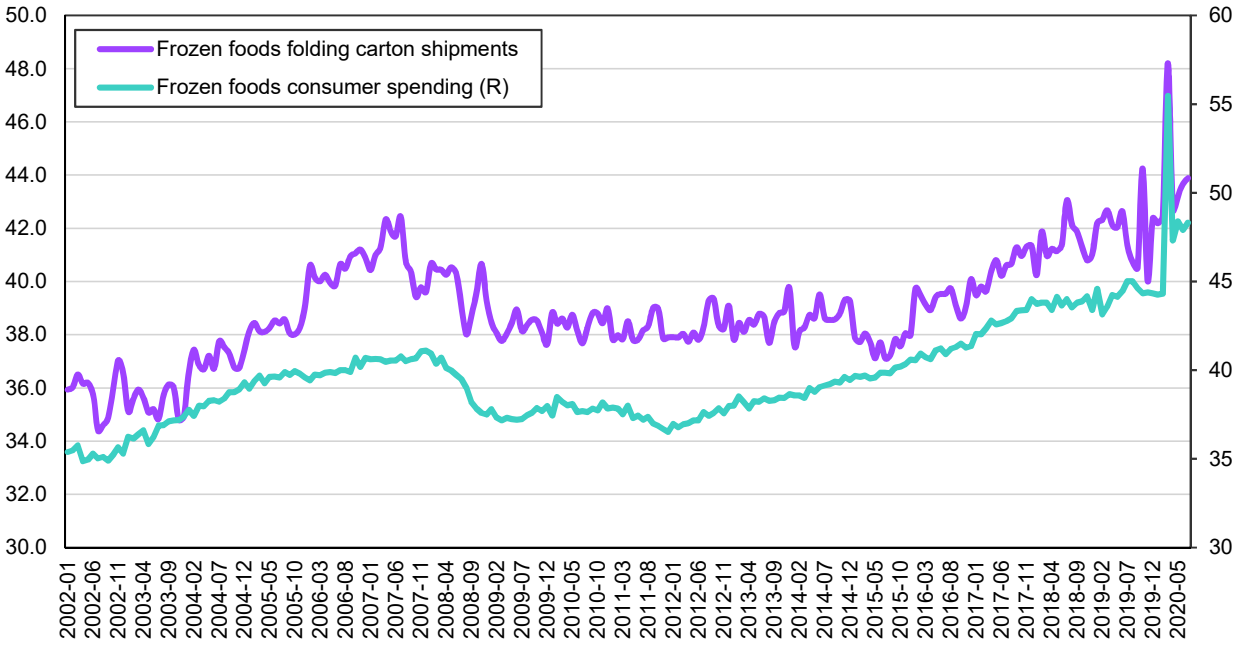
On annual basis, frozen foods folding carton shipments are called to finish the year with 4.2% growth year-on-year. This growth is the net of two opposing factors: headwinds facing the labor market and serious challenges in food services spending. Frozen foods are capturing some share of the demand that has shifted away from food service. However, weak labor markets and working from home are providing parents with more time, making cooking a viable alternative to frozen food options.

Shipments will decline by an average annual rate of 0.1% from 2021-2024, an anticipated correction following the significant growth in 2020. Our five-year forecast indicates that frozen foods folding carton shipments will post growth of 0.8% annually, which includes the 2020 demand shock and the 2021-2024 growth correction, allowing shipments to reach 523,500 tons by 2024.

Figure 6

Frozen foods folding carton shipments and consumer spending

Shipments in thousand tons and spending in billions of 2012 US dollars

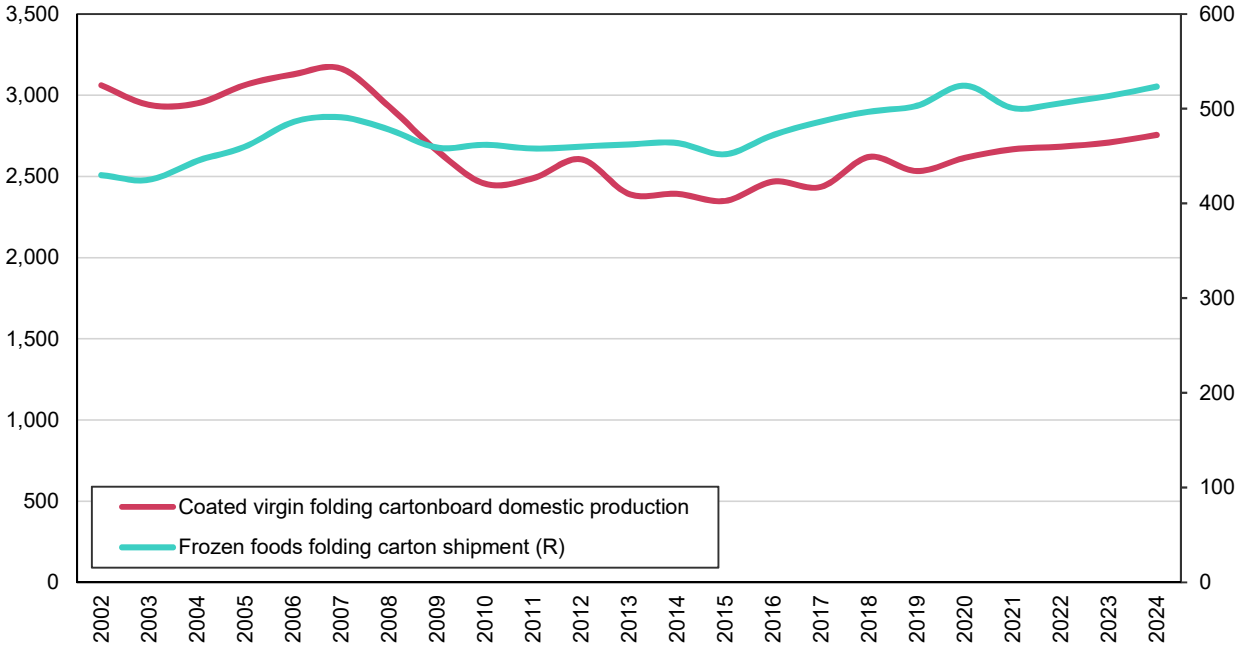


Source: Fastmarkets RISI Inc. and US BEA Real Personal Income Expenditures.

Figure 7

Frozen foods folding carton shipments and domestic production of coated virgin board

Thousand tons



Source: Fastmarkets RISI, Inc.

Chapter 7
Cereal and milled grains

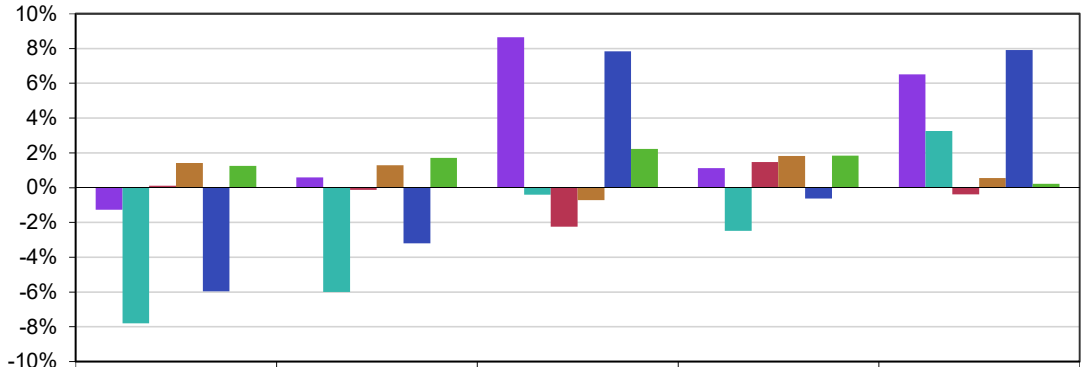
Cereals have been an especially challenged end use for folding carton producers over time due to changes in consumer eating habits. Shipments to the cereals and milled grains segments have eroded by 0.5% per year on average over the last five years. However, industrial production has shown some gains on net over the same period of 1.5% per year on average, which implies some packaging substitution or demand shifting to less carton-intensive sectors. Cereal production growth is expected to be strong between 2020 and 2021, mainly due to the expected healthy demand during that period. Carton shipments to this segment have been facing challenges as preferences for less starch-filled breakfast options continue to gain popularity and plastic alternatives to paperboard increasingly fill the packaging needs for this segment. E-commerce is a growing force in the dry foods sector, especially in cereal and milled grains products. The emerging digital retail model has gained momentum with the acquisition of Whole Foods Market by Amazon. The rise of e-commerce in the cereal market will limit the growth of folding carton shipments, allowing corrugated boxes to gain share in the long run.

COVID-19 has significantly accelerated demand for cereals during the past few months. Cereals carton shipments in the first and second quarter saw 6.5% and 3.3% growth rates, respectively, mostly fueled by the restocking during the lockdown. The coming years are expected to see slight declines in growth, which will bring it back into its historical range. Prospects for cereals carton shipments will grow in the forecast, averaging 0.2% per annum, accounting for both the COVID-19 demand shock and the correction in the subsequent years.

Figure 1

Cereals and milled grains end-use market indicators

Quarterly, annual and five-year average annual growth rates



	GDP	Food and beverage spending	Cereal spending	Cereal production	Carton shipments
2020 Q1 (e)	-1.3%	0.6%	8.6%	1.1%	6.5%
2020 Q2 (e)	-7.8%	-6.0%	-0.4%	-2.5%	3.3%
2020 Q3 (f)	0.1%	-0.1%	-2.2%	1.5%	-0.4%
2020 Q4 (f)	1.4%	1.3%	-0.7%	1.8%	0.5%
2020f	-6.0%	-3.2%	7.8%	-0.6%	7.9%
2020-2024 (f)	1.2%	1.7%	2.2%	1.8%	0.2%

Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

Spending trends

Long-term context

Cereals spending, according to the Bureau of Economic Analysis (BEA), has grown by 2.3% annually over the last ten years. In the years prior to the recession, cereals spending increased at a rapid pace, averaging in the mid-single digits. However, much of the growth in spending was on value-added (i.e., brand name, specialty items) and imported products, and therefore did not translate into similar growth in folding carton shipments. Once the effects of the recession in 2008 kicked in, spending declined by 1.5% in 2008 as consumers cut consumption and traded down to private label brands. In 2010, consumer spending on cereals had bounced back by 2.6%, but stalled once again in 2011, recording basically flat growth. Growth accelerated at a healthier pace and stabilized during 2012-2019, leaving total spending at $55.1 billion (2012$) in 2019. It appears a considerable proportion of recent growth also came from imported cereal products. Overall, the recovery in cereals and milled grains spending appears in line with total nondurables spending growth over the last five years. On the other hand, cereals spending has actually tracked closely with the overall performance by processed food, which in general faced significant challenges shortly after the recession but was able to bounce back during 2012-2019. Readers should also note that Fastmarkets RISI also believes the BEA estimates for cereals spending growth may be overstated given that the BEA's methodology is probably not accounting for share losses in total sales in the various retail establishments tracked in their monthly surveys.

Consumer spending on breakfast cereals in particular seems poised to continue losing share to other breakfast alternatives for a number of reasons. First is the proliferation of new products consumers are gravitating toward for breakfast. Greek yogurt is a prime example. As consumers have become more conscious of healthy eating, starchy breakfast options are less attractive to lighter, higher protein alternatives. There is also a movement, particularly among younger consumers, to eat away from home, which generally does not favor sitting down and eating a bowl of cereal; breakfast bars are a more popular option. The irony for cereals producers is the actual number of people eating breakfast is probably on the rise. There has been a notable uptick in breakfast offerings from fast food chains on their menus in recent years, likely in an effort capture some of this new demand from consumers on the go. This is especially true when the employment situation improves, placing greater time constraints on the working population and pushing them toward dining away from home. However, cereal has proven to be a resilient product over the years, particularly during downturns, given its abundance and cheap price point.

COVID-19 trends

Historically, consumer expenditures on cereals have been resilient to weakness in the labor market and economic downturns. According to the BEA, cereals spending in March 2020 rose to about $70.1 billion (2012$, seasonally adjusted), representing a 26.1% increase month-to-month. Spending then declined 14% in April to about $60.3 billion (2012$, seasonally adjusted). Cereals spending flattened in May at 0.3%, before falling again in June by 1.3%. Despite the volatility, the first half of 2020 was 8.4% higher than pre-COVID-19 levels. This overall positive performance continued into the first month of the second half of the year, with spending in July growing 2.1%.

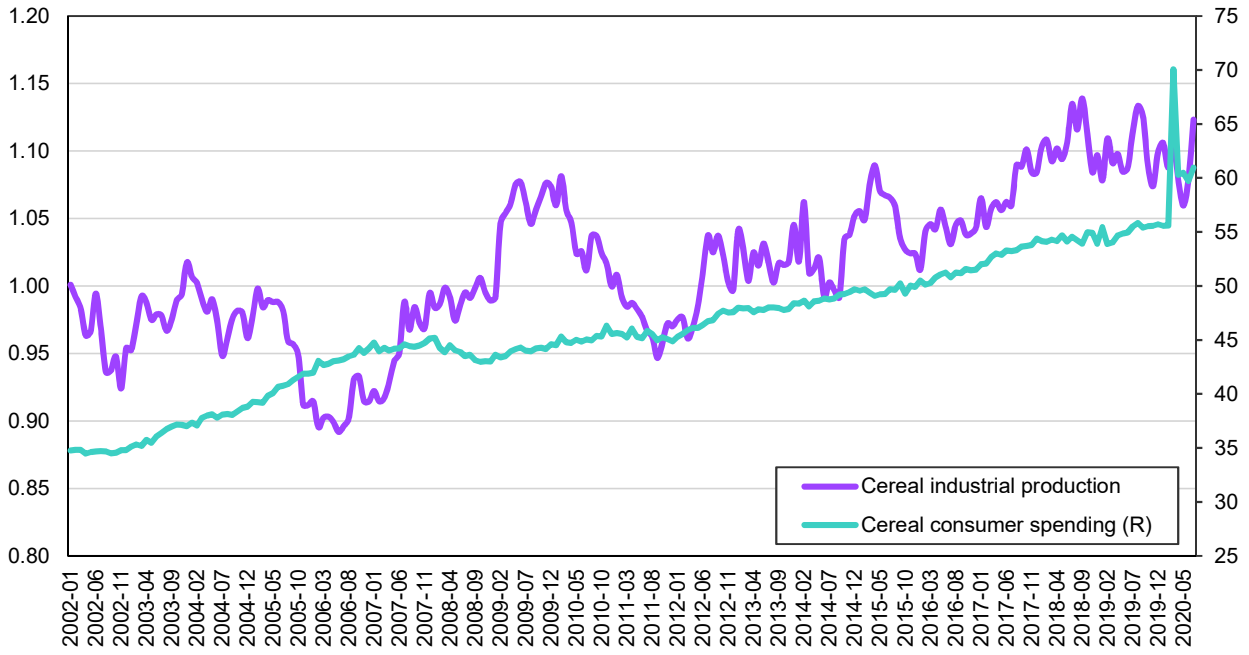
Despite average growth in January and February, March's strong spending allowed first quarter gains to register an 8.6% growth rate. The second quarter showed a slight decline of 0.4%, but held fairly steady at $60.2 billion (2012$, seasonally adjusted), which is nearly 8.2% higher than the pre-COVID-19 levels. Fastmarkets RISI forecasts that cereals spending will decline in the third and fourth quarters at 2.2% and 0.7%, respectively. The ongoing competition from other breakfast options will continue to place pressure on cereals going forward, but the relatively cheaper price of cereal will provide tailwinds to demand. On an annual level, 2020 cereals spending is called to grow by 7.8%, and continue its overall growth in the next four years at an average annual growth rate of 0.9%, reaching 61.5 billion (2012$, seasonally adjusted) by 2024.

Fastmarkets RISI believes that cereals will account for a smaller proportion of food

Figure 2

Cereals and milled grains industrial production and consumer spending

Industrial production index (2012 = 1.00), spending in billions of 2012 US dollars



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

spending over the forecast period as spending and eating patterns continue to favor low carbohydrate meals on the go. Despite the sector-specific challenges in the cereals segments, the economy is showing some level of uncertainty, which should stabilize spending on cereals as a cheaper alternative to other pricier breakfast options. This is especially the case with consumers feeling increasingly cautious about their spending habits toward 2021. Thus, we anticipate long-term consumer spending on cereals, including the COVID-19 demand shock and subsequent correction, will increase by 2.2% on average during 2020-2024, leaving total consumption at almost $61.5 billion (2012$) by 2024.

Trade trends

Long-term context

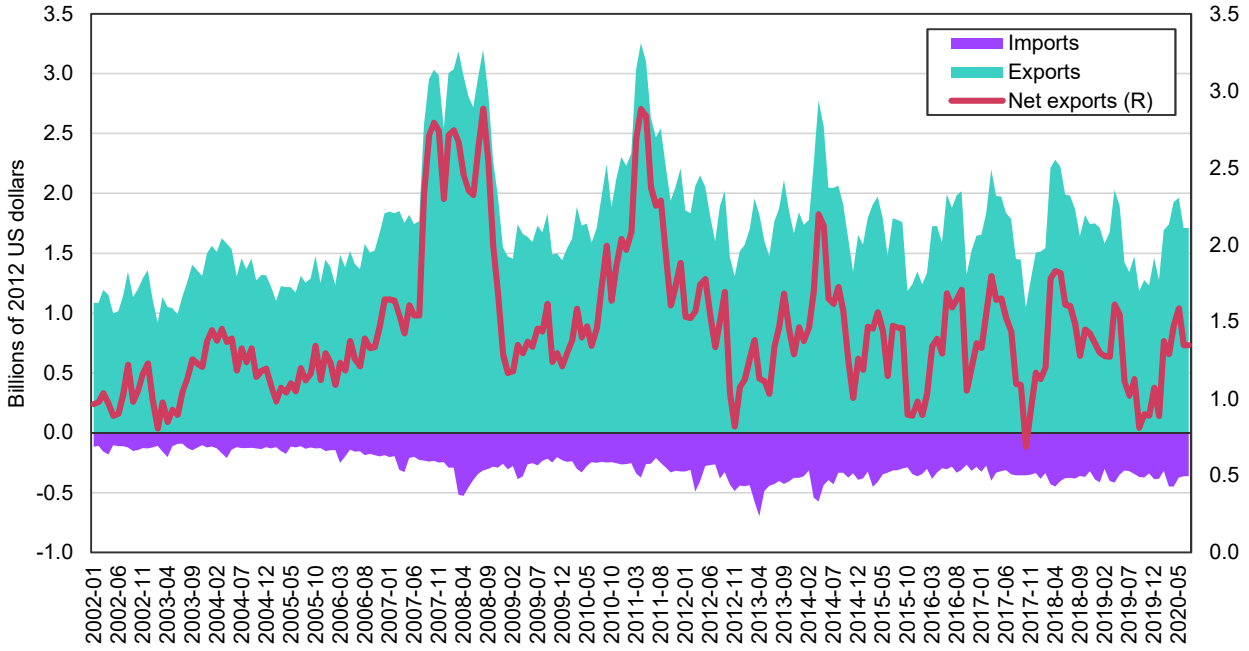
Trade plays a more important role in the cereal market compared to other dry food products, since this segment includes bulk grain and seed. Grain exports from the US surged in the years prior to the recession, more than doubling between 2005 and 2008. The trade surplus for grain followed suit during those four years, peaking at $28.2 billion (2012$) in 2008, as imports could not keep pace. However, the surge was quickly followed by a collapse in 2009, when exports tumbled 40.7% year-over-year in real terms. As a result, the trade surplus fell to just $15.9 billion in 2009. Exports have since been extremely volatile, causing the surplus to repeatedly swell and deflate again, and the trade surplus rose to $15.4 billion (2012$) by 2015. Imports were able to withstand the shock of the downturn better than exports, although they have still exhibited volatility in recent years. The last two years saw the trade surplus reaching $15.9 billion (2012$) in 2017 and $18 billion (2012$) in 2018, before retreating to $13.9 billion (2012$) in 2019. This most recent improvement in the trade surplus is closely tied to the stronger dollar and the resulting swift contraction in exports during 2019.

Fastmarkets RISI expects annual growth in imports of 0.3% over the five-year forecast, reflecting growing consumer tastes for foreign grain and milled products as well

Figure 3

Cereals and milled grains trade outlook

Trade in billions of 2012 US dollars



Source: US Census and Fastmarkets RISI, Inc.

as challenges by expected weakness in the US dollar. Exports will also increase over the forecast, albeit at a stronger pace of 3.3% per year on average. Year-over-year export movements could see more of the tremendous volatility that history has shown, especially if exchange rates swing dramatically in the coming years. Nevertheless, over the next five years, the total value of grain exports will continue to far exceed any imported products, with the trade surplus averaging $15.8 billion ($2012).

COVID-19 trends

The trade outlook has changed slightly in the past few months of the pandemic. We estimate that 2020 exports will rise by 1.9%, while imports will see an increase of 2.8%. The growth in imports is mainly the result of surging consumer spending, despite the overall monthly volatility. Meanwhile, exports have behaved differently than other packaged goods. The first few months of the pandemic saw slight growth in export volumes, but mid-year figures indicate considerable acceleration. One explanation could be that the export markets have seen some growth for dry foods, particularly cereals, due to the pandemic and the associated lockdown abroad. The total value of grain exports will continue to grow, allowing the trade surplus to widen by 4.1% annually from 2020-2024, reaching $17 billion ($2012) by 2024.

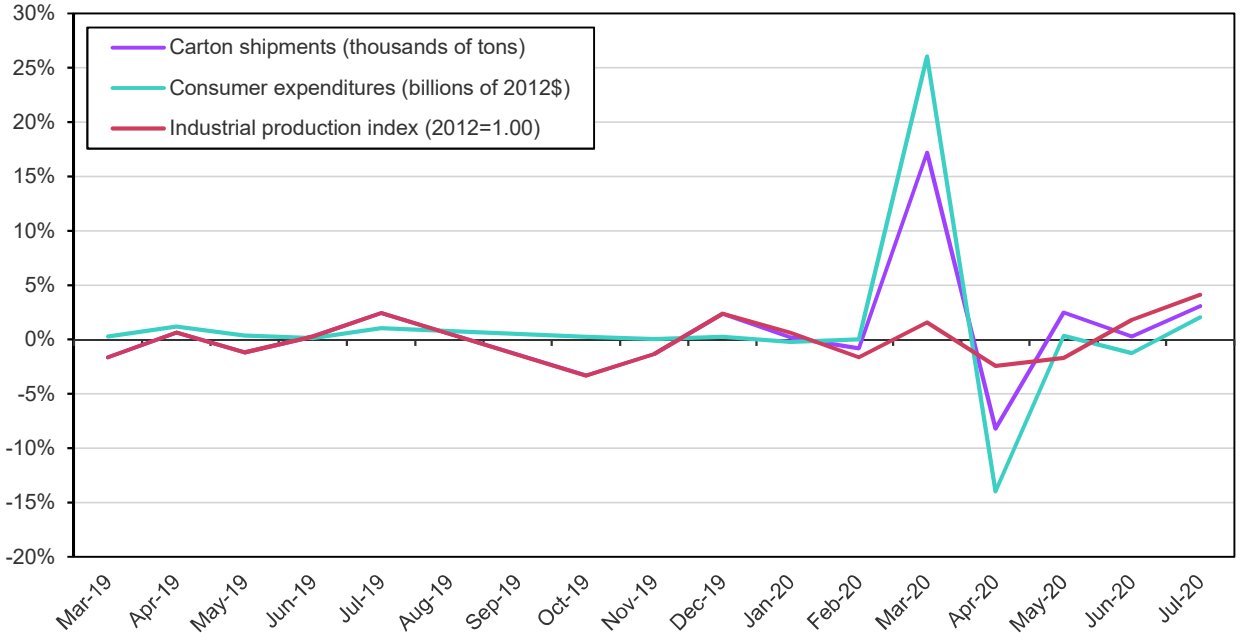
Production trends

Long-term context

The Federal Reserve Index used to track cereals production, listed as "grain and oilseed milling," is a useful proxy for estimating growth in domestic carton demand in this industry segment; however, it is important to note that this index is heavily weighted toward bulk production of grain and seed for downstream manufacturing and export. Based on the Federal Reserve's latest revision to industrial production of cereals and grains in general, output posted a nearly flat annual average growth rate of 0.4% over the last ten years, as short bursts of growth were almost always followed by deeper declines. Cereal

Figure 4

Cereals and milled grains growth in shipments, consumer spending and industrial production



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

production from 2006-2010 advanced by 1.4% on average; interestingly, significant growth was accumulated during the recession years of 2007, 2008 and 2009 at an annual average rate of 5.2%. Growth eroded in the following two years, before stabilizing after 2012. Over the past five years, grain production increased by 1.5% per year on average. Output is forecast to rise by 1.8% over the next five years in line with the positive spending outlook.

COVID-19 trends

We expect production to shrink by 0.6% in 2020, following 2019's 0.8% decline. Part of this negative trend is attributed to the changing trade balance. Despite its expected positive performance for the year, cereal exports will be roughly $4 billion ($2012) lower than in 2018. A stronger US dollar contributed to this dynamic. Due to tailwinds provided by a weakening dollar, exports will expand at an average annual rate of 3.6% from 2021-2024. As a result, production is predicted to recover as well through 2024 by 2.5% per year on average. The five-year outlook is expected to average 1.8% annually from 2020-2024, which takes into account the volatility in 2019 and 2020 and the anticipated recovery.

Folding carton trends

Long-term context

The cereals and milled grain industry consumed 356,000 tons of folding cartons in 2019, accounting for 7.4% of total folding carton shipments for the year. Shipments continued to slip further from their pre-recession levels in 2019, but this trend reversed in 2020 with the strong demand pull due to the pandemic. Industrial production of these products increased at a 1.5% average annual rate between 2015 and 2019, while shipments declined by an average annual rate of 0.5%, indicating that there is a decoupling between carton shipment growth and overall growth of the cereal and milled grain industry.

Carton demand growth in the cereals segment will lag behind consumer spending growth over the forecast, largely because of the difficulties faced by domestic manufacturers

of these goods as imports continue to gain share. As mentioned earlier, the BEA data likely overstate the strength of the cereals market, which also justifies the disparity in the growth profiles between spending and shipments. As a result, total carton shipments to the milled grain products industry are forecast to register slight growth over the next five years by 0.2% on average through 2024. This growth outlook echoes several opposing dynamics: the demand shock of 2020, substitution pressure from other packaging materials such as plastic cups in individually packaged cereal containers and the potential pressure from corrugated boxes as e-commerce makes inroads in the dry foods markets.

The cereal market continues to be a heavy consumer of clay-coated recycled boxboard (CRB), and prices for this grade increased at a much faster rate than the average values per ton for folding cartons in the cereal industry, compressing margins significantly for some converters. During the 2008-2009 downturn, growth in shipments to recession-resistant end uses helped slow the increased cost pressure facing converters as the boxboard segment struggled. Recent mill closures and the declining capacity in the CRB market are expected to keep CRB prices elevated, which indicates that carton converters in the cereal and breakfast industry will continue to face headwinds in paperboard costs throughout 2020.

COVID-19 trends

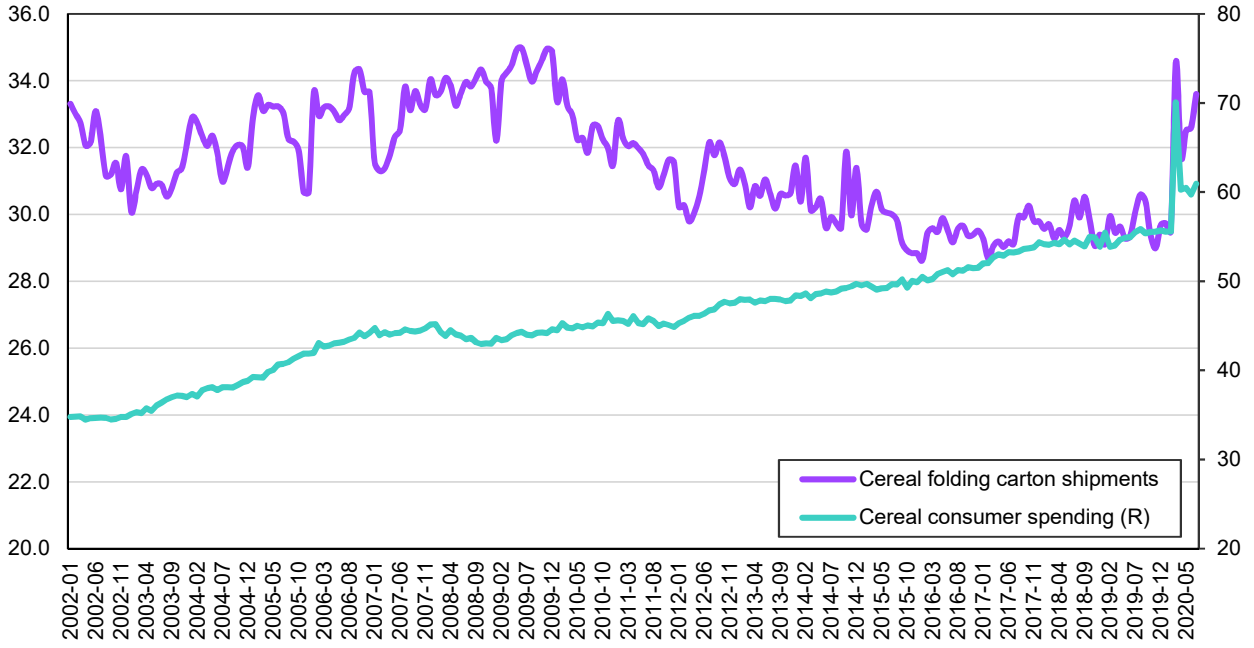
Folding carton shipments soared during the early stages of the lockdown as restocking gained momentum. March's seasonally adjusted shipments of cereal folding cartons climbed sharply by 17.2%, accelerating the first quarter's growth outlook to 6.5% quarter-to-quarter and nearly 93,800 tons. The increased shipment levels reflect consumer spending behavior, which expanded by 8.6% in the first quarter of the year.

The second quarter witnessed a slower growth in shipments by 3.3%, due to the 8.2% decline in April, before growth stabilized in May and June at 2.5% and 0.3%, respectively. We forecast that the next two quarters will show mild

Figure 5

Cereals and milled grains folding carton shipments and consumer spending

Shipment in thousand tons and spending in billions of 2012 US dollars

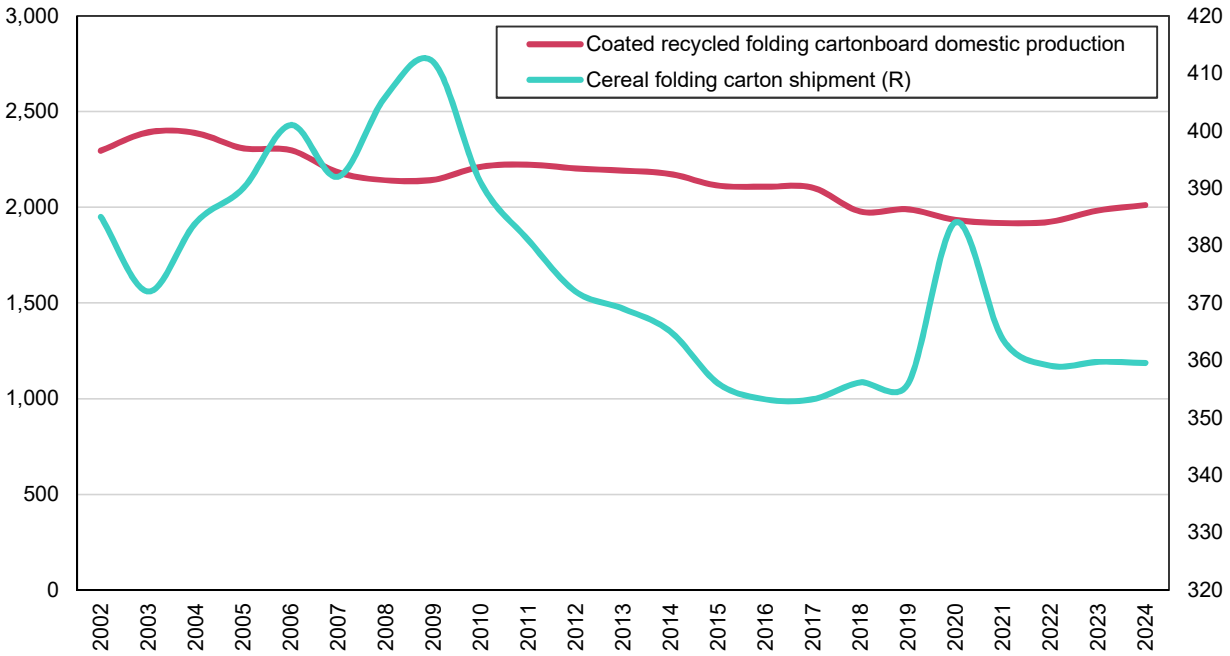


Source: Fastmarkets RISI Inc. and US BEA Real Personal Income Expenditures.

Figure 6

Cereals and milled grains folding carton shipments and domestic production of coated recycled board

Thousand tons



Source: Fastmarkets RISI, Inc.

growth fluctuations of -0.4% and 0.5%, respectively. The forecasted growth in folding carton shipments in the third and fourth quarters is based on the anticipated decline in consumer spending of 2.2% and 0.7%, respectively, and gains in production of 1.5% and 1.8%.

On an annual basis, cereals folding carton shipments are expected to post 7.9% growth year-on-year. This growth is the net of two opposing factors: increased consumer spending and production of cereals on one hand, and substitution pressure coming from corrugated boxes (e-commerce) and plastic packaging (bulk purchases) on the other.

Shipments will decline by 1.6% on average annually from 2021-2024, a correction that is expected following the significant growth registered in 2020. Our five-year forecast indicates that cereals folding carton shipments will show growth of 0.2% annually, which includes the 2020 demand shock and the 2021-2024 correction, allowing shipments to reach 359,600 tons by 2024.

Chapter 8
Pharmaceuticals

The pharmaceutical industry is a small but important market for folding cartons, with strong upward trends in real spending. In 2019, pharmaceutical consumption of folding cartons in the US accounted for 306,000 tons, or 6.4% of total folding carton shipments. Despite experiencing some strong growth in the early part of the last decade, shipments to this market have been on a downward trend, reflecting much of the broader weakness in the folding carton market. Fastmarkets RISI estimates folding carton shipments are at levels seen in the early 2000s when shipments to the segment were growing. Part of this reflects the exceptionally poor performance by industrial production since the recession, with output in 2019 coming in 20.6% below the peak levels recorded in 2007. It seems production has returned to a path of growth, however, prompting Fastmarkets RISI to forecast that folding carton shipments to the pharmaceuticals industry will grow at a 0.9% average annual rate during 2020-2024, which includes the volatility experienced during the COVID-19 pandemic.

Spending trends

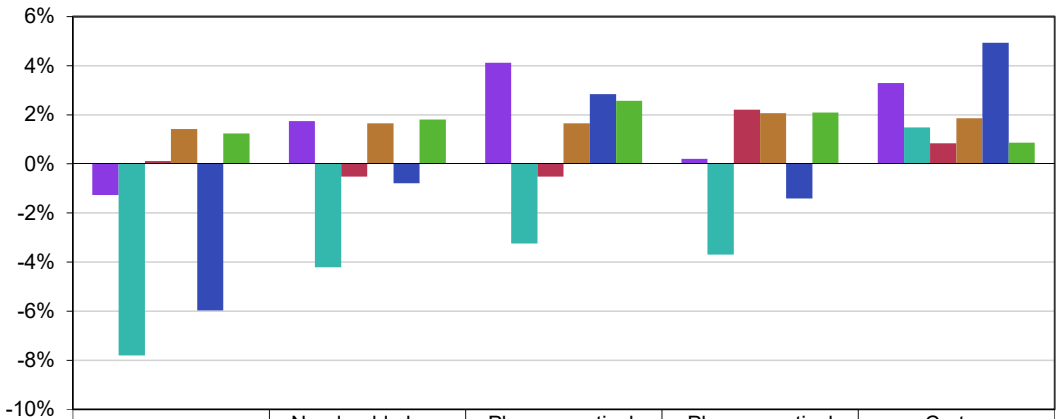
Long-term context

Consumer spending on pharmaceuticals has historically been very strong and proved to be extremely recession resistant. Expenditures increased 2.6% annually on average between 2006 and 2010; this is one of the only segments of the economy in which consumer spending rose during the depths of the recession, with growth averaging 0.9% per year in 2008-2009.

Figure 1

Pharmaceuticals end-use market indicators

Quarterly, annual and five-year average annual growth rates



	GDP	Nondurable less energy spending	Pharmaceutical spending	Pharmaceutical production	Carton shipments
2020 Q1 (e)	-1.3%	1.7%	4.1%	0.2%	3.3%
2020 Q2 (e)	-7.8%	-4.2%	-3.2%	-3.7%	1.5%
2020 Q3 (f)	0.1%	-0.5%	-0.5%	2.2%	0.8%
2020 Q4 (f)	1.4%	1.6%	1.6%	2.1%	1.9%
2020f	-6.0%	-0.8%	2.8%	-1.4%	4.9%
2020-2024 (f)	1.2%	1.8%	2.6%	2.1%	0.9%

Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

While spending on other medical equipment declined by 2.5% in 2009, spending on prescription and non-prescription drugs increased by 0.8% and 3.4%, respectively. In the period between 2009 and 2013, the trends changed, however, as spending levels on prescription drugs remained effectively flat at 0.6% annually, while non-prescription drug spending continued its exceptional performance at 6.8% and spending on medical supplies rebounded at a robust 4.2%. Overall spending on pharmaceuticals posted 1.5% average annual growth over the same period. Spending gains across all categories persisted from 2011 forward, translating into average spending growth of 3.6% annually over the last five years, with a noticeable acceleration in spending experienced on the prescription side of the market at 3.4% annually. Other categories continued their strong performance with non-prescription growing at 4.8% annually, while other medical products recorded 5.5% average annual growth from 2015-2019. As of 2019, consumer spending on pharmaceuticals stood at $473.2 billion (2012$), 82.3% of which was prescription drugs.

COVID-19 trends

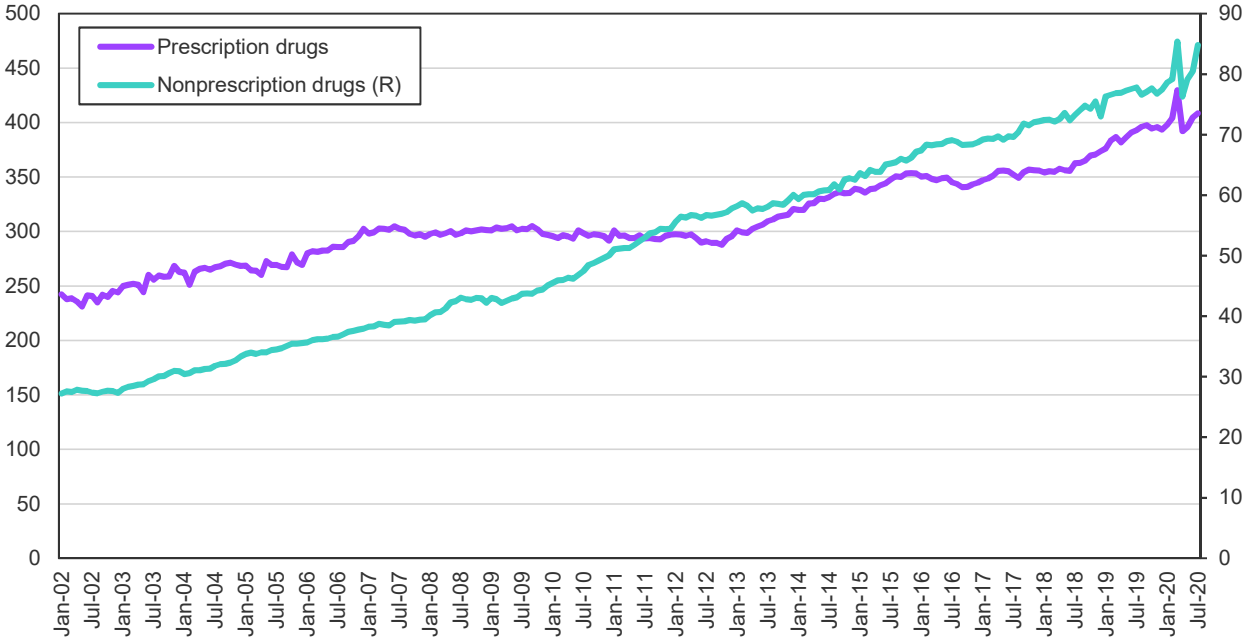
Historically speaking, consumer expenditures in pharmaceuticals have shown resilience and immunity to economic downturns and crises. According to the Bureau of Economic Analysis (BEA), pharmaceuticals spending in March 2020 rose to about $521.2 billion (2012$, seasonally adjusted), representing a 6.4% increase month-to-month. In the following month, spending declined 9.1% to about $473.7 billion (2012$, seasonally adjusted). Pharmaceuticals spending recovered in May, June and July, rising 1.6%, 2.1% and 1.7%, respectively.

Prescription drugs maintained an 82.4% share of all pharmaceuticals spending in March 2020, which is in line with historical trends. This segment saw a 6.3% monthly growth rate in March, compared to 7.9% in the non-prescription segment, which accounted for 16.3% of pharmaceuticals spending. Despite average growth in January and February, the strong spending in March pushed first quarter gains to a 4.1% growth rate. The second quarter showed a decline of 3.2%, which

Figure 2

Pharmaceuticals consumer spending: Prescription vs. nonprescription drugs

Billion of 2012 US dollars

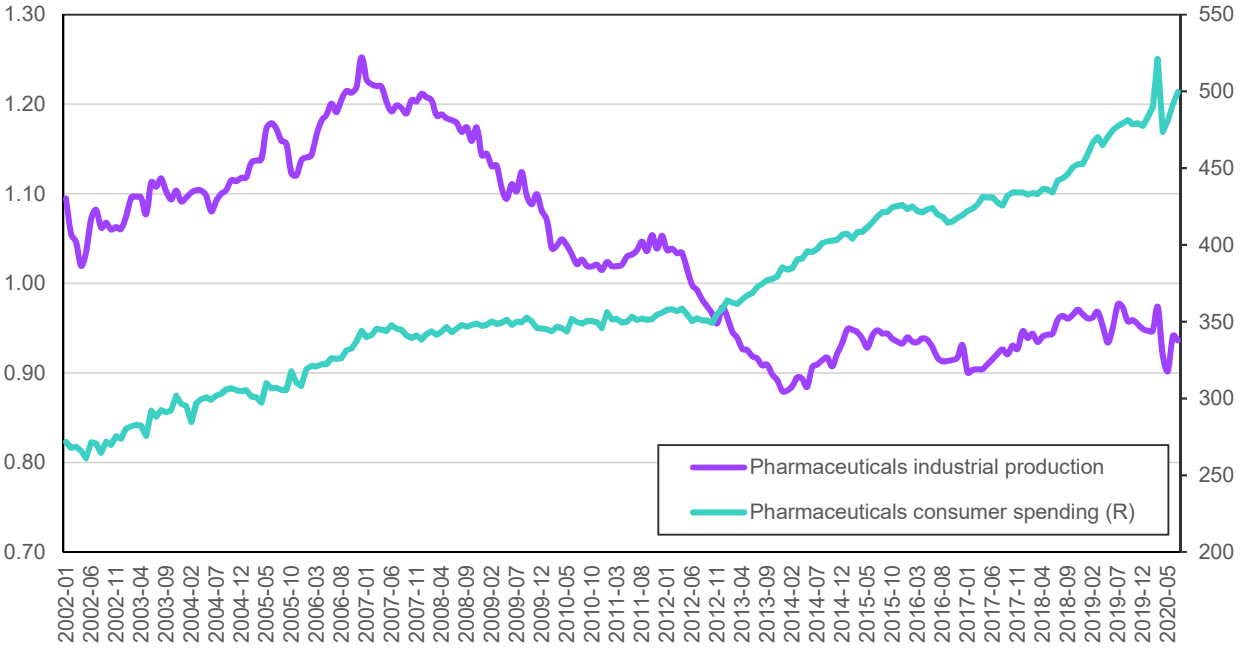


Source: Fastmarkets RISI, Inc. and US BEA Real Personal Income Expenditures.

Figure 3

Pharmaceuticals industrial production and consumer spending

Industrial production index (2012 = 1.00), spending in billions of 2012 US dollars



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

appeared in all pharmaceuticals products. The lockdowns and the resulting rescheduling of regular doctor's appointments could have had some impact on pharmaceuticals expenditures at the beginning of the second quarter.

Fastmarkets RISI forecasts that pharmaceuticals spending will decline in the third quarter by 0.5% before bouncing back in the fourth by 1.6%. On an annual level, 2020 pharmaceuticals spending is called to grow by 2.8% and will continue expanding in the next four years at an average annual rate of 2.5%, reaching $537 billion (2012$, seasonally adjusted) by 2024. Growth during the forecast period will be driven by aging baby boomers, new drug developments and rising healthcare coverage. However, this could be undermined by significant drops in revenue from the ongoing patent cliff, which is allowing generics to proliferate for a number of critical drugs developed in the early 1990s. Profit margins are greater for wholesalers of generics, but revenue from such products will be greatly reduced, creating substantial downside risk to our spending forecast. Nevertheless, Fastmarkets RISI anticipates that spending will increase at an average annual rate of 2.6% over the next five years, which includes the demand fluctuations caused by COVID-19.

Trade trends

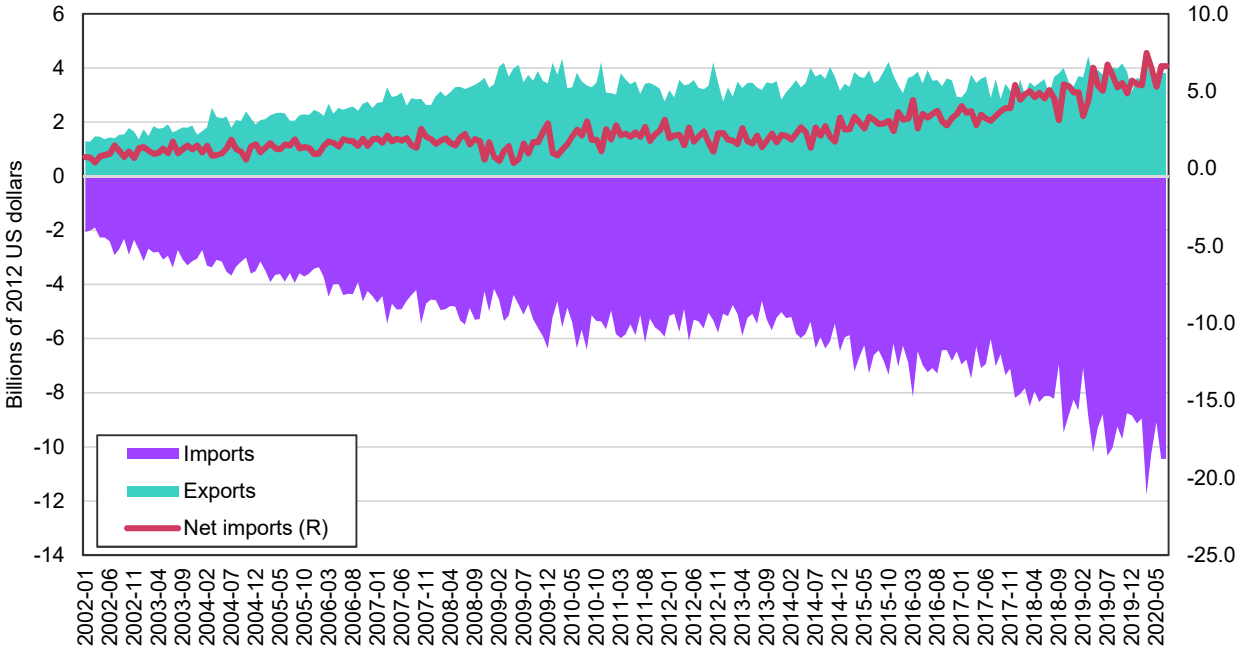
Long-term context

Trade flows of pharmaceutical products have continued to swell over the years in the US, with a widening trade deficit in the category. From 2002-2019, net imports of pharmaceuticals expanded from $11.4 billion to $63.8 billion (2012$). Much of this was due to soaring prescription drug costs in the US, which drove consumers to purchase cheaper alternatives available in Canada and other industrialized countries that impose price ceilings on drug prices. Imported pharmaceutical products grew by 8.5% per year between 2006 and 2010. Exports expanded at a faster pace of 10.2% annually over the same period; however, exports were growing from a significantly lower base than imports, which explains the growth in the trade deficit for pharmaceuticals. The recession temporarily abated the deficit expansion as imports slowed but exports continued to

Figure 4

Pharmaceuticals market trade outlook

Trade in billions of 2012 US dollars



Source: US Census and Fastmarkets RISI, Inc.

rapidly expand in 2008 and 2009. However, this was short-lived as the effects of the economic slowdown in the US spilled over to the global economy, undermining exports and allowing the trade deficit to resume its upward trend.

The past five years saw the deficit ballooning at an enormous 18.2% average annual rate, which was mostly fueled by the accelerating growth in imports at 9.4% annually and slow growth in exports of 1.6%. In 2015, imports posted their second-highest growth rate since the recession at 13.5%, accounting for some of the 4.9% increase in pharmaceuticals spending for the year and pushing the trade deficit to $35.8 billion (2012$), 29.6% higher than in 2014. This significant trend change could be partly attributed to the rapid strengthening of the US dollar over that period.

COVID-19 trends

The trade deficit swelled significantly at the beginning of the year, even before the lockdown at the end of March. The deficit rose by 10.7%, 58% and 69% in the first three months of the year, respectively, and 43.5% year-on-year for the first quarter as a whole. This is understandable given the acceleration in imports of 21.4% in the first quarter of 2020 compared to the contraction in exports of 2.8%.

We estimate that 2020 exports will record flat growth, while imports will finish the year at 5.4%. Despite the expected inflation in the trade deficit of 9.2% in 2020, it will contract slightly through 2024 by an average annual rate of 0.6% from 2021-2024, hitting $68.4 billion (2012$) by the end of the forecast. A slightly weaker US dollar will allow exports to expand by 4.1%, surpassing the gains in imports of 1.4% annually from 2021-2024.

Production trends

Long-term context

Manufacturing of pharmaceuticals and medications was very strong prior to the recession, but during the recession production experienced its first declines since 1992, falling 2.3% and 5.9% in 2008 and 2009, respectively. Output losses deepened in 2010, decreasing by 6.9%, and then flattened in

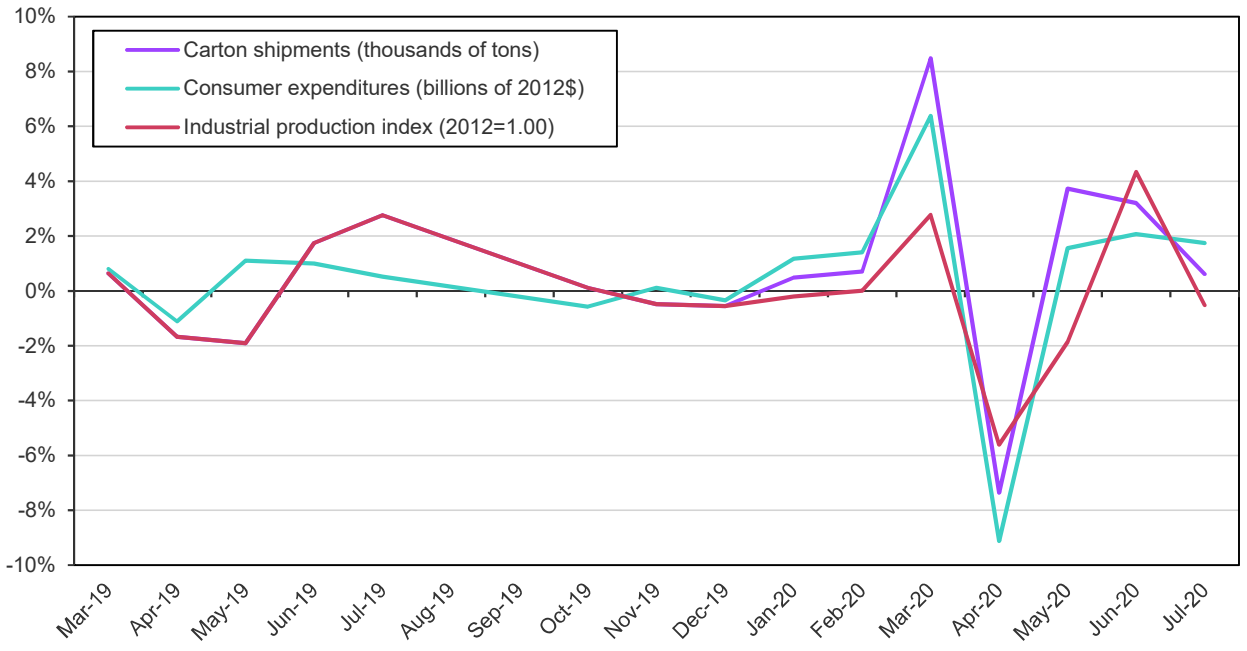
2011. However, the next two years saw further declines of 3.3% and 8.1%, respectively. In 2014, production losses moderated to a more bearable 1.6% decline. The stagnant-to-declining trend in pharmaceutical production broke in 2015, with growth expanding by 4.1% year-over-year, which was also more consistent with the consumer spending figures. Production of pharmaceuticals declined again in 2016 and 2017 by 1.5% and 1.0%, respectively. The decline in pharmaceutical output despite strong spending growth can be partly explained by soaring import growth and imports accounting for an increasing share of total pharmaceutical spending. The challenging export market in 2016 and 2017 also contributed to the volatility in production. Exports recorded a 4.3% drop in 2016 and deteriorated even further in 2017 by 6.9% year-on-year. This trend reversed in 2018 and 2019, as production grew 3.8% and 0.6%, respectively. Overall, production recorded a positive average annual growth rate of 1.2% from 2015-2019. As of 2019, pharmaceutical industrial production was still 20.6% below 2007 levels.

COVID-19 trends

The flat growth in exports in 2020 due to weak markets abroad will cast a slight shadow on the production outlook. We expect production to shrink by 1.4% in 2020. But because of the expected weakening dollar over the forecast, exports will surge by an average annual growth rate of 4.1% from 2021-2024. As a result, production is called to record a recovery of 3.0% on average annually over the same period. The five-year outlook from 2020-2024 is for 2.1% average annual growth, although production will continue to face challenges from imported products.

Figure 5

Pharmaceuticals growth in shipments, consumer spending and industrial production



Source: Fastmarkets RISI, Inc. using US BEA and Federal Reserve data.

Folding carton trends

Long-term context

In the years leading up to the recession, folding carton shipments to pharmaceutical end uses grew by roughly 3%. However, shipments of folding cartons to the pharmaceutical segment have since had difficulty re-attaining those pre-recession growth levels. Despite showing some initial resilience, industrial production deteriorated notably by 2010, dragging folding carton shipments down as a consequence. Pharmaceutical manufacturing in the US rebounded by 2011, but struggled to keep that momentum and contracted by 4.9% annually from 2009-2013, leaving average carton shipments down by 3.8% over the same period. The past five years (2015-2019) provided some recovery on the production and carton shipment fronts. Production recorded a recovery of 1.2% annually, echoed by 1.1% annual growth in carton shipments. As noted, there has been an odd disparity in industrial production and consumer spending growth since the recession, even when factoring in the growing trade deficit, but we believe over the next five years output will grow moderately and fall closer in line with consumer spending in pharmaceuticals.

COVID-19 trends

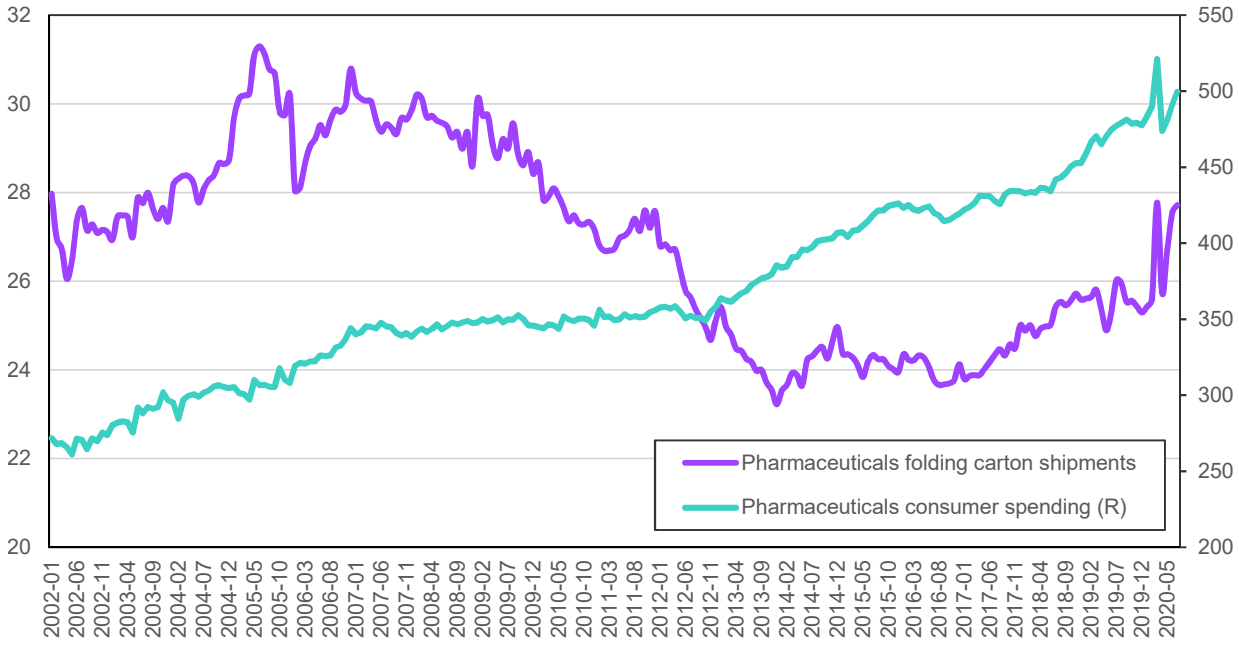
Seasonally adjusted shipments of pharmaceuticals folding cartons rose by 8.5% in March, accelerating first quarter growth to 3.3% quarter-to-quarter and nearly 78,800 tons. The increased shipment level was in line with consumer spending behavior, which had risen 4.1% by the end of the first quarter.

Pharmaceuticals folding carton shipments continued their upward trajectory, recording another 1.5% growth in the second quarter of 2020. This growth outlook reflects a strong performance in May and June of 3.7% and 3.2%, respectively. We forecast that the positive shipments trend will carry on through the third and fourth quarters with growth of 0.8% and 1.9%, respectively. The forecasted growth in folding carton shipments in the final two quarters of the year is based on the consumer spending growth profile of -0.5% and 1.6%, respectively, and anticipated gains in production of 2.2% and 2.1%.

Figure 6

Pharmaceuticals folding carton shipments and consumer spending

Shipment in thousand tons and spending in billions of 2012 US dollars

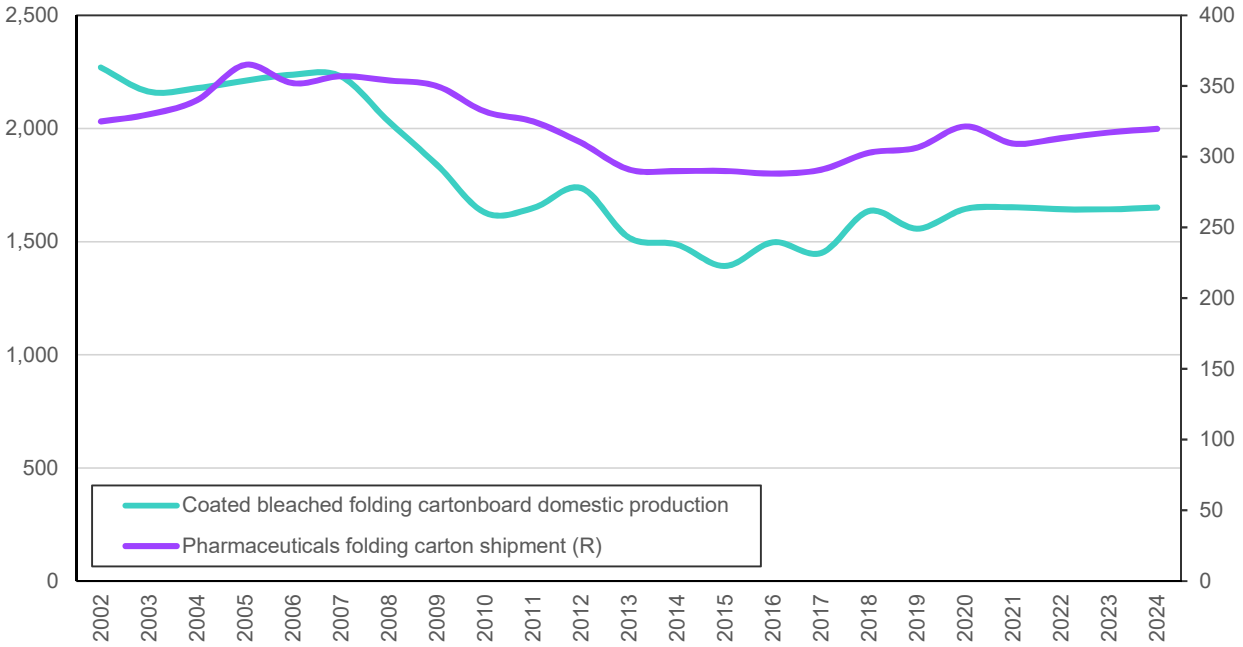


Source: Fastmarkets RISI Inc. and US BEA Real Personal Income Expenditures.

Figure 7

Pharmaceuticals folding carton shipments and domestic production of coated bleached board

Thousand tons



Source: Fastmarkets RISI, Inc.

On an annual basis, pharmaceuticals folding carton shipments are called to post 4.9% year-over-year growth. The rise in the shipment level is understandable given the increased demand for pharmaceuticals during the pandemic. Pharmaceuticals mostly use bleached board (SBS) for smoothness and clear printability for small font instruction. However, the availability of European folding boxboard (FBB) presents headwinds for folding carton shipments gaining more traction. Improved pharmaceutical output will be driven by wider healthcare coverage and greater access to more affordable generic options, which should help carton shipments to this sector to grow by 0.9% annually for the next five years, reaching 319,800 tons by 2024.

Chapter 9
Soap and detergents market

Carton consumption in the soap and detergent markets has suffered in the last ten years due to substitution pressures and lower industrial production, leading shipments to decline at a 2.8% average annual rate in 2010-2019. Fastmarkets RISI's forecast shows carton shipments to the soap and cleaning preparations industry slightly rising by 0.1% from 2020-2024, which is an improvement compared to recent history but would still lag well behind the 2.1% average annual increase in soap and detergent production due to continuing competition from plastic packaging, which will see notable demand growth over our forecast period.

Spending trends

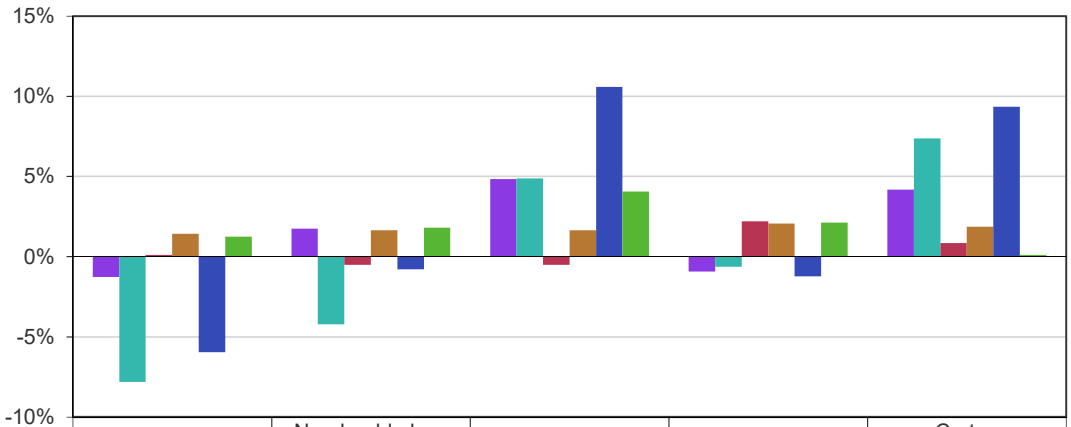
Long-term context

Spending on soap and detergents declined on average by 0.6% (2012$) from 2007-2011, with most of the declines being logged during the recession years. As a result, consumer spending hit a low of $42.6 billion (2012$) in 2009. However, the industry has experienced a steady recovery since the recession, growing its share of nondurables spending; consumer spending growth between 2009 and 2013 averaged 1.3% annually, reaching $47.7 billion (2012$) by 2013, surpassing its pre-recession peak of 2005.

Figure 1

Soap and detergent end-use market indicators

Quarterly, annual and five-year average annual growth rates



	GDP	Nondurable less energy spending	Soap spending	Soap production	Carton shipments
2020 Q1 (e)	-1.3%	1.7%	4.8%	-0.9%	4.2%
2020 Q2 (e)	-7.8%	-4.2%	4.9%	-0.6%	7.4%
2020 Q3 (f)	0.1%	-0.5%	-0.5%	2.2%	0.8%
2020 Q4 (f)	1.4%	1.6%	1.6%	2.1%	1.9%
2020f	-6.0%	-0.8%	10.6%	-1.2%	9.3%
2020-2024 (f)	1.2%	1.8%	4.1%	2.1%	0.1%

Source: Fastmarkets RISI using US BEA and Federal Reserve data.

Spending accelerated even further between 2015 and 2019, expanding at an average rate of 5.0% and exceeding $64 billion (2012$) by the end of that period, representing about 2.1% of total nondurables spending. Within the broader soaps and detergents category, household cleaning products account for 61.7% of spending, with the balance being miscellaneous household products. Prior to COVID-19, hotels and restaurants accounted for a substantial proportion of demand for cleaning supplies, both of which had seen business pick up as the US consumer's situation improved, bolstering service spending on meals and vacations. Cleaning products have slowly lost share to the smaller miscellaneous category, declining by over 14 percentage points since 2005.

COVID-19 trends

The data from the first several months of the pandemic point to much stronger spending growth in line with the restocking observed in other segments within the nondurable goods market. According to the Bureau of Economic Analysis (BEA), soaps and detergent spending in March 2020 rose to about $73.4 billion (2012$, seasonally adjusted), representing an 11.2% increase month-to-month. Spending declined 5.5% month-over-month in April to about $69.4 billion (2012$, seasonally adjusted), but then increased again in May by 5%, before flattening in June and July at -0.2% and -0.1%, respectively. Despite the volatility, spending in the first half of 2020 was 7.5% higher than pre-COVID-19 levels.

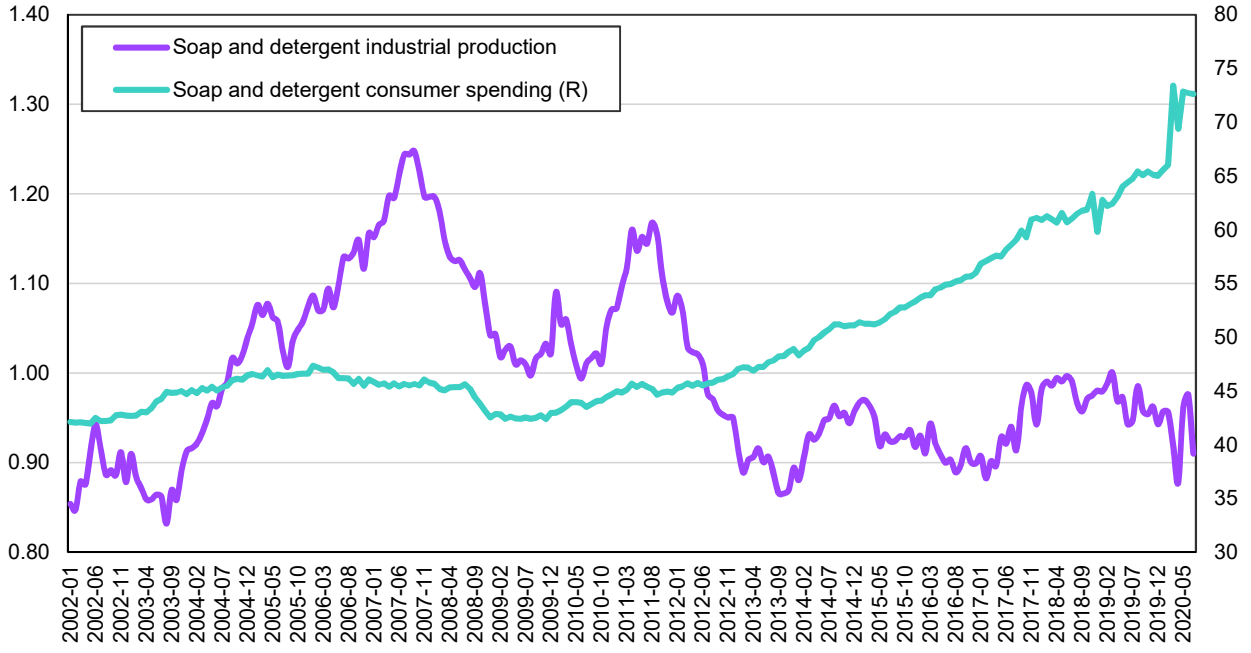
March's strong spending allowed first quarter gains to register a 4.8% growth rate. The second quarter continued the strong performance, climbing by 4.9% and reaching $71.7 billion (2012$, seasonally adjusted). Fastmarkets RISI forecasts that soaps and detergent spending will decline slightly in the third quarter by 0.5% before growing again in the fourth by 1.6%, in line with the growth outlook for nondurables spending.

The growth in demand surged as restocking accelerated during the lockdowns. With the heightened health concerns and the rising importance of hygiene, the demand for soaps and detergents is expected to remain elevated. On an annual level, 2020 soaps and detergent spending is called to grow by 10.6% and continue its overall growth in the next four years at an average annual rate of 2.5%, reaching 78.3 billion (2012$, seasonally adjusted) by 2024.

Figure 2

Soap and detergent industrial production and consumer spending

Industrial production index (2012 = 1.00), spending in billions of 2012 US dollars



Source: Fastmarkets RISI using US BEA and Federal Reserve data.

Trade trends

Long-term context

Trade trends are a more notable, although not critical, factor in the soap and cleaning preparations market compared to other industry segments. The import share of consumer spending was about 4.6% in 2004 and increased only marginally to 5.8% by 2019. Exports have grown at a slower pace compared to imports over the past ten years, by roughly 2.5 percentage points on average. Since the recession years, the trade outlook has improved, with exports growing at an exceptional average annual rate of 8.6%, while imports registered 9% growth over the period from 2010-2014, with the trade surplus for soaps and detergents expanding from $2.4 billion to $4.5 billion between 2007 and 2014.

The strengthening of the US dollar in 2015 created an unfavorable environment for exports, which contracted 4.0% and 2.5% year-on-year in 2015 and 2016, respectively. The overall decline for exports between 2015 and 2019 averaged 1.6% annually, while imports enjoyed a robust expansion of 2.9% per year on average, reflecting the relatively cheaper foreign products caused by the swings in the exchange rate over that period. Thanks to exports rebounding by a promising 4.6% in 2017 and a weak 0.4% in 2018 while imports continued their exceptional performance at 6.7% and 9.6%, respectively, the trade surplus shrank to $3.8 billion (2012$) in 2018, below its level in 2011. The trade surplus saw an additional drop in 2019 to $3.36 billion (2012$), due to the significant drop in exports of 6.3% and the less dramatic decline in imports of 1.1%. We expect the surplus to observe a period of some instability, ranging from $3.4-4.4 billion, given the expected weakening of the US dollar over the forecast, which will cause the trade surplus to eventually grow to $4.4 billion (2012$) by 2024.

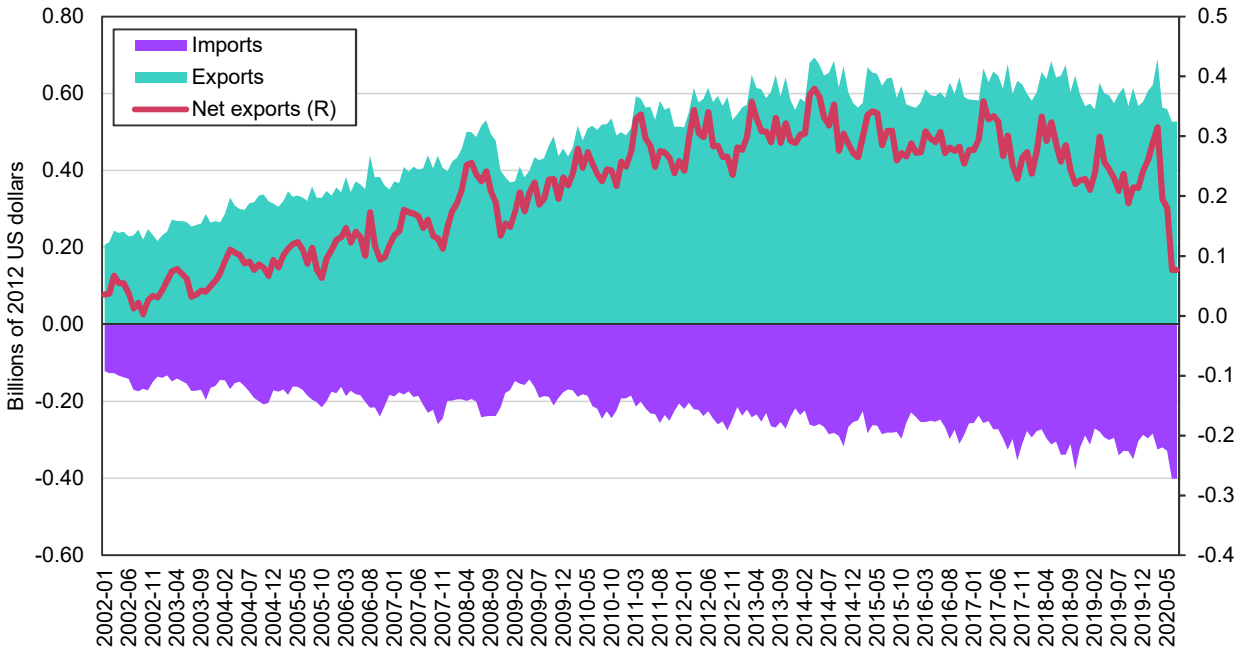
COVID-19 trends

We estimate that 2020 exports will rise by 1.9%, while imports will see an increase of 4.0%. The growth in imports will be mainly a result of the surging consumer spending, despite the overall monthly volatility. Imports growth have continued during the months of the lockdown since March 2020. Exports have not fared as well, however, with the exception of March, as they recorded monthly contractions over this period. The total value of soaps and detergent exports will rebound

Figure 3

Soap and detergent market trade outlook

Trade in billions of 2012 US dollars



Source: US Census and Fastmarkets RISI.

over the forecast thanks to the favorable exchange rate environment, pushing the trade surplus to $4.4 billion (2012$) by 2024.

Production trends

Long-term context

Following the recession, growth in industrial production of soaps, cleaning compounds and toiletries showed relatively flat growth, in contrast to the very robust growth that characterized the years before the recession. The biggest declines predictably occurred in 2008 and 2009. Production had a very modest recovery in 2010, but accelerated notably in 2011, rising by 8.3% year-over-year. However, this recovery was short-lived, and output growth registered an average annual decline of 1.7% in 2010-2014.

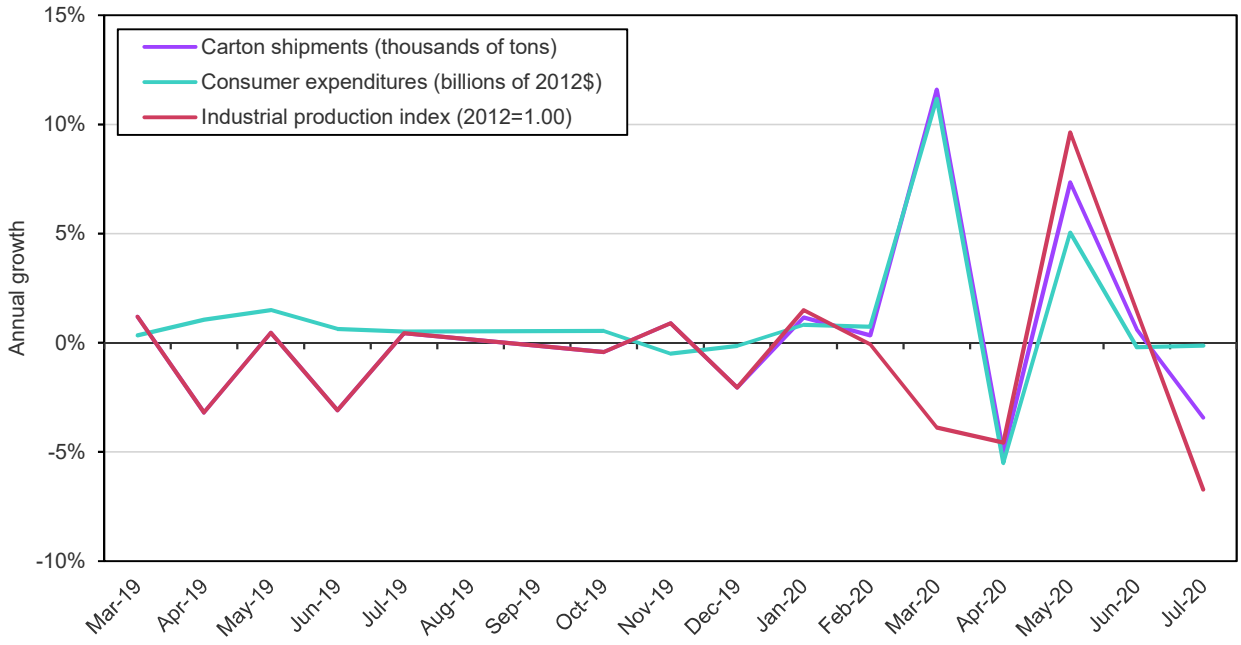
Production improved over the last five years, reflecting the considerable expansion in spending, rising 0.6% annually on average. Despite the growth in consumer spending, which supported production's positive outlook, the unfavorable exchange rate negatively impacted exports, which dropped by 1.6% annually on average over the same period. In 2019, the output of soaps, cleaning compounds and toiletries clocked another decline of 1.5%, following two years of strong gains in 2017 and 2018 of 2.2% and 5.6%, respectively. Fastmarkets RISI is assuming soaps output will slowly grow in line with spending and exports in the forecast, since in recent years the growth in consumer spending and output seem to have converged, translating to anticipated average production growth between 2020 and 2024 of 2.1%.

COVID-19 trends

We expect production to shrink by 1.2% in 2020, following the 1.5% decline in 2019. Part of this negative trend is attributed to the changing trade balance and the weak exports markets. Due to tailwinds provided by a weakening dollar over the forecast, exports will expand at an average annual rate of 4.1% from 2021-2024. As a result, production is predicted to recover as well through 2024 by 3% per year on average. Over the five-year outlook, we anticipate production will grow by 2.1% annually on average, which takes into account the volatility in 2019 and 2020 and the anticipated recovery.

Figure 4

Soap and detergent growth in shipments, consumer spending and industrial production



Source: Fastmarkets RISI using US BEA and Federal Reserve data.

Folding carton trends

Long-term context

The soap and cleaning products markets did not prove to be a very good one for folding cartons during the last ten years, which to some degree is partially a reflection of poor output growth from manufacturers of these goods. Efforts by alternative packaging to displace folding cartons and growth in sub-segments of soaps and cleaners which are less carton intensive could also be responsible for the losses, as carton shipments to the sector have fallen faster than even industrial production over the last ten years (a 2.8% decline in shipments versus a 0.5% drop in industrial production). One example is the incursion of liquid soap and detergent products on retailers' shelves, which tend to favor plastic packaging over cartons. With the combination of increasing prices for recycled boxboard and substitution pressure from plastic packaging over the horizon, we expect 0.1% average annual growth in carton shipments to the soap and cleaning preparations industry during the next five years.

COVID-19 trends

Folding carton shipments soared during the early stages of the lockdown as restocking gained momentum. March's seasonally adjusted shipments of soap and detergent folding cartons soared by 11.6%, accelerating the first quarter's growth outlook to 4.2% quarter-to-quarter and nearly 39,200 tons. The increased shipment levels reflected consumer spending behavior, which expanded by 4.8% in the first quarter of the year.

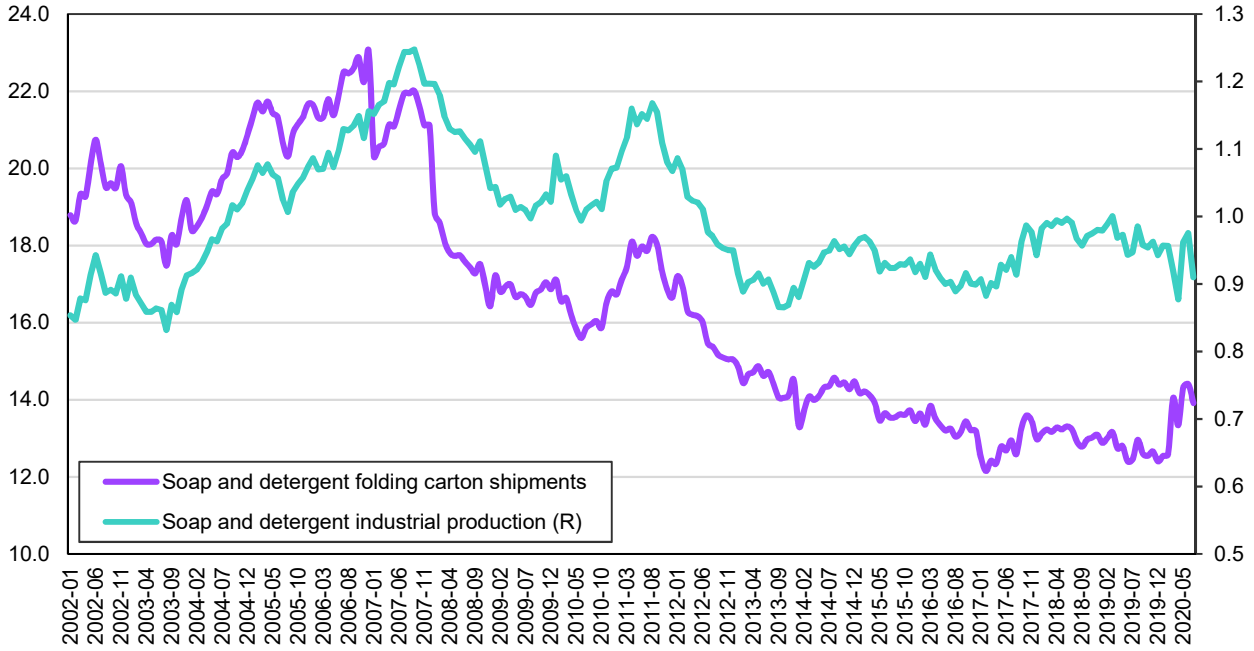
The second quarter continued on this trend, rising by 7.4%, thanks to the 4.9% growth in consumer spending. We forecast that the next two quarters will show milder growth of 0.8% and 1.9%, respectively. The forecasted growth in folding carton shipments in the last two quarters of the year is based on the anticipated tailwinds coming from industrial production growth of 2.2% and 2.1%.

On an annual basis, soaps and detergent folding carton shipments are expected to post 9.3% growth year-on-year in 2020. This strong performance has broken the

Figure 5

Soap and detergent folding carton shipments and industrial production

Shipment in thousand tons and industrial production index (2012 = 1.00)

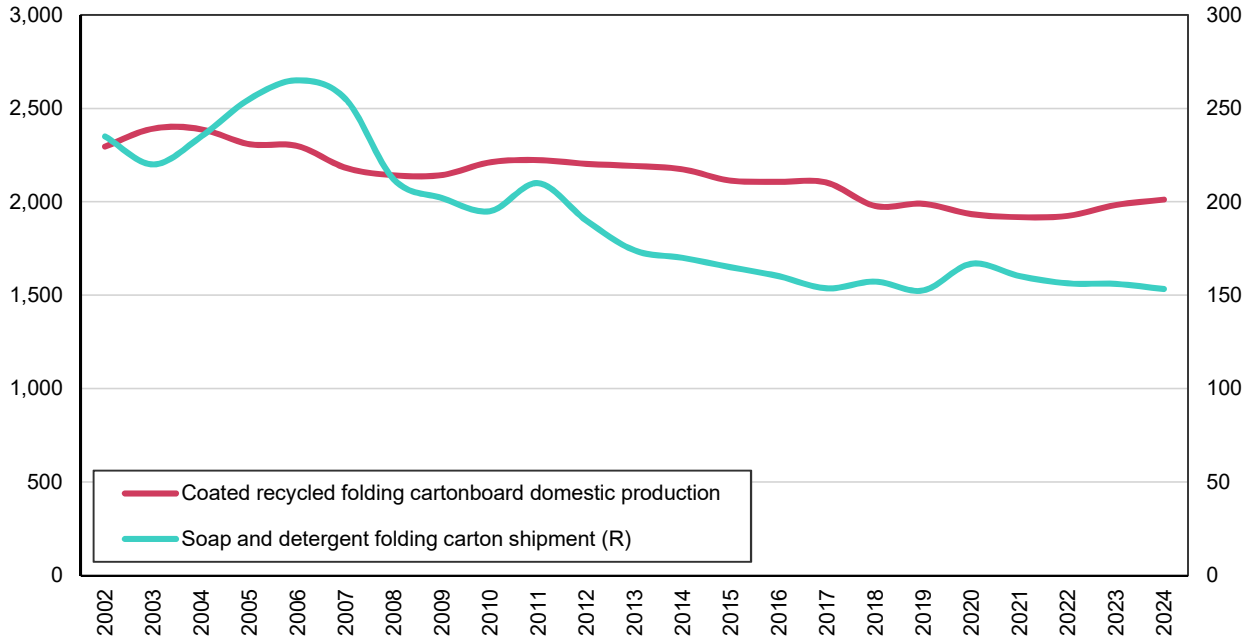


Source: Fastmarkets RISI and Federal Reserve data.

Figure 6

Soap and detergent folding carton shipments and domestic production of coated recycled board

Thousand tons



Source: Fastmarkets RISI.

downward trend of shipments to this segment. Consumers restocking essential goods, including soaps and detergents, and their extra focus on hygiene have lifted the demand for cleaning products across the board. This demand pull includes soap bars and powder detergent, both of which are packaged with folding cartons. Going forward, shipment levels will return to their long-term flat to downward trend, due to the continuous pressure from plastic packaging of liquid soap and detergent products.

Shipments will decline by 2.1% from 2021-2024, a correction to the significant growth registered in 2020. Looking at the long-term outlook from 2019 through 2024, our forecast indicates that soap and detergent folding carton shipments will show growth of 0.1% annually. This growth profile recognizes the anticipated growth of total folding carton shipments, supported by the restocking in 2020, and the challenges brought by alternative products and packaging materials. Shipments will reach 153,300 tons by 2024.

Appendix A: End-use methodology

End-use market activity

For most end-use markets, there are at least two distinct measures of activity that can be used to calculate the overall growth in the individual market segments: consumer spending data collected by the Department of Commerce's Bureau of Economic Analysis (BEA) and industrial production data released by the Federal Reserve Board. A third source of data that was used to assess the health of the various markets was trade data, as reported by the Department of Commerce's International Trade Administration.

Theoretically, there should be a tight correlation between these sets of series. Spending on domestically produced goods should equal total consumer spending less imports. Adding exports of these products to this figure would result in total production of these goods. This production figure should be the most important measure that can be used to track potential carton demand, since goods produced in the US are primarily going to be packaged in folding cartons produced in the US, while most consumer product imports are going to be packaged in their home countries.

In practice, however, calculated shipments for the various end-use markets rarely match up with the reported industrial production figures due to variations in the way the consumer spending data and the industrial production data aggregate products. The industrial production figures were shifted over to the new North American Industrial Classification System (NAICS) in 2002, but the trade data are reported using a completely separate classification system. And the consumer spending data do not fit into either of these systems, since the government calculates consumer expenditures on a commodity basis instead of an industry basis. Both consumer spending and industrial output are important measures used to gauge the health of the various end-use markets, and both were used in deriving the growth potential for folding cartons.

Carton demand by end use

The end-use market activity described above is the primary driver for the demand forecast by segment for folding cartons. The other is the ratio of carton shipments relative to end-use market growth. Fastmarkets RISI primarily uses the ratio of carton shipments relative to industrial production to generate the forecasts, since this ratio tends to have a tighter historical fit than the ratio relative to consumer expenditures. However, the second ratio provides a very good method to check whether the overall growth projections seem reasonable.

One glance at the trend of these ratios, which Fastmarkets RISI calls "end-use factors," gives a vivid illustration of whether carton shipments are exceeding general end-use market growth, which is rare, or lagging behind the end-use markets, which is much more common. Several factors contribute to the trend relative to end-use activity. One is that folding cartons may be heavily dependent on a specific sub-segment of the various end-use markets that is growing at a different pace than the general market.

The end-use factor also incorporates all other aspects that affect demand. The most important of these is substitution by alternative packaging materials, such as plastics or mini-flute corrugated. Another would be the shift toward using lighter-weight boxboard in the carton converting process, which leads to lower tonnage consumed per thousand square feet. In most cases, there is a very strong correlation between shifts in the end-use factor away from its trend and changes in real values per ton for folding cartons. Fastmarkets RISI used its projections of future changes in boxboard prices, primarily driven by fiber costs, to project the future trend in real carton values per ton. This was necessary to understand whether the carton markets would be subjected to intensifying losses in market share to competing materials or moderating losses over time, like those that occurred during the early part of the

last decade. Total shipments for the various carton end-use markets were then calculated by multiplying the end-use factor by the measure of overall growth in spending or output for that particular market.

Historical carton shipments by end use

Starting with the *2006 Trends Report*, with encouragement from the PPC, Fastmarkets RISI began to estimate shipments by end use based on the underlying growth trends for the different end-use markets rather than a PPC survey. The main purpose of the revision was to ensure that shipment numbers in each industry more closely reflected the activity in the end-use market, specifically the end-use factor. Another benefit of the revision is that total shipments, in tons, are now more consistent with Fastmarkets RISI's boxboard demand series.

Fastmarkets RISI uses the total folding carton shipment data to calculate a boxboard consumption estimate at carton plants by adjusting for the average converting loss at carton plants. The difference between this "true" consumption figure and the apparent consumption data for folding cartonboard is categorized as non-carton usage of folding boxboard. The final step of the forecast process requires a minor adjustment to the growth projections for all of the folding carton end-use markets so that this non-carton use figure will fall into an acceptable range. In the case of Canada, Fastmarkets RISI directly estimates carton shipments from folding cartonboard apparent consumption after factoring out losses, leaving out a non-carton use estimate for the country.

Appendix B: End-use market definitions

Table A1

End-use market definitions

End-use markets	NAICS code(s)	Description of key end-use markets and products
Beverages	3121 Beverage	Soft drinks, fruit drinks (except juice which is reflected in frozen foods), flavored water, bottled water, iced coffee and tea (non-iced in dry foods), wine, beer, spirits and other alcoholic beverages consumed off-premises and at food service establishments
Cereals/milled grains	3112 Grain & Oilseed	Breakfast cereals, other milled grain products
Confectionery	3113 Sugar and Confectionery	Granola clusters, chocolate bars, breakfast bars, fudge, chocolate candies, chewing gum, hard candies, jelly candies, licorice, marshmallow, popcorn, toffee, fruit peels
Dry foods	3111 Animal Food, 31182 Cookie, Cracker and Pasta, 31191 Snack Food, 31192 Coffee & Tea, 31194 Seasoning & Dressing	Snack foods, potato chips, corn chips, pretzels, pork rind, nuts, coffee and tea, flavoring syrup, condiments, animal food, dog and cat food, other snack food, spices and extracts
Frozen foods	31141 Frozen Food	Frozen fruit, frozen juices, frozen vegetables, frozen specialty foods, such as frozen dinners, entrees, and side dishes, frozen pizza, frozen whipped toppings, frozen waffles, pancakes, and french toast
Perishable bakery goods	3118 Bakeries and Tortilla	Refrigerated biscuits & dough, frozen cakes, pies and other pastries, pasta and tortilla manufacturing
Dairy	3115 Dairy	Fluid milk, dry and condensed milk, creamery butter, cheese, ice cream, popsicles, puddings, sherbets and other frozen desserts (except frozen bakery products)
Meat products	3116 Animal Slaughtering, 3117 Seafood	Beef, pork, chicken, seafood (fresh or frozen), animal fats and oils
Retail carry-out	722513 Limited-Service Restaurants	Fast food restaurants, take-out sandwich shops, pizza delivery shops
Cosmetics & toiletries	32562 Toilet Preparation	Perfumes, shaving preparations, hair preparations, face creams, lotions (including sunscreens), and other cosmetic preparations
Hardware & appliances	3325 Hardware, 334 Computer & Electronics, 335 Electrical Equipment, 3363 Motor Vehicle, 33221 Metal Cutlery	Metal hardware, such as hinges, handles, keys, and locks, computer and electronic products, video and audio equipment, laptops, CD drives, household appliances, motor vehicle parts
Converted paper product	32223 Stationary, 32229 Other Converted Products	Office supplies, mailers, household stationary, greeting cards, cups, plates, cartons, food trays
Pharmaceuticals	3254 Pharmaceutical, 3391 Medical Equipment	Medicine intended for internal and external consumption in such forms as ampoules, tablets, capsules, vials, ointments, powders, etc.
Soap & other detergent	325611 Soap and Other Detergent	Bar soap, liquid soap, laundry detergents, dishwashing detergents, pastes, powders, wetting agents, emulsifiers and other industrial agents
Recreational (sporting & toys)	33992 Sporting & Athletic Goods, 33993 Doll, Toy and Game	Balls, bows, clubs, weights, rackets, surfboards, skateboards, exercise equipment, dolls, action figures, toys, games (including electronic), hobby kits
Tobacco	31221 Tobacco	Chewing tobacco, cigars, cigarettes, snuff, prepared pipe tobacco
Miscellaneous markets		All other products not specified in the above categories

Appendix C: Summary

Table A1

End-use summary

Folding carton shipments by segment

Market	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f	% Growth 24/19
BEVERAGES										
Tons (thousands)	296	301	298	299	1,194	1,121	1,153	1,161	1,182	1.0%
Percentage change	4.1%	1.4%	-0.8%	0.4%	6.5%	-6.2%	2.8%	0.7%	1.8%	
Cereal/milled grain										
Tons (thousands)	94	97	96	97	384	364	359	360	360	0.2%
Percentage change	6.5%	3.3%	-0.4%	0.5%	7.9%	-5.3%	-1.3%	0.2%	0.0%	
Frozen foods										
Tons (thousands)	133	130	130	132	525	501	506	514	523	0.8%
Percentage change	4.9%	-2.5%	0.4%	1.4%	4.2%	-4.5%	1.1%	1.5%	1.9%	
Retail carry-out										
Tons (thousands)	64	60	67	72	262	295	307	316	324	1.9%
Percentage change	-13.8%	-7.4%	11.5%	7.9%	-11.7%	12.4%	4.2%	2.7%	2.7%	
Pharmaceuticals & OTC										
Tons (thousands)	79	80	81	82	322	309	313	317	320	0.9%
Percentage change	3.3%	1.5%	0.8%	1.9%	4.9%	-3.8%	1.2%	1.3%	0.8%	
Soap & other cleansers										
Tons (thousands)	39	42	42	43	167	160	156	156	153	0.1%
Percentage change	4.2%	7.4%	0.8%	1.9%	9.3%	-3.9%	-2.4%	-0.2%	-1.8%	
TOTAL INDUSTRY										
Tons (thousands)	1,252	1,286	1,292	1,154	4,985	5,046	5,084	5,163	5,255	1.9%
Percentage change (y-o-y)	5.6%	8.2%	0.8%	1.5%	4.0%	1.2%	0.8%	1.6%	1.8%	
Dollars (millions)	2,444	2,344	2,360	2,108	9,255	9,545	9,954	10,268	10,650	3.9%
Percentage change	5.9%	5.2%	4.3%	4.8%	5.1%	3.1%	4.3%	3.1%	3.7%	
Average value per ton	1,951	1,823	1,826	1,827	1,857	1,892	1,958	1,989	2,027	2.0%

Source: Fastmarkets RISI, Inc.

Note(s): r = revised, e = estimate, f = forecast.

Table A2

Folding carton shipments by segment

Percentage share

	Q1 2020	Q2 2020	Q3 2020	Q4 2020	2020e	2021f	2022f	2023f	2024f
Beverages	23.7%	23.4%	23.1%	25.9%	24.0%	22.2%	22.7%	22.5%	22.5%
Frozen foods	10.6%	10.1%	10.1%	11.4%	10.5%	9.9%	10.0%	9.9%	10.0%
Pharmaceutical products	6.3%	6.2%	6.2%	7.1%	6.5%	6.1%	6.2%	6.1%	6.1%
Retail carry-out	5.1%	4.6%	5.1%	6.2%	5.3%	5.8%	6.0%	6.1%	6.2%
Milled grain products (cereals, biscuits & crackers)	7.5%	7.5%	7.5%	8.4%	7.7%	7.2%	7.1%	7.0%	6.8%
Soap & other cleansers	3.1%	3.3%	3.3%	3.7%	3.3%	3.2%	3.1%	3.0%	2.9%

Source: Fastmarkets RISI, Inc.

Note(s): r = revised, e = estimate, f = forecast.

Appendix D: Analysis of changes in forecasts

As shown in the tables in Appendix C, historical revisions of both the US government macroeconomic data and the PPC carton market shipment data have had some effect on the forecast for folding carton demand over the years. This is because the forecasts for the individual markets are all based on the historical relationship between carton shipments, consumer spending and industrial production.

Specific revisions to the historical data include:

- GDP/consumer spending
  - Every summer, the US Bureau of Economic Analysis (BEA) releases an annual revision to the national income and product data for the prior three years. The BEA released a comprehensive revision of the National Income and Product Accounts (NIPA) in July 2018. These comprehensive revisions are released every four or five years. In any of these, all data from 1929 forward are subject to revisions, although changes extending that far back in time tend to be definitional in nature. Some examples of this from the 2009 comprehensive revision were the shift of all spending on food consumed away from home (restaurants and bars) over to the service sector, the removal of some antiquated categories and the introduction of new categories (such as wireless communications and internet access). There were no such definitional changes for consumer spending on goods in the 2013 or 2018 revisions. Consequently, the adjustments to the spending figures only extended back to 1998 and reflected statistical improvements coming from the incorporation of new or revised source data. The BEA also changed the base year for the real spending calculations from 2009 to 2012, which affected the actual consumption level figures rather than the growth figures. Overall, the revisions to consumer spending figures were relatively minor from 1998-2010, but more significant in 2011 and 2012.
- Industrial production
  - The Federal Reserve Board (FRB) released a comprehensive revision to all industrial production series in early 2016. All industrial production series have been rebased from 2007 to 2012 as well. Most of the changes in industrial production output appear to downwardly revise output in the post-recession years, with obviously greater variation at the more granular level as discussed more specifically in the end-use chapters.
- Folding carton shipments
  - In August 2013, the Paperboard Packaging Council (PPC) released a significant revision to the tonnage shipment data that are published in its Market Flash Report. The Executive Committee of the PPC had appointed a special task force to review and confirm the published figures for folding carton size, a task that had not been done for many years. The task force found that the dollar size of the market for 2012 ($8.845 billion) was correct, but that the tonnage had been slightly overstated. The corrected figures lowered tonnage shipments about 4% for that year, while the average value per ton increased by a similar amount.
  - This revision was constrained to the year 2012 alone, and there were no revisions to the tonnage data for prior years. While the revised data show shipments declining 2.9% for the year during 2012, it should be stressed that this figure probably overstated the actual decline during that particular year. Given the number of years since the PPC last conducted a comprehensive review of the data, some of the reduction in shipments in the 2012 data probably reflects adjustments for prior years. However, this does not really matter in the context of the *Trends Report*, which inherently looks at longer-term trends rather than specific year-to-year movements.

- Fastmarkets RISI adjusted the 2012 tonnage shipment data for all market segments to reflect the new total shipment levels from the Market Flash Report. Special emphasis was given to adjusting the data in market segments that the revised consumer spending and industrial production data indicated should have been weaker than previously expected in 2012. However, the shipment figures for every market segment were lowered to one degree or another. Even so, the brunt of the revision fell on the miscellaneous product category, which by its nature is vague. In much of the data published by the government, categories such as this are referred to as "Not Elsewhere Specified or Included" or NESOI.