The lean, green money-making machine

MEATING DEMAND

Meat alternatives: An investment analysis

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There are two main types of meat alternatives: i) plant-based, currently the only commercially available; ii) cultured or cell-based, which is created by taking cells from an animal and then exponentially growing them in a bioreactor, which involves no animal slaughter and is far more efficient than traditional livestock farming.

Kearney estimates that revenue for the global plant-based market is projected to grow from US$46bn to US$120bn between 2018 and 2025, representing a 15% CAGR. Longer-term growth projections vary greatly, with revenue estimates for the global market in 2030 ranging from $140bn (Barclays) to $252bn (Kearney).
INVESTMENT LOGIC

• We see multiple and varied routes to investing in plant-based markets, including i) producers, ii) companies that serve and distribute products containing meat alternatives, for example, restaurants, iii) food packaging and nutritional and health supplements.

• The three main drivers for consumers choosing to eat less meat are animal welfare, health and climate change.

• The cell-based meat industry is still nascent; however, as cell-based meat becomes revenue generating we expect there will be scope for greater investment. This could be as early as 2025. Large-cap public meat producers are among those to have already invested, with names including Tyson, Cargill and Merck.

• As government support initiatives for plant-based producers and rising prices of meat should provide a key tailwind for the plant-based industry, securing long-term growth and diminishing the idea of it being a passing fad.

• Regulatory headwinds for plant-based products include restrictions on the use of genetically modified organisms (GMO) and on the marketing of plant-based products as "meat".

• The loss-making nature of plant-based companies leaves them exposed to the threat of acquisition – a trend we show has been accelerating in recent years. We believe there is scope for significant consolidation in the plant-based food market.

• COVID-19 appears to have already benefitted non-meat alternatives, and may create supply shortages that lead to significant prices increases for animal meat.
Companies mentioned in this report:

Beyond Meat (BYND.O) > Hilton Food Group (HFG.L) > Science in Sport (SISS.L)*
Burcon NutraScience (BU.TO) > Hormel Foods Corp (HRL) > Starbucks Corp (SBUX.O)
Cargill (Private) > Hotel Chocolat (HOTC.L) > Tesco (TSCO.L)
Cranswick (CWK.L) > J Sainsbury (SBRY.L) > Tyson Foods (TSN)
Danone (DANO.PA) > McDonald’s Corp (MCD) > Unilever (ULVR.L)
Domino’s Pizza (DOM.L) > Merck (MRK) > Very Good Food (VERY.CD)
Enervit SpA (ENVIT.MI) > Modern Meat (MEAT.CD) > YUM! Brands (YUM)
Greggs (GRG.L)* > Nestlé (NESN.S) >
Hain Celestial Group (HAIN.O) > Restaurant Brands (QSR.TO) >

*Edison Investment Research client
**EXECUTIVE SUMMARY**

**What are meat alternatives?**

There are two main types:
1. **Plant-based**, which mimic the taste and texture of meat – currently the only commercially available alternative and forecast to grow significantly over the next 20 years as conventional meat sales decline.
2. **Cultured or cell-based**, which is created by taking cells from an animal and then exponentially growing them in a bioreactor, which involves no animal slaughter and is far more efficient than traditional livestock farming.

Kearney estimates that revenue for the global plant-based market is projected to grow from US$46bn to US$120bn between 2018 and 2025, representing a 15% CAGR. Longer-term growth projections vary greatly, with revenue estimates for the global market in 2030 ranging from $140bn (Barclays) to $252bn (Kearney).

**Investment opportunities**

We see multiple and varied routes to investing in plant-based markets, including:
- Producers, ranging from those with a focused portfolio to companies with broader portfolios that include plant-based alternatives as part of the mix.
- Companies that serve and distribute products containing these alternatives; for example, restaurants, cafés and shops that provide food services and prepared products.
- Food packaging and nutritional and health supplements.

Since the COVID-19 March related sell-offs, pure-play food producers have recovered more strongly than the broader food producer category. For example, Burcon NutraScience are up 276% to a high of US$2.26/share and Beyond Meat up 241% to a high of US$184/share. Over the past 12 months, Burcon and Beyond Meat have outperformed the S&P 500 Packaged Food and Meats index by 65% and 37% respectively.

Relative to companies focusing on plant-based proteins, other food producers offer lower risk but potentially less return if sales in the plant-based market reach the top end of our growth projections.
EXECUTIVE SUMMARY

Consumer demand drivers

In our view, a completely plant-based diet will never be dominant, but positively for the plant-based market there is a rising trend in new approaches such as flexitarianism (the elimination of processed foods coupled with low or occasional meat consumption).

The three main drivers for consumers choosing to eat less meat are animal welfare, health and climate change.

Rising competition from cell-based meat

The cell-based meat industry is still nascent, where global investments in 2018 totalled US$50m, equivalent to only 6% of the amount invested in plant-based food; however, as cell-based meat becomes revenue generating we expect there will be scope for greater investment. This could be as early as 2025, which is when cell-based meat is expected to be produced on an industrial scale and at a price equal to conventional meat.

Large-cap public meat producers are among those to have already invested, with names including Tyson, Cargill and Merck.

Affordability, pricing and meat industry subsidies

The severe impact of COVID-19 on global employment places emphasis on the price of food, where consumers will purchase cheaper alternatives to save more while earning less.

However, the current cost advantage for the meat industry (which is often heavily subsidised) may be short lived, as government support initiatives for plant-based producers and rising prices of meat should provide a key tailwind for the plant-based industry, securing long-term growth and diminishing the idea of it being a passing fad.
Executive Summary

Regulatory headwinds

Plant-based product companies who use genetically modified organisms (GMO) may find their expansion into regions with tighter GMO regulation limited. Brexit also creates an additional unknown as the UK’s stance on GMO imports once it leaves the EU is still undetermined. Regulators may also prevent plant-based product companies from labelling their products as “meat” if it is deemed misleading to consumers.

Consolidation trends

Plant-based companies’ low-margin sales and high R&D expenses typically result in them remaining loss-making for long periods of time. For example, Beyond Meat, which listed on Nasdaq in 2019 and has been operating since 2012, reported a net loss of US$10.2m in its Q220 results despite achieving record net revenues of US$113.3m (Q219: US$67.3m).

This subsequently, leaves such companies exposed to the threat of acquisition – a trend we show has been accelerating in recent years.

Acquirers, including typically large and diversified names such as Unilever, Nestlé and Danone, have the economies of scale and the established market presence and balance sheets to grow these new products quickly and generate a profit, leading us to believe there is scope for significant consolidation in the plant-based food market. Additional benefits for acquirers include creating both diversity and ESG in their portfolios, expanding regional capabilities and providing a faster route to market.

COVID-19

COVID-19 appears to have benefitted non-meat alternatives. For example, in the US plant-based meat sales grew 264% in the nine weeks ending 2 May (Nielsen).

Moreover, as happened following African Swine Flu, COVID-19 may create supply shortages that lead to significant prices increases for animal meat.

Finally, a report by Mintel highlights the potential COVID-19 tailwinds for the plant-based market, stating that 25% of millennials in the UK now found veganism more appealing as a result of the pandemic.

there is scope for significant consolidation in the plant-based food market
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Global meat market revenues are expected to almost double over the next 20 years; however, its growth looks set to be driven by the plant- and cell-based meat subsectors. Plant-based products should dominate the meat alternatives space over the next five years, where innovation is creating a credible consumer proposition. Products can now mimic the sensory profile of conventional meat, where tastes and textures offer a meat-like experience. Kearney estimates that revenue for the global plant-based meat market is projected to grow from US$46bn to US$120bn between 2018 and 2025, representing a 15% CAGR. Longer-term growth projections vary greatly, with revenue estimates (Barclays) to $252bn (Kearney). The number of companies entering the market is proliferating, including a number of large multinationals that can support significant R&D investment. That said, the plant-based meat market is still in its infancy and faces several headwinds, including the threat of competition and regulatory scrutiny.

Innovation: A catalyst for growth?

Consuming a wholly plant-based diet is not a new concept, nor are the links between animal protein consumption and its impact on the environment, animal welfare and human health. However, the popularity of plant-based foods has accelerated recently, with 29% sales growth for the US plant-based meat market between 2017 and 2019, outperforming the overall US retail food market growth of 4% (Good Food Institute). Initiatives such as Veganuary and the emergence of flexitarianism (to reduce overall meat intake) have encouraged consumers to transition towards plant-based products. Pure-play Beyond Meat is a key innovator in the plant-based meat industry. Refinitiv consensus forecasts anticipate its sales to grow from US$298m in 2019 to US$480m in 2020 (+61%) and to US$1.5bn by 2024 (+38.5% CAGR). Additionally, Greggs’ addition of its vegan sausage roll contributed to outstanding like-for-like sales growth of 9.6% in the first seven weeks of FY19.

Growing number of investment opportunities

Beyond Meat’s debut on the Nasdaq stock market in 2019 represented the first public investment opportunity in plant-based meat; however, with demand rising significantly over the last few years, so too has the number of companies entering the market. Nestlé, Tyson and Tesco have all invested heavily in their own plant-based products and have leveraged their established market positions to compete with the likes of Beyond Meat. Restaurants provide another route for investors, with examples including Burger King (a Restaurant Brands company), which uses Beyond Meat in its plant-based range (which has come under criticism as the plant-based patties are cooked on the same grill as conventional patties), or Greggs, which manufactures its own vegan range (which has come under criticism as the plant-based patties are cooked on the same grill as conventional patties). Alternatively, Science in Sport has a plant-based range of sports supplements, providing an alternative to traditional supplements such as whey protein.
Kearney forecasts (Exhibit 1) that the global meat market is projected to grow from c US$1tn in 2018 to US$1.8tn by 2040, which includes conventional meat, novel vegan meat replacement (plant-based meat) and cultured meat. Cultured meat is created from conventional meat by taking cells from an animal and then exponentially growing them in a bioreactor, which involves no animal slaughter and is far more efficient than traditional livestock farming.

There is a developing awareness of the increasing unsustainability of conventional meat as populations grow, providing significant scope for alternatives. Plant-based meat is the only commercially available alternative and is forecast to grow significantly over the next 20 years as conventional meat sales decline. Kearney forecasts that novel vegan meat replacements will have an 18% share of the global meat market by 2030 (US$252bn), up from c 4% currently (US$46bn). That said, 2030 revenue estimates vary, with UBS and Barclays expecting market sales to reach US$85bn (c 6%) and US$140bn (c 10%) respectively.

We see multiple and varied routes to investing in plant-based protein markets. This includes producers, ranging from those with a focused portfolio to companies with broader portfolios that include plant-based alternatives as part of the mix. Secondary to producers, investors can also gain exposure via companies that serve and distribute products containing these alternatives; for example, restaurants, cafés and shops that provide food services and prepared products. More tangentially, investment exposure can be accessed via food packaging and nutritional and health supplements. In Exhibit 3 we present valuations for a range of companies, split into these various categories.
Pure-play food producers

In Exhibit 2 we show the one-year performance of pure-play plant-based meat producers. Three of these have raised funds via IPO within the last two years. Beyond Meat’s 2019 IPO (which raised US$240m) was the first in the sector, followed by the Very Good Food Company (listed 16 June 2020, raised C$4m) and Modern Meat (listed 1 July 2020, raised C$2.5m). Burcon NutraScience, an R&D company focused on plant protein extraction and purification, also offers a pure-play investment opportunity.

Some of the key points for this segment are:
- Since the COVID-19 March related sell-offs, pure-play food producers have recovered more strongly than the broader food producer category, with Burcon NutraScience up 362% to a high of US$2.91/share and Beyond Meat up 261% to a high of US$195/share. Over the past 12 months, Burcon and Beyond Meat have outperformed the S&P 500 Packaged Food and Meats index by 68% and 52% respectively.
- We note that Beyond Meat trades at a materially higher FY21 EV/sales ratio than all other companies and categories shown in Exhibit 3. Sales for Burcon, Very Good Food and Modern Meat are too small for multiples to be significant.
- Multiple valuations, as typical for nascent companies reporting either negative or low earnings and absorbing high R&D investment tend not to be appropriate at this stage.
- Long-term earnings visibility obscured by potential competition or regulatory headwinds.
- In the shorter term, demand from restaurants may be constrained due to the perceived risk of adding to menu complexity with plant-based foods due to the earnings impact caused by COVID-19.
EXHIBIT 2: ONE-YEAR PRICE PERFORMANCE FOR A BASKET OF PURE PLAY FOOD PRODUCERS

Price performance (rebased to 100)

Source: Refinitiv, Edison calculations, priced at 27 October 2020

EXHIBIT 3: ONE-YEAR PRICE PERFORMANCE FOR A BASKET OTHER FOOD PRODUCERS

Price performance (rebased to 100)

Source: Refinitiv, Edison calculations, priced at 27 October 2020
**Other food producers and relevant companies**

Relative to companies focusing on plant-based proteins, other food producers are typically larger, with more diversified portfolios and stronger balance sheets. They offer lower risk but potentially less return if sales in the plant-based market reach the top end of the growth projections detailed in Exhibit 1. Some of the key points for these companies are:

- Mid-cap food producers have been the strongest performers of the other companies in Exhibit 4 over the last 12 months, with Hain Celestial and Cranswick up 53% and 7% respectively. Looking comparatively at large caps, Nestlé is up 2% and Tyson is down 27%, but the overall price performances for the selected companies detailed in Exhibit 4 are more stable relative to pure plays.
- Prospective multiples for food producers with hybrid models, particularly larger and more diverse players such as Nestlé, are marginally higher on average than traditional meat processors such as Tyson.
- Food producers outside of pure play are more attractive from an income perspective; median dividend yields range from 2–3% versus no dividend for companies focusing on plant-based products.
- Forward earnings multiples for large-cap food service companies are significantly higher relative to the rest of the table (except for pure play); however, multiples for mid-cap food service companies are on par with the other averages.

Supermarkets and companies focusing on food packaging and sports supplements have the lowest forward earnings multiples; supermarkets also offer the highest yields, as can be seen in Exhibit 4.
## INDUSTRY AND CORPORATE LANDSCAPE

### Exhibit 4: Company valuations

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<tr>
<th>Name</th>
<th>Description</th>
<th>Share price (ccy)</th>
<th>Quoted currency</th>
<th>Market cap (ccym)</th>
<th>Market cap ($m)</th>
<th>EV ($m)</th>
<th>EV/sales FY20e (x)</th>
<th>EV/sales FY21e (x)</th>
<th>EV/EBITDA FY20e (x)</th>
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<td>Beyond Meat Leading plant-based meat producer</td>
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<td>NESN.S</td>
<td>Nestlé Owns Garden Gourmet (plant meat)</td>
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<td>CHF</td>
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<td><strong>Food producers (meat)</strong></td>
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<td>TSN</td>
<td>Tyson Foods Raised &amp; Rooted plant-based brand</td>
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<th>P/E FY21e (x)</th>
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<td>MCD</td>
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<tr>
<td>SBUX.O</td>
<td>Starbucks</td>
<td>Plant protein extraction company</td>
<td>88</td>
<td>USD</td>
<td>102,404</td>
<td>102,404</td>
<td>213,219</td>
<td>9.1</td>
<td>9.1</td>
<td>7.6</td>
<td>9.1</td>
<td>7.6</td>
<td>36.7</td>
<td>36.7</td>
<td>47.5</td>
</tr>
<tr>
<td>YUM</td>
<td>YUM! Brands</td>
<td>Owns KFC, sells Beyond Chicken</td>
<td>97</td>
<td>USD</td>
<td>29,311</td>
<td>29,311</td>
<td>68,579</td>
<td>12.3</td>
<td>12.3</td>
<td>11.0</td>
<td>12.3</td>
<td>11.0</td>
<td>33.0</td>
<td>33.0</td>
<td>38.0</td>
</tr>
<tr>
<td>DOM.L</td>
<td>Domino’s Pizza</td>
<td>Launched vegan range on 7 Sept</td>
<td>339</td>
<td>GBP</td>
<td>2,025</td>
<td>1,564</td>
<td>3,898</td>
<td>9.9</td>
<td>9.9</td>
<td>7.9</td>
<td>9.9</td>
<td>7.9</td>
<td>26.6</td>
<td>26.6</td>
<td>27.9</td>
</tr>
<tr>
<td>GRGL</td>
<td>Greggs</td>
<td>Vegan sausage roll and steak bake</td>
<td>1318</td>
<td>GBP</td>
<td>1,725</td>
<td>1,332</td>
<td>3,298</td>
<td>3.3</td>
<td>3.3</td>
<td>2.4</td>
<td>3.3</td>
<td>2.4</td>
<td>14.4</td>
<td>14.4</td>
<td>28.6</td>
</tr>
<tr>
<td>HOTCL</td>
<td>Hotel Chocolat</td>
<td>Vegan range using nut milk</td>
<td>350</td>
<td>GBP</td>
<td>567</td>
<td>438</td>
<td>1,029</td>
<td>9.9</td>
<td>9.9</td>
<td>7.9</td>
<td>9.9</td>
<td>7.9</td>
<td>1.5</td>
<td>1.5</td>
<td>33.0</td>
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<tr>
<td>Mean</td>
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<td>Median</td>
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<tr>
<td><strong>Food packaging</strong></td>
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</tr>
<tr>
<td>HFLG.L</td>
<td>Hilton Food</td>
<td>50% share in Dalco, veg producer</td>
<td>1156</td>
<td>GBP</td>
<td>1,223</td>
<td>945</td>
<td>2,522</td>
<td>0.9</td>
<td>0.9</td>
<td>0.7</td>
<td>0.9</td>
<td>0.7</td>
<td>19.8</td>
<td>19.8</td>
<td>17.7</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
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<tr>
<td><strong>Supermarkets</strong></td>
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<tr>
<td>TSCO.L</td>
<td>Tesco</td>
<td>Plant chef is own plant-based range</td>
<td>212</td>
<td>GBP</td>
<td>26,772</td>
<td>20,678</td>
<td>63,316</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>10.1</td>
<td>10.1</td>
<td>12.1</td>
</tr>
<tr>
<td>SBRYL</td>
<td>J Sainsbury</td>
<td>Plant Pioneers plant-based range</td>
<td>203</td>
<td>GBP</td>
<td>5,818</td>
<td>4,494</td>
<td>18,264</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>6.7</td>
<td>6.7</td>
<td>15.0</td>
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<tr>
<td>Mean</td>
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<tr>
<td><strong>Sport supplements</strong></td>
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<tr>
<td>SISS.L</td>
<td>Science in Sport</td>
<td>Produces/sells plant-based supps</td>
<td>33</td>
<td>GBP</td>
<td>57</td>
<td>44</td>
<td>95</td>
<td>1.1</td>
<td>1.1</td>
<td>1.0</td>
<td>1.1</td>
<td>1.0</td>
<td>21.5</td>
<td>21.5</td>
<td>28.4</td>
</tr>
<tr>
<td>ENVT.MI</td>
<td>Enervit</td>
<td>Produces/sells plant-based supps</td>
<td>3</td>
<td>EUR</td>
<td>58</td>
<td>49</td>
<td>122</td>
<td>1.8</td>
<td>1.8</td>
<td>1.7</td>
<td>1.8</td>
<td>1.7</td>
<td>26.9</td>
<td>26.9</td>
<td>28.4</td>
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<td>Mean</td>
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</table>

We commented on the rapidly accelerating growth in the adoption of plant-based diets above. These include the most significant (and perhaps the easiest) one in the form of flexitarianism (focusing on a plant-based diet with the elimination of processed foods and low or occasional meat consumption). Veganism is increasingly being adopted, although rates of veganism are still low globally. That said, according to the Vegan Society, nearly half the UK is either flexitarian, vegetarian or vegan, providing significant scope for the entry of innovative plant-based products. We identify that ethics, health and climate change mitigation are the main consumer demand drivers, with plant-based products having several advantages versus animal meat. Exhibits 5 to 10 highlight the significant rise in the popularity of veganism since 2017, particularly among 18–34-year olds.

Food consumption trends

Kitchen Stories’ 2019 survey on food consumption outlines trends in leading world markets (China, the US, the UK and Germany), where the percentage of vegans is still small, ranging from 2% (China) to 7% (Germany). Additionally, when asked what trend they found most interesting, the majority of consumers chose high protein (c 34%) and low carbohydrate diets (c 25%) over the vegan diet, which ranged between 12.4% (China) and 17.5% (Germany). However, the number of innovative plant-based options that allow consumers to eat both a plant-based and high protein diet is increasing, exemplified by plant-based meat, which has a nutritional profile akin to animal meat.

In our view, a completely plant-based diet will never be dominant, but positively for the plant-based market there is a rising trend in new approaches such as flexitarianism, as mentioned above. Below are a few key points from a YouGov study on consumption trends in the UK in 2018:

- Around 14% of the British population are on a flexitarian diet, twice as many as pescatarians, vegetarians and vegans combined.
- Women between the ages of 18 and 24 are the most likely to limit the amount of meat they consume, with 18% considering themselves flexitarian and 3% vegan.
- The highest category for men limiting the amount of meat they eat is between the ages of 25 and 34, where 14% consider themselves flexitarian and 2% vegan.
- The three main drivers for consumers choosing to eat less meat were animal welfare, health and climate change. We explore each of these reasons in detail below.
CONSUMER DEMAND DRIVERS

However, according to Kitchen Stories, almost 15% of its UK polled consumers claimed to be vegetarian as of 2019, significantly higher than the 3% detailed in the YouGov study. Subsequently, this would mean almost 50% of the UK population follows a diet that requires plant-based protein.

Ethics

Graphic videos and information displaying the links between animal welfare and farming have never been more accessible and we believe it is a principal demand driver for the plant-based market. A study published by the Vegan Trade Journal supports this, demonstrating that in July 2018, 51% of polled UK vegan consumers stated they were vegan for ethical reasons. That said, there has been no specific policy on animal welfare in US-UK trade talks, which could see the return of chlorinated chicken and hormone-treated beef imports post Brexit. These headwinds affecting animal welfare could exponentially increase the number of people wanting to try alternative plant-based proteins.

Currently, animal welfare in the UK is among the best globally, with it being one of four countries to receive the highest grade in the Animal Protection Index and the fifth lowest user of on-farm antibiotics across 31 European countries; welfare is also supported by Red Tractor standards. That said, the level of animal welfare is capped when it becomes too costly for domestic farms to compete.
CONSUMER DEMAND DRIVERS

Exhibit 6: Share of adults who have tried plant-based meats in the US in 2019, by income

Exhibit 7: Google search trends showing interest in veganism over 10 years

Exhibit 8: Interest in veganism by country, according to Google search trends over the last 12 months (dark green equates to highest share of Google searches)

Source: TrendSource

Source: Google, Edison Investment Research

Source: Google, Edison Investment Research
CONSUMER DEMAND DRIVERS

Exhibit 9: Number of people that signed up to Veganuary globally, by year

Source: Veganuary, Edison Investment Research

Exhibit 10: Main reason for abandoning vegan diet in the UK, May 2018

Source: Edge Hill University; The Vegan Society
A plant-based diet is widely propagated as a healthier diet versus one with a significant intake of meat, particularly red meat. Indeed, there are a number of studies where life-threatening illnesses, such as cardiovascular and hypertension (high blood pressure), have been diminished through a decline in meat intake. In 2019, the Journal of the American Heart Association showed that in a study of more than 12,000 people those who ate mostly plant-based foods were 32% less likely to die from heart disease. It also highlighted the potential for a plant-based diet to promote weight loss and reduce body fat without restricting calories. So, given the myriad of diet options available, the idea of cutting out meat to improve health is one of the simplest to understand, making it a key demand driver of the plant-based diet.

We believe consumers will choose diets based on simple headline figures without understanding all the relevant variables, primarily due to the complex and ever-changing nature of nutrition research.

A common example is limiting red meat intake and replacing it with more plant-based options in the hope of reducing the risk of developing cancer. A study by the World Cancer Research Fund did conclude there was a 17% increased risk of colon cancer from eating 100g of red meat per day; however, this is insignificant when compared to the 1,500–3,000% increased risk of getting lung cancer from smoking. The fact that nutritional advice constantly evolves is also important, as illustrated by the Cochrane Institute, which stated in August 2020 there was no link between saturated fat and the risk of dying of heart disease, contradicting its 2015 report, which showed there was a mortality risk.

It seems that an individual’s experience rather than research will dictate demand and this may change over time. The health impacts of switching to a plant-based diet may take years to definitively prove or disprove. For example, vitamin B12 deficiency, which is common among vegans, takes years to develop and can cause extreme fatigue and immunodeficiency. Conversely, it is not that prevalent among meat eaters as it is one of the main nutrients found in red meat. Therefore, health is a strong short-term demand driver, but its impact may vary over time.

Mitigating climate change and environmental issues

Climate change awareness is growing rapidly; in 2020, 76% of UK residents were either very or fairly concerned about climate change (Department for Business, Energy and Industrial Strategy) and investments in clean energy globally have grown by a 15% CAGR over the last 15 years to $302bn in 2019 (2004: US$36.8bn) (Bloomberg). Mitigating climate change is a key reason why consumers choose a plant-based diet; in the UK 32% of respondents to a 2020 government poll said they chose to avoid or eat less meat to help limit the effects of climate change, up from 20% in 2019. Comparatively, in the same study only 26% of respondents walk, cycle, or use public transport instead of using a car, although this is up from 22% in 2019.
CONSUMER DEMAND DRIVERS

The substantial land and water needed for both meat and crop feed production are among the contributing factors towards its impact on the environment. Meat and dairy currently occupy 77% of the world’s agricultural landmass but only contribute 17% of the world’s calorie supply (Our World In Data); this disparity will potentially widen as the global population continues to grow. Further, Exhibit 11 illustrates that animal meat, especially beef, can require over 10x more water than plant-based foods, such as tofu and oats.

Noting the positive link between the environment and plant-based foods is not only key for determining demand drivers, but also for establishing why large conglomerates seek to enter the market. Starbucks, for example, is looking to increase its plant-based menu options as part of the environmental sustainability commitment it announced in January 2020.

However, there are negative environmental factors associated with plant-based foods, mainly caused by the limited number of protein options available. Soy, for example, is one of the principal proteins and its production is one of the leading causes of deforestation. In July 2020, the BBC highlighted that 65% of the world’s soya originates from countries with the highest deforestation rates, with the UK’s annual demand for soy between 2016 and 2018 requiring an area of land similar to the size of Wales (data from WWF and RSPB). That said, most of the soy produced in these regions is used to feed livestock, so switching to a plant-based diet may help reduce overall soy production and subsequently help mitigate associated environmental issues.

Exhibit 11: Health and environmental comparators

<table>
<thead>
<tr>
<th>Nutrition</th>
<th>Environmental cost in terms of water use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 pound of beef = 90–100 grams protein</td>
<td>20–80 gallons of water per gram of protein</td>
</tr>
<tr>
<td>1 gallon of milk = 128 grams of protein</td>
<td>15 gallons of water per gram of protein</td>
</tr>
<tr>
<td>1 pound of tofu = 45–55 grams of protein</td>
<td>6 gallons of water per gram of protein</td>
</tr>
<tr>
<td>1 pound of oats = 75 grams of protein</td>
<td>3.8 gallons of water per gram of protein</td>
</tr>
</tbody>
</table>

Source: UCLA, Edison Investment Research
Rising competition from cell-based meat

Plant-based foods face limited competition from other commercial products that can act as sustainable substitutes to animal meat. That said, cell-based meat is becoming a prominent alternative and has the potential to significantly disrupt the market due to its ability to create animal meat without the environmental impact. The cell-based meat industry is still nascent, where global investments in 2018 totalled US$50m, equivalent to only 6% of the amount invested in plant-based food; however, as cell-based meat becomes revenue generating there will be scope for greater investment (Good Food Institute). This could be as early as 2025, which is when cell-based meat is expected to be produced on an industrial scale and at a price equal to conventional meat.

Crucially, large-cap public meat producers are among those to have already invested, with names including Tyson, Cargill and Merck. Cargill, for example, has chosen cell-based meat over plant-based by electing to invest in Aleph Farms, a cultured meat company focused on growing complex meat varieties such as steak, with some products anticipated to launch in the next three to five years. KFC, a YUM! Brands company, is another important example, where management signed an agreement with Mosa Meat in Q220 to receive its lab-grown chicken once it is commercially available.

Affordability, pricing and meat industry subsidies

The severe impact of COVID-19 on global employment places emphasis on the price of food, where consumers will purchase cheaper alternatives to save more while earning less. Looking at the last 15 years in the UK, the household savings ratio is at a high of 25%, while disposable income has seen the greatest year-on-year fall at 5.6% over the period; both of these metrics are not expected to normalise until mid-2021 (Oxford Economics).
There are many global examples where livestock farming is heavily subsidised, helping meat products maintain lower prices than the plant-based alternatives, where the onerous costs of both ingredients and innovation are placed on companies. In the EU, direct payments for the animal farming sector amount to €28–32bn pa, c 18–20% of its total budget. The ability to sell animal meat at low prices potentially inhibits the long-term growth trajectory of plant-based alternatives, eclipsing the importance of ethics, the environment or health for the consumer. Burger King’s Impossible Whopper, for example, costs $1 more than the Whopper and average daily sales per store in Q419 fell to 28 from 32 when it was first introduced in Q319. As illustrated by Exhibit 13, these disparities in pricing are typical across a range of industries, particularly for products which aim to replicate conventional meat.

However, the cost advantage for the meat industry may be short lived, highlighted by the UK announcing it will be breaking from a range of EU farm subsidies following Brexit, where the money will instead be used to benefit the climate, ecosystems and the public. Additionally, a report by environmental research group CE Delft discusses the importance of introducing a ‘sustainability charge’ on meat in the EU to help cover its environmental damage, where the levy would increase the price of a steak by c 25%. Comparatively, the Canadian government announced in June 2020 that it would be providing C$100m in financing for Merit Functional Foods, a JV of Burcon NutraScience that produces plant-based proteins. Further government support initiatives for plant-based producers and rising prices of meat should provide a key tailwind for the plant-based industry, securing long-term growth and diminishing the idea of it being a passing fad.

Exhibit 13: Meat versus plant-based alternative price comparison

<table>
<thead>
<tr>
<th>Company</th>
<th>Meat-based product</th>
<th>Plant-based alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burger King</td>
<td>Whopper $4.29</td>
<td>Impossible Whopper $5.49</td>
</tr>
<tr>
<td>Ikea</td>
<td>Meat balls 500g $4.50</td>
<td>Plant balls $5.99</td>
</tr>
<tr>
<td>Greggs</td>
<td>Sausage roll £1</td>
<td>Vegan sausage roll £1</td>
</tr>
<tr>
<td></td>
<td>Steak bake £1.55</td>
<td>Vegan steak bake £1.55</td>
</tr>
<tr>
<td>Hotel Chocolat</td>
<td>Milk chocolate batons £7.00</td>
<td>Nut milk chocolate batons £7.00</td>
</tr>
<tr>
<td>Tesco</td>
<td>Southern fried breaded chicken mini filelets £8.20/kg</td>
<td>Plant Chef southern fried filelets £10/kg</td>
</tr>
<tr>
<td></td>
<td>Thin and crispy cheese feast pizza £0.63/100g</td>
<td>Plant Chef margherita pizza £0.93/100g</td>
</tr>
<tr>
<td>Science in Sport</td>
<td>PROTEIN20 £2.50</td>
<td>PLANT20 Bar £2.50</td>
</tr>
</tbody>
</table>

Source: Refinitiv, Edison Investment Research
Regulatory headwinds

Producers of plant-based meat aiming to disrupt the industry face a number of regulatory headwinds, which will only increase as the subsector grows. Soy, a primary protein used in numerous plant-based meats, is a key example. Companies such as Impossible Foods do not use genetically modified organisms (GMO) soy grown in the US due to the severe environmental impact of expanding soybean plantations in Brazil, the world’s largest soy producer. Subsequently, expansion into regions with tighter GMO regulation is limited and is the reason why Impossible Foods’ products have not been approved for sale in the EU. Brexit creates an additional unknown as the UK’s stance on GMO imports once it leaves the EU is still undetermined. Further, ingredients are not the only factor exposed to headwinds; marketing, particularly labelling products as meat, is another area in the regulatory spotlight. Plant-based food companies in France, for example, face a $370,000 fine for using ‘meat’ or any related terms as it has been deemed misleading to customers.

A YouGov study also showed this could be a potential problem in the UK, with only 47% of respondents agreeing that it would be acceptable to label plant-based products as meat.

Exhibit 14: M&A activity

<table>
<thead>
<tr>
<th>Date</th>
<th>Acquirer</th>
<th>Target</th>
<th>Description</th>
<th>Value where known (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 19</td>
<td>Navis Resources</td>
<td>Modern Meat</td>
<td>Now a wholly owned subsidiary of Navis</td>
<td></td>
</tr>
<tr>
<td>July 19</td>
<td>Cranswick</td>
<td>Katsouris Brothers</td>
<td>Continental and Mediterranean foods business that broadens offering in a number of plant-based, non-meat categories</td>
<td>41.3 (net consideration)</td>
</tr>
<tr>
<td>Mar 19</td>
<td>Pfeifer &amp; Langen</td>
<td>AMIDORI Food Company</td>
<td>Provides entry into plant-based protein market</td>
<td></td>
</tr>
<tr>
<td>Dec 18</td>
<td>Unilever</td>
<td>The Vegetarian Butcher</td>
<td>Part of its strategy to expand its portfolio into plant-based foods</td>
<td></td>
</tr>
<tr>
<td>Oct 18</td>
<td>Hilton Foods</td>
<td>Dalco Food</td>
<td>50% JV providing exposure in the vegetarian market</td>
<td></td>
</tr>
<tr>
<td>Sept 18</td>
<td>Nestlé</td>
<td>Terraferti</td>
<td>New investment bolsters Nestlé’s position in the plant-food based segment in the Americas</td>
<td></td>
</tr>
<tr>
<td>July 18</td>
<td>KKR &amp; Co</td>
<td>Upfield Foods</td>
<td>Private equity investment into Unilever’s plant-based spreads business</td>
<td>6,031</td>
</tr>
<tr>
<td>July 17</td>
<td>Nestlé</td>
<td>Sweet Earth Foods</td>
<td>Provided exposure to North America</td>
<td></td>
</tr>
<tr>
<td>July 16</td>
<td>Danone SA</td>
<td>WhiteWave Foods</td>
<td>Created DanoneWave plant-based business unit</td>
<td>8,010</td>
</tr>
</tbody>
</table>

Source: Refintiv, Edison Investment Research
Consolidation trends

As previously established, the rise in popularity of plant-based products is primarily driven by climate change mitigation, human health and animal welfare considerations. This demand needs to be met by product innovation, which is necessary to create substitutes that can compete with animal products in both taste and texture. That said, plant-based products’ persistent dependence on innovation forms an underlying headwind, as low-margin sales and high R&D expenses during the development stages typically can result in companies remaining loss-making for long periods of time. For example, Beyond Meat, which listed on Nasdaq in 2019 and has been operating since 2012, reported a net loss of US$10.2m in its Q220 results despite achieving record net revenues of US$113.3m (Q219: US$67.3m).

Subsequently, the difficulty in reaching profitability leaves companies exposed to the threat of acquisition; Exhibit 14 shows this has been an accelerating trend in recent years. Acquirers, including typically large and diversified names such as Unilever, Nestlé and Danone, have the economies of scale and the established market presence and balance sheets to grow these new products quickly and generate a profit, leading us to believe there is scope for significant consolidation in the plant-based food market. Additional benefits for acquirers include creating both diversity and ESG in their portfolios, expanding regional capabilities and providing a faster route to market.

COVID-19

COVID-19’s impact on animal meat processing has been well publicised, benefitting alternatives, such as the plant-based meat market, where US sales grew 264% in the nine weeks ending 2 May (Nielsen). Livestock factories, in particular, are typically cold and damp, in some cases creating perfect environments for spreading the virus, exemplified by the US where there have been at least 34,000 positive cases in over 384 meat-packing plants as of 14 August (Midwest Center). In Germany, more than 1,500 slaughterhouse workers tested positive for COVID-19, leading to the quarantine of over 7,000 workers (Financial Times). The full impact of COVID-19 on supply shortages is becoming increasingly apparent; however, African Swine Flu typifies how disease can create supply shortages that lead to significant price increases. As indicated by the National Bureau of Statistics of China, total hog production in 2019 was 544m heads, 21.6% lower than 2018, leading to average price increases of 63.3% y-o-y. COVID-19 presents a similar scenario, where the Guardian reported that over 10m chickens and 10m pigs in the US were likely to be culled by the end of September due to COVID-19 related shutdowns. The article adds that most of the culling was done by water-based foam, a method that animal welfare groups called ‘inhumane’. A report by Mintel highlights the potential tailwinds for the plant-based market, stating that 25% of millennials in the UK now found veganism more appealing as a result of the pandemic.
## APPENDIX

### Exhibit 15: Company snapshots for selected companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
<th>Key financials</th>
<th>Bull/bear points</th>
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</tr>
</thead>
</table>
| **Beyond Meat**     | Beyond Meat offers a range of plant-based meat, including the Beyond Burger, Beyond Sausage, Beyond Beef Crumbles and Beyond Chicken Strips. The company sells a range of plant-based products across the three main meat platforms of beef, pork and poultry. | Dec 2019  
Mkt cap: US$10.96bn  
Net cash: US$244.8m  
Revenue: US$297.9m  
EBITDA: US$25.3m  
Net loss: US$12.4m | Bull  
• First plant-based meat multinational company to bring production to China, with new facilities announced 8 September 2020.  
• Strong consumer awareness benefitted by a range of high-profile celebrity ambassadors.  
• Creators of plant-based meat so has first-mover advantage. |                                      |
| **Burcon NutraScience** | Burcon NutraScience is a Canadian research and development company, engaged in the development of plant protein extraction and purification technology in the field of functional, renewable plant proteins. The company and its subsidiary are engaged in developing a wide array of protein products, which includes Peazzaz, a pea protein, Puratein and Supertein canola proteins, and CLARISOY, a soy protein. | Mar 2020  
Mkt cap: C$240.6m  
Net cash: C$8.3m  
Revenue: C$31k  
EBITDA: C$3.7m  
Net loss: C$4.6m | Bull  
• Long-term deal with Nestlé to process plant-proteins announced at start of 2020.  
• In August 2020, Bunge invested $30m in JV, Merit Functional Foods, which will expedite construction of its new state-of-the-art plant-based protein production facility. |                                      |
| **Very Good Food**  | The Very Good Food Company is a Canada-based plant-based food technology company, which designs, develops, produces, distributes and sells a variety of plant-based meat and other food alternatives. Its products include The Very Good Burger, Smokin’ Burgers, Very British Bangers, Smokin’ Bangers, Pepperoni, Ribz, Taco Stuffer, Roast Beast, Steak and Stuffed Beast. | Dec 2019  
Mkt cap: C$138.2m  
Net debt: C$1.0m  
Revenue: C$1m  
EBITDA: N/A  
Net loss: C$2.3m | Bull  
• On 1 September 2020 it signed a lease for a Californian food production facility, which is expected to accelerate online sales.  
• Oversubscribed placing in August raised proceeds of C$8.5m, which will support its expansion into the US. |                                      |
| **Modern Meat**     | Modern Meat, formerly Navis Resources Corp, is a Canada-based meat alternative company, engaged in the business of developing organic plant-based meat alternative products and related branding and intellectual property. Its products include Modern Burger, Modern Crabcakes, Modern Meatball and Modern Crumble. It is focused on producing and distributing its products for retail sale in North America. | October 2019  
Mkt cap: C$110.9m  
Net cash: US$0.5m  
Revenue: N/A  
EBITDA: N/A  
Net loss: C$0.1m | Bull  
• Soy-, nut- and gluten-free across the range, which differentiates it from many competitors.  
• The company has recently announced it is expanding production into the US to meet demand. |                                      |
# APPENDIX

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<td><strong>Tyson Foods</strong> TSN US$59.5</td>
<td>Tyson Foods is a modern, multinational, protein-focused food company producing approximately 20% of the beef, pork and chicken in the United States. In June 2019, it announced the launch of its alternative meat company, Raised &amp; Rooted, which creates blended burgers (plant and beef mix) and faux chicken nuggets.</td>
<td><strong>September 2019</strong>&lt;br&gt;Mkt cap: US$21.5bn&lt;br&gt;Net debt: US$11.4bn&lt;br&gt;Revenue: US$42.1bn&lt;br&gt;EBITDA: US$4.1bn&lt;br&gt;Net profit: US$2.0bn</td>
<td><strong>Bull</strong>&lt;br&gt;• Established brand name, particularly in North America.&lt;br&gt;• Balance sheet to support rapid growth, following its launch Raised &amp; Rooted became available in 7,000 stores.&lt;br&gt;• Small business segment, so risk is significantly reduced and spread among its large meat business. <strong>Bear</strong>&lt;br&gt;• Meat producers and processors typically have inherently lower margins than their branded fast-moving consumer goods peers, due to lower brand loyalty and higher costs.&lt;br&gt;• Meat processors are affected by exogenous factors such as African Swine Fever, which can cause fluctuations in both demand and cost.</td>
</tr>
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</table>

| **Hain Celestial** HAIN.O US$34 | Hain Celestial is an organic and natural products company and its subsidiaries manufacture, market, distribute and sell organic and natural products under brand names, which are sold as better-for-you products. The company’s segments include United States, United Kingdom and Rest of World. Its brand Yves Vital Foods offers nutritious vegan and vegetarian options that provide a good source of protein, which contain B12 and iron. | **June 2020**<br>Mkt cap: US$3.8bn<br>Net debt: US$245.0m<br>Revenue: US$2.1bn<br>EBITDA: US$199.9m<br>Net profit: US$87.1m | **Bull**<br>• It is undergoing a comprehensive transformation following underperformance, with brand divestments, an organisational restructuring and a review of the commercial team and supply chain.<br>• Reduction in complexity has already started to bear fruit. **Bear**<br>• There is still work to do in improving the cash flow and the margin of the remaining brands.<br>• COVID-19 and greater at-home consumption provided a boost to FY20. Management expects some of the gains to recur, but time will tell. |

| **Cranswick** CWKL.L 3,590p | Cranswick is a leading British supplier of premium, fresh and added-value products. It typically supplies a range of meat products, however its acquisition of Katsouris Brothers in July 2019 broadens its offering into a number of plant-based product categories. Katsouris Brothers is a leading processor and multi-channel supplier of Continental and Mediterranean food products. | **March 2020**<br>Mkt cap: £1.9bn<br>Net debt: £146.9m<br>Revenue: £1.7bn<br>EBITDA: £155.3m<br>Net profit: £82.7m | **Bull**<br>• Acquisition immediately earnings enhancing, contributing revenue of £42.4m and profit after tax of £2.9m from July 2019 to 28 March 2020, rising to £65.7m and £4.4m respectively if Katsouris had been acquired at the start of the financial year.<br>• UK origin of produce resonates well with health-conscious consumers and minimises Brexit-related issues. **Bear**<br>• Product offering is skewed towards the premium and convenience ends of the markets, which are more likely to be affected by an economic downturn.<br>• The UK retail environment remains challenging.<br>• Brexit negotiations are ongoing and the impact is uncertain until full details are known. |

| **Hotel Chocolat** HOTC.L 347p | Hotel Chocolat is a leading UK premium chocolate brand, manufacturing innovative and accessibly priced luxury chocolate. Its products are sold via its 130 store locations, online and subscriptions. Recently, the company introduced a new range of chocolates suitable for vegans by replacing milk with nut-milk made with finely milled hazelnuts. | **June 2020**<br>Mkt cap: £418.9m<br>Net debt: £138.9m<br>Revenue: £136.3m<br>EBITDA: £10.3m<br>Net profit: £3.5m | **Bull**<br>• Company is successfully expanding into new geographies, most recently the US and Japan.<br>• Uses quality ingredients and so will benefit from growing consumer consciousness on health.<br>• Pricing of nut-milk products on par with dairy products. **Bear**<br>• Premium pricing for products, more likely to be affected by an economic downturn. |

Source: Edison Investment Research, Refinitiv, Company data

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**Exhibit 15 continued...**
### Exhibit 15: Company snapshots for selected companies

#### Company Description

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<td><strong>Food service</strong></td>
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<tr>
<td>Greggs GRG.L 1,314p</td>
<td>With 2,039 shops, eight manufacturing and distribution centres and 23,000 employees, Greggs is the leading UK 'food-on-the-go' retailer. It uses vertical integration to offer differentiated products at competitive prices.</td>
<td>Dec 2019 Mkt cap: £1.3bn Net debt: £184m Revenue: £1.27bn EBITDA: £231m Net profit: £87m</td>
<td>Bull • Strong product innovation, looking at the plant-based space; vegan sausage roll and steak bake.</td>
</tr>
<tr>
<td>Enervit ENV €2.9</td>
<td>Enervit operates in the sport supplements, food and functional nutrition markets through the research, development, manufacturing and sales of foods and supplements for those who practice sports or live a healthy lifestyle.</td>
<td>Dec 2019 Mkt cap: €51.0m Net debt: €13.2m Revenue: €62.2m EBITDA: €5.2m Net profit: €0.7m</td>
<td>Bull • Business is well placed in an attractive category. • Market leader in Italy in sports nutrition, functional nutrition and omega-3 supplements. In Spain and Sweden, Enervit is market leader in endurance sport supplements.</td>
</tr>
<tr>
<td><strong>Sports supplements</strong></td>
<td></td>
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</tr>
<tr>
<td>Science in Sport SIS.L 37p</td>
<td>Science in Sport is a British premium performance nutrition company, which develops, manufactures and markets innovative nutrition products for elite professional athletes, fitness enthusiasts and the gym lifestyle community.</td>
<td>Dec 2019 Mkt cap: £1.2bn Net debt: £184m Revenue: £1.27bn EBITDA: £231m Net profit: £87m</td>
<td>Bull • Well-placed business in a category that is attractive in the long term. • Online opportunity is significant and should drive margin expansion. • Well capitalised to weather COVID-19-related disruption.</td>
</tr>
<tr>
<td>Domino’s Pizza DOM.L 352p</td>
<td>Domino’s Pizza Group is the UK’s leading pizza brand and now has c. 1,200 stores across six markets, including the Republic of Ireland, Switzerland, Sweden, Iceland and Liechtenstein. The company announced on 7 September 2020 the addition of vegan items to its menu across all its UK stores, following a successful trial at 46 stores earlier in 2020.</td>
<td>Dec 2019 Mkt cap: £1.7bn Net debt: £236.8m Revenue: £508.3m EBITDA: £117.0m Net profit: £81.1m</td>
<td>Bull • Strong customer response from the release of its vegan pizza range, contributing to a 19.6% uplift in summer sales. • Business model is resilient to economic shocks and lockdown periods.</td>
</tr>
</tbody>
</table>

**Source:** Edison Investment Research, Refinitiv, Company data
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