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## **The Possible Impacts of Financial Nudging in the Food Infant Industries: Beyond Meat Case Study**

**Abstract.** The second decade of the XXI century has experienced the development of meat substitutes. The origin of this niche is said to emerge from environmental concerns. One of the market leaders in this infant industry is Beyond Meat company. The study aims to identify the impact of the capital markets and media coverage for an infant industry, such as meat alternatives, on the example of Beyond Meat. A sizeable portion of the investment in this new branch of the food sector came from the capital markets, which expect a return on their investment. The Beyond Meat case suggests that these substantial investments did not bring expected returns, which several factors, such as the post-COVID bear market and lack of demand for meat substitute products, could have caused. Thus, despite awareness campaigns, so far, the company has experienced losses. The development of this market niche acted contrary to what was expected. The market failings correlate with the loss of interest of the retail investors, which was attempted to be measured by this research. As a proxy for the retail investor interest, Google Trends Index was used and compared to the stock prices (a method often described as a Buzz Indicator).

**Key words:** consumer behaviour, meat substitute, nudge

**JEL Classification:** D11, D12

### **Introduction**

Food producers, as well as food retailers, face changing, increasing consumer demands on issues such as, for example, nutritional value, convenience, etc. (Gurbuz and Macabangin, 2019; Nowicki and Sikora, 2012). The increasing part of the market responds with the provision of organic foods, which are perceived as more nutritious and safer (Gurbuz and Macabangin, 2019), or with plant-based proteins, presented as healthy and environmentally friendly (Antoniak et al., 2022). While there is a perspective of the market responding to the needs of the consumers, another view suggests that it is the consumers responding to the products marketed by the producers. Marketers may be inclined to be manipulative when offering their products, despite the difficulty of satisfying consumers (Gurbuz and Macabangin, 2019). Katono and Atukunda (2021) even question whether the “consumer is still a king” or whether his sovereignty has been appropriated by salespeople (marketers) studying human reflexes and instincts.

Similar conclusions can be drawn from studying the works of Nobel prize laureates Sunstein and Thaler (2008), who is well-known for coining the concept of "nudge", i.e.,

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directing consumers towards specific choices without resorting to coercion. These can be used by the policy-makers seeking to influence the population's behaviour (e.g., to channel peoples' behaviour to eat healthier), but also, for instance, by companies that try to improve the productivity of their workers (Cai, 2019). Moreover, companies can use nudges to increase market share with their products in the markets.

According to Thaler and Sunstein (2008), the main criterion for the nudge to fulfil is that the “nudged” ones are the ones to tell whether the choice they are advised to make will improve their welfare (also pointed out by Cai, 2019). Thus, the example of Beyond Meat shows that establishing an infant industry well-funded by institutional investors can apply to the “nudge” theory on various levels. One of them is the development of this new sector through stock market investment.

The previous studies on nudging in the financial markets focus on financial choices for the security of the retirement of retail investors (Anderson and Robinson, 2018; Cai, 2019; Vasas, 2022). Cai (2019) points out a research gap regarding the study of nudges in the financial markets. It allows for studying the impact of prominent, large investors and their impact on the perception of shares by retail investors.

The application of nudge theory regarding meat alternatives has been applied only on the “micro”-level by Vandenbroele et al. (2019). The study has examined the use of nudging on consumer choice of meat substitute products and has shown that too intense pressure on consumers might, in fact, discourage them from consuming a product. This might have been the case with Beyond Meat, as regarding the infant industry, both nudges from the financial markets and consumer choice perspective may interlock each other.

A nudge towards plant-based meat substitutes has been introduced as the discussion regarding human-induced climate change progressed. Vandenbroele et al. (2019) studied consumer reactions toward the alternatives in the shopping surrounding. They discovered that cross-sections (containing both meat and plant-based products) are regarded as less intrusive and, thus, more convincing for the customers. Evers et al. (2018) discovered that the less intrusive the nudge is perceived by a consumer, the more likely the consumer is willing to accept the suggestion of the nudge. The less obvious “nudge” might be the media presence, which may be reflected in demand for stocks, thus in their prices, as well as in the accessibility for the company funds.

Huang et al. (2019) presented an extensive literature review showing that the Internet presence at a certain time (search engine searches, mentions on blogs, and social media) strongly correlates with stock market prices. They list a few features assisting the phenomenon of stock prices and the investor attention correlation.

a) As much as the stock price can draw the investor's attention, so can the attention influence the stock price (creating a feedback loop). Especially extreme prices and trading volumes bring the investor's attention to specific stocks.

b) Although news coverage can be used as an investor attention proxy, the news presence does not have to translate toward the corresponding readership.

c) Investor attention (with the media presence as a proxy) can both positively and negatively correlate with the stock price.

d) It may be that investors' beliefs impact the prices of certain financial assets for a brief time, yet soon these prices return to their fundamental value.

Several research attempts to find correlates between the media presence of certain companies (or their industries) and their stock market valuation, not always showing conclusive outcomes (Alamsyah et al., 2019; Pierre et al., 2019; Preis et al., 2010). Yet, the

previous research did not focus on the infant industries, which rely on information diffusion.

## **Methodology**

The study aims to estimate whether the significant inflow of capital toward Beyond Meat corresponds with the increase of interest by retail investors, fostering the performance of the infant industry.

First, the structure of the stock ownership is analysed. Second, the Buzz Indicator is compared with the stock prices. Buzz Indicator is a ratio of search engine searches on a given topic. The keywords used in our research are: “Beyond Meat”. Then, we compare the Buzz Indicator with the stock prices of the analysed company. The Google Trends values range from 0 to 100, indicating the rate of interest of a particular keyword. The comparison was performed with the help of Google Search Query Stock Analyzer software.

Using Pearson correlation, monthly Google Trends values were correlated with the corresponding stock prices. The monthly levels were rounded according to the range in which they were in different periods.

## **Results**

In the study, we analyse Beyond Meat Inc., a company that offers meat substitutes. The industry itself is new and can be qualified as an infant industry. This American company specializes in producing plant-based products imitating meat, such as beef patties, sausages, jerkies, etc. This new industry is associated with concerns over climate change (in particular methane emissions from cattle), as well as ethical concerns (i.e., animal welfare), placing itself as a vegan alternative toward animal-sourced food. It received support from a broad spectrum of investors and media personalities. Such companies aim to reduce these emissions by feeding people with plant-based products. The company was founded in 2009 in the USA, and it started selling its products in 2012. After ten years, i.e., in 2019, it was listed on the New York Stock Exchange (NYSE). The same year, it was acclaimed by CNBC (2019) as the best NYSE debut of the year. As the example of this company shows, the successful Initial Public Offering (IPO) has translated into increased company activity (e.g., marketing and production). Soon the situation changed - already before the market crash of early 2020 due to the economic closures following lockdowns, Beyond Meat's share price has started decreasing.

The sales of the company have been diminishing ever since. At the end of the first quarter of 2020, the stock value again increased, as has the whole stock market, due to quantitative easing and the establishment of Special Purpose Vehicles (SPVs) by the Federal Reserve (FED). The role of institutional investors has increased significantly after the creation of SPVs by the FED in 2020. The establishment of SPVs was responsible for the indirect yet active engagement of the FED as a stock market investor. Despite companies' hopes for growth after the lockdowns have stopped (Seattle Times, 2021), the further losses were attributed to the closure of venues and, consequently, the revenue losses, but the inflation. As the 2022 crisis unfolds, the company has lowered its annual revenue guidance (from 560-620 million USD range to 470-520 million USD range), and

its sales continue to drop, causing a nearly 100 million USD revenue loss (Just Food, 2022). As the cost-of-living crisis prevails, cheaper meat is blamed for the continued drop in plant-based meat alternatives. The sale of Beyond Meat products has been discontinued by several fast-food chains, such as Dunkin Donuts or Hardee's, due to the lack of demand (Fox Business, 2021; Reuters, 2022). Due to the losses, the company decreased its workforce by over 1000 (ca. 4% of its total workforce). Figure 1 depicts the stock market prices of Beyond Meat since its Initial Public Offering (IPO) as compared with the Google Trends presence (treated as a proxy for the media presence, as well as the retail investor interest).



Fig. 1. Price of the Beyond Meat stock prices since its Initial Public Offering in 2019 as compared to Google Trends

Source: own elaboration and calculation based on Nasdaq (2022) and Google Trends (2022) data.

Indeed, the buzz (pink colour) often was reflected in temporal price spikes (green colour). The higher Google Trends scores had to be caused by the increased search intensity, thus indicating higher interest from retail traders at these times. The highest correlations can be seen in June and July of 2019, from January to March 2020, May 2020, and February/March 2021. In the following months, both price and media momentum was already down (Figure 1).

A Pearson correlation has been calculated from the gathered data to investigate whether there is a correlation between retail investors' interest in a particular stock (here: Beyond Meat) and the share prices. The Google Trends Index and share prices of Beyond Meat were grouped by month from May 2019 until October 2022 and rounded to entire fives. The justification for such price simplification is that stock market share prices change multiple times within a day, while this research aimed to investigate certain tendencies. The full range of the data is presented in Appendix 1. The Pearson correlation has been calculated for the studied period and the particular years since the Beyond Meat IPO (i.e., 2019). The correlates are presented in table 1.

Table 1. Pearson correlations for the monthly Google Trends Index and share prices

Period	05.2019 - 10.2022	2019	2020	2021	2022
Correlation	0,400	0,412	-0,141	0,441	0,226

Source: own calculations based on Nasdaq (2022) and Google Trends (2022) data.

The overall correlation between the Google Trends Index and share price changes is significant, at the rate of positive 0.4. The weak negative correlation of the year 2020 can be attributed to the market shocks due to the lockdowns, as well as the overall market volatility. As the interest decreases and, at the same point, becomes less volatile, the impact of the Google searches diminishes to 0.226, becoming insignificant (Table 1).

The progressing convergence of the Google Trends Index and stock prices followed periods of high volatility. This confirms some observations made by other researchers. Huang et al. (2019) claim that high volatility draws great attention. Moreover, building on another argument stated by Huang (et al., 2019) that investor attention might translate as negatively as positively to the share prices, it can be asserted that in the first months after the IPO, the market was still trying to determine the actual value of the shares, thus such shares might experience higher volatility as well as a higher rate of online searches by the potential investors (Figure 2).

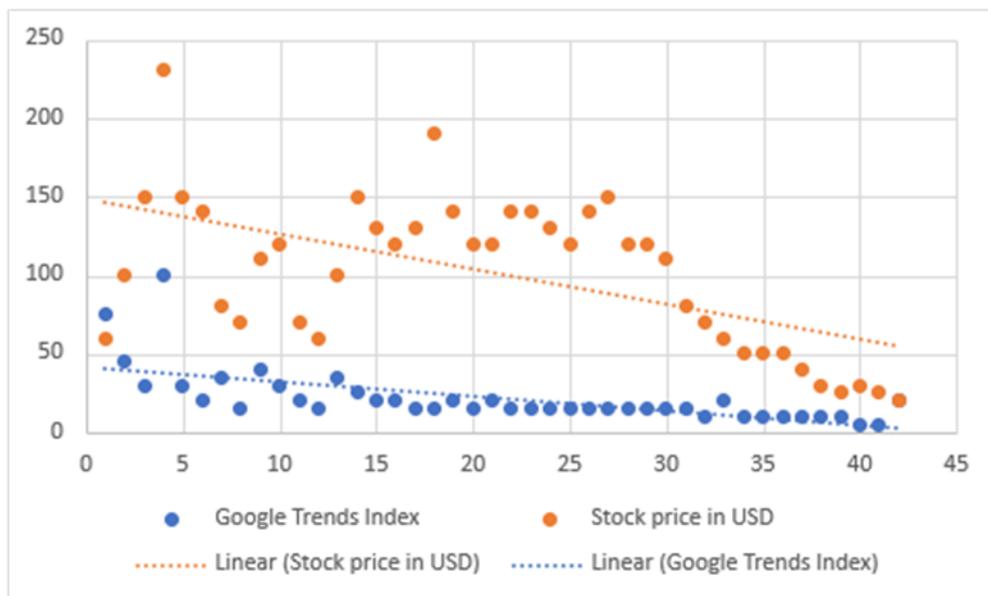


Fig. 2. Regression lines for the chosen Beyond Meat Google Trends Index and stock price points

Source: own study.

Despite market failings, the company still has a sizeable number of shareholders among the institutional investors, indicating that the retail investors initiated the outflow of funds. The institutional investors rely less on media information, and they are the ones who seem to have maintained their investment in Beyond Meat. The biggest group of investors constitutes institutional investors. Mutual fund folders and other institutional investors

constitute more than half of all the shares and more than  $\frac{2}{3}$  of all publicly traded shares (Figure 3).

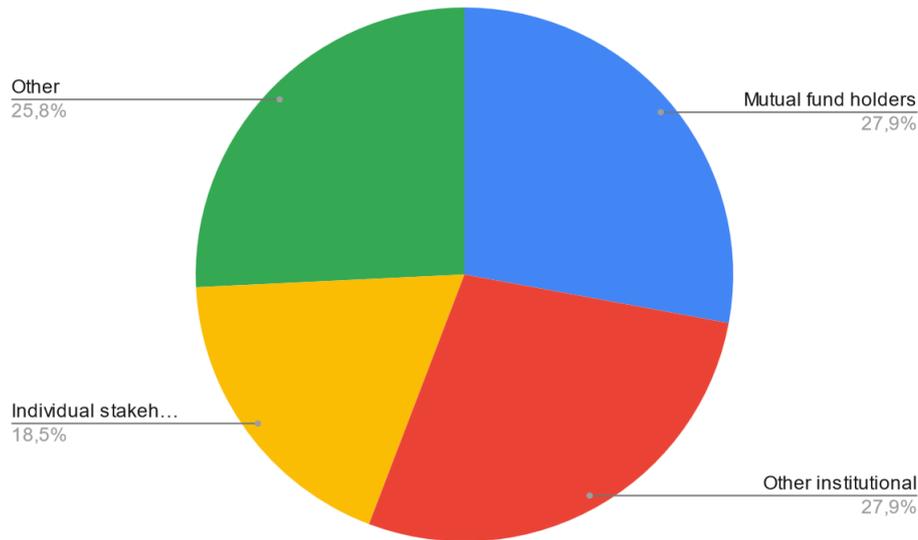


Fig. 3. Various kinds of investors holding BYND shares

Source: own elaboration based on CNN (2022).

A specific breakdown of the company's institutional ownership can be seen in table 2, presenting the companies holding ca. one-third of the publicly traded shares of Beyond Meat. They are represented by major investment institutions, such as The Vanguard Group, BlackRock (the institution nominated by the FED to manage SPVs), Goldman Sachs, or Barclays. Their initial support (as well as during the first months of the COVID-19 pandemic) could have been an incentive (a nudge) for the retail investors to invest in Beyond Meat.

Table 2. Top 10 owners of Beyond Meat Inc. [27.09.2022]

Stockholder	Stake (%)	Shares owned	Total value (USD million)	Shares bought/sold	Total change (%)
The Vanguard Group, Inc.	8.49	5,406,367	131.915	+437,550	+8.81
Baillie Gifford & Co.	6.61	4,209,257	102.705	-4,219,252	-50.06
BlackRock Fund Advisors	5.69	3,623,690	88.418	+1,482,551	+69.24
S SgA Funds Management, Inc.	2.23	1,419,462	34.634	+556,475	+64.48
Ninety One UK Ltd.	2.22	1,414,254	34.507	+38,647	+2.81
SG Americas Securities LLC	1.74	1,109,388	27.069	+56,748	+5.39
Geode Capital Management LLC	1.69	1,072,606	26.171	+292,312	+37.46
Goldman Sachs & Co. LLC	1.57	998,959	24.374	+76,001	+8.23
D. E. Shaw & Co. LP	1.52	970,537	23.681	+561,491	+137.27
Barclays Bank Plc	1.33	848,751	20.709	-97,212	-10.28

Source: own elaboration, based on CNN (2022).

Nudges can be used by different institutions (governments, companies) and on various levels. Some nudges may be used to translate the outcome into another field. Such can be regarded as institutional investors funnelling their funds towards a particular industry. Significant investment funds, aiming at capitalisation from the promising market of meat substitutes, directed their resources in the stocks of the meat alternative infant industry, represented by, e.g., Beyond Meat. Increased demand for the stocks translates into a higher value of its stocks, thus increasing the financing possibilities of the company. The growth of a stock value itself nudges other investors, both institutional as well as retail ones, to channel their funds toward a company promising favourable returns. The increase of funds from the stock market is supposed to translate into the rise of funds on the business activities (such as marketing or production), with hopes of increased sales. Thus, the nudge from the financial markets is supposed to work twofold: on the stock environment and the consumer (Table 3).

Table 3. The expected outcome of the initial investments in the meat substitute infant industry. As the experience has proven, the financial market nudge from the institutional investors did not translate into the expected outcome

A	B	C	D
Capital inflow from institutional investors	Other investors follow as the stock price grows  Increase of funds for the company	Further growth of the stock price  Increase of company activities (marketing, production)	Expected increased sales

Source: own study.

While the purchase of stocks by large institutional investors, and consequential rises in the price of certain stocks, may not be intended to be nudging, it certainly is, as it impacts the choices of other investors covertly. Cai (2019) suggests that nudges should be thought of only as beneficial for the nudged ones, yet in practice, it does not have to be so. Despite significant nudging efforts from both governments and producers, plant-based meat production does not respond to this expected consumption and investment patterns.

Beyond Meat, an example of an infant industry company may exemplify the nudge theory twofold. First, most obvious is the attempt to convince potential customers, using marketing campaigns, to purchase the new product. This nudge is directed toward the retail consumers (as well as wholesale partners, as the previously mentioned examples of Hardee's and Dunkin Donuts show), whose arguments may convince them that the product is healthier for them, better for them, better for the planet they live on, etc. Second, yet essential and primary for the first nudge, is the large inflow of capital towards the stocks of a given product (here: Beyond Meat). This nudge is directed toward retail investors who, seeing the large influx of capital and the rise of the given share prices, would be encouraged to invest in a particular stock. Here, again, retail consumers would judge positively such an increase, viewing such a company as a promising investment, thus positive for their investment portfolios. Both are inseparable, and one influences the other. Although nudges are often characterized as incentivising for the improvement of the well-being of the incentivised ones, it does not have to be so, especially in the financial markets, where

clients may be nudged for the benefit of the nudging one (Cai, 2019), i.e., the institutional investors.

The price of the stock may have been, in fact, driven more by the institutional investors than by the retail ones. Yet, large investments coming from institutional banks also show misallocated funds on an investment, which so far proved not to meet the consumers' demand in a scale previously anticipated.

## Conclusions

The Beyond Meat case shows that despite substantial funding and a favourable outlook in the media, the consumers did not accept the product as the investors expected. Consumer choice may not be entirely easy to be shaped at will. Thus, the prediction that consumer choice has been entirely replaced by those who study human instincts to implement their goals (whether financial or policy-wise) might be premature. Yet, the findings show that the strongest correlation between the price changes and Google Trends is within the initial months following the IPO when the stock price adjusts to the market. The weak correlation in 2021 shows high volatility within this year, followed by the drop in the share prices following the extinguishing interest in the brand.

We are fully aware of the study's limitations. Our study is based on only one company representative of the substitute meat market, i.e., Beyond Meat, which might not fully reflect the sector's performance. Moreover, the research period, 2019-2022, is characterised by a high stock market volatility driven mainly by the COVID-19 pandemic and the Russian invasion of Ukraine. Especially this volatility can be seen (setting aside quite typical instability in the first months after the IPO) in the year 2020 (see: table 1). Additionally, there is a limitation to the Buzz Indicator method, as a high search ratio does not have to indicate positive interest in the company's stocks. A deeper analysis of the substitute meat market is a challenge for future research.

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Appendix 1. Monthly Beyond Meat Google Trends Index and its estimated price per share from May 2019 until October 2022

		2019							
		May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Google Trends Index		75	45	30	100	30	20	35	15
Share price in USD		60	100	150	230	150	140	80	70

		2020											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
G. Tren.		40	30	20	15	35	25	20	20	15	15	20	15
Sh. (\$)		110	120	70	60	100	150	130	120	130	190	140	120

		2021											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
G. Tren.		20	15	15	15	15	15	15	15	15	15	15	10
Sh. (\$)		120	140	140	130	120	140	150	120	120	110	80	70

		2022									
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
G. Tren.		20	10	10	10	10	10	10	5	5	20
Sh. (\$)		60	50	50	50	40	30	25	30	25	20

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