

Consumer Spending on Plant-Based Meat Alternatives

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It is estimated that the world population will reach 9 billion by 2050 (Boukid, 2021); meeting the food needs of this growing population is a global challenge. Meanwhile, inspired by sustainability and environmental stewardship initiatives, food production practices themselves have begun to shift. The production of alternative proteins is an example of a new production practice that continues to attract the attention of investors, the media, and stakeholders along the food supply chain. Dominating the market for alternative proteins are plant-based meat alternatives (PBMA), which are designed to mimic animal-derived proteins while avoiding some of the environmental impacts of raising animals for meat. In addition to potentially alleviating the effects of the livestock industry on the environment and climate (Boukid, 2021), PBMA may also lead to improvements in animal welfare and human health. This article describes various aspects pertaining to the current landscape of PBMA, with a focus on consumer spending patterns and presents insights into the potential role of policy in shaping the market for alternative proteins.

Despite the public discourse surrounding PBMA, these products have yet to become a consistent part of consumers' diets for several reasons. First, demand for animal-based meat continues to rise, as noted by Rubio, Xiang, and Kaplan (2020). One reason for sustained meat consumption is that it remains a significant cultural norm (Slade, 2018). Second, there are concerns about the level of ultra-processing in PBMA, as highlighted by Hu, Otis, and McCarthy (2019).

Empirical research has illuminated challenges surrounding consumer adoption of PBMA. Hoek et al. (2011) found that consumers often do not find the taste and texture of PBMA as appealing as animal-based meat. A subsequent study by Hoek et al. (2013) explored long-term consumer acceptance of a plant-based diet using a repeated in-home adoption experiment. They found that consumers' preferences for meat substitutes could improve with continuous exposure. On the other hand, Elzerman, Van Boekel, and Luning (2013) observed that consumers hesitate to

adopt PBMA given the insufficient product information on packaging, price considerations, and incomparable taste and texture of meat. Graça, Calheiros, and Oliveira (2015) and Michel, Hartmann, and Siegrist (2021) further revealed that a strong attachment to meat and negative perceptions of PBMA hinder consumers' willingness to switch to PBMA. Moreover, White, Ballantine, and Ozanne (2022) employed Social Practice Theory to explore consumer practices related to PBMA consumption. Their findings underline the influence of social and cultural structures on the awareness and consumption of PBMA. This resonates with the observations by Slade (2018) about the significant role of cultural norms in consumer choices, thereby creating a deeper understanding of the barriers and facilitators in the adoption of PBMA.

Both Cuffey et al. (2023) and Neuhofer and Lusk (2022) utilized product purchasing data and found that PBMA buyers are primarily young, single, female, college-educated, employed, and of higher income. Interestingly, 86% of these buyers also purchased ground meat, suggesting that PBMA are not completely displacing traditional meat products in the household. Zhao et al. (2023) added to this by showing that PBMA may act as a complement to beef and pork, while substituting for chicken, turkey, and fish, offering unique implications for market strategies.

Taken together, while there has been a growing body of research on consumer demand for PBMA, the majority of the literature has relied on either theoretical rationale or hypothetical economic experiments. In addition, previous research findings highlight the complexity of consumer attitudes and behaviors toward PBMA, suggesting the need for a more comprehensive understanding of the determinants influencing their adoptions. In this article, we summarize actual consumer adoption patterns for PBMA using real-world consumer purchasing data. We draw primarily on Cuffey et al. (2023), who used a nationally representative consumer panel dataset to examine adoption patterns for PBMA.

Who Buys Plant-Based Meat Alternatives?

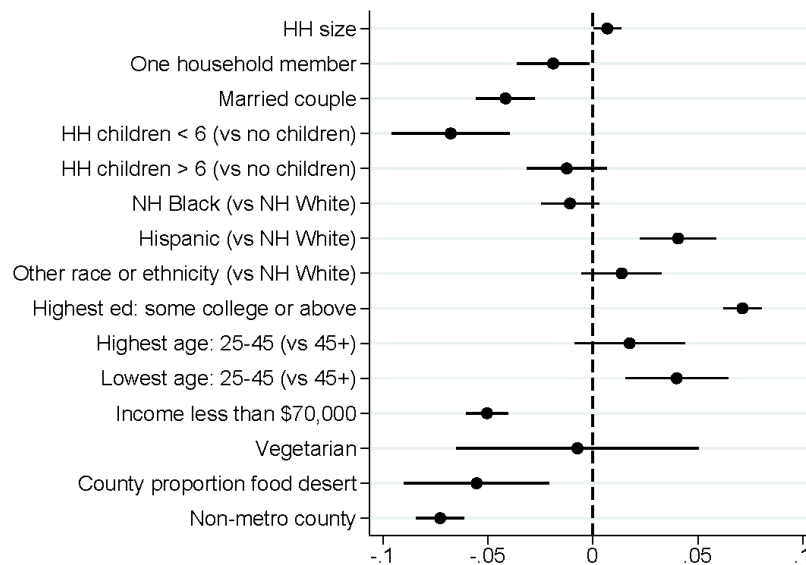
This article uses the NielsenIQ Consumer Panel Data (CPD) from January 2014 through December 2019 to assess consumer spending patterns on PBMA. This dataset captures detailed purchase information at the product level from households participating in the panel across various nationwide retailers. Further, NielsenIQ collects comprehensive data on the households, which includes aspects like household attributes, geographical information, and the assets they own. We focus on a sample of U.S. households that are part of the NielsenIQ panel. Specifically, the sample is restricted to households that have been in the panel for at least three consecutive years during the 2014–2019 period and have recorded at least one shopping trip per quarter. This selection results in a final sample comprising 52,022 households from most major metropolitan areas in the United States.

In our sample, 68% of households had never purchased PBMA, 11% purchased PBMA in only one month, and 21% purchased PBMA in multiple months. For households that purchased PBMA in multiple months, we used the information on PBMA spending over time to define a household-level index of PBMA spending strength. This index combined information on how much a household spent on PBMA each month on average with how much monthly PBMA spending varied over time. We classified households as low spenders if their spending strength index was below the median index

value. Medium spenders had a spending strength index between the median and 75th percentile, and high spenders had spending strength index values above the 75th percentile. Low spenders purchased PBMA less frequently (1.18 times per month on average) and spent an average of \$8.25 on PBMA in months that they did purchase PBMA. Medium-spenders purchased PBMA more frequently (1.20 times per month on average) and spent an average of \$8.73 on PBMA in months that they purchased PBMA. High spenders purchased PBMA most frequently (1.63 times per month on average) and spent an average of \$13.60 on PBMA in months that they purchased PBMA. Meat spending did not vary much across household types. Households that never purchased PBMA spent an average of \$21.32 per month on meat, while once-only, low-spenders, and medium-spenders all spent around \$22 per month on meat (\$22.15, \$22.89, and \$22.79, respectively). Only high spenders on PBMA spent less on meat (\$20.81 per month on average). We classified vegetarian households as households who had never purchased meat. While high-spenders on PBMA were more likely to be vegetarian, only 1% of high-spender households were classified as vegetarians.

Figure 1 shows the relationships between different variables describing households and whether that household has ever purchased PBMA. Values to the right of the dotted line in the figure indicate that households with that characteristic were more likely to have ever tried PBMA, and values to the left of the

Figure 1. Household Determinants for Ever Having Purchased Plant-Based Meat Alternatives



Notes: HH=household, NH=Non-Hispanic. Figure shows regression coefficients and 95% confidence intervals from a regression of an indicator for whether the household ever purchased plant-based meat alternatives on variables describing the household. Source: Authors' depiction.

dotted line indicate that households with that characteristic were less likely to have ever tried PBMA. Married couples and households with children under 6 are less likely to have tried PBMA than other households. Relative to White households, Hispanic households were more likely to have tried PBMA. Households with a college-educated individual were much more likely to have tried PBMA, as were younger individuals. Lower-income households were less likely to have tried PBMA. Households in counties with a greater proportion of the population in USDA-defined food deserts (low-income and low-access census tracts) are also less likely to have tried PBMA, and resident of nonmetro counties are also less likely to have tried PBMA.

What Happens When Households First Purchase Plant-Based Meat Alternatives?

In order to investigate what households think of PBMA, we looked at how household spending on food changed when households first purchased PBMA. Figure 2 shows monthly spending on PBMA, total monthly food spending, and the share of food spending on different categories of food both before and after the initial purchase of PBMA (month 0). By definition, there was no spending on PBMA prior to month 0. In the month that households first tried PBMA, they spent on average around \$8 on PBMA (panel a). Spending on PBMA dropped to less than \$2 per month on average in future months, indicating that households did not consistently continue buying PBMA after the initial purchase. In the month that PBMA were first purchased, total food spending increased by over \$40 more than in previous months (panel b). This increase is substantially more than the PBMA purchased, suggesting that households first try PBMA in unusual months. When PBMA are first purchased, the share of spending on dairy (panel e), deli (panel f), and dry grocery (panel g) products drops. One interpretation of these results is that households consider PBMA to be substitutes to deli, dairy, and dry grocery products. At the same time, the share of spending on frozen food increases. Notably, the share of spending on meat does not change when households first try PBMA.

In sum, a substantial proportion of consumers have not tried PBMA. The characteristics of PBMA purchasers in our sample suggest that the price or cultural habits of meat consumption limit the consumer base. Further, PBMA spending does not appear to be a substitute for meat spending. Households continue to purchase substantial amounts of meat no matter how much they spend on PBMA. Finally, since initial spending on PBMA happens in months with unusually large food spending overall, households may initially try PBMA as part of a broader change in food consumption.

Discussion

PBMA have attracted substantial interest recently, but consumers likely do not consider PBMA to be a true substitute for animal-based meat. One potential reason is the higher price of PBMA, and cultural norms of meat consumption also likely play a role. In addition to limited consumer adoption, there are barriers to entry for food manufacturers interested in participating in the PBMA sector. PBMA require substantial investments in research and development and product formulation. Once the product is developed, the manufacturer must be able to scale up production, which may be difficult given the extensive processing required to produce PBMA products.

In the context of the current landscape of the PBMA options, sustainability has emerged as a primary goal for food manufacturers in the development of these products. However, a notable imbalance has arisen as manufacturers have prioritized sustainability over the incorporation of healthy ingredients. This imbalance could potentially hinder the success of many companies as consumers are presented with an increasing set of substitutable options in the market.

Plant-based meat alternatives are a response to the increasing consumer demand for healthier and more sustainable products. As the market for PBMA continues to expand, an important consideration for market entrants is to establish a robust sourcing and procurement strategy to ensure a consistent supply of ingredients that yield products that align with consumer preferences, even if they entail a premium price point. However, the industry faces the ongoing challenge of crafting distinctive, economically accessible offerings amid a continuous influx of new market participants. Policy makers play a role in promoting sustainable food systems. Examples of policies that could promote sustainable food systems include encouraging research and development, providing incentives for sustainable farming practices, and promoting consumer awareness. These policies may help facilitate the transition toward a more environmentally friendly and socially responsible food industry. Further, international co-operation on policies related to alternative proteins can help address global food security challenges and reduce the environmental footprint of food production on a larger scale.

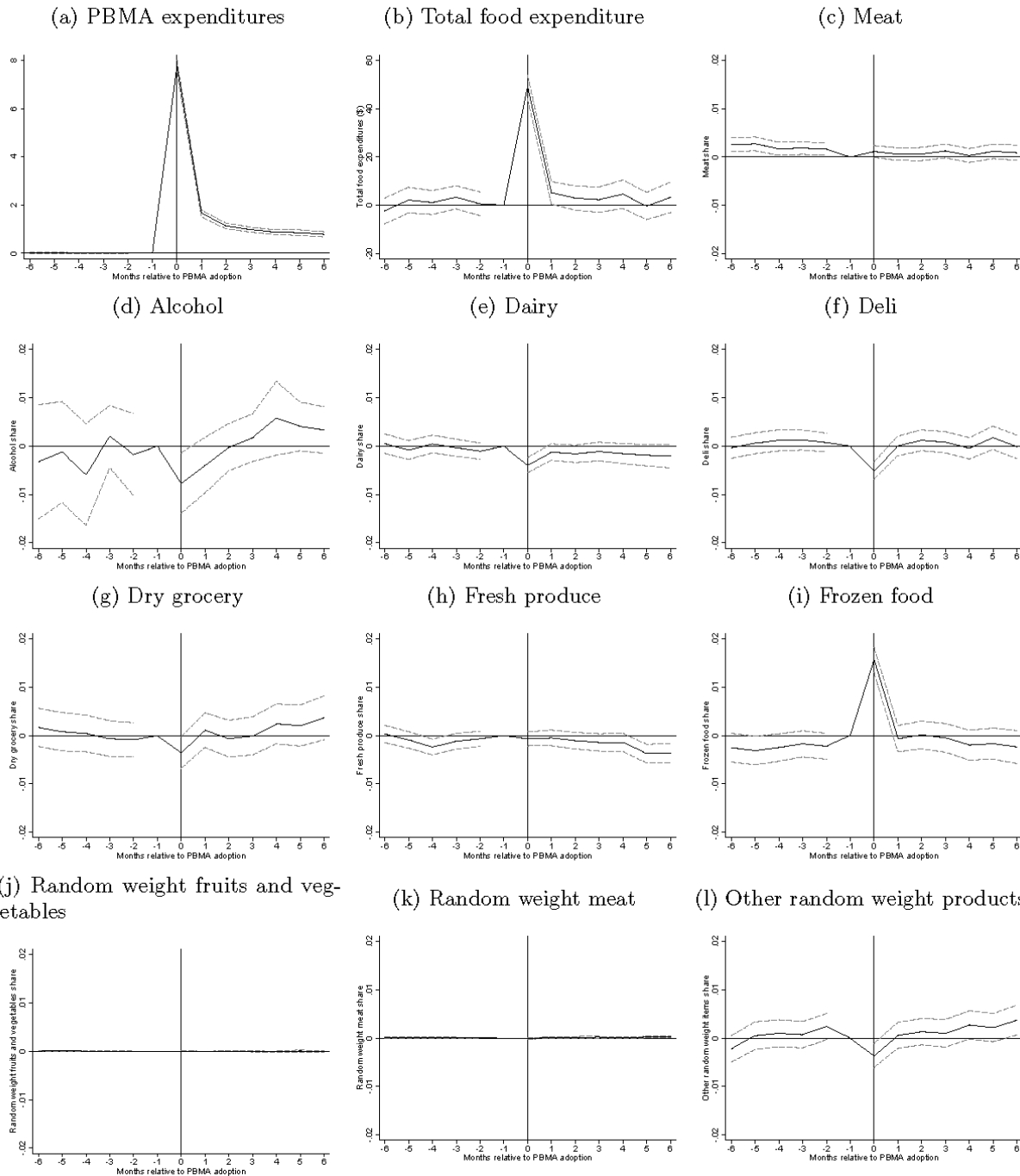
Conclusion

This article discusses the interplay between consumer choices, industry innovation, and policy development in the evolving landscape of plant-based meat alternatives. Despite their growing availability, PBMA have not yet become substantial substitutes for animal-based meats, and their adoption is confined to specific demographic groups. Moreover, initial PBMA spending coincides with a broader shift in food consumption patterns rather than a reduction in meat purchases. These insights have

implications for industry stakeholders and policy makers, emphasizing the need for product development, targeted marketing, and supportive policy environments to boost

PBMA adoption. Future research should also explore the long-term behavior of consumers and the influence of cultural factors in the adoption of PBMA.

Figure 2. Spending on Plant-Based Meat Alternatives (PBMA) and Spending Shares on Other Food Items before and after Initial Purchase of PBMA



Note: Figure displays coefficients from regression models describing spending on PBMA (panel a), total food spending (panel b), and spending shares on other food categories (panels c–l), both before and after household initially purchases PBMA (month 0).

Source: Authors' depiction.

For More Information

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