Impacts of New Plant-Based Protein Alternatives on U.S. Beef Demand

Executive Summary of Project Report Prepared for the Cattlemen's Beef Promotion and Research Board (CBB)

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Executive Summary

This project's objective was to provide economic insights into competitive threats to U.S. beef demand posed by plant-based protein alternatives. Given the current market penetration of plant-based alternatives, this study focuses on these potential beef substitutes. Lab-based protein alternatives are not studied in this analysis as they remain in development and are not yet on the market. The project provides a multitude of insights using a series of experiments in a survey of over 3,000 U.S. residents in September of 2020. The results, weighted to be representative of the U.S. population, provide a comprehensive assessment across both retail and food service market channels.

The full project report documents procedures employed, models estimated, and results of multiple evaluations. The full report starts with a chapter focused on strategy. The strategy chapter provides a transition from a summary of main findings and recommendations to detailed presentation of methods, analyses, and conclusions underpinning this summary. A corresponding Appendix provides supplementary details. We encourage those wanting background context and related details to read the full report.

Main Findings:

1. Cattle-based beef is currently chosen in the marketplace about three times more often than plant-based protein alternatives. In prior day meals, one in six report eating a plant-based protein item while roughly one-half had beef. Among those consuming plant-based burgers or ground crumbles in the past month, beef or chicken are the two proteins consumers would have otherwise most likely purchased.

2. Beef has a good image. Consumers' perceptions of Taste, Appearance, Price, and Naturalness of beef greatly exceeds that for plant-based proteins. Average response scores for 15 meat/protein attributes indicate more consumers favor beef over plant-based protein. Overall consumer perceptions of nutrients accurately reflect information posted on nutrient contents panels of both beef and plant-based retail items. Beef compares most favorably on perceptions of Protein and Iron. And consumers perceive beef to be overall better for Farmers, Consumers, Rural Communities, and Food Prices than plant-based alternatives. The sense of "good" sentiments consumers have associated with beef are noteworthy. Good for Environment is the only item where over one-third of consumers view plant-based as superior to beef.

3. Plant-based proteins score highest on Animal Welfare, Health, Environmental Concerns, though on average these are still slightly lower scores than beef for the same attributes. Plant-based rank higher than beef on average for Cholesterol, Fat, and Dietary Fiber. These are the areas in which plant-based proteins appeal most to consumers.

4. Providing consumers information highlighting ingredient lists or nutrient panel contents does not significantly affect selection between beef burger and plant-based meals.

5. Regular meat consumers (68% of the study's full sample) are much less likely to select a plant-based item when a beef item is available.
    - The typical regular meat consumer is willing to pay $1.87 more at a restaurant for a beef burger meal than a Beyond Meat burger meal. Conversely, those declaring an alternative diet (Vegan, Vegetarian, Flexitarian, or other) are willing to pay $1.48 more for a Beyond Meat than beef burger meal. Likewise, in retail settings the typical regular meat consumer is willing to pay $0.29/lb more for store-brand, 80% lean ground beef than Beyond Meat while those with an alternative diet would pay $2.32/lb more for Beyond Meat than beef.
    - In a food service setting at contemporary prices, about 5% of regular meat consumers would select a Beyond Meat burger meal (the combined market share for beef and bacon beef burgers is 11 times larger at 55%); 23% of consumers declaring an alternative diet would choose the Beyond Meat burger (the combined market share for beef and bacon beef burgers is 1.5 times larger).
    - In a retail grocery setting at contemporary prices, about 2% of regular meat consumers would select a Beyond Meat or Impossible burger (the combined market share for ground beef is about 14 times higher); 25% of consumers declaring an alternative diet would choose the Beyond Meat or Impossible burger (the combined market share for ground beef was roughly the same).

6. Characteristics of consumers most likely to select plant-based proteins include younger, those with children under the age of 12, having higher household income, residing in a Western state, and affiliating with the Democratic party. Consumers who select plant-based proteins place greater importance on environmental and animal welfare concerns when making food choices than consumers predicted to choose traditional animal proteins.

7. Replacing a chicken wrap with a new plant-based protein offering on a food service menu has a small (less than 3%) impact on frequency of selecting beef burger meals.

8. Changes in the price of beef have a much larger impact on consumer decisions to buy beef than the impact of changes in the price of plant-based offerings. This means plant-based burgers are relatively weak substitutes for beef.
    - In food service, a 1% increase in beef burger meal price reduces overall probability of selecting beef by 2.5%; by contrast, a 1% decrease in Beyond Meat burger meal price reduces the probability of selecting beef by only 0.21%.
    - In a retail grocery setting, a 1% increase in store brand 80% lean ground beef prices reduces overall probability of selecting the same product by 1.73%; by contrast, a 1% decrease in Beyond Beef prices reduces the probability of choosing 80% lean ground beef by only 0.18%.

- Using an experiment allowing multiple pounds and products to be selected in a retail grocery setting, a 1% increase in store brand 80% lean ground beef prices reduces stated purchase volume by 2.80% while a 1% decrease in Beyond Beef prices reduces beef volume by 0.65%.

9. Plant-based burgers have more elastic demands than hamburger and chicken breast for regular meat eaters. This suggests those who eat meat regularly will be more responsive to adjusting consumption to plant-based proteins as their prices change.

Key Recommendations:

1. Regular meat consumers are not the core market segment for plant-based protein items. Conversely those declaring an alternative diet, primarily flexitarian, largely comprise the majority of the current plant-based protein market. Therefore, sustaining and promoting core aspects unique to beef attractive to regular meat consumers is recommended. Furthermore, finding ways for beef to be attractive to flexitarians is also important. When plant-based items are purchased they often are made by consumers who also purchased beef or chicken. This points to an ongoing opportunity for appealing to consumers who may not have traditional, meat protein-centric diets.

2. Given beef price has a much larger impact than plant-based prices on beef purchases the industry will be well-served to persistently seek supply-side gains that enhance beef's competitiveness. However, these efforts must not compromise core beef demand drivers of Taste, Food Safety, and Freshness that have repeatedly been identified as key demand determinants.

3. Be aware that if plant-based protein prices decline, regular beef eaters will likely incorporate more plant-based protein in their consumption choices. Since the share of plant-based protein is still small this is not currently a large threat to the beef industry. However, it suggests keeping the valued attributes of beef in front of consumers who regularly eat meat will remain important (these include Taste, Nutrition, Safety, Naturalness, Iron, Protein, as well aesthetic attributes consumers currently value about the beef industry).

4. With plant-based protein products being perceived by consumers as lower in Fat and Cholesterol, and higher in Fiber, the beef industry may wish to consider strategies to boost beef product images around these areas. Continued information on lean beef products available for those who are concerned with these health aspects can better position beef relative to plant-based proteins. But realize this is for a small portion of the overall beef sector demand opportunity. Don't over invest in this strategy to enhance a small segment of the overall beef consumption pie.

5. Changes in chicken breast prices have a larger impact on beef demand than plant-based price adjustments. Given the heavy importance of chicken in U.S. diets indicates priority should be given to continuing to track chicken's impact on beef demand, monitoring

chicken industry dynamics, and continually seeking to improve beef's relative position to chicken with consumers.

6. The overall greatest threat from plant-based protein to the beef industry is small at this time. However, the main traction the plant-based sector has is it currently appeals to the younger generation that tends to have greater concerns about health (e.g., fat content), environmental concerns, likely to have young children at home, likely to have college education, and has growing income. All aspects associated with more favorable demand for plant-based protein. If plant-based protein price declines and the product is viewed more favorably by consumers in taste and appearance, it could become a stronger substitute for beef. However, that is likely some ways into the future. However, it provides key attributes of the plant-based product for the beef industry to monitor (see the Strategy and Recommendations section for more discussion here).

7. Finally, although it is worthwhile to track the share of the protein market beef is able to garner, it is even more important to focus on strategies that can grow the overall size of the market and strategies that ultimately improve profitability of beef producers.