The No-Hunger Games: How GLP-1 Medication Adoption is Changing Consumer Food Purchases*

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December 29, 2024

This draft is preliminary and incomplete

Abstract

We examine how consumers modify their food purchasing behavior after adopting appetite-suppressing GLP-1 receptor agonists, such as Ozempic and Wegovy. Utilizing a unique dataset linking survey responses on medication adoption and timing with transaction data from a representative U.S. household panel, we document the prevalence, motivations, and demographic patterns of GLP-1 adoption, including off-label use. Households with at least one GLP-1 user reduce grocery spending by approximately 6% within six months of adoption, with higher-income households reducing spending by nearly 9%. These reductions are driven by significantly larger decreases in purchases of calorie-dense, processed items, including a 11% decline in savory snacks. In contrast, we observe directional increases in nutrient-dense purchases, such as yogurt and fresh produce. We also examine food-away-from-home spending at limited-service establishments, such as fast-food chains and coffee shops, finding reductions at breakfast and especially during dinner times. Our findings highlight the potential for GLP-1 medications to significantly reshape consumer food demand, a trend with increasingly important implications for the food industry as adoption continues to grow.

Keywords: GLP-1 Medications, Food Consumption, Weight Loss Drugs, Pharmaceutical Innovation, Dietary Changes, Food Industry

JEL codes: D12, I12, L66, M31, L11, O33

*The authors thank Omid Rafieian and Sachin Gupta for their helpful comments, as well as Ziyi Lin for superb research assistance. The analyses and conclusions set forth herein are those of the authors only and do not necessarily indicate concurrence by Numerator. Numerator household panel and survey data was provided through a research agreement with Cornell University. The use of Numerator household panel and survey data is for research purposes only and does not imply endorsement, recommendation, or favoring of any brand, product, or service by Numerator.

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1 Introduction

After more than a decade of steadily rising obesity rates, 2023 marked the first recorded decline, a significant public health breakthrough likely tied to the growing adoption of GLP-1 drugs in the U.S. (Rader et al. 2024). These appetite-suppressing GLP-1 receptor agonists—such as Ozempic, Wegovy, and Mounjaro—were originally developed for diabetes management but have gained widespread popularity for treatment of obesity as well as off-label weight-loss treatment. Their use has been associated with anecdotal reports of noticeable shifts in dietary behavior, raising questions about their broader economic and societal impacts (Kolata 2024). However, despite the scale of this change, there has been no systematic evaluation of how GLP-1 adoption influences consumer food purchases, leaving a critical gap in understanding the economic implications of this public health milestone. In this paper we address three key questions:

1. Who is adopting GLP-1 medications, and how prevalent is their use?
2. How do food purchases change after GLP-1 adoption?
3. Are these changes persistent?

We answer these questions using household panel and proprietary survey data from Numerator that links survey responses on GLP-1 medication adoption and timing to food purchases for a representative panel of households in the U.S.

The first research question examines the prevalence, motivations, and demographic patterns of GLP-1 adoption. A distinguishing feature of our data is that we observe off-label users, who are largely invisible in traditional insurance claims data. In our sample, nearly half of adopters report using GLP-1 medications for weight loss, with at least one-third paying out of pocket. Overall, weight loss users are younger and wealthier compared with users taking GLP-1 medications for diabetes management. Our data thus enable a more comprehensive understanding of adoption trends.

The second research question investigates changes in food-purchasing behavior following GLP-1 adoption, using transaction data from July 2022 through October 2024. Employing a difference-in-differences framework to compare adopters and non-adopters, we estimate that, on average, grocery spending declines by 5.5% in the six months after adoption, with a 95% confidence interval of [-7.1%, -3.9%]. However, this average masks substantial heterogeneity, with higher-income households showing a notably larger reduction, averaging 8.6%. We further analyze changes in shopping behavior across 40 different product categories. Users exhibit the largest reductions in spending on ultra-processed categories, such as sweets, snack foods, and other calorie-dense items. Sweet bakery items, a category potentially associated with impulse purchases, also show one of the largest spending decreases. In contrast, nutrient-dense options, such as yogurt and fresh produce are least affected. These patterns align with the appetite-suppressing effects of GLP-1 medications, which are known to reduce food cravings (Blundell et al. 2017), with the most pronounced effects observed for calorie-dense products.

In addition to changes in grocery spending, we document declines in food-away-from-home expenditures, focusing on limited-service establishments such as fast food chains, coffee shops, and quick-service restaurants. Notably, these reductions are most pronounced during breakfast and dinner times. Our results suggest heterogeneous adjustments across user groups: Higher-income households are more likely to reduce breakfast consumption, while lower-income households show greater reductions in dinner spending at limited-service establishments.

Our third research question examines whether dietary changes persist beyond the initial six months of adoption. Analyzing shopping patterns over the 12 months post-adoption, we find that the magnitude of the reduction in food spending decreases after six months but remains negative and statistically significant. This partial reversal may reflect factors such as compliance challenges, drug wear-off, or measurement limitations.[1]

In estimating these changes in purchasing behaviors, we acknowledge endogeneity and selection concerns. Individuals adopting GLP-1 medications may have unobservable characteristics or engage in concurrent lifestyle changes, such as dietary modifications or increased physical activity, that influence food purchasing behavior independently of the drugs' pharmacological effects. Clinical trials document substantial weight loss driven by the appetite-suppressing properties of GLP-1s (Jastreboff et al. 2022, Garvey et al. 2023). Although these randomized trial findings rigorously isolate the pharmacological impact of the medications from lifestyle changes, in our observational setting, we cannot fully account for the potential influence of simultaneous behaviors or unobserved time-varying confounders. Given these complexities, we interpret our findings as capturing changes in food purchasing behavior following GLP-1 adoption, rather than isolating the causal effects of the medication. Despite these challenges, our analyses provide important early insights into evolving consumption patterns and highlight heterogeneity across different consumer groups and settings, with significant implications for both the food industry and policymakers.

By addressing these three research questions, our paper provides a timely and comprehensive examination of how adopters of GLP-1 medications change their food consumption, offering some of the earliest insights as adoption accelerates. Our findings reveal significant shifts in food purchases, with reduced spending in both grocery stores and limited-service

[1] Anecdotally, some users report that the appetite-suppressing effects diminish over time, requiring dosage adjustments to maintain efficacy.

establishments. The adjustments are not uniform across categories: calorie-dense, highly processed products see the largest declines, whereas nutrient-dense options are least affected. While we do not observe direct health outcomes, these changes in food purchasing behavior can serve as a leading indicator of broader public health trends and economic implications. The documented shifts in food purchases also present actionable opportunities for the food industry. Firms may need to adapt their product offerings, packaging sizes, and marketing strategies to align with changing consumption patterns. By proactively addressing these evolving preferences, businesses can better position themselves in a market shaped by the growing adoption of GLP-1 medications. We discuss these important implications for the food industry in greater detail in the final section of our paper.

2 Data and Descriptive Statistics

2.1 Data

Consumer Panel Transactions Data. Our primary data come from Numerator, a market research company with a representative panel of 150,000 US households during the July 2022 through October 2024 time period we analyze. Our dataset includes information on each household and their shopping trips, including the date of the trip, the time of the trip, the name of the retailer, the channel type (e.g., grocery stores, convenience stores, fast food stores, food delivery apps), the total amount spent on an item, and the total quantity purchased.[2] Numerator extracts this information and classifies items from receipts into standardized categories across all retailers.[3] In addition to the shopping data, we incorporate demographic information about the panelists and their households obtained from regular surveys conducted by Numerator, including household income bracket, panelist age, and household zip code.

GLP-1 Survey Data. We supplement the transaction data with survey data on GLP-1 adoption among Numerator panelists. Starting in October 2023, Numerator began surveying its panel of 150,000 households about GLP-1 drugs. The initial wave in October 2023 was followed by three additional waves conducted quarterly in January/February 2024, April 2024, and July 2024. The survey asked whether respondents had heard of these medications, whether household members were using them, whether household members were not using

[2] Numerator uses a proprietary mobile app, "Receipt Hog," to capture physical receipt images and digital transaction records provided by panelists.

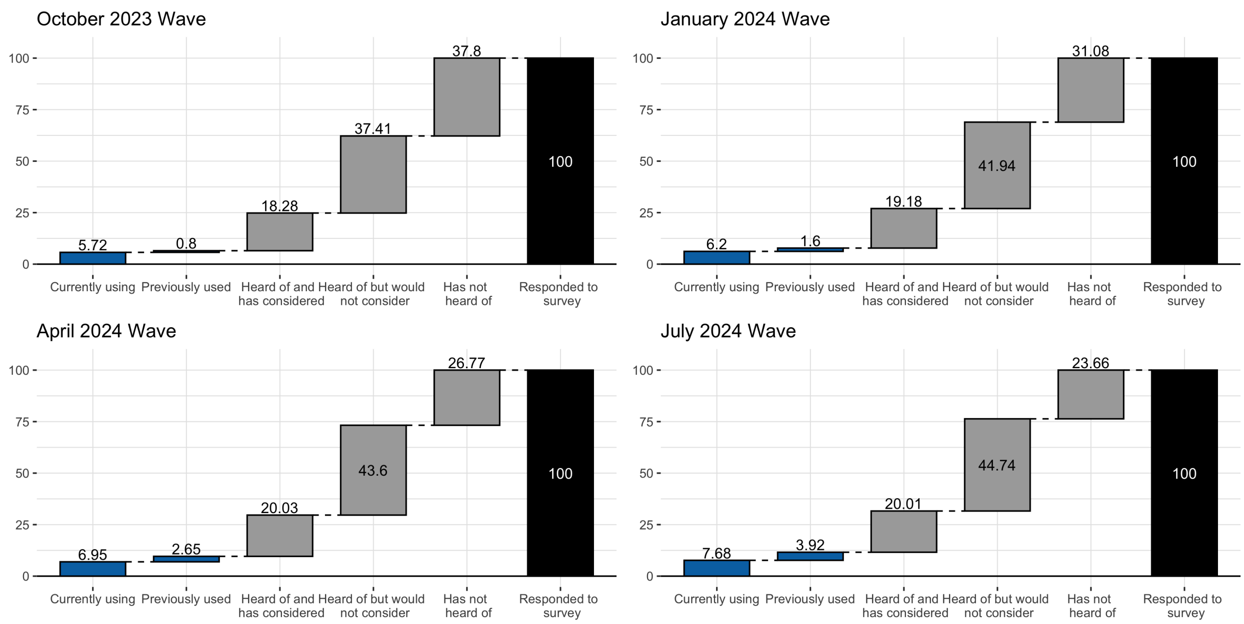
[3] These categories are highly granular product groups such as "packaged cookies," "yogurt & yogurt drinks," and "stocks & broths." In the grocery sector, we observe shopping patterns across approximately 220 detailed product categories.

but considering using them, and the timing of adoption. Follow-up questions asked whether the drugs were being used for diabetes management, both diabetes management and weight loss, or exclusively for weight loss.

2.2 Sample Construction and Descriptive Patterns

Panelists in the Numerator data are observed at the household level. We define GLP-1 adoption similarly, classifying a household as an adopter if at least one member reports using a GLP-1 medication.

Figure 1: GLP-1 Usage and Awareness Patterns Across Four Survey Waves



Notes: Awareness and adoption patterns of GLP-1s among our sample of 22,712 panelists.

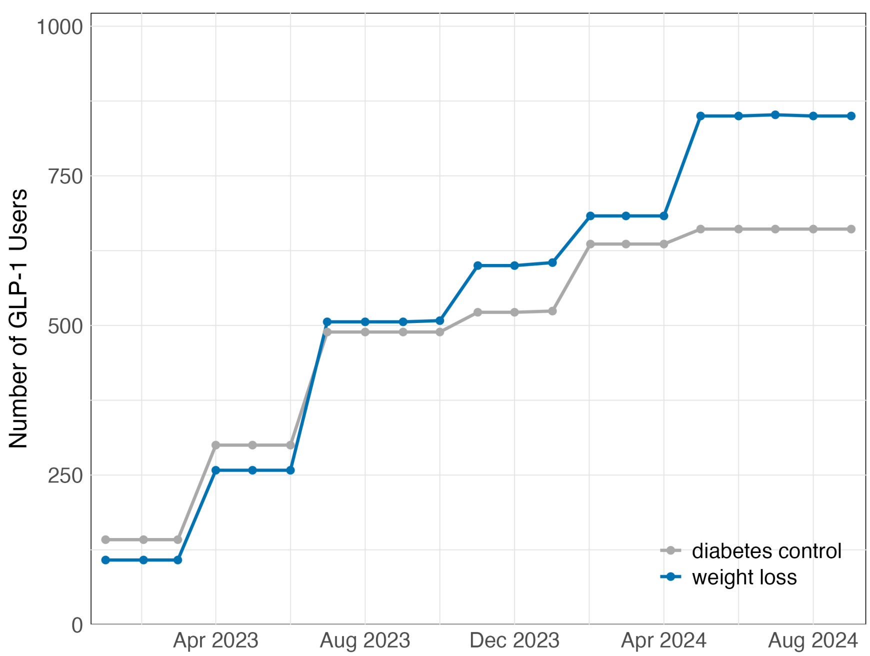
To ensure consistency and reliability in our analyses, we applied several criteria to define our sample. First, we included only households that completed all four waves of the GLP-1 survey, which allows us to accurately identify the timing and duration of GLP-1 use. Second, we restricted the sample to households with internally consistent responses across survey waves. Lastly, we focused on households where the recorded start of GLP-1 use occurred on or after January 2023, the timing of the earliest survey.

Our final sample includes 22,712 panelists, 2,623 of whom reported starting GLP-1 use between January 2023 and July 2024, representing an 11.6% incidence. This closely aligns with the national estimate of approximately 12% of U.S. adults having used GLP-1 medications, as reported by the Kaiser Family Foundation's 2024 Health Tracking Poll, which is designed to be based on a large and representative random sample of U.S. adults (Kaiser Family Foundation 2024).

Figure 1 illustrates the evolving trends in awareness, consideration, and adoption of GLP-1 drugs across the four survey waves. Awareness of these medications has become increasingly widespread, with the proportion of respondents unfamiliar with them declining from 38% in the first wave to 24% in the fourth wave. Current usage rises from 5.7% to 7.7% across the survey waves, while total usage (combining current and past usage) nearly doubles, increasing from 6.5% to 11.6%. These trends highlight the growing penetration of GLP-1 medications, aligning with observations from popular press coverage and emerging research (Kaiser Family Foundation 2024).

Numerator's data offers a distinct advantage in studying GLP-1 medication adoption by capturing households that use these drugs "off-label," including many who pay out of pocket. Unlike insurance claims data, which primarily reflect usage among diabetic or obese individuals whose treatments are covered by insurance, Numerator's panel provides a broader view of adoption patterns. This allows for a more comprehensive understanding of GLP-1 usage and its associated changes in purchasing behavior.

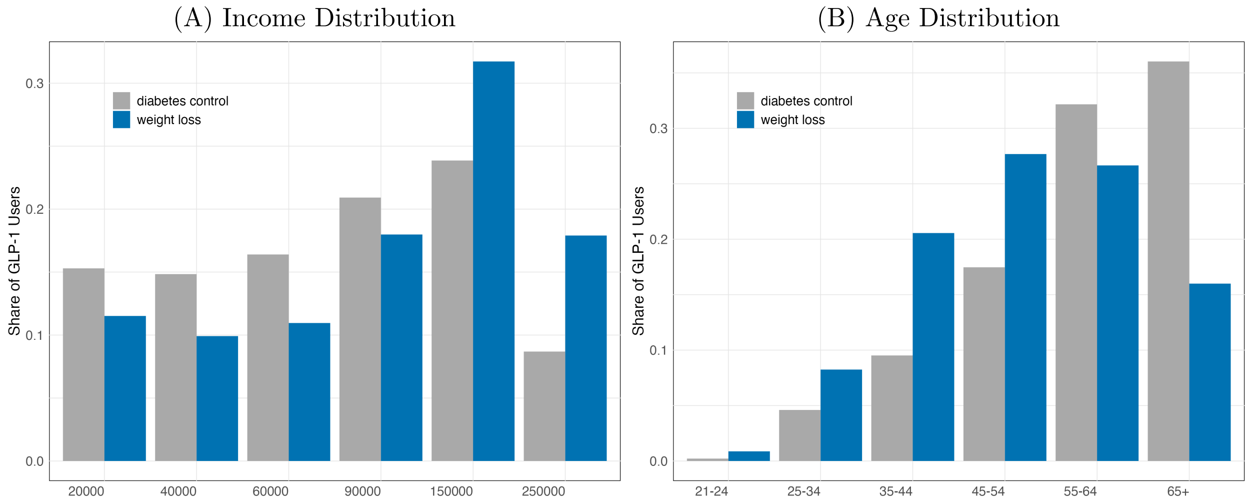
Figure 2: Timing of GLP-1 Adoption by Reason for Use



Notes: Number of panelists in our sample using GLP-1s over time, categorized by reason for use. Total N = 2,623.

Our analyses differentiate between consumers using GLP-1s for diabetes versus weight loss. Figure 2 plots the number of GLP-1 users in our sample over time, categorized by their stated reason for taking the medications.[4] While both groups grow steadily, users adopting GLP-1 drugs for weight loss consistently exceed those using them for diabetes control. This trend highlights the increasing popularity of GLP-1 medications as weight-loss treatments, including off-label use among individuals who do not meet the clinical criteria for obesity.

Figure 3: Income and Age Distribution of GLP-1 Adopters by Reason for Use



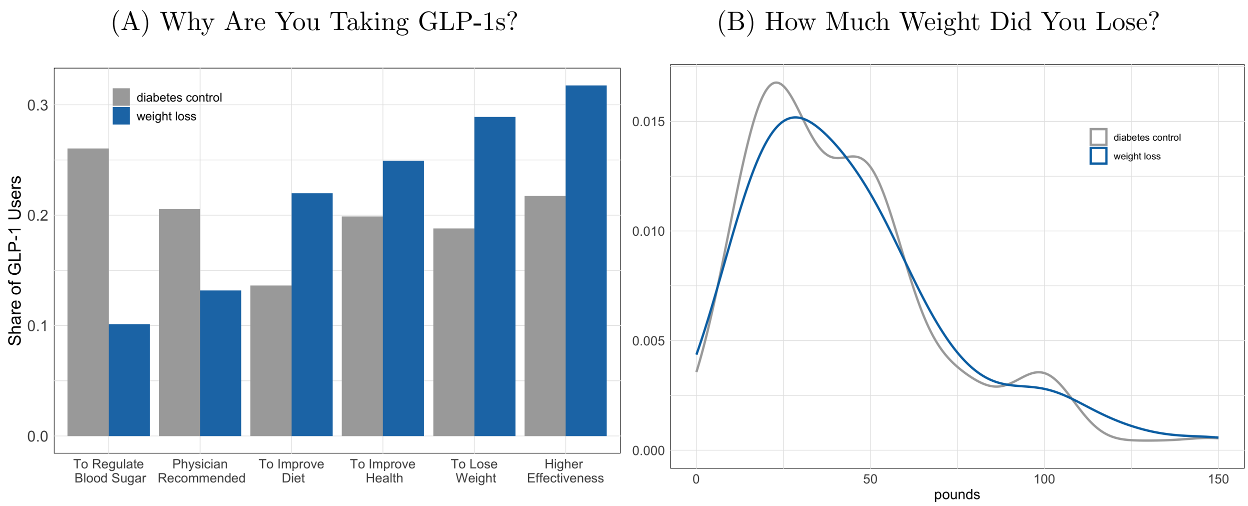
Notes: Demographic profile of GLP-1 adopters in our sample, separately by reason for use. Total N = 2,623.

Figure 3 presents the distribution of GLP-1 users by income and age, separated by their reason for taking the medication. Weight-loss users are disproportionately concentrated in higher-income households, with the largest share in those earning $150,000 or more. In contrast, diabetes control users are more evenly distributed across income brackets. Consistent with the higher prevalence of diabetes among older individuals, GLP-1 users for diabetes control are predominantly concentrated in the 55-65 and 65+ age groups. Conversely, weight-loss users are more evenly distributed across younger and middle-aged cohorts, with the largest shares in the 35-64 age brackets. These differences highlight the distinct demographic profiles of users based on their stated purposes for taking GLP-1 medications.

Unpacking GLP-1 User Experiences To gain deeper insights into user experiences, Numerator conducted a follow-up survey targeting GLP-1 users identified in the main survey. Of the 2,623 GLP-1 adopters in our sample, 904 responded to this follow-up survey. This additional survey collected detailed responses allowing us to examine their motivations for adoption, weight loss outcomes, and payment methods in greater detail.

[4]Panelists may report using the medication for diabetes management, both diabetes management and weight loss, or exclusively for weight loss. We group "diabetes management" and "both diabetes management and weight loss" under "diabetes management," as weight loss is often part of diabetes management.

Figure 4: Self-Reported Motivations and Outcomes



Notes: Summary of responses on motivation and realized weight loss after adoption of GLP-1s. Average reported weight loss is 47 lbs, median is 40 lbs. N=904.

As expected, there are notable differences in motivations and experiences between users adopting GLP-1s for weight loss versus diabetes management. Panel (A) of Figure 4 highlights these motivational differences, with weight-loss users most frequently citing reasons such as "to lose weight" and the medication's perceived "higher effectiveness," while diabetes management users primarily pointed to "regulating blood sugar" and physician recommendations. Panel (B) presents self-reported weight loss, with users reporting an average reduction of 47 pounds and a median reduction of 40 pounds. These self-reported results align closely with the weight loss documented in clinical trials of GLP-1s (Jastreboff et al. 2022, Garvey et al. 2023).

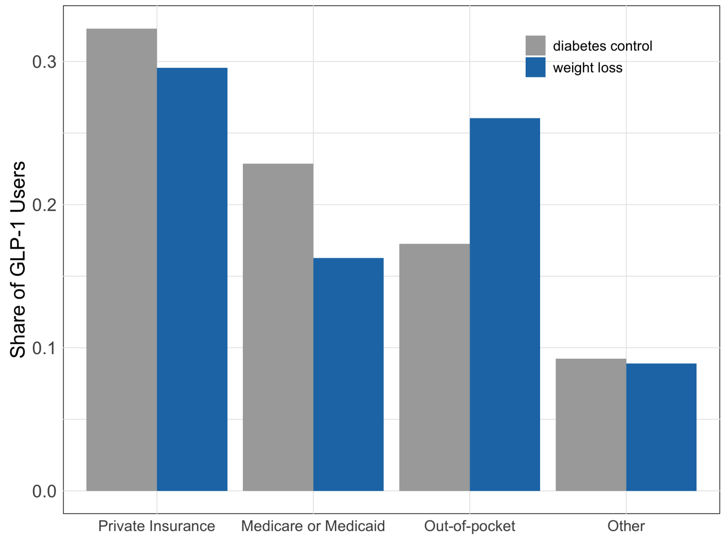
Importantly, this follow-up survey also sheds light on payment methods, highlighting important contrasts across motivations. Figure 5 shows that weight-loss users were more likely to pay out-of-pocket; whereas diabetes management users relied more heavily on private insurance or Medicare/Medicaid. These differences likely reflect differences in coverage policies, as weight-loss use is often excluded from standard insurance plans.

3 Empirical Analyses

3.1 Estimation

Our estimation strategy compares changes in food shopping patterns between GLP-1 adopters and households who do not use the medication during our sample period. Our primary outcome of interest is grocery spending, aggregated to the household-by-month level and

Figure 5: Payment Method



Notes: Summary of responses on payment method using follow-up survey data. N=904.

logged.[5] For each adopter, we track grocery spending for six months prior to adoption and six months after adoption. The sample period spans July 2022 to September 2024, with households adopting GLP-1 medications between January 2023 and July 2024. We use a Difference-in-Differences (DiD) framework to examine changes in spending for household i in month t after adopting GLP-1 medications:

$$\log(\text{spending}+1)_{it} = \beta \text{GLP1}_{it} + \alpha_i + \gamma_t + \varepsilon_{it}, \tag{1}$$

where GLP1_{it} is an indicator for whether household i has adopted GLP-1 medications by month t, α_i represents household fixed effects, and γ_t captures month fixed effects.

To examine dynamic changes in shopping behavior relative to adoption, we also estimate an event-study specification:

$$\log(\text{spending}+1)_{it} = \sum_{l=-6}^{6} \beta^l \text{D}^l_{it} + \alpha_i + \gamma_t + \varepsilon_{it}, \tag{2}$$

where D^l_{it} is an indicator that is equal to one if panelist i is l months from adopting GLP-1s at time t. We estimate the event study in Equation 2 using six different estimators, including the Callaway and Sant'Anna's staggered DiD method, implemented via the `did2s`

[5] We replicate the analysis using the log number of items purchased instead of spending and confirm that our findings are driven by changes in quantities purchased rather than shifts between expensive and cheaper products. Spending remains our preferred specification due to its ease of interpretation and its direct managerial relevance.

package in R (Butts and Gardner 2022). In addition to the baseline Two-Way-Fixed-Effects (TWFE) model, this package implements DiD estimators proposed by Borusyak, Jaravel, and Spiess (2024), Callaway and Sant'Anna (2021), Gardner (2021), Roth and Sant'Anna (2023), and Sun and Abraham (2021). Comparing these estimators provides robustness of our findings by assessing whether the TWFE model introduces potential bias in our setting due to treatment heterogeneity or staggered adoption. We analyze potential changes in shopping patterns both for the overall sample of users and across subgroups defined by usage motivations and demographics.

Table 1: Descriptive Statistics

		GLP Adopters		Non-Adopters		Difference	
Reason	Variable	Mean	SD	Mean	SD	Difference	p-Value
Weight Loss	Spend total	628.43	338.99	625.28	423.31	3.15	0.80
	Household size	2.67	1.38	2.61	1.59	0.06	0.22
	Share Income < \$125,000	0.64	0.48	0.64	0.48	-0.01	0.72
	Share Diabetes Type 2	0.09	0.28	0.08	0.28	0.00	0.84
	Share Age <54	0.56	0.50	0.55	0.50	0.01	0.70
	Observations	1458		2552			
Diabetes	Spend total	601.40	388.31	577.50	369.68	23.90	0.10
	Household size	2.49	1.27	2.44	1.48	0.06	0.29
	Share Income < \$125,000	0.78	0.41	0.78	0.41	0.00	0.86
	Share Diabetes Type 2	0.48	0.50	0.38	0.48	0.11	0.00
	Share Age <54	0.32	0.46	0.34	0.47	-0.03	0.16
	Observations	1101		1717			

Notes: The table shows the summary statistics separately by reason for adopting GLP-1s. We match each adopter to two non-adopters based on observable demographics and pre-adoption spending, using nearest neighbor matching. The final sample consists of 2,623 users and 4,072 corresponding matched non-adopters.

Our sample has information on 20,089 who did not use GLP-1 medications either before or during the sample period of July 2022 to September 2024. We select the set of non-adopters for estimation using nearest neighbor matching based on observable demographics (household size, age, income, diabetes diagnosis) and average grocery spending during the six months prior to adoption.[6,7]

Table 1 compares GLP-1 adopters to their matched non-adopters, separated by the stated reason for taking the medication, using data from July 2022 to December 2022 prior to any households in our sample adopting GLP-1s. The summary statistics confirm that adopting and non-adopting households are broadly similar across observable characteristics.

[6]Matching is ran separately for each treated household to align the six-month pre-adoption period with the corresponding time periods for non-adopters. We implement nearest neighbor matching with replacement, selecting two non-adopter households for each adopter.

[7]As a robustness check, we also matched based on spending during the 12 to 6 months prior to adoption to account for potential pre-trends; the results remain consistent.

3.2 Selection and Endogeneity Concerns

We acknowledge that selection into adopting GLP-1 medications introduces endogeneity, which complicates the causal interpretation of our results. This endogeneity may arise from both time-invariant and time-varying factors.

Time-invariant selection could arise if individuals who adopt GLP-1 medications systematically differ from non-adopters based on characteristics such as income, healthcare access, or general health awareness. We mitigate these concerns by matching GLP-1 adopters to non-adopters on observable characteristics, including income, household size, age, and pre-adoption food spending. Additionally, we implement a robustness specification that leverages staggered adoption timing among adopters only, employing the doubly robust estimator proposed by Callaway and Sant'Anna (2021). Our results remain consistent, alleviating concerns about selection driven by unobserved time-invariant factors.

Time-varying selection, however, presents an important challenge, as dynamic, unobservable factors, such as increased motivation to improve health may influence both GLP-1 adoption and changes in shopping behavior. For example, individuals adopting GLP-1 medications following a recent diabetes diagnosis may already exhibit shifts in food purchasing patterns due to declining health or specific dietary recommendations from their doctors. Similarly, GLP-1 adopters may engage in concurrent lifestyle changes, such as seeking dietary advice, increasing physical activity, or adopting other health-conscious behaviors, which could independently influence their food purchases.

On the other hand, the results from the SURMOUNT-1 (Jastreboff et al. 2022) and SURMOUNT-2 (Garvey et al. 2023) clinical trials provide compelling evidence that partially, but not fully, addresses the time-varying selection concerns. These large, randomized controlled studies evaluated the efficacy of tirzepatide, a GLP-1 receptor agonist, in promoting weight loss among adults with obesity, both with and without type 2 diabetes. In SURMOUNT-1 (adults without type 2 diabetes), participants taking GLP-1s achieved an average weight loss of 18.13% of their baseline weight (42 lbs) compared to 3.1% (7 lbs) for the placebo group. In SURMOUNT-2 (adults with type 2 diabetes), GLP-1 users experienced an average weight loss of 13.75% (30 lbs) versus 3.2% (7 lbs) for the placebo group. Importantly, all participants—including those in the placebo group—received identical lifestyle counseling, with recommendations to follow calorie-deficit diets and engage in physical activity.[8] Despite these shared interventions, GLP-1 users exhibited substantially greater weight loss, underscoring the dominant role of the pharmacological properties of

[8] In both trials, both the treatment and placebo groups received lifestyle interventions, including regular counseling sessions to support adherence to a calorie-deficit diet and engagement in at least 150 minutes of physical activity per week.

these medications. These findings demonstrate that the weight loss associated with GLP-1 use is a direct effect of reduced caloric consumption driven by the drug's appetite-suppressing biological mechanisms (Blundell et al. 2017), rather than lifestyle changes.

Nevertheless, since we cannot fully address the time-invariant selection concerns, we acknowledge that the changes we document reflect not only the pharmacological impact of GLP-1 drugs but also the combined effect of the medication alongside potential simultaneous behaviors. Therefore, we interpret our findings as changes in food purchases following adoption, rather than isolating the causal effect of GLP-1 drugs.

Despite these methodological challenges, our analyses remain valuable for several reasons. First, we provide practical, early-stage insights for the food industry and policymakers. These findings can help the food industry adapt product offerings, packaging, and marketing strategies to align with the evolving consumption patterns of GLP-1 adopters. Second, by examining the heterogeneous trajectories of GLP-1 adoption across consumer demographics, we uncover a previously unexplored perspective on how these medications influence behavior, offering more granular insights that go beyond overall trends. Finally, given the rapid growth in GLP-1 adoption and its potential to reshape consumer habits, our study highlights key behavioral shifts that could signal broader transformations. Understanding these trends as they develop positions both researchers and practitioners to anticipate and respond effectively to these changes. We further explore these implications and corresponding limitations in section 6.

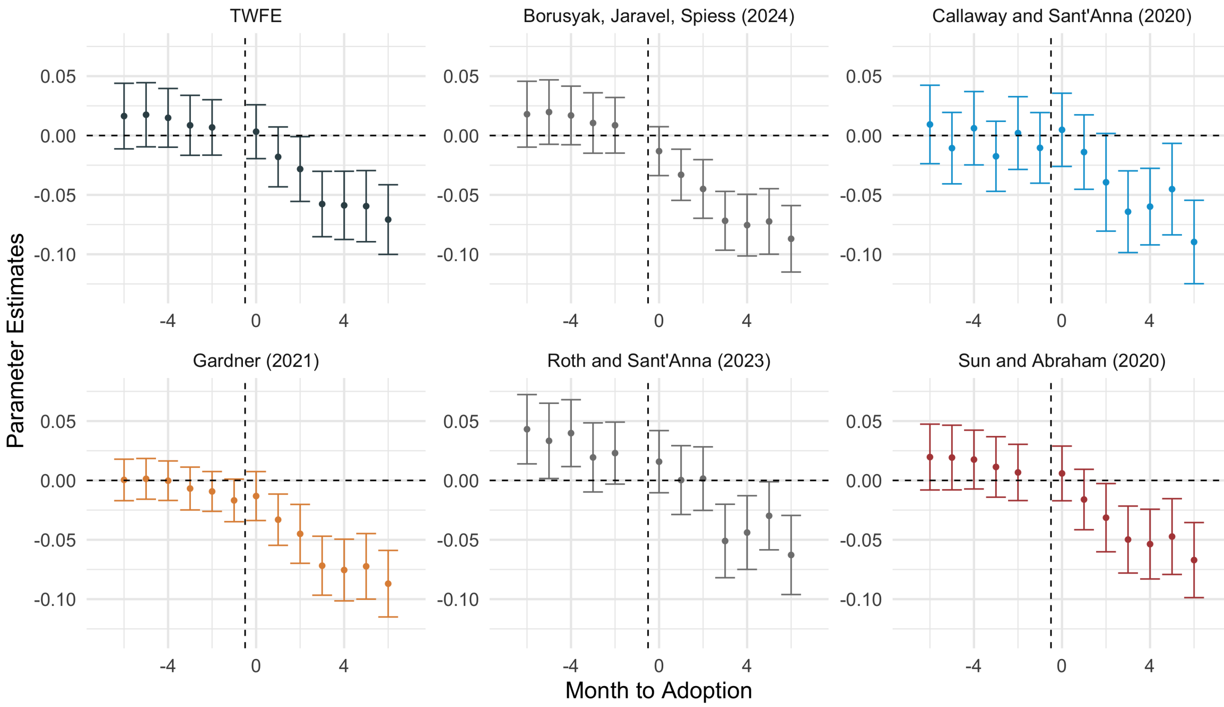
4 Results

Our analyses examine how food spending changes after households adopt GLP-1 medications, analyzing these changes both for the overall sample of users and across subgroups defined by usage motivations and demographics. While our study is descriptive due to potential self-selection and endogeneity concerns, it provides valuable insights into how shopping habits evolve for individuals on GLP-1 medications.

4.1 Changes in Shopping Patterns Following GLP-1 Adoption

Figure 6 presents the event study analysis based on Equation 2. The results reveal a gradual and sustained decline in grocery spending during the six months following GLP-1 adoption, consistent with the known effects of these medications in reducing appetite and overall food intake. Reassuringly, there are no discernible pre-trends in the six months prior to adoption, providing support for the parallel trends assumption underlying the DiD estimators.

Figure 6: Change in Grocery Spending Post Adoption



Notes: Changes in grocery spending using alternative difference-in-difference estimators, based on 2,623 users and 4,072 corresponding matched non-adopters. The dependent variable is log of spending on groceries.

The results remain consistent across these six alternative DiD estimators. Notably, the doubly robust estimator proposed by Callaway and Sant'Anna (2021) confirms the robustness of our key findings. Given the similarity of estimates across all six approaches, including TWFE, we rely on the TWFE estimator due to its parsimonious structure and ease of augmenting it with interactions for heterogeneity analysis.

Table 2 summarizes the total estimated change in grocery purchases during the six months following GLP-1 adoption. Standard errors are clustered at the household level. We find that households with at least one GLP-1 user reduce their grocery spending by about 5.5% within this period.

One might expect spending adjustments to vary by the reason for taking GLP-1 medications or by demographic characteristics. Table 2 presents spending adjustments across different groups of adopters. First, we compare changes in grocery spending by the stated reason for taking GLP-1 medications. While weight-loss adopters exhibit slightly larger reductions in spending compared to panelists taking the drug for diabetes management, this difference is not statistically significant. Looking at heterogeneity based on demographics, we see notably larger adjustments among higher-income and younger adopters.

With an average monthly grocery spend of approximately $630, the overall 5.5% decline following GLP-1 adoption translates to a \$416 annual reduction in purchases per household. However, as our results illustrate, this average masks significant heterogeneity across demographics. Higher-income households, earning over \$125,000, reduce their grocery spending by 8.6%, an annualized decrease of \$690—more than double the 4.2% decline (\$270 annually) observed among households earning less than \$125,000. This represents a substantial decline, especially considering the narrow profit margins with which grocery stores typically operate under (Thomassen et al. 2017, Hristakeva 2022).

Table 2: Changes in Grocery Spending 6-Months Post Adoption

	All	Motivation		Income		Age	
		Weight Loss	Diabetes	$<$ \$125,000	$\geq$ \$125,000	under 55	over 55
GLP-1	-0.0552***	-0.0589***	-0.0521***	-0.0419***	-0.0859***	-0.0606***	-0.0507***
	(0.0081)	(0.0111)	(0.0119)	(0.0098)	(0.0142)	(0.0127)	(0.0103)
# of Adopters	2623	1458	1101	1834	789	1197	1426

Notes: The table reports the change in shopping patterns for the 6-month period post-adoption. The dependent variable is log of spending on grocery items in a month. TWFE estimates. Standard errors are clustered at the household level. Significance codes: *p<0.05; **p<0.01; ***p<0.001.

Overall, these findings indicate that GLP-1 adoption is associated with a reduction in grocery spending. The managerial and health implications of these changes, however, depend on which product categories experience the largest declines and whether certain types of foods are consumed more or less frequently. To further understand these patterns, we next analyze spending adjustments at the category level and changes in spending on food away from home.

4.2 Changes in Purchases across Grocery Categories

To analyze changes in purchases across food categories, we estimate the following equation:

$$\log(\text{spending+1})_{ict} = \beta \text{GLP1}_{it} + \alpha_i + \gamma_t + \varepsilon_{ict}, \tag{3}$$

where $\log(\text{spending+1})_{ict}$ tracks the monthly spending on category c by household i at time t. We use a TWFE estimator and cluster standard errors at the household level. The regression is run separately for each product category, where we estimate a distinct β parameter for each category. We analyze the 40 product categories purchased in grocery stores with the highest expenditures.[9]

[9]To comply with our data-sharing agreement, these 40 categories were aggregated by Numerator from smaller subcategories to protect proprietary information.

Figure 7: Changes in Grocery Spending Six Months Post GLP-1 Adoption by Category

Notes: Estimates of changes in shopping patterns for the 6-month period post-adoption for 40 top grocery categories. x-axis represents the estimated changes using TWFE (multiplying the estimate by 100 gives the approximate percentage change). Categories are sorted based on the magnitude of the parameter estimate. *Blue* estimates represent categories corresponding to Savory Snacks, while *Yellow* estimates represent categories corresponding to Sweets. All GLP-1 Users $N = 2,861$. Standard errors are clustered at the household level.

Figure 7 summarizes the results, with the x-axis representing the estimated change in spending by category (multiplying the estimate by 100 gives the approximate percentage change), and the y-axis listing individual product categories. Categories are sorted based on the magnitude of the parameter estimate in the first panel. Overall, the results show that GLP-1 users reduce spending on high-calorie, high-sugar, or high-fat items. For example, spending on products such as chips, sweet bakery, sides, and cookies show some of the largest reductions, averaging around -11.1% to -6.7%. To illustrate these trends, we highlighted Savory Snacks and Sweets in *Blue* and *Yellow*, respectively, showing that these categories are among those with the largest drops in spending.

Panels 2 and 3 in Figure 7 estimate the adjustments separately by reason for taking the drug, confirming that the patterns are similar across both groups of households. This consistency suggests that shifts in spending behavior are relatively similar, regardless of whether GLP-1 users are taking the medication for weight loss or diabetes management.

Interestingly, we do not observe statistically significant increases in spending on traditionally healthier products, such as fresh produce or whole grains, across all adopters. However, among weight-loss users specifically, there is a modest increase in spending on fresh produce and yogurt. The primary dietary change appears to be a reduction in high-calorie items, which by construction shifts the proportional spending toward healthier options, even without a substantial increase in the quantity of those items. Essentially, the composition of their grocery baskets becomes healthier more by cutting back on unhealthy items than by adding more healthy ones.

4.3 Changes in Spending on Food Away From Home

In addition to changes in grocery spending, we document changes in food-away-from-home expenditures, focusing on limited-service establishments such as fast food chains, coffee shops, and quick-service restaurants. Using Equation 3 we next analyze changes in spending on food away from home, separately by time of the day.

Table 3 shows decreases in spending during breakfast (5:00am-10:59am) and during the dinner meal time (4:00pm-8:59pm), suggesting that GLP-1 users adjust both their meal timing and consumption patterns. Interestingly, we find heterogeneity in these changes across user groups: Higher-income households are more likely to reduce breakfast consumption, while lower-income households show greater reductions in dinner spending.

Table 3: Changes in Food-Away-From-Home Spending by Meal Time

Daypart	Share of Spending	All	Motivation		Income		Age	
			Weight Loss	Diabetes	< \$125,000	≥ \$125,000	under 55	over 55
12:00am-4:59am	1.1%	-0.01	-0.018	0.003	0.025	-0.018*	-0.014	-0.006
		(0.007)	(0.01)	(0.01)	(0.017)	(0.008)	(0.011)	(0.009)
5:00am-10:59am	16.1%	-0.036*	-0.021	-0.056*	-0.023	-0.039*	-0.041	-0.031
		(0.017)	(0.023)	(0.027)	(0.039)	(0.019)	(0.026)	(0.024)
11:00am-1:59pm	29%	-0.023	-0.025	-0.026	-0.075	-0.01	-0.018	-0.029
		(0.019)	(0.026)	(0.03)	(0.045)	(0.021)	(0.029)	(0.026)
2:00pm-3:59pm	13%	-0.004	-0.012	0.009	0.004	-0.006	-0.011	0.001
		(0.017)	(0.022)	(0.026)	(0.039)	(0.018)	(0.025)	(0.022)
4:00pm-8:59pm	37.5%	-0.062**	-0.064*	-0.063*	-0.116**	-0.049*	-0.062*	-0.061*
		(0.02)	(0.028)	(0.03)	(0.043)	(0.023)	(0.031)	(0.027)
9:00pm-11:59pm	3.3%	-0.007	0.002	-0.018	-0.002	-0.009	-0.009	-0.006
		(0.011)	(0.014)	(0.017)	(0.025)	(0.012)	(0.018)	(0.013)

Notes: The table reports the change in shopping patterns for the 6-month period post-adoption. Dependent variable is log monthly away-from-home spending separately by meal time. TWFE estimates. Standard errors are clustered at the household level. Significance codes: *p<0.05; **p<0.01; ***p<0.001.

5 Persistence over Time

Our third research question examines whether dietary changes persist beyond the initial six months of GLP-1 adoption. We extend our analysis to evaluate shopping patterns over a 12-month period following adoption, where the average usage duration in our data are 11 months. We estimate the following equation:

$$\log(\text{spending+1})_{it} = \beta_1 \text{GLP1}_{it} + \beta_2 \text{GLP1}_{it} \times \text{month 6-12}_{it} + \alpha_i + \gamma_t + \varepsilon_{it}, \tag{4}$$

where month $6\text{-}12_{it}$ is equal to 1 if household i has been using GLP-1s for more than 6 months at time t.

Table 4 presents the results for grocery spending, with the first six months captured in the estimates reported in the first row and the interaction term displayed in the second row. The findings indicate that while the magnitude of spending reductions diminishes after six months, the effects remain negative and statistically significant.[10] This partial reversal may be driven by factors such as compliance challenges, waning drug efficacy, or measurement limitations. Anecdotally, some users report that the appetite-suppressing effects weaken over time, necessitating dosage adjustments to sustain efficacy.[11]

[10] An exception is the spending pattern for weight-loss users, where to total change in the second six months is not statistically distinguishable from zero, suggesting a reversion to pre-adoption spending levels.

[11] The long-term effects of GLP-1 medications on behavior and spending patterns remain uncertain. Even the medical literature, which is several years ahead of widespread consumer adoption, acknowledges that the long-term outcomes of these drugs are not yet fully understood, highlighting the need for further research.

Table 5 presents results for food-away-from-home spending, disaggregated by meal type (breakfast, lunch, and dinner). Similar to the patterns observed for grocery spending, we find evidence of a partial reversal in spending reductions after six months of GLP-1 use. Spending on breakfast and dinner continues to show negative and statistically significant reductions, consistent with the sustained, albeit weaker, effects seen in grocery spending.

Table 4: Changes in Grocery Spending 12-Months Post Adoption

	All	Motivation		Income		Age	
		Weight Loss	Diabetes	$<$ \$125,000	$\geq$ \$125,000	under 55	over 55
GLP-1	-0.0554***	-0.0590***	-0.0519***	-0.0420***	-0.0858***	-0.0607***	-0.0509***
	(0.0081)	(0.0111)	(0.0119)	(0.0098)	(0.0142)	(0.0127)	(0.0103)
GLP-1 × month 6-12	0.0141	0.0395**	-0.0130	0.0069	0.0304*	0.0230*	0.0063
	(0.0094)	(0.0129)	(0.0137)	(0.0114)	(0.0166)	(0.0138)	(0.0129)
# of Adopters	2623	1458	1101	1834	789	1197	1426

Notes: The table reports the change in shopping patterns for the first and second 6-month periods post-adoption. The dependent variable is log of spending on grocery items in a month. TWFE estimates. St. errors are clustered at the household level. Significance codes: *p<0.05; **p<0.01; ***p<0.001.

Table 5: Changes in Spending Away From Home 12-Months Post Adoption

	5:00am-10:59am	11:00am-1:59pm	4:00pm-8:59pm
GLP-1	-0.0361*	-0.0235	-0.0619**
	(0.0174)	(0.0193)	(0.0202)
GLP-1 × month 6-12	-0.0041	0.0374	0.0165
	(0.0221)	(0.0243)	(0.0255)
# of Adopters	2623	2623	2623

Notes: The table reports the change in shopping patterns for the first and second 6-month periods post-adoption. The dependent variable is log of spending on grocery items in a month. TWFE estimates. St. errors are clustered at the household level. Significance codes: *p<0.05; **p<0.01; ***p<0.001.

6 Managerial Implications and Concluding Remarks

The widespread and growing adoption of GLP-1 receptor agonists, such as Ozempic and Wegovy, is significantly reshaping food purchasing patterns. Our analysis reveals that households with at least one GLP-1 user reduce grocery spending by approximately 6% within six months of adoption. Given an average monthly grocery expenditure of \$630, this translates to an annual reduction of \$416 per adopter. In addition to grocery spending, households also reduce food-away-from-home expenditures, with breakfast spending declining by nearly 4% and dinner spending decreasing by 6%. These shifts highlight the broad impact of GLP-1 adoption on household food consumption behaviors.

Our findings, consistent with reports from major retailers like Walmart (Case and Banjo 2023), indicate substantial declines in purchases of high-calorie, indulgent foods such as chips, candy, and cookies. A closer examination across grocery categories reveals that the impact of GLP-1 use extends beyond just calorie-dense products, with most categories experiencing declines. Notably, increased spending is observed only for yogurt and fresh produce and only among adopters who take GLP-1 for weight loss. Overall, GLP-1 adoption drives a net reduction in household food expenditures, with significant implications for producers and retailers across the grocery sector.

This transformation presents both challenges and opportunities for the food industry as GLP-1 medications reshape consumer food purchasing patterns. Companies that rely heavily on calorie-dense, processed, or indulgent foods are likely to face declining demand and need to reassess their product portfolios to remain competitive. Understanding these demand shifts is important for managers seeking to make strategic decisions in a landscape increasingly shaped by declines in food spending.

Indeed, the effects of GLP-1 adoption are already being felt across the food industry. Major food corporations, including Kraft Heinz and Campbell's, have reported sales declines tied to shifting consumer preferences, particularly in processed and snack food categories. The growing focus on health and wellness, driven in part by the popularity of GLP-1 medications, has spurred companies to diversify their offerings. For example, Mars' acquisition of Kevin's Natural Foods highlights an industry-wide pivot toward healthier product lines. These adjustments underscore a significant shift in market dynamics, as companies adapt to evolving consumer behavior influenced by GLP-1 adoption.

The appetite-suppressing effects of GLP-1 drugs are likely to prompt targeted adjustments in product development and packaging. Companies may need to reevaluate product formulations, portion sizes, and packaging strategies to align with changing consumption patterns (Shanker 2024). Consumers on GLP-1 medications are expected to gravitate toward smaller portions and products emphasizing health and convenience, such as single-serving or portion-controlled options for nutrient-dense items like fresh produce, yogurt, and nutrition bars. Repackaging to provide these formats will be critical for targeting this evolving consumer segment. These shifts go beyond broader health trends, addressing the distinct changes in purchasing behaviors driven by GLP-1 adoption and requiring the food industry to adapt strategically to remain competitive.

While our findings provide valuable insights into the impact of GLP-1 adoption on household food spending and consumption patterns, there are several limitations to this study that warrant consideration. First, while we observe broad trends in food spending, the precise mechanisms driving these changes remain unclear. For example, it is difficult to fully isolate the effects of GLP-1 medications from other factors, such as lifestyle changes that might be concurrent with the decision to adopt the drugs. Moreover, while our study tracks household level spending, we cannot not account for individual-level variations in diet or medication adherence, both of which could influence the extent of dietary shifts and spending reductions. Additionally, household-level analysis inherently aggregates the behaviors of all members, meaning that the observed changes may also reflect spillover effects, where the GLP-1 user's behavioral changes influence others in the household.

Additionally, while we document a reduction in high-calorie food consumption, the long-term persistence of these changes remains uncertain. The appetite-suppressing effects of GLP-1 medications may lead to temporary shifts in consumption, but we observe some reversion of these effects beyond six months. It is unclear whether these changes will persist as the novelty of the medications wears off or if adherence declines over time, especially given that GLP-1 adoption is still in its early stages.

Moreover, the profile of GLP-1 adopters is likely to evolve over time. Our findings reflect the behaviors of current users, many of whom may have strong motivational traits or underlying health conditions that influenced their decision to adopt. As GLP-1 use expands to broader populations, including individuals seeking modest weight loss, the aggregate results may shift. This study provides an early estimate based on a specific point in time—early in the adoption lifecycle—and these results are likely to evolve as the characteristics of the GLP-1 user population change. Documenting these shifts as they occur will be critical for anticipating broader behavioral transformations.

Lastly, while our paper highlights potential implications for the food industry, it does not directly address the broader public health benefits that may result from reduced consumption of high-calorie foods. These potential benefits—such as a decrease in obesity rates and improvements in overall public health—are outside the scope of this analysis but represent an important area for future research. As GLP-1 adoption continues to rise, further studies are needed to understand the long-term effects on both consumer behavior and public health.

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