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ABSTRACT

We analyze the effect of California's $20 fast food minimum wage (Assembly Bill 1228), enacted in September 2023 and implemented in April 2024, on consumer prices using the Bureau of Labor Statistics' Consumer Price Indices for food away from home across 21 metropolitan statistical areas. Food away from home prices in California's four in-sample MSAs increased by 3.3 to 3.6 percent relative to 17 control MSAs through December 2024. Our estimates are stable across a number of specifications. Placebo tests on price indices for goods and services that were not affected by the policy, including food at home, show no differential increases in California's MSAs. The price increases we estimate likely arise in part from spillovers to the full-service sector, as well as changes in the production functions and product quality choices of limited service restaurants.

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1 Introduction

In September 2023, through Assembly Bill 1228, California legislated a minimum wage increase to $20 per hour for fast food workers employed at chains with more than sixty locations nationwide.[1] Because the entirety of this increase went into effect on April 1, 2024, the increase from the statewide minimum wage of $16 (effective January 1st, 2024) is one of the largest one-time minimum wage increases in United States history. Additionally, though sector-specific minimum wages are attracting renewed attention, California's increase is one of the few enacted in recent decades.

We analyze the effects of AB 1228 on consumer prices using the food away from home (FAFH) component of the Consumer Price Index for Urban Consumers (CPI-U), as produced by the Bureau of Labor Statistics. This series is reported separately for each of 21 large metropolitan statistical areas (MSAs), of which four are located within California and 17 elsewhere around the country (U.S. Bureau of Labor Statistics, 2025a).[2] The FAFH index measures the prices paid by urban consumers for meals and snacks purchased at restaurants and other commercial food service establishments, reflecting the total price including taxes and tips. Limited-service and full-service restaurants together account for over 93 percent of the index. It is the most comprehensive, high-frequency, publicly released measure of restaurant prices available at this level of geographic granularity.

In unadjusted data, we find that FAFH prices in California's four in-sample MSAs increased by 3.4 percent relative to FAFH prices elsewhere in the United States from September 2023 through December 2024. Adjusting for pre-AB 1228 trends modestly increases this differential to 3.5 percent, while including time-varying MSA-level controls for local macroeconomic conditions yields estimates ranging from 3.3 to 3.6 percent. Difference-in-differences event study analyses show that FAFH prices begin rising gradually in California's MSAs relative to MSAs elsewhere in the months between enactment and implementation.

[1]The law in question also established a Fast Food Council within its Department of Industrial Relations, which was "charged with developing minimum fast food restaurant employment standards, including, as appropriate, standards on wages, working conditions, and training, as are reasonably necessary or appropriate to protect and ensure the welfare, including the physical well-being and security, of fast food workers" (California State Legislature, 2023). The full text of the law is available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB1228. We use the term "fast food" to encompass the limited-service restaurant sector.

[2]The 21 MSAs included in the CPI-U food away from home data are: Atlanta–Sandy Springs–Roswell; Baltimore–Columbia–Towson; Boston–Cambridge–Newton; Chicago–Naperville–Elgin; Dallas–Fort Worth–Arlington; Denver–Aurora–Lakewood; Detroit–Warren–Dearborn; Houston–The Woodlands–Sugar Land; Los Angeles–Long Beach–Anaheim; Miami–Fort Lauderdale–West Palm Beach; Minneapolis–St. Paul–Bloomington; New York–Newark–Jersey City; Philadelphia–Camden–Wilmington; Phoenix–Mesa–Scottsdale; Riverside–San Bernardino–Ontario; San Diego–Chula Vista–Carlsbad; San Francisco–Oakland–Hayward; Seattle–Tacoma–Bellevue; St. Louis; Tampa–St. Petersburg–Clearwater; and Washington–Arlington–Alexandria.

The differential stabilizes between 3 and 4 percent above the 17 control MSAs roughly six months after implementation. In a set of falsification checks, we find no evidence of differential changes when comparing California's MSAs to other MSAs for either the Food at Home index or the broader index for All Items Less Food and Energy. Additionally, trends for the FAFH price index were remarkably similar prior to AB 1228's enactment.

Limits on AB 1228's scope imply that a $4 increase in all restaurants' minimum wages would have a greater impact on prices than the 3.3 to 3.6 percent increase we estimate. AB 1228's reach within the limited service sector, for example, excludes chains with fewer than sixty establishments nationwide. Additionally, the within-sample cities of Los Angeles ($17.24 in July 2024), San Francisco ($18.67 in July 2024), and San Diego ($16.85 in January 2024) had already imposed local minimum wages above the initial state level of $16, further reducing the $20 fast food minimum wage's effective bite. More importantly, AB 1228 excludes full service restaurants altogether, which account for 43.1 percent of BLS's FAFH index.

While full service restaurants were not impacted directly, existing evidence from Reich and Sosinskiy (2025) suggests that indirect spillover effects on the full service sector were non-trivial. In their analysis of web-scraped menu prices, Reich and Sosinskiy (2025) estimate that the ratio of the impact on full-service prices to the impact on limited-service prices was 43 percent. The Reich and Sosinskiy (2025) estimate allows us to allocate our overall FAFH price increases between the limited and full service sectors. The implied increases are 4.9–5.1 percent in limited service restaurant prices and 2.1–2.2 percent in full service restaurant prices. The reductions in quantity demanded that are implied by multiplying these price increases by existing estimates of restaurant-sector price elasticities of demand (Andreyeva et al., 2010) are -3.9 to -4.1 percent in the limited service sector and -1.7 to -1.8 percent in the full service restaurant sector. These changes in quantities are very similar to the limited and full service restaurant employment declines estimated by Clemens et al. (2025a) using data from the Quarterly Census of Employment and Wages (QCEW).

A large literature documents that increases in minimum wages tend to be at least partially passed through to consumers in the form of higher prices, particularly in low-wage service sectors such as restaurants (Clemens, 2021). Early evidence from U.S. data shows that minimum wage increases raise prices for food away from home (Aaronson, 2001; Aaronson et al., 2008).[3] Recent studies that focused specifically on the fast food industry find significant

[3] Evidence from outside the United States also supports significant price pass-through: Link (2024) finds that German firms responded to the introduction of a national minimum wage primarily through higher prices rather than employment reductions, and Harasztosi and Lindner (2019) show that Hungarian firms absorbed minimum wage increases through a combination of higher prices, reduced profitability, and lower employment.

pass-through (Basker and Khan, 2016; Allegretto and Reich, 2018; Ashenfelter and Jurajda, 2022), though Wiltshire et al. (2026) find limited evidence of price pass-through. More recent work using high-frequency retail scanner data reaches mixed conclusions regarding the magnitude of pass-through, with some studies finding less-than-full pass-through and others finding close to one-for-one price responses (Leung, 2021; Renkin et al., 2022). An implication of price pass-through is that minimum wage increases function in part as a regressive consumption tax, with costs borne disproportionately by lower-income consumers who spend a greater share of income on affected goods (MaCurdy, 2015).

Most of the existing evidence on price impacts, however, comes from relatively modest minimum wage increases. There is increasing evidence that large increases have qualitatively different effects than small ones (Clemens and Strain, 2021; Clemens et al., 2025b; Meer and Tajali, 2025), a pattern predicted by models emphasizing firm bargaining power (Berger et al., 2025), capital and production technology adjustment frictions (Hurst et al., 2022), and non-wage adjustment margins (Clemens et al., 2018, 2021). California's policy experiment provides an opportunity to examine the price effects of an unusually large increase, which may give rise to more substantial competitive and compositional effects than more modest increases. When such competitive and compositional effects are present, prices may rise more than one-for-one with the precipitating cost shock.

AB 1228 has already attracted empirical analysis of several margins of adjustment. On the consumer side, Pandit (2025b) uses high-frequency transaction data from ten national chains and finds that customer visits and transactions fell by 6 to 7 percent, while revenue declined by approximately 5 percent. Together, these results imply higher spending per visit, which is consistent with partial price pass-through. In the analysis most closely related to ours, Reich and Sosinskiy (2025) use web-scraped menu data from a sample of restaurants. Reich and Sosinskiy (2025) estimate that approximately 63 percent of the wage increase is passed through to prices. Notably, the timing of their data collection precludes the estimation of anticipation effects between AB 1228's enactment and implementation. We provide clear evidence of such effects, yielding larger overall estimated price increases.

With respect to employment, Sovich and Hamdi (2025) analyze AB 1228 using anonymized payroll records from Equifax, covering approximately 5,000 large employers nationwide. Their analysis focuses on relatively large fast-food establishments[4] and finds evidence of offsetting reductions in turnover and hiring that together imply little net change in employment. In contrast, Clemens et al. (2025a), using administrative QCEW data, find clear

[4]For their establishment-level analysis, Sovich and Hamdi (2025) report examining 1,097 establishments, spanning 23 distinct firms in their fast-food sample. Prior to treatment, the median establishment employs 67 workers, substantially larger than the typical food service establishment.

evidence of employment declines in California's fast food sector following the policy's enactment.[5] Reich and Sosinskiy (2025), by contrast, report seeing no evidence of employment effects in the QCEW. As in their analysis of prices, however, Reich and Sosinskiy (2025) make no allowance for anticipation effects between AB 1228's enactment and implementation, which biases their estimated employment effects towards zero.[6] In the spirit of Aaronson and French (2007), the present paper rounds out the linkage between price and employment effects by considering the effects of price increases on the quantity of FAFH demanded. The price increases we estimate imply quantity reductions of 3.9 to 4.1 percent and 1.7 to 1.8 percent in the limited and full service sectors respectively, which align with the employment declines estimated by Clemens et al. (2025a).

This paper contributes to the emerging literature on AB 1228 by providing a transparent analysis using the most comprehensive data available on prices in the restaurant sector. While Reich and Sosinskiy (2025) rely on web-scraped menu prices from a limited sample of restaurants, our approach captures actual transaction-weighted prices across the full spectrum of food service establishments within each metropolitan area, including taxes and tips. The CPI data also allow us to compare prices for indices of Food at Home and All Items Less Food and Energy. The resulting falsification checks allow us to rule out biases from California-specific shocks arising from agricultural-produce input costs or broad-based macroeconomic factors.

The remainder of this paper proceeds as follows. In section 2 we discuss our data and in section 3 we present our empirical methodology. Section 4 presents our results and discusses their implications for California's restaurant sector. We conclude in Section 5.

2 Data

We use monthly price data from the U.S. Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers (CPI-U) covering September 2022 through December 2024. Our sample includes all 21 MSAs for which the BLS publishes the Food Away from Home price index. Of these aforementioned 21 MSAs, the four located in California constitute our

[5] Complementary evidence from an analysis of AB 1228 finds evidence consistent with changes in hours and reorganization of shifts (Pandit, 2025a), while additional evidence from a broader set of minimum wage increases provides complementary evidence that minimum wage increases lead to increases in unpredictability in workers' shift schedules (Farkas, 2025).

[6] We note that anticipation effects will tend to emerge in most any model that accounts for the forward-looking nature of firms' investment decisions. As in Sorkin (2015) and Aaronson et al. (2018), for example, the production technologies of new entrants will reflect their expectations for future input costs. Anticipation effects will also tend to emerge in models that incorporate frictions to adjustments of either wages or prices. Renkin et al. (2022) find evidence of anticipation effects in their analysis of price pass-through.

treated units and cover approximately two thirds of California's population.[7] The remaining 17 non-California MSAs serve as the control group.[8]

We focus on four CPI series: the All Items Index, the All Items Less Food and Energy Index, the Food at Home Index, and the Food Away from Home Index (FAFH). Our primary outcome is the FAFH Index, which captures average prices paid by urban consumers for meals and snacks purchased from commercial food service establishments, reflecting the total price paid, including tips and any applicable taxes.

FAFH aggregates prices from five subcategories: full-service meals and snacks (relative importance weight of 2.434), limited-service meals and snacks (2.845), food at employee sites and schools (0.072), food from vending machines and mobile vendors (0.055), and other food away from home (0.241).[9] Limited-service and full-service meals together account for over 93 percent of the FAFH basket, with limited-service restaurants comprising approximately 50 percent of the index.

Food at Home is reported monthly in all MSAs. In contrast, for most MSAs, the All Items, All Items Less Food and Energy, and FAFH indexes are published every other month. To construct a balanced monthly panel, we linearly interpolate the bimonthly series for all MSAs except for Chicago—Naperville—Elgin and Los Angeles—Long Beach—Anaheim, both of which report the three indices monthly.

The CPI indices each took baseline values of 100 when BLS first began to track each MSA. The MSA-specific indices have diverged substantially over time, so that index levels vary considerably across MSAs at the start of our sample (see Appendix Figure A1). Because a one-unit change in the index implies a different percent change in prices when starting from different baseline levels, we re-index each MSA's series to equal 100 in the month AB 1228 was enacted. This re-indexation ensures that a 1-unit change in each series is interpretable as a percent change from September 2023 and is comparable across MSAs.

For robustness, we also analyze series that are detrended by removing MSA-specific pre-trends. To do so, we detrended each CPI series by calculating the compound monthly

[7]The four MSAs – Los Angeles–Long Beach–Anaheim; Riverside–San Bernardino–Ontario; San Diego–Carlsbad; and San Francisco–Oakland–Hayward – have a combined population of approximately 25.4 million out of California's 39 million residents based on 2023 U.S. Census Bureau estimates.

[8]Of these 17 MSAs, 14 are located in states that increased their minimum wages during the study period. Seven of these experienced relatively small inflation-indexed adjustments, while the remaining seven saw legislation-driven step increases of at least $1 or more in at least one MSA-constituent state, though even the largest of these increases is much less than the statutory $4 per hour increase imposed by AB 1228. To the extent that these increases raised prices in these areas, our difference-in-difference estimates are attenuated towards zero.

[9]Weights are drawn from the BLS "Relative Importance of Components in the Consumer Price Indexes" tables for December 2024 and reflect each component's share of total consumer expenditure in the CPI-U (U.S. Bureau of Labor Statistics, 2025b).

growth rate over the 12 months prior to AB 1228's enactment and subtracting the resulting counterfactual trend from the observed series.

3 Methods

Our formal econometric estimation framework is an event study at the MSA level. The difference-in-differences event study is described by:

$$\text{Indexed CPI}_{\text{i,t}} = \alpha + \sum_{k=1}^{K_{\text{lead}}} \rho_k^{\text{lead}} \left(\text{Lead } k\right)_{i,t} + \sum_{k=1}^{K_{\text{lag}}} \rho_k^{\text{lag}} \left(\text{Lag } k\right)_{i,t} + \phi_i + \phi_t + \epsilon_{i,t}, \tag{1}$$

where MSAs are indexed by i and months by t. The dependent variable is the reindexed CPI for Food Away from Home (equal to 100 for all MSAs in September 2023). The terms ϕ_i and ϕ_t denote MSA and time fixed effects, respectively. The lead and lag indicators interact a California treatment indicator with event-time indicators, with September 2023 as the omitted reference period. Each lead coefficient ρ_k^{lead} will provide evidence on whether there were differential pre-trends over the k months prior to AB 1228's enactment, while the lag coefficients ρ_k^{lag} trace the differential evolution of food away from home prices in California MSAs relative to the control group in the months following enactment. In our baseline specification, we include up to 12 leads and 15 lags.[10]

In a set of robustness checks, we augment Equation 1 with time-varying MSA-level covariates to control for differential economic trends across MSAs that might confound the estimated price effects. Specifically, we include the employment rate in non-minimum-wage-intensive industries, average weekly wages, and unemployment rate. The non-minimum-wage employment rate is constructed from the Quarterly Workforce Indicators (QWI) (U.S. Census Bureau, 2025) as total employment less employment in Retail Trade (NAICS 44–45) and Accommodation and Food Services (NAICS 72), as a share of the MSA's total employment. Average weekly wages are from the Quarterly Census of Employment and Wages (QCEW) (U.S. Bureau of Labor Statistics, 2024). Unemployment figures are from the Current Employment Statistics (CES) (U.S. Bureau of Labor Statistics, 2026).

Because AB 1228 was enacted in California alone, only four in-sample MSAs are exposed to treatment. Consequently, standard cluster-robust standard errors may produce insufficiently conservative inference. We rely instead on placebo inference procedures, in which we repeatedly assign treatment and control status at random across draws of MSAs,

[10] Meer and West (2016) show that the impacts of minimum wage increases are likely to have dynamic effects. To improve precision in estimating the medium-run treatment effect, we also estimate a specification that pools all event-time indicators at 12 months or beyond into a single indicator. This pooled specification estimates the average treatment effect over the period from 12 months after enactment onward.

using sampling designs that retain the data's underlying structure with respect to having four treatment and 17 control MSAs. We conduct both "with replacement" and "without replacement" versions of the resampling procedure. For the procedure without replacement, treatment is assigned at random to four randomly selected MSA, while control status is assigned to the remaining seventeen. For the procedure with replacement, treatment is assigned at random to four MSAs and control status to 17 MSAs, with replacement making it possible for an individual MSA to be selected multiple times within either the treatment or control group or to be omitted from the sample altogether. Under both procedures, we re-estimate Equation 1 with the randomly drawn sample and repeat the procedure 500 times to generate a distribution of placebo treatment effects. We assess significance by computing the fraction of placebo treatment effects that exceed our actual estimate for the set of California MSAs in magnitude. For the event study specifications, we present the time paths of each placebo draw's treatment effects alongside California's estimates in "spaghetti plots," as has become standard in the synthetic control literature.

4 Results

Our presentation of results proceeds as follows. Section 4.1 presents our estimates of the effects of AB 1228 on the overall Food Away from Home (FAFH) price index. Section 4.2 then gauges the economic magnitude of these estimates, using evidence from Reich and Sosinskiy (2025) on spillovers from the limited service to the full service sector to allocate our overall FAFH estimate across the two sectors. In the spirit of Aaronson and French (2007), section 4.3 concludes the analysis by discussing the implications of our estimated price effects for the quantity of restaurant services demanded, labor demand, and the restaurant sector's composition.

4.1 Estimates of the Effects of AB 1228 on Food Away from Home Prices

We begin by presenting comparisons of FAFH prices in California's MSAs and the control MSAs in Figure 1. We start in panel 1a with the average reindexed FAFH CPI for treated and control MSAs, then show each of the four California MSAs individually against the control average in panel 1b. Panel 1a reveals that the average across the FAFH price indices in the treatment and control MSAs followed parallel trends over the year preceding AB 1228's enactment. The series then diverge, with a gap on the order of 3 to 4 percent emerging by late 2024. Panel 1b reveals further that each of the 4 California MSAs followed similar trends prior to AB 1228's enactment. There is some evidence of heterogeneous treatment effects, with larger price increases in San Diego–Carlsbad and Riverside–San Bernardino–Ontario than in San Francisco–Oakland–Hayward and Los Angeles–Long Beach–Anaheim. This is consistent with the relative magnitude of effective treatment impacting these MSAs, as baseline minimum wage rates were higher in the latter two MSAs than in the former.

The FAFH price indices for all 21 MSAs are presented separately in panel 1c, as are their detrended series, which appear in panel 1d. These panels illustrate that the California MSAs were consistently towards the middle of the distribution of (re-indexed) MSA-level price indices prior to AB 1228's enactment, but subsequently diverged upward relative to the remainder of the distribution. These panels provide an initial indication that placebo inference methods are likely to yield statistically significant estimates, as all four of the California MSAs emerge at the high end of the distribution by the end of the sample.

For comparison, Figures A2, A3, and A4 in Appendix A show the same set of panels for the All Items, All Items Less Food and Energy, and Food at Home indices, respectively. Reassuringly, and in contrast to the FAFH series, none of these indices exhibits a differential increase in California's MSAs following AB 1228's enactment. As with the FAFH index, each of these indices exhibits similar trends when comparing treatment and control MSAs prior to AB 1228's enactment.

Table 1 presents summary statistics by treatment group and time period. California's MSAs had higher average unemployment rates than the control MSAs both before and after September 2023 (3.93 versus 3.30 percent pre-enactment; 4.69 versus 3.67 percent post-enactment) and higher average weekly wages ($1,644 versus $1,526 pre-enactment). Employment rates in non-minimum wage intensive industries, by contrast, were similar across the two groups and stable over time. These macroeconomic differences motivate the inclusion of time-varying MSA level controls for average weekly wages, the non-minimum wage employment rate, and the unemployment rate in some of our robustness checks.

Using Equation 1, Table 2 presents estimates of the pooled coefficient for all months that occur 12 or more months after AB 1228's enactment. In panel (a), the baseline specification with no covariates yields an estimate of 3.36 (Column 1). Adding controls for average weekly wages (Column 2), the non-minimum-wage employment rate (Column 3), the unemployment rate (Column 4), or all three together (Column 5) produces estimates ranging from 3.29 to 3.39. Panel (b) of Table 2 repeats this exercise using detrended data, yielding estimates ranging from 3.51 to 3.60 across the same set of specifications. The similarity of estimates across specifications, with and without detrending and with varying sets of controls, provides reassurance that the results are not driven by variations in macroeconomic conditions or pre-existing trends across MSAs.

Columns 6 through 8 of Table 2 present estimates of the same fully specified event study applied to three additional CPI indices: All Items, All Items Less Food and Energy, and Food at Home. In the reindexed specification (Panel (a)), the pooled 12 months-and-beyond coefficient is -0.34 for All Items, -0.19 for All Items Less Food and Energy, and 0.19 for Food at Home. The detrended specifications (Panel (b)) yield similarly insignificant estimates. The absence of differential price effects in these indices, all of which should be largely unaffected by AB 1228, strengthens the case that the FAFH results reflect the policy's impact rather than price trends specific to California.

The panels of Figure A5 present three sets of robustness checks that probe the sensitivity of our results to the exclusion of individual MSAs or categories of MSAs from the sample. For the estimates in panel A5a, we first exclude any MSA that was impacted by a minimum wage increase during the pre-AB 1228 portion of our sample, we next exclude any MSA that was impacted by a minimum wage increase during the post-AB 1228 portion of our sample, and we finally exclude all control group MSAs that were impacted by minimum wage increases during our sample. Reflecting that the typical minimum wage increases enacted in other states and MSAs were modest, these exclusions have very little effect on the resulting point estimates. For the estimates in panel A5b we exclude the control group MSAs from each census region one region at a time. This too has little impact on the point estimates, revealing that no particular geographic region is substantially influencing our estimates. Finally, for panel A5c we exclude each MSA from the sample, one at a time. These estimates reveal first that no individual MSA within the control group exerts substantial influence.

The exclusion of individual MSAs from the treatment group sheds light on heterogeneity in the underlying treatment effects. Consistent with the MSA-specific time series from panel 1b of Figure 1, we observe that removing San Diego–Carlsbad from the sample results in a moderately smaller estimated treatment effect while removing either San Francisco–Oakland–Hayward or Los Angeles–Long Beach–Anaheim results in a modestly larger estimated treatment effect. As discussed above, this heterogeneity is consistent with a role for the fact that the effective treatment from AB 1228's $20 fast food minimum wage was greater in San Diego–Carlsbad than in San Francisco–Oakland–Hayward and Los Angeles–Long Beach–Anaheim.

Figure 2 presents standard event study coefficient graphs. Panels 2a and 2b show the FAFH event study with (a) and without (b) detrending. Consistent with the time series evidence in Figure 1, FAFH prices in California's MSAs track the control group closely prior to AB 1228's enactment, begin to diverge upward between enactment and implementation, and stabilize approximately one year post enactment at an increase of between 3 and 4 percent. Panels 2c through 2e show the corresponding event studies for the All Items, All

Items Less Food and Energy, and Food at Home Indices, none of which exhibit a change in the wake of AB 1228's enactment. The pre-enactment coefficients are close to zero in all panels. Figure A6 shows that our results are not sensitive to our use of imputation to fill in missing observations for the MSA series that are reported bimonthly. For this figure, we treat each time period as a two-month interval, averaging the reported values for the series that have values in every month and using the single reported value for the bimonthly series. Both the magnitudes and dynamics of the estimates, as well as the statistical significance of the estimates, are robust to adopting this approach.

We assess the statistical strength of our estimates using the placebo inference methods described in Section 3. Figure 3 presents the placebo event studies, in which California's treatment effect path (solid blue line) is displayed alongside the 500 placebo treatment paths (gray lines). In our baseline specifications without macroeconomic controls, we find that our point estimates for longer-run effects (i.e., at month 12 and at month 15) are statistically significant at the 5 percent level or better. This holds both whether we conduct resampling with replacement (panels a and b) or without replacement (panels c and d), as well as whether we adjust for MSA-specific trends (panels b and d) or not (panels a and c). Because adjusting for MSA-specific trends tends to increase variance in the post-treatment period, we find particularly small p-values (less than 0.01 in all cases) for regressions run on data that have not been detrended. Finally, as shown by the p-values in square brackets beneath the estimated minimum wage impacts in Table 2, these conclusions also apply to the pooled coefficient for months 12+ across the specifications that include time varying macroeconomic covariates.

4.2 Inferring Direct Effects on Fast Food Prices, Spillovers, and Pass-Through Rates

The FAFH index aggregates prices from both limited-service and full-service restaurants, weighted by their shares of the CPI consumption basket. Because AB 1228 directly targeted limited-service restaurants, translating our FAFH estimates into implied effects on fast food prices requires decomposing the aggregate effect across these two sectors. Limited-service and full-service restaurants together account for approximately 93 percent of the FAFH basket; we assume price changes in the remaining categories are negligible, so that the decomposition is:

$$\hat{\beta} = \omega_{LS} \times \Delta P_{LS} + \omega_{FS} \times \Delta P_{FS} \tag{2}$$

where $\omega_{LS} = 0.504$ and $\omega_{FS} = 0.431$ are the BLS relative importance weights for limited-service and full-service restaurants within the FAFH basket (U.S. Bureau of Labor Statistics, 2025b), and ΔP_{LS} and ΔP_{FS} are the respective price increases. This decomposition has one equation and two unknowns, so recovering ΔP_{LS} requires an assumption about the relative magnitude of the full-service price response. We use the ratio of the full-service to limited-service price effects estimated by Reich and Sosinskiy (2025), whose analysis of web-scraped menu prices finds full-service price increases of 0.9 percent alongside limited-service increases of 2.1 percent, implying a spillover ratio $\lambda = \Delta P_{FS}/\Delta P_{LS} = 0.43$.[11] Substituting yields $\Delta P_{LS} = \hat{\beta}/(\omega_{LS} + \omega_{FS} \times \lambda)$. Table B1 in Appendix B reports the full decomposition.

Under this allocation, our baseline FAFH estimate of 3.4 percent implies a limited-service price increase of 4.93 percent and a full-service increase of 2.12 percent. The detrended estimate of 3.5 percent implies corresponding increases of 5.08 and 2.18 percent.

These implied price increases can be compared to what one would expect under full pass-through of the direct labor cost increase. Clemens et al. (2025a) estimates an industry-specific wage increase of approximately 8 percent in California's limited-service sector relative to the rest of the United States. With labor accounting for 30 percent of revenue based on payroll-to-revenue ratios from the 2017 and 2022 Economic Census (Reich and Sosinskiy, 2025), a conventional pass-through calculation would imply full pass-through with a price increase of 2.4 percent. Our implied limited-service price increases of 4.93 to 5.08 percent imply a conventional pass-through rate of approximately 2.1, suggesting that factors beyond a simple passing along of increased input costs must be at play. We next turn to a discussion of potential contributing factors.

4.3 Implications for Employment and the Composition of Firms

In this section, we discuss the potential implications of the price effects we estimate for outcomes including the quantity of restaurant services demanded, restaurant employment, and the restaurant sector's composition and competitive environment. We begin by returning to Table B1, which converts price increases into declines in quantities demanded by drawing on estimates of the elasticity of demand for food away from home. The median restaurant industry price elasticity estimate reported in a meta-analysis by Andreyeva et al. (2010) is $\varepsilon = -0.8$. Applied to the limited-service price increase we estimate, this elasticity suggests a decline in fast food quantity demanded of 3.9 to 4.1 percent. Applied to the full-service price increase we estimate, the implied decline in the quantity of full service restaurant services is

[11] Recall that Reich and Sosinskiy (2025) is limited with respect to the time period under analysis, which does not allow their estimates to incorporate anticipation effects, which we show to be important for capturing the full impact of AB 1228 on prices. Renkin et al. (2022) similarly find evidence of anticipation effects in their analysis of price pass-through.

1.7 to 1.8 percent.

In the spirit of Aaronson (2001), Aaronson and French (2007), and Aaronson et al. (2008), we note that price increases and the associated declines in the quantity of restaurant services demanded have implications for canonical models of the labor market and, more directly, for restaurant employment. As these earlier papers emphasize, the finding of substantial price increases is consistent with the competitive model of low-wage labor markets, in which higher labor costs are passed through to consumers and output falls. It is inconsistent with a strong monopsony interpretation, under which a minimum wage increase would expand output and potentially reduce prices. As a simple approximation, if restaurants' demand for labor scaled back proportionally with demand for their services, the price impacts we estimate would result in a 3.9 to 4.1 percent employment decline in the fast food sector and a 1.7 to 1.8 percent decline in employment in the full service sector. The magnitudes of these estimates are consistent with the 3.2 and 2.1 percent employment declines estimated for these sectors, respectively, by Clemens et al. (2025a) using QCEW data.

Labor cost increases and declines in demand may also impact the composition of the limited-service sector in ways that may shift average prices for reasons that extend beyond conventional pass-through. Luca and Luca (2019), for example, find that minimum wage increases disproportionately drive exit among lower-rated restaurants, with a one-dollar increase raising the likelihood of exit by 14 percent for a median-rated restaurant but having no discernible effect on the highest-rated establishments. If exiting firms are also disproportionately low-price firms, their removal from the distribution mechanically raises the measured average even if no surviving establishment changes its prices. Models of industry dynamics in which labor-intensive incumbents are gradually replaced by more capital-intensive entrants predict exactly this pattern: industry-level adjustment occurs not within continuing firms but through compositional turnover.

To illustrate the potential magnitude of this compositional effect, we use the pre-AB 1228 hamburger price distribution from Reich and Sosinskiy (2025), which has a mean of \$3.91 and standard deviation of \$1.27. Assuming a normal distribution and removing the bottom 3.2 percent, which corresponds to the employment decline estimated in Clemens et al. (2025a), raises the average price by approximately 2.5 percent even if no individual establishment changes its price.[12] A composition effect of this magnitude can thus account for a substantial fraction of the price effects we estimate. Kline (2025) notes that improvements in quality among firms that remain in operation, as when they respond to a minimum wage increase by changing the skill composition of the workers they hire, can contribute further to estimated price pass-through effect. Taken together, combinations of conventional cost

[12]For an illustration, see Figure B1 in Appendix B.

pass-through and compositional change are sufficient to rationalize the full magnitude of the price increases we observe.

An additional point relates to how firms price in response to wage increases specifically. Sangani (2026) shows that across a range of industries, firms maintain constant dollar markups over costs (e.g., a one-dollar cost increase leads to a one-dollar price increase). For labor costs specifically, Sangani (Appendix C.2, Proposition C1) shows that a channel related to firms' markups can generate pass-through greater than 100%. Because wage increases raise the prices of other goods in the economy, consumers become less price-sensitive, and firms' desired dollar markups increase as a function of the wage increase. Markups may also rise as a result of any declines in competition that arise due to firm exit.

5 Conclusion

We examine the effect of California's Assembly Bill 1228 on restaurant prices using the Bureau of Labor Statistics' Consumer Price Index for Food Away From Home (FAFH) across 21 metropolitan statistical areas. We find that FAFH prices in California's four in-sample MSAs rose by 3.3 to 3.6 percent relative to FAFH prices in the 17 control MSAs from September 2023 through December 2024. Our estimates are robust to whether or not each MSA's price index is detrended, as well as across specifications that control in various ways for time-varying proxies for local economic conditions. Placebo tests on price indices for goods and services not directly affected by AB 1228 show no differential increases in California, supporting a causal interpretation of the FAFH results.

Because the FAFH index aggregates limited-service and full-service restaurant prices, the implied effect on fast food prices specifically is larger than the aggregate estimate. Using BLS expenditure weights and the ratio of full-service to limited-service price effects estimated by Reich and Sosinskiy (2025), we infer limited-service price increases of 4.9 to 5.1 percent and full service price increases of 2.1 to 2.2 percent. The magnitude of the effect on FAFH prices suggests that a combination of conventional cost pass-through effects and changes in the restaurant sector's composition and competitive environment are likely at work.

Our findings complement the analysis in Clemens et al. (2025a) by fleshing out our understanding of AB 1228's product market and labor market effects. Positive effects on restaurant prices imply negative effects on the quantity of restaurant services demanded. As emphasized by Aaronson (2001), Aaronson and French (2007), and Aaronson et al. (2008), positive effects on prices also imply negative effects on the quantity of labor demanded. Together, the findings of positive price effects and negative employment effects paint a picture consistent with competitive-market models of low-wage labor markets: a large, sector-specific minimum wage increase raised labor costs substantially, firms passed those costs through to consumers in the form of higher prices, and the resulting decline in demand contributed to reductions in employment (Aaronson et al., 2018). The price increases we document also have distributional implications, as lower-income households spend a larger share of their budgets at limited service restaurants (MaCurdy, 2015).

Generative AI Statement: During the preparation of this work, the authors used ChatGPT and Refine.Ink in order to identify typos and improve clarity. After using these tools and services, the authors reviewed and edited the text and take full responsibility for its content.

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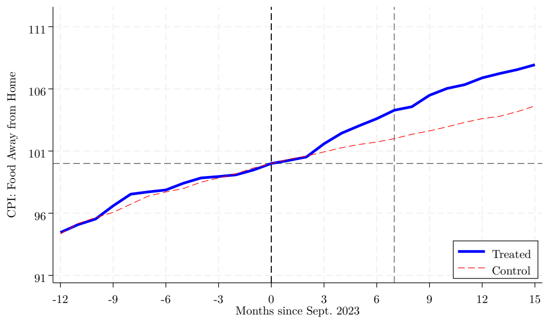
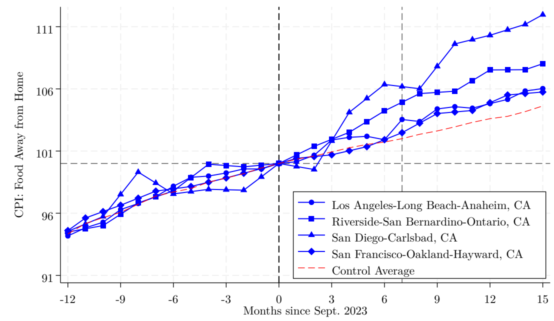
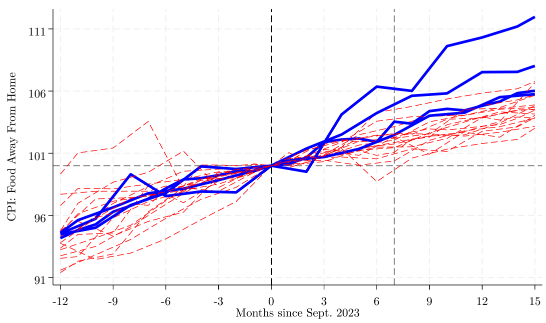
Tables and Figures



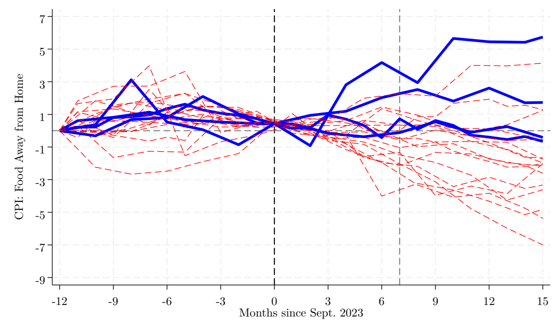
(a) Avg. CPI by Treatment Status



(b) Individual California vs. Control Avg.

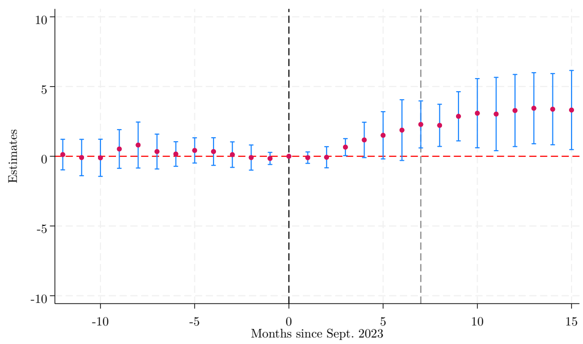


(c) CPI by All MSAs

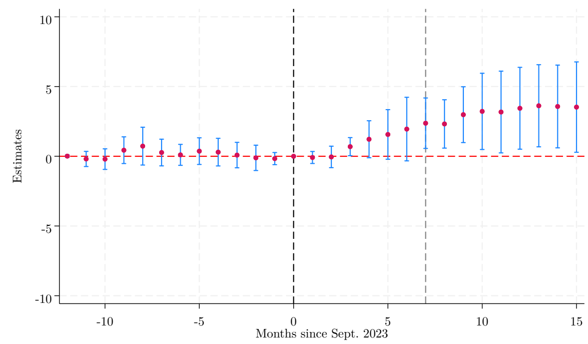


(d) Detrended CPI by All MSAs

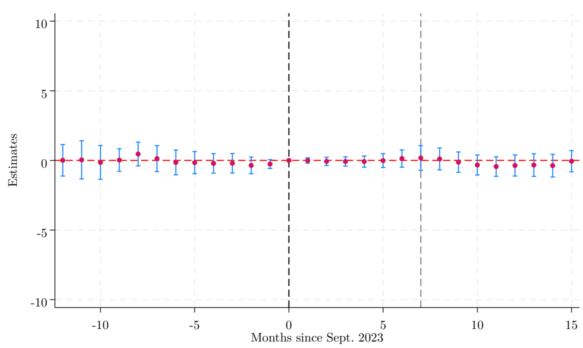
Figure 1: **CPI: Food Away from Home Index Time Series.** The figure illustrates monthly CPI: Food Away from Home in California MSAs and the other MSAs around the enactment of AB 1228 in September 2023, using CPI-U data described in Section 2. Blue lines represent treated MSAs and red lines represent control MSAs. All panels are reindexed to 100 in September 2023. Panel (a) shows the average FAFH by treated and control MSAs. Panel (b) shows FAFH separated by individual California MSAs and the average FAFH for controls. Panel (c) shows FAFH for all MSAs. Panel (d) presents panel (c) with the detrending procedure described in Section 2.



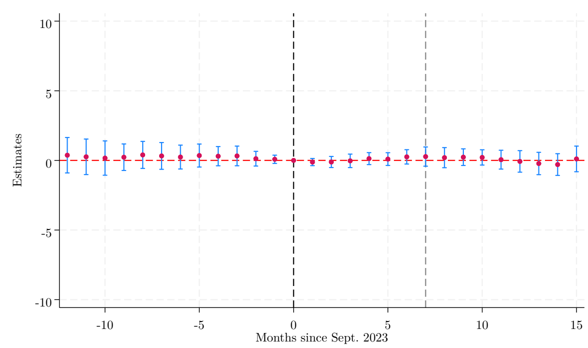
(a) Food Away from Home



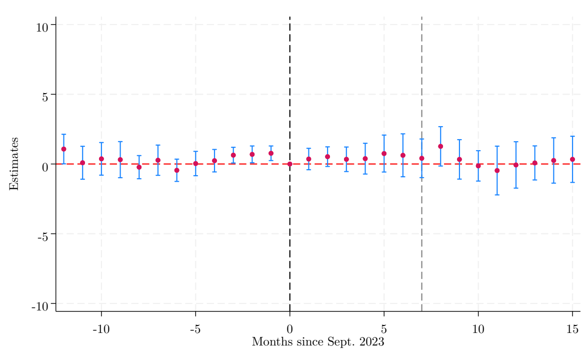
(b) Food Away from Home (Detrended)



(c) All Items

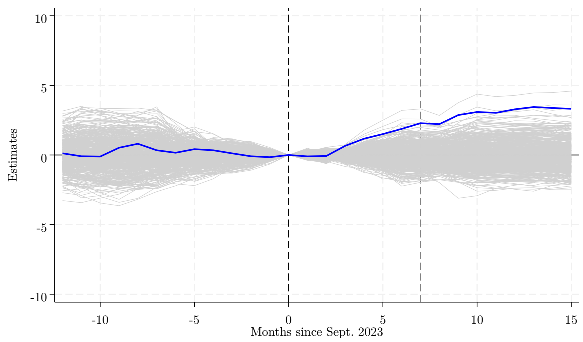


(d) All Items Less Food and Energy

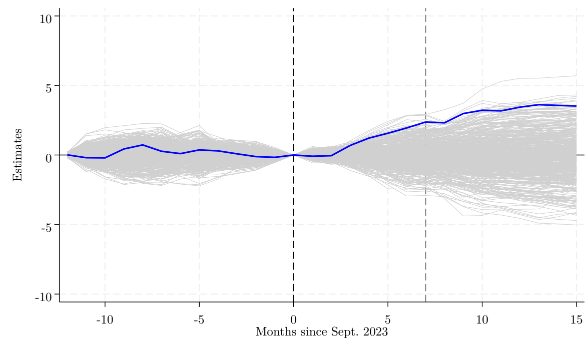


(e) Food At Home

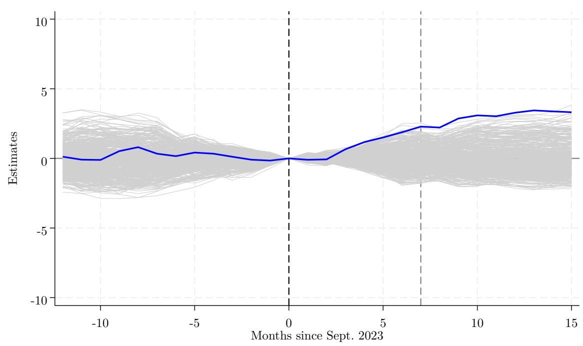
Figure 2: **Effect of Fast Food Minimum Wage on Price Indices** This figure shows coefficient estimates from Equation 1 of the Consumer Price Index Indices for California MSAs relative to control metropolitan areas, using CPI-U data. All series are indexed to 100 at September 2023. Confidence intervals are constructed using cluster robust standard errors.



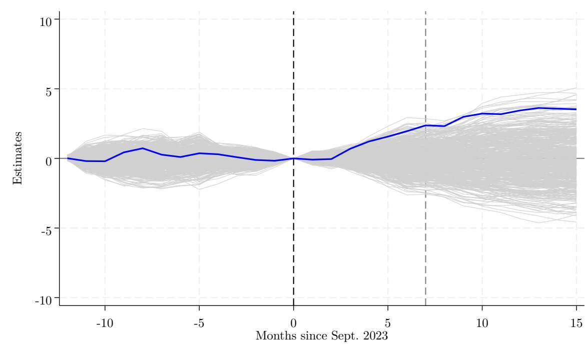
(a) Procedure w/ Replacement



(b) Procedure w/ Replacement (Detrended)



(c) Procedure w/o Replacement



(d) Procedure w/o Replacement (Detrended)

Figure 3: **Placebo Event Studies for Food Away from Home.** This figure shows event study estimates for California alongside placebo treatment effects, both estimated as described in Section 3. California's treatment effect estimates are displayed by the solid blue line and the placebo treatment effect estimates for other states are shown in lighter gray lines. Panels (a) and (b) are estimated from the placebo procedure drawing from the pool of all MSAs with replacement, while panels (c) and (d) draw without replacement.

Table 1: Summary Statistics by Treatment Group and Time Period

	(1) California Pre-Sep 2023	(2) California Post-Sep 2023	(3) Control Pre-Sep 2023	(4) Control Post-Sep 2023
Panel A: Macroeconomic Variables				
Average Weekly Wage	16.44	17.37	15.26	16.07
(Hundreds of Dollars)	(4.89)	(5.30)	(2.31)	(2.53)
Employment Rate in Non-MW	81.02	81.19	81.60	81.67
Intensive Industries (%)	(1.88)	(1.76)	(1.66)	(1.63)
Unemployment Rate	3.93	4.69	3.30	3.67
(%)	(0.68)	(0.64)	(0.70)	(0.73)
Panel B: Price Indices				
Food Away from Home	97.66	104.52	97.47	102.39
	(1.80)	(3.03)	(2.38)	(1.58)
All Items	97.92	101.51	97.98	101.63
	(1.44)	(1.11)	(1.56)	(1.29)
All Items Less Food & Energy	98.14	102.24	97.90	102.19
	(1.63)	(1.29)	(1.71)	(1.40)
Food at Home	99.27	100.77	98.98	100.44
	(1.03)	(1.18)	(1.26)	(1.15)
Panel C: Price Indices (Detrended)				
Food Away from Home	0.67	1.38	0.56	-0.85
	(0.69)	(1.87)	(1.04)	(1.88)
All Items	-0.02	-0.61	0.05	-0.50
	(0.47)	(1.11)	(0.61)	(1.37)
All Items Less Food & Energy	0.32	-0.01	0.29	-0.28
	(0.55)	(1.03)	(0.55)	(1.33)
Food at Home	-0.01	0.04	0.28	-0.89
	(0.84)	(1.57)	(0.89)	(1.55)
Observations	52	60	221	255
Number of MSAs	4	4	17	17

Note: This table presents the mean and standard deviations (below in parentheses) by pre- and post-periods and by treatment status. Pre-Sep 2023 period includes September 2023. Panel B and C are indexed to 100 in September 2023. Panel C shows detrended price indices (deviation from pre-trend). California includes 4 metropolitan statistical areas. Control includes 17 metropolitan statistical areas.

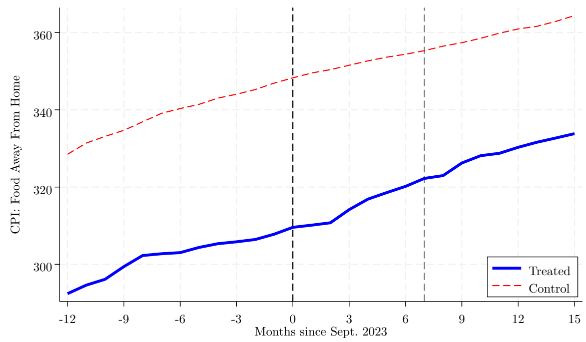
Table 2: Effect of Minimum Wage on Price Indices

	Food Away from Home					Across Other Price Indices		
	(1)	(2)	(3)	(4)	(5)	(6) All Items	(7) All Items Less Food & Energy	(8) Food At Home
Panel A: Main Results								
Coefficient for 12+ Months	3.355**	3.380**	3.287**	3.387**	3.379**	-0.342	-0.190	0.187
	(1.254)	(1.223)	(1.317)	(1.265)	(1.313)	(0.356)	(0.396)	(0.711)
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.754]	[0.688]	[0.730]
Average Weekly Wage		-0.316*			-0.301*	0.122	0.026	0.123
(Hundreds of Dollars)		(0.173)			(0.174)	(0.081)	(0.084)	(0.076)
Employment Rate in Non-MW			0.323		0.131	0.226	0.299	-0.102
Intensive Industries			(0.725)		(0.758)	(0.445)	(0.504)	(0.419)
Unemployment Rate				-0.379	-0.331	0.029	0.057	-0.307
				(0.636)	(0.649)	(0.210)	(0.239)	(0.331)
Observations	588	588	588	588	588	588	588	588
Panel B: Detrended Results								
Coefficient for 12+ Months	3.540**	3.571**	3.569**	3.511**	3.600**	-0.205	0.314	1.445
	(1.439)	(1.400)	(1.462)	(1.432)	(1.416)	(0.835)	(0.862)	(1.166)
	[0.032]	[0.024]	[0.030]	[0.038]	[0.030]	[0.844]	[0.772]	[0.164]
Average Weekly Wage		-0.389**			-0.411**	-0.016	-0.057	0.218**
(Hundreds of Dollars)		(0.175)			(0.181)	(0.095)	(0.078)	(0.086)
Employment Rate in Non-MW			-0.137		-0.287	-0.117	0.176	-0.442
Intensive Industries			(0.810)		(0.827)	(0.576)	(0.581)	(0.677)
Unemployment Rate				0.350	0.398	-0.350	-0.393	-0.660*
				(0.407)	(0.412)	(0.413)	(0.336)	(0.331)
Observations	588	588	588	588	588	588	588	588

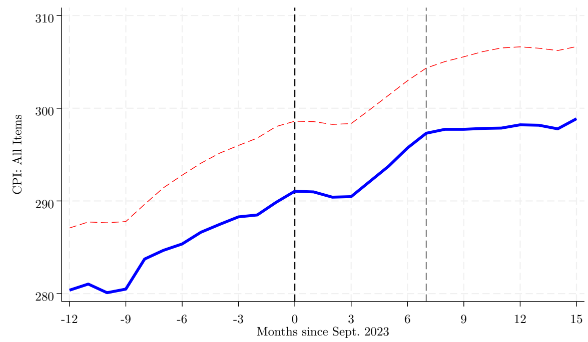
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Standard errors in parentheses. Placebo p-values generated from the procedure with replacement in brackets. Using data from CPI-U, this table presents the 12+ month pooled results of the event study specification presented in Equation 1. Panel A uses price indices reindexed at September 2023. Panel B uses detrended price indices as described in Section 2. Food Away from Home columns present the long-run effect without macroeconomic controls in column (1), with individual macroeconomic controls in columns (2)–(4), and with all controls in column (5). Columns (6)–(8) present the fully saturated model across different price indices.

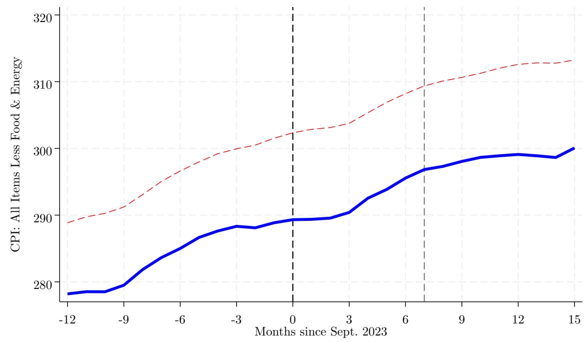
A Additional Tables and Figures



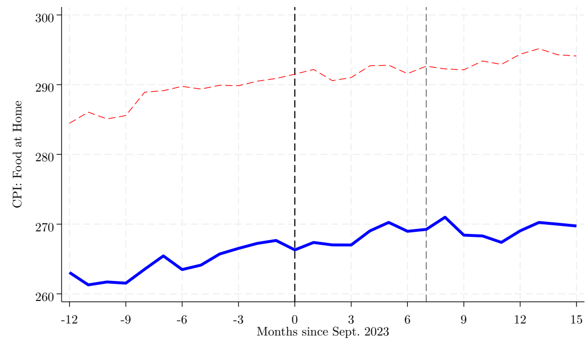
(a) Food Away from Home



(b) All Items

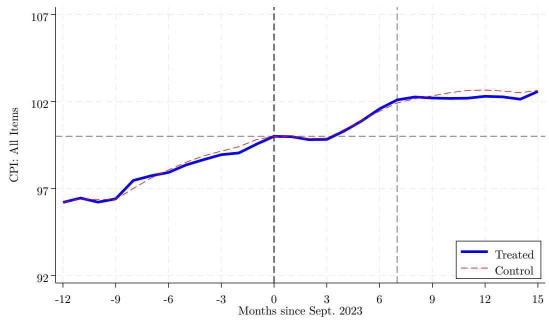


(c) All Items Less Food & Energy

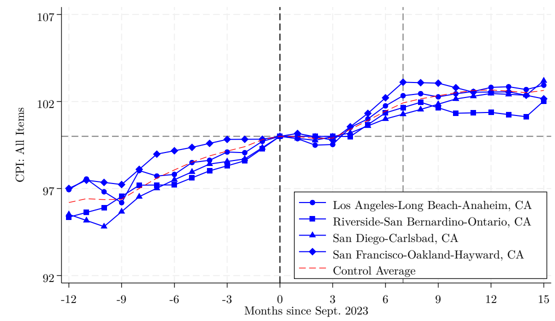


(d) Food At Home

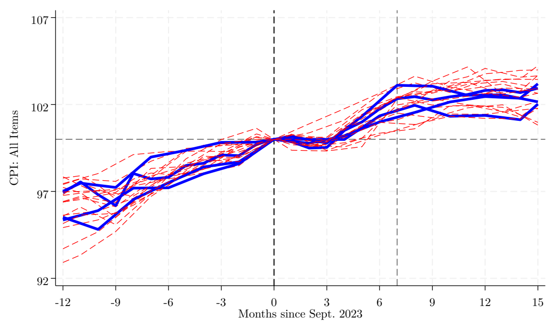
Figure A1: **Nominal CPI Time Series** The figure illustrates all four monthly CPI indices in California MSAs and the other MSAs around the enactment of AB 1228 in September 2023. All panels display the nominal values of the respective CPI-U index described in Section 2.



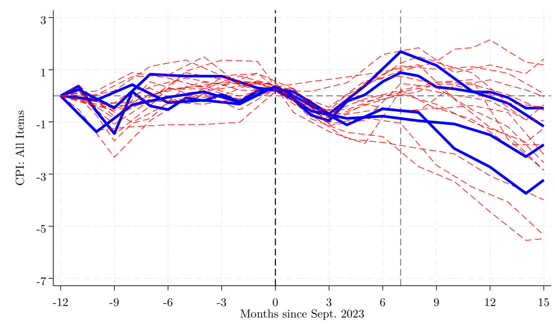
(a) Avg. CPI by Treatment Status



(b) Individual California vs. Control Avg.

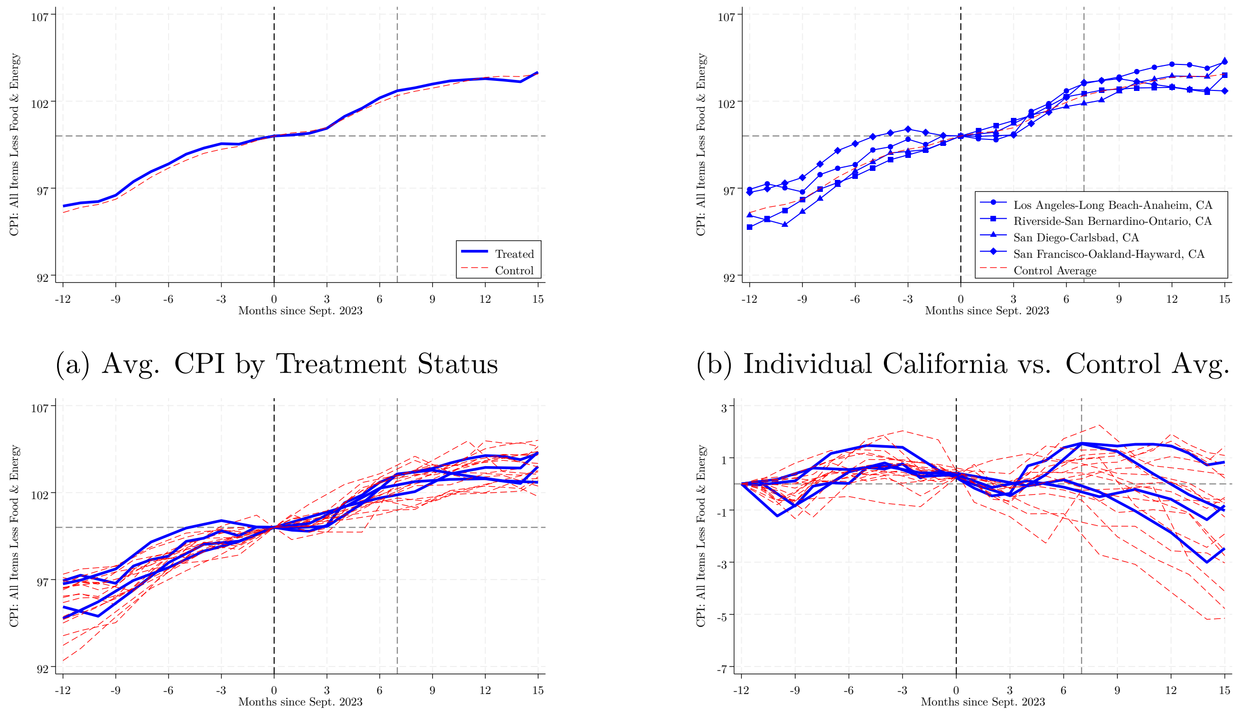


(c) CPI by All MSAs



(d) Detrended CPI by All MSAs

Figure A2: **CPI: All Items Time Series.** The figure illustrates monthly CPI: All Items in California MSAs and the other MSAs around the enactment of AB 1228 in September 2023, using CPI-U data described in Section 2. Blue lines represent treated MSAs and red lines represent control MSAs. All panels are reindexed to 100 in September 2023. Panel (a) shows the average All Items Index by treated and control. Panel (b) shows All Items Index separated by individual California MSAs and the average All Items Index for control MSAs. Panel (c) shows All Items Index for all MSAs. Panel (d) presents panel (c) with the detrending procedure described in Section 2.



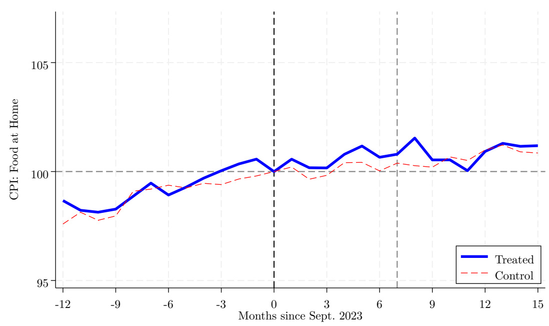
(a) Avg. CPI by Treatment Status

(b) Individual California vs. Control Avg.

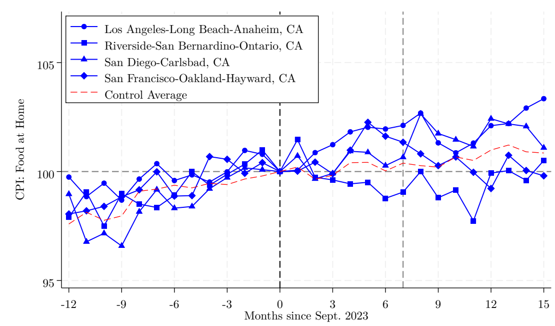
(c) CPI by All MSAs

(d) Detrended CPI by All MSAs

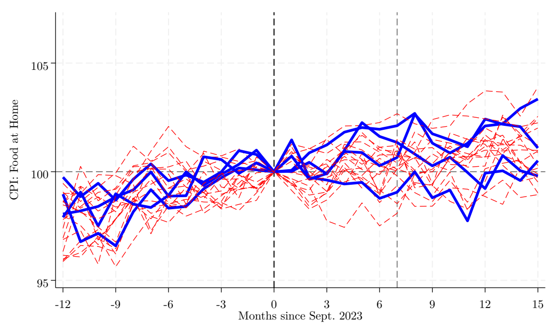
Figure A3: **CPI: All Items Less Food & Energy.** The figure illustrates monthly CPI: All Items Less Food & Energy in California MSAs and the other MSAs around the enactment of AB 1228 in September 2023, using CPI-U data described in Section 2. Blue lines represent treated MSAs and red lines represent control MSAs. All panels are reindexed to 100 in September 2023. Panel (a) shows the average All Items Less Food & Energy Index by treated and control. Panel (b) shows All Items Less Food & Energy Index separated by individual California MSAs and the average All Items Less Food & Energy Index for control MSAs. Panel (c) shows All Items Less Food & Energy Index for all MSAs. Panel (d) presents panel (c) with the detrending procedure described in Section 2.



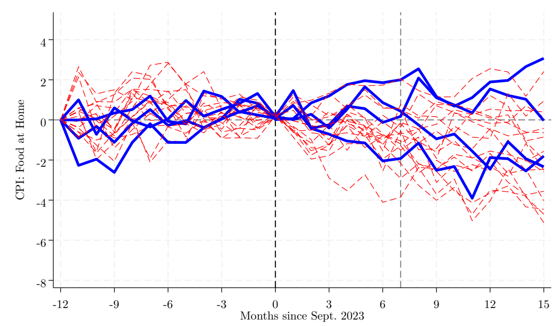
(a) Avg. CPI by Treatment Status



(b) Individual California vs. Control Avg.

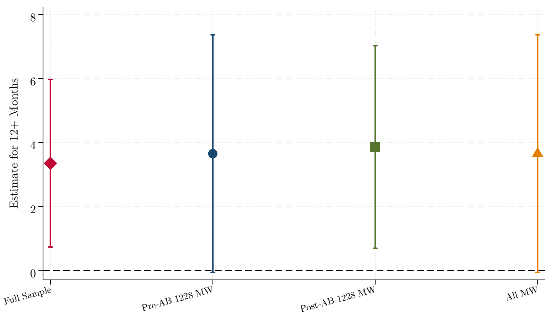


(c) CPI by All MSAs

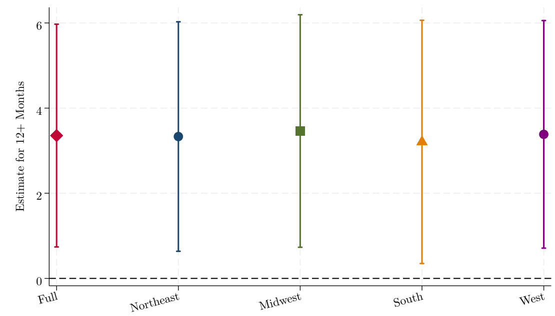


(d) Detrended CPI by All MSAs

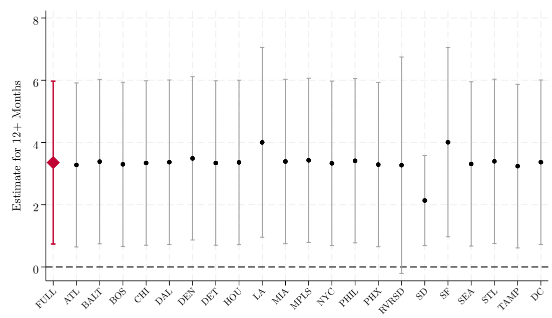
Figure A4: **CPI: Food at Home.** The figure illustrates monthly CPI: Food at Home in California MSAs and the other MSAs around the enactment of AB 1228 in September 2023, using CPI-U data described in Section 2. Blue lines represent treated MSAs and red lines represent control MSAs. All panels are reindexed to 100 in September 2023. Panel (a) shows the average Food at Home Index by treated and control. Panel (b) shows Food at Home Index separated by individual California MSAs and the average Food at Home Index for control MSAs. Panel (c) shows Food at Home Index for all MSAs. Panel (d) presents panel (c) with the detrending procedure described in Section 2.



(a) Exclude by Min. Wage Law Timing

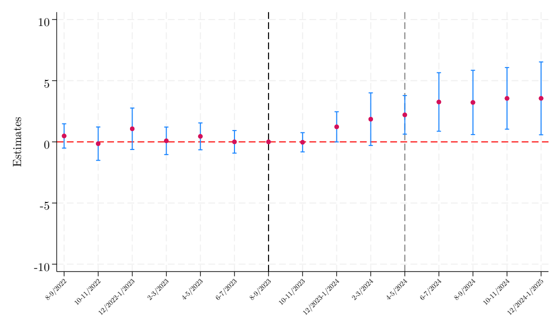


(b) Exclude by Region

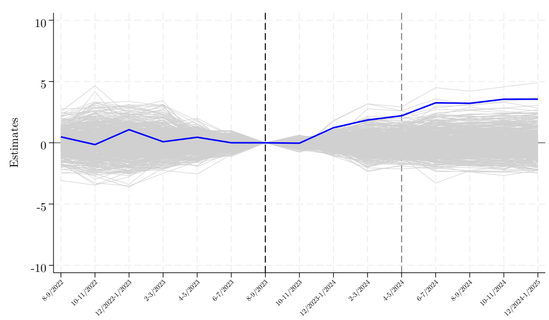


(c) Exclude by One MSA

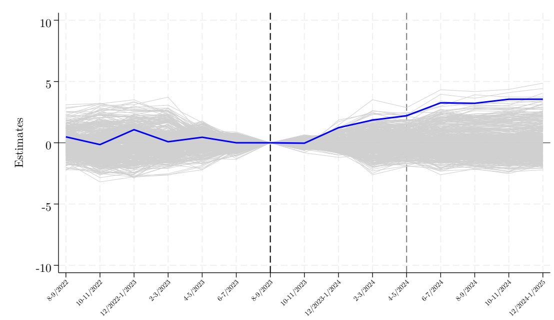
Figure A5: **Robustness by Control Group**. This figure presents robustness of the coefficient for 12+ months using different control groups. Panel (a) presents the estimates by excluding MSAs based on different timing of minimum wage laws. Panel (b) presents the estimates by excluding MSAs by census region. Panel (c) presents the estimates by excluding one MSA at a time.



(a) Bimonthly Event Study



(b) Procedure w/ Replacement



(c) Procedure w/o Replacement

Figure A6: **Bimonthly Event Study Estimates**. This figure presents estimates of Equation 1 using bimonthly dates rather than linearly interpolating to have a balanced monthly panel. Panel (a) presents the event study results. Panel (b) presents the placebo estimates with replacement. Panel (c) presents the placebo estimates without replacement.

B Additional Figures and Tables for Inferring Direct Effects on Fast Food Prices, Spillovers, and Pass-Through Rates

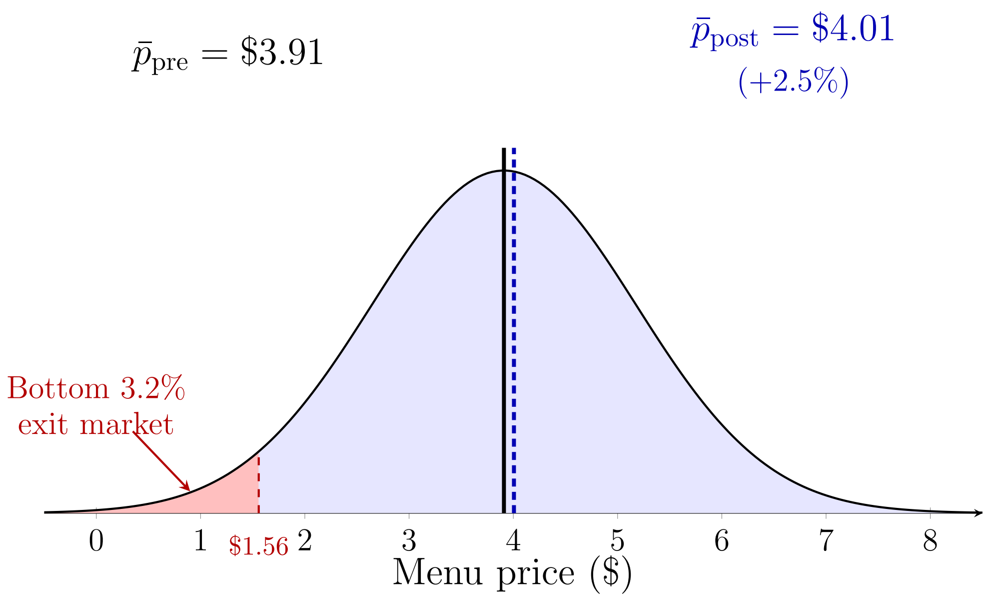


Figure B1: **Composition effect from exit of lowest-priced establishments.** We truncate the bottom 3.2 percent of the pre-policy hamburger price distribution reported by Reich and Sosinskiy (2025), where 3.2 percent corresponds to the estimated employment decline in Clemens et al. (2025a). The solid vertical line marks the pre-policy mean ($3.91); the dashed vertical line marks the post-exit mean ($4.01), an increase of 2.5 percent with no individual establishment changing its price.

Table B1: Decomposing the FAFH Price Effect into Limited-Service and Full-Service

$$\underbrace{\hat{\beta}}_{\text{Our FAFH estimate}} = \underbrace{\omega_{LS}}_{\text{BLS basket weight}} \times \underbrace{\Delta P_{LS}}_{\text{LS price increase}} + \underbrace{\omega_{FS}}_{\text{BLS basket weight}} \times \underbrace{\Delta P_{FS}}_{\text{FS price increase}}$$

Using the spillover ratio from Reich and Sosinskiy (2025): $\lambda = \Delta P_{FS}/\Delta P_{LS} = 0.9/2.1 = 0.43$:

$$\hat{\beta} = \omega_{LS} \times \Delta P_{LS} + \omega_{FS} \times \lambda \times \Delta P_{LS} = \Delta P_{LS} \left(\omega_{LS} + \omega_{FS} \times \lambda\right)$$

$$\Delta P_{LS} = \frac{\hat{\beta}}{\omega_{LS} + \omega_{FS} \times \lambda}, \qquad \Delta P_{FS} = \lambda \times \Delta P_{LS}$$

Parameter	**Source**	**Value**
ω_{LS} (LS share of FAFH basket)	U.S. Bureau of Labor Statistics (2025b)	0.504
ω_{FS} (FS share of FAFH basket)	U.S. Bureau of Labor Statistics (2025b)	0.431
λ (FS/LS ratio)	Reich and Sosinskiy (2025)	0.43
$\hat{\beta}$ (FAFH effect, baseline)	Panel (a) of Table 2	3.4%
$\hat{\beta}$ (FAFH effect, detrended)	Panel (b) of Table 2	3.5%
Denominator: $\omega_{LS} + \omega_{FS} \times \lambda$	$0.504 + 0.431 \times 0.43$	0.689

		Implied Price Increase		Implied Qty Decline ($\varepsilon = -0.8$)	
FAFH Estimate	$\hat{\beta}$	ΔP_{LS}	ΔP_{FS}	ΔQ_{LS}	ΔQ_{FS}
Baseline	3.4%	$3.4/0.689 = 4.93\%$	$0.43 \times 4.93 = 2.12\%$	-3.95%	-1.70%
Detrended	3.5%	$3.5/0.689 = 5.08\%$	$0.43 \times 5.08 = 2.18\%$	-4.06%	-1.75%

Pass-Through: Comparing the implied LS price increase to the predicted increase under full cost pass-through:

$$\text{Full PT Benchmark} = \underbrace{\alpha}_{\text{labor share}} \times \underbrace{\Delta W}_{\text{wage increase}}, \qquad \text{Pass-Through Rate} = \frac{\Delta P_{LS}}{\text{Full PT Benchmark}}$$

FAFH Est.	ΔP_{LS}	Labor Share (α)	Wage Incr. (ΔW)	Full PT Benchmark	Pass-Through
3.4%	4.93%	30%	8%	2.4%	2.06
3.5%	5.08%	30%	8%	2.4%	2.12

Notes: BLS relative importance weights from the 2024 CPI basket: LS (NAICS 722513) = 2.845, FS (NAICS 722511) = 2.434, total FAFH = 5.648. Weights are $\omega_{LS} = 2.845/5.648 = 0.504$ and $\omega_{FS} = 2.434/5.648 = 0.431$. The remaining 6.5 percent of the FAFH basket is assumed to have negligible price responses to AB 1228. The spillover ratio $\lambda = 0.43$ is the ratio of Reich and Sosinskiy (2025)'s Q3 full-service price effect (0.9%) to their Q3 fast-food price effect (2.1%). Quantity declines computed as $|\varepsilon| \times \Delta P$, using $\varepsilon = -0.8$ from a meta-analysis of FAFH demand elasticities (Andreyeva et al., 2010). Labor share of 30% is payroll-to-revenue from the 2017 and 2022 Economic Census (Reich and Sosinskiy, 2025). The 8% industry-wide wage increase is from Clemens et al. (2025a).