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Platform Dependence During COVID-19: Restaurants' Resilience in the United States

Eric Du[1,a]

[1]*Harrow International School Hong Kong, 38 Tsing Ying Rd, Tuen Mun, Hong Kong, China*
a. *dueric7777@outlook.com*

Abstract:
The COVID-19 pandemic triggered one of the most severe shocks in the history of the U.S. restaurant industry. As government restrictions and voluntary avoidance of public spaces sharply reduced in-person dining, revenues plummeted, and closures surged across the sector. Yet even within this crisis, adaptation paths diverged sharply. Restaurants that had access to digital ordering and delivery platforms—such as DoorDash, Uber Eats, and Grubhub—were able to support partial access to consumers and reconfigure operations toward off-premises sales. By contrast, many small independent restaurants without digital infrastructure faced devastating revenue losses and permanent closures. This paper examines how reliance on third-party delivery platforms shaped the resilience of U.S. restaurants during the COVID-19 shock. Using publicly available evidence from federal statistics, industry analyses, and peer-reviewed research, combine descriptive patterns with theoretical insights from microeconomics, platform economics, and dynamic capabilities theory. Argues that platform dependence enabled survival for many firms by substituting for dine-in demand, but imposed longer-run costs through commissions, heightened intra-platform competition, algorithmic visibility constraints, and dependence on powerful intermediaries. This study also discusses policy responses—such as emergency fee caps and the Paycheck Protection Program (PPP)—and assess their interaction with platform-mediated adaptation. The analysis concludes that digital readiness became indispensable for resilience in food service, yet platform dependence created strategic trade-offs that will shape the industry's post-pandemic equilibrium.

Keywords: Pandemic shock. Platform. Policy. Industry. Market.

1. Introduction

The restaurant industry plays a vital role in the U.S. economy, employing millions and shaping local community life through an ecosystem of independent eateries, full-service concepts, and quick-service chains. Heading into 2020, nominal sales were on a steady upward trend and digital ordering was growing but still supplementary to on-premises dining for most operators. The onset of COVID-19 in March 2020 abruptly reversed this trajectory. State and local restrictions limited indoor dining, mobility collapsed, and consumers voluntarily avoided crowded spaces. In April 2020, seasonally adjusted sales of "food services and drinking places" fell by roughly half relative to the prior year, the sharpest monthly contraction on record. Millions of workers were furloughed or laid off, and by year's end a large share of independent restaurants had closed permanently.

This aggregate collapse masked substantial heterogeneity in firms' capacity to adapt. A critical differentiator was digital readiness. Restaurants that had invested in online ordering, curbside pickup, or a proprietary delivery fleet could pivot quickly. Others joined third-party platforms to access demand at home, outsourcing logistics and discovery to intermediaries. Consumers, simultaneously, shifted behavior at scale: app-based orders surged as households reallocated food spending from on-premises dining toward delivery and take-away. While this channel substitution did not fully replace dine-in revenue, it provided a lifeline for many establishments.

This paper investigates how platform dependence—defined as strategic reliance on third-party delivery and marketplace platforms for order flow—shaped restaurant resilience during the pandemic. This study address three questions: To what extent did platforms cushion the revenue shock by enabling substitution toward off-premises transactions [1, 2]? What trade-offs did platform dependence entail for margins, autonomy, and competitive positioning [3]? How did policy interventions, such as PPP loans and temporary caps on delivery commissions, interact with platform-mediated adaptation?

Our contributions are threefold. First, this study synthesizes descriptive evidence to outline a coherent, data-consistent narrative of the industry's contraction, partial recovery, and digital reconfiguration. Second, this study develops a conceptual framework linking microeconomic shutdown conditions, two-sided market dynamics, and firm-level dynamic capabilities to observed outcomes. Third, this study draws policy implications for supporting small businesses in systemic shocks while managing intermediaries' market power. The remainder proceeds as follows. Section 2 situates the study in the literature. Section 3 lays out the theoretical framework. Section 4 describes data and method. Section 5 presents results with guidance for figures. Section 6 discusses implications, including distributional and strategic issues. Section 7 concludes.

2. Literature Review

Pandemic shock to small businesses. Early surveys and administrative microdata documented extraordinary distress among U.S. small businesses in spring 2020. Using a large-scale survey, reported widespread temporary closures and steep revenue losses, with restaurants and hospitality among the hardest-hit sectors. Prior studies showed disproportionate impacts on minority-owned businesses in the initial months, underscoring structural vulnerabilities [2, 3]. From the demand side, cellphone mobility analysis indicates that voluntary avoidance of crowded spaces—rather than mandates alone—drove the collapse in visits to retail and restaurant venues [4]. Establishment-level work combining business listings and mobility data estimated sizable permanent exit rates by year-end 2020, particularly for independents and for venues in central business districts reliant on office worker foot traffic [2, 5].

Acceleration of digital adoption. Parallel research chronicled the rapid scale-up of online ordering and third-party delivery. Using operational data, found that for restaurants remaining open on Uber Eats, orders per operating hour more than doubled post-lockdown in several cities [6]. Federal and industry analyses reported that app-based spending rose sharply. As USDA ERS documented tripling of quick-service delivery via third-party platforms between 2019 and 2022 and even larger proportional gains for full-service restaurants from a smaller base [7]. These developments suggest a durable shift in consumption habits toward off-premises channels that persisted into the recovery [8].

Platform economics and intermediation. Two-sided market theory provides a lens for understanding platform-mediated resilience. Platforms create value by lowering search and matching frictions and by providing logistics, payments, and trust infrastructure [4, 9]. Network effects attract both restaurants and consumers, potentially stabilizing transactions under adverse conditions. Yet growth in supply on the platform also intensifies intra-platform competition. Evidence from sponsored listings and ranking markets indicates that paid prominence and algorithmic curation can skew demand toward already visible sellers, complicating the prospects of late adopters during the surge in onboarding [10, 11].

Unit economics and profitability. Commission fees, typically assessed as a share of order value, shift surplus from restaurants to intermediaries and can compress contribution margins [12]. Theoretical analysis of emergency fee caps predicts that caps improve short-run margins for restaurants but could alter platform incentives to invest or expand coverage [13]. This trade-off is emblematic of pol-

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icy design under uncertainty [14].

Policy interventions. The Paycheck Protection Program sought to preserve employment by subsidizing payroll costs through forgivable loans. At the local level, temporary delivery fee caps were enacted to protect restaurants' margins during mandated closures [15]. Policy timing and intensity varied with the public health context tracked by the Oxford COVID-19 Government Response Tracker [16]. Industry data specifically recorded the breadth of sales declines and job cuts across all restaurant segments amid these policy shifts [17].

International context. Outside the U.S., studies report similar acceleration of phantomization but different institutional supports. European wage subsidies provided direct employment stabilization, whereas in China delivery was integrated into broader super-app ecosystems. These contrasts suggest that platform dependence interacts closely with labor market institutions and digital infrastructure [18]. Cross-border observations also reflect that restaurant permanent closure rates remained notably high globally during the pandemic, a trend consistent with U.S. market patterns [19].

3. Theoretical Framework

This study articulates a parsimonious framework combining shutdown conditions, two-sided market dynamics, and dynamic capabilities.

3.1 . Microeconomic Shutdown Condition and Substitution

Let a restaurant's short-run profit be$\pi = p \cdot q - w \cdot h - m -$ where p is price, q is quantity, w·h captures variable labor cost, m is other variable cost (ingredients, packaging), and k denotes quasi-fixed operating costs (rent, utilities, baseline staffing). A dine-in collapse reduces q_dine toward zero. Access to delivery platforms enables substitution q_deliv > 0 with per-order commission rate τ on pre-tax revenue. Effective per-order margin becomes $p(1 - \tau) - c$, where c aggregates variable costs. The shutdown condition is $\pi \geq 0$; platform access can raise q enough to cover variable costs even if profits are slim. The key trade-off is that τ reduces per-order surplus, so survival may come with lower cash generation.

3.2 . Two-Sided Markets, Network Effects, and Competition.

Platforms match N_R restaurants with N_C consumers. Cross-group externalities imply $\partial U\_C/\partial N\_R > 0$ and $\partial U\_R/\partial N\_C > 0$. During a shock, an increase in platform participation on both sides can stabilize transactions. However, within-platform competition for visibility intensifies: each restaurant's order share depends on rank r_i and promotional spend s_i, with $\partial q\_i/\partial N\_R < 0$ holding N_C constant. Algorithmic curation and sponsored placement can shift demand concentration toward top-ranked sellers. Thus, platform expansion is a rising tide that does not lift all boats equally.

3.3 . Dynamic Capabilities and Digital Reconfiguration.

Dynamic capabilities emphasize sensing, seizing, and transforming. Sensing: recognizing collapsing on-premises demand. Seizing. Rapidly onboarding to platforms, redesigning menus for delivery, adjusting prices. Transforming: integrating new workflows (order batching, packaging, kitchen line reconfiguration), investing in data and loyalty outside third-party channels. Heterogeneity in these capabilities explains survival differences beyond location and segment.

4. Data and Methods

Through assemble evidence from public statistical series, industry disclosures, and academic studies to trace a five-year arc from pre-pandemic baseline through recovery:

Industry revenue: U.S. Census Monthly Retail Trade Survey (food services and drinking places) provides monthly sales to anchor contraction and recovery dynamics.

Digital channel adoption: USDA Economic Research Service analyses summarize app-based spending by segment (QSR vs FSR) and mode (restaurant app carry-out vs third-party delivery), allowing before-and-after comparisons.

Platform context: Corporate filings and analyst reports describe bookings growth and changing platform market shares, indicating concentration trends.

Closures and survival: Establishment-level studies using business listings and mobility proxies estimate permanent exit, with correlates like ratings, review counts, and neighborhood type.

Policy environment: The Oxford COVID-19 Government Response Tracker provides timelines of restrictions, and official summaries describe PPP structure and local fee-cap ordinances.

Our approach is descriptive, and theory guided. This study present narrative results and recommend four figures that visualize key components of the argument. This study then interprets these patterns using the framework in Section 3. While causal identification is outside scope, triangulation across sources lends robustness.

5. Results

5.1 . Industry Contraction and Uneven Recov-

ery

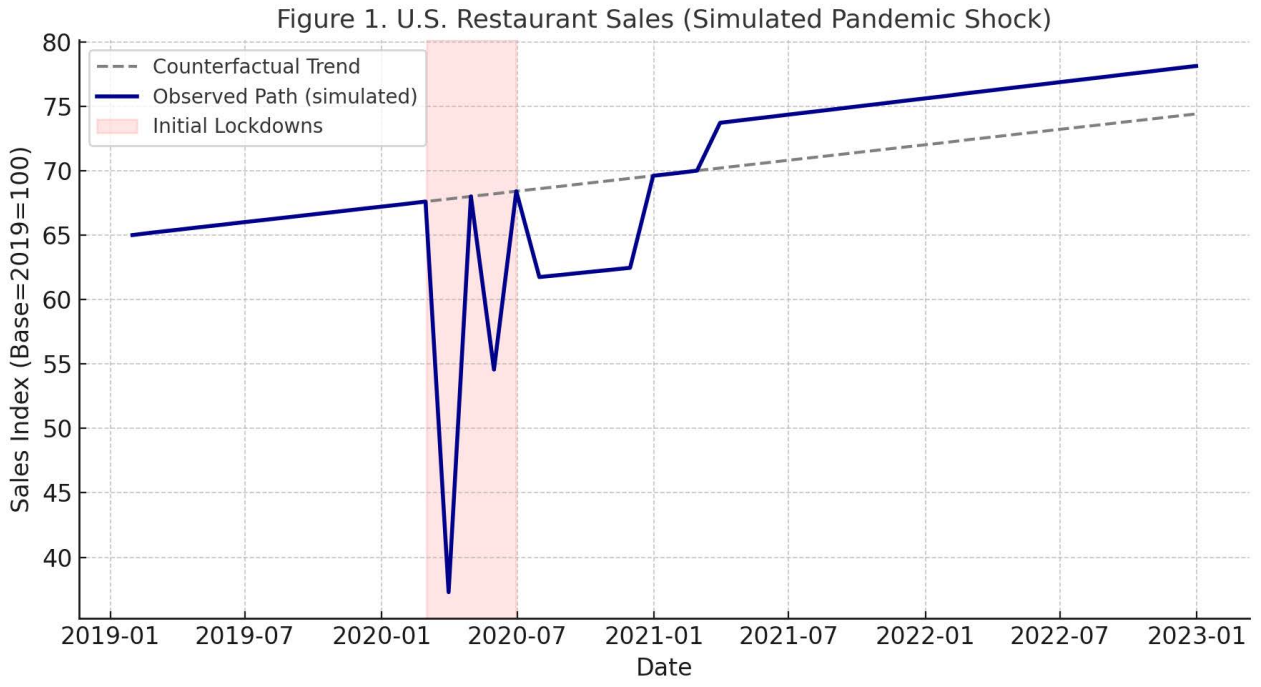

Figure 1: U.S. Restaurant Sales Trend, 2019–2024

Figure 1 plots monthly restaurant sales to show the abrupt collapse in spring 2020 and the partial rebound through late 2020, followed by a more persistent recovery in 2021–2022 as vaccination and reopening progressed. The visual underscores three points. First, the depth of the trough—half the pre-pandemic level—was unprecedented for the sector. Second, the recovery was incomplete and uneven in 2020, with winter resurgence of cases flattening momentum. Third, structural adaptation—menu redesign, outdoor dining, off-premises workflows—enabled sales to regain or exceed the pre-pandemic trend by 2021–2022, although composition shifted toward higher off-premises share. Beneath the aggregate, heterogeneity was stark: full-service restaurants (heavily reliant on the on-premises experience) faced steeper and longer declines than quick-service restaurants (which leveraged drive-thru and existing take-away infrastructure). Independent operators in downtown business districts suffered from the prolonged absence of office workers.

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5.2 . Platform Adoption and Off-Premise Pivot

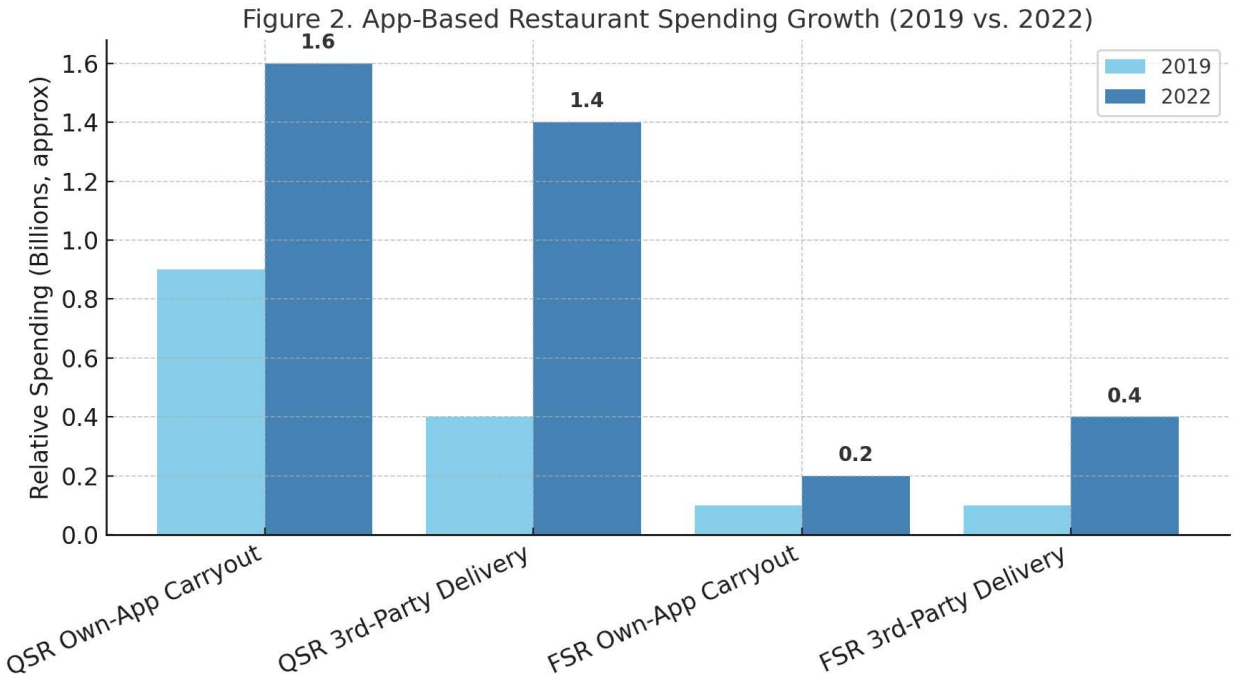

Figure 2: App-Based Restaurant Spending Growth, 2019 vs 2022

Figure 2 compares pre-pandemic and post-pandemic app-based spending by segment and channel. The exhibit typically shows tripling of third-party delivery at QSRs and even larger relative growth for FSRs from a smaller base. Two mechanisms are salient. First, substitution: dine-in utility collapsed, so households reallocated discretionary food budget toward delivery. Second, access and convenience: third-party marketplaces aggregate options, standardize payment, and offer tracking, lowering search and transaction costs. For restaurants, the platform provided both a demand conduit and a coordination solution without upfront investment in a fleet. This combination explains why platform onboarding surged in 2020–2021 among independents. Yet the margin arithmetic changed: commissions and packaging costs cut into contribution margins, making volume critical. Operators reported operating "for cash-flow survival, not profits," particularly in high-cost urban markets. Over time, many restaurants adopted a mixed strategy—maintaining a marketplace presence to acquire new customers while nudging loyal patrons toward lower-fee direct channels (e.g., first-party ordering for pickup).

5.3 . Market Concentration and Visibility Fric-

tions

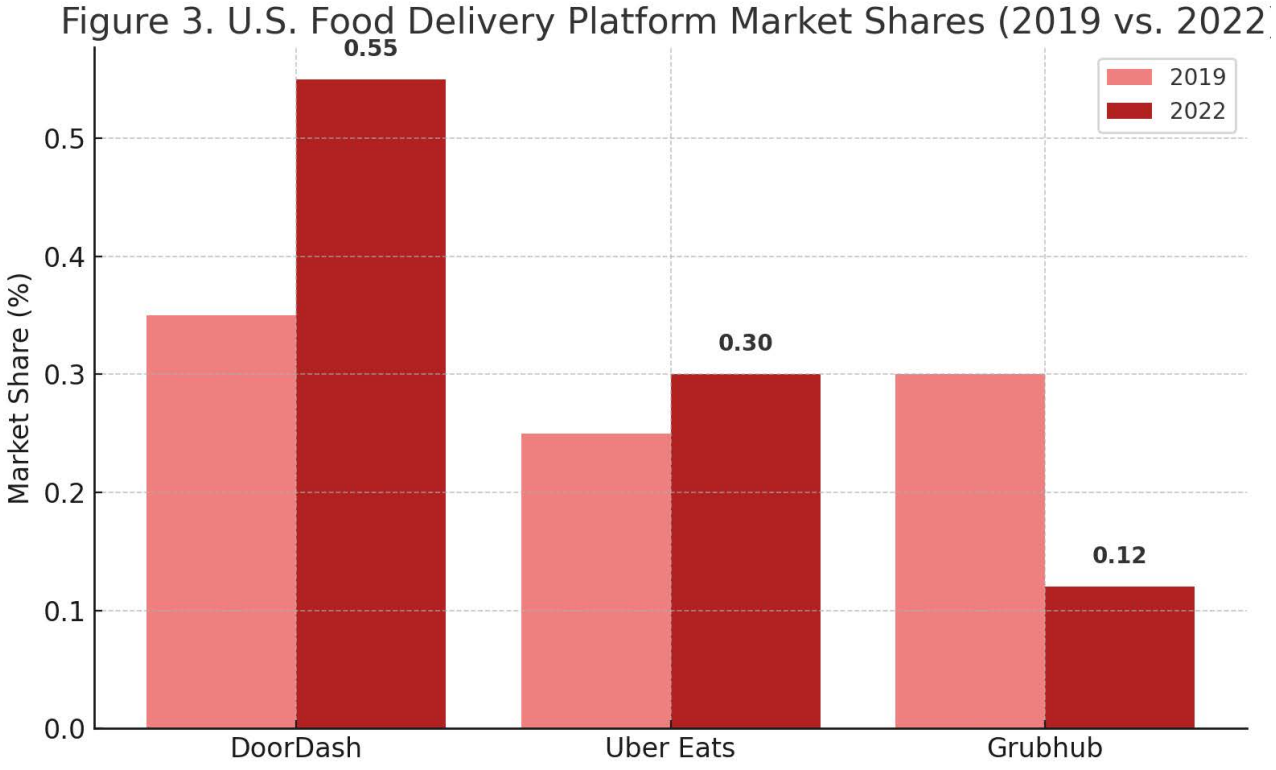

Figure 3: U.S. Food-Delivery Platform Market Shares, 2019 vs 2022

Figure 3 presents market share estimates for DoorDash, Uber Eats, and Grubhub before and after the pandemic's peak disruption. A stylized pattern is rising concentration: DoorDash expanded share substantially, Uber Eats grew but to a lesser degree, and Grubhub's share diminished. Concentration has two implications. First, bargaining power: dependence on a smaller set of intermediaries can weaken restaurants' negotiating position on fees, promotions, and data access. Second, algorithmic exposure: with more restaurants on a dominant platform, competition for top-of-list placement intensifies. Sponsored listings and ranking signals (conversion, speed, ratings, price compliance) can generate cumulative advantage for already visible sellers. For new or niche restaurants, acquiring attention may require paid promotion or discounts, which further compresses margins. The result is a resilience paradox: the same platform that enables survival can entrench power asymmetries that challenge long-run viability for smaller players.

5.4 . Policy Cushioning and Platform–Policy In-

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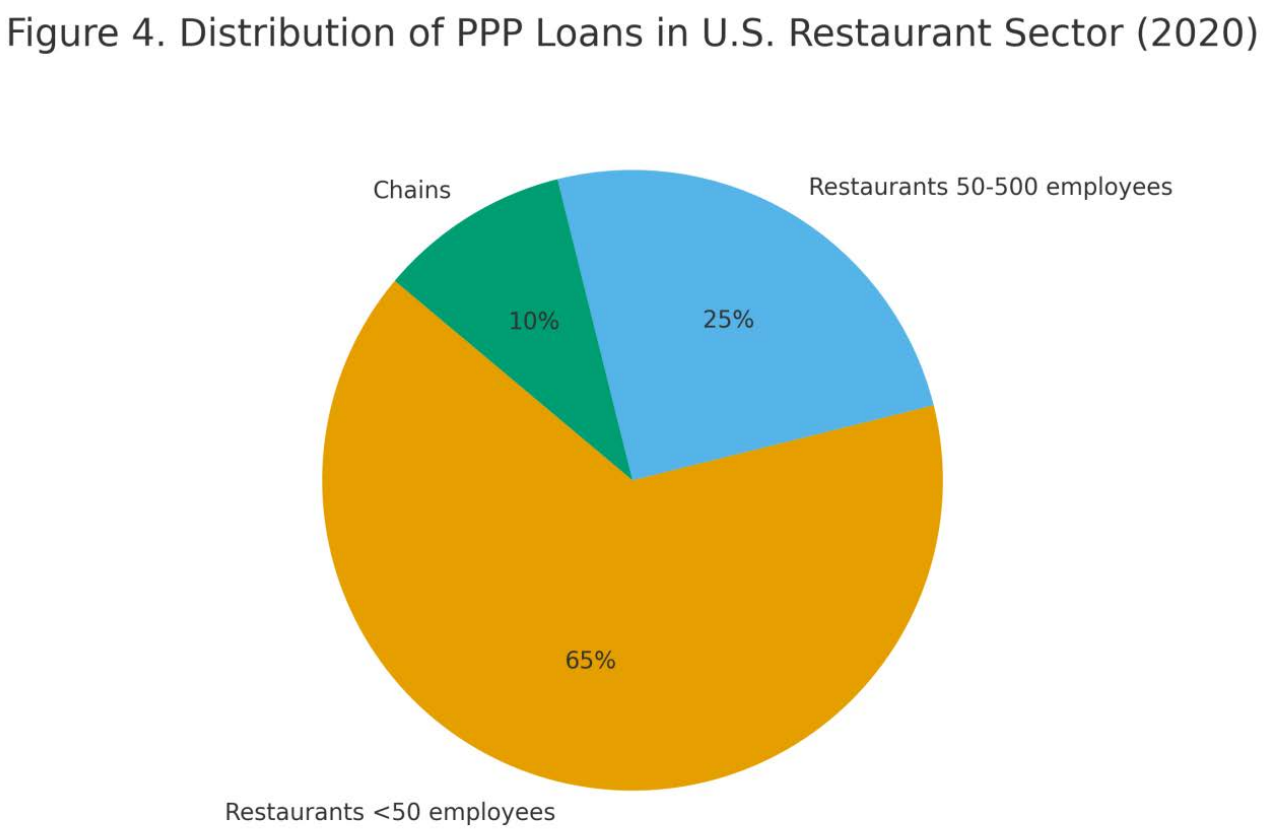

Figure 4: PPP Loan Distribution within the Restaurant Sector

Figure 4 illustrates the distribution of PPP loans across restaurant size classes (for example, establishments with fewer than 50 employees, 50–500 employees, and large chains). The intention is not to adjudicate exact percentages but to visualize that a substantial share of loans flowed to small establishments, cushioning payroll and helping restaurants bridge the most acute months. At the city level, temporary fee caps on delivery commissions offered additional relief during closures by limiting the percentage of order value paid to platforms. These interventions interacted with platform dependence in two ways. In the short run, they raised survival probabilities by improving unit economics. In the longer run, they sparked debate over whether caps should be permanent, sunset with the emergency, or convert into negotiated rate tiers. The broader lesson is that platform-mediated resilience does not operate in a policy vacuum; emergency stabilization and local regulation shape its efficacy and distributional consequences.

5.5 . Heterogeneity by Business Model, Cuisine, And Geography

Resilience varied with operational design. QSRs with drive-thru lanes and standardized menus adapted swiftly, often supplementing platform orders with first-party mobile apps. FSRs faced higher frictions—menu items less suited to travel, dining experiences difficult to translate to take-out—but many successfully pivoted by simplifying offerings, investing in packaging, and launching heat-at-home meal kits. Chains with existing digital ecosystems benefited from economies of scale and brand familiarity; several reported double-digit same-store growths in delivery-heavy categories. Independents leveraged authenticity and local loyalty but were more exposed to fees and marketing costs on platforms. Geographically, dense urban cores reliant on commuters and tourism recovered more slowly than suburban corridors, where curbside pickup and drive-thru dominated.

5.6 . Robustness and Triangulation

The narrative above is supported by triangulating multiple data types: national revenue aggregates, app-based spending measures, establishment-level closure estimates,

and platform growth metrics. While each source has limitations—sampling frames, classification differences, or proprietary opacity—the convergence of direction and magnitude across them strengthens the conclusion that platform-enabled off-premises consumption materially contributed to restaurant survival in 2020–2021 and left a lasting imprint on consumption patterns through 2022 and beyond.

6. Discussion

6.1 . Microeconomic Incidence and Survival–Profitability Trade-Off

From a micro perspective, platform dependence shifts the firm's shutdown boundary by raising q (orders) at the cost of a commission wedge τ. In the emergency phase, this can convert a negative cash-flow trajectory into a barely positive one, thereby preventing exit. Yet the wedge reduces unit margin and can limit retained earnings needed for recovery investment. A dynamic trade-off emerges survive now, pay later. Operators that survived the shock with thin or negative margins may carry higher debt, deferred maintenance, or eroded staff capacity into the recovery.

6.2 . Platform Design, Ranking, and Local Competition

Within a platform, not all restaurants experience the same demand uplift. Ranking algorithms and sponsored placement can concentrate attention on a subset of sellers, generating Matthew effects. Category saturation (e.g., multiple pizza or burger options within a tight delivery radius) raises cross-price elasticity and increases the likelihood of price-promotion spirals. Local discovery frictions also matter iconic or highly rated independents attract organic demand even without heavy promotion, while newer entrants may need paid boosts. Policymakers and platform designers face questions about fairness and transparency in ranking signals, especially during emergencies when stakes are high for small businesses.

6.3 . Data, Loyalty, and Strategic Autonomy

Platform dependence limits direct access to first-party customer data and narrows the funnel for building loyalty programs. Restaurants that blended marketplace presence with direct ordering channels (own website or app for pickup) could gradually migrate repeat customers off third-party rails, improving margin and data ownership while keeping the platform as an acquisition channel. Over time, the most resilient strategies are hybrid: active on large marketplaces to capture incremental demand but investing in direct digital to enhance autonomy.

6.4 . Labor Market and Operational Capacity

Delivery intermediation externalizes the coordination workforce to gig couriers, introducing operational flexibility for restaurants but also potential volatility in surge pricing, wait times, and service quality. Kitchens reconfigured for higher throughput, with stations geared toward packaging and batching. Staffing models shifted toward fewer front-of-house roles and more back-of-house and expo roles aligned with delivery peaks. These changes have distributional implications for workers and suggest that resilience was partly a story of operational redesign.

6.5 . Equity, Neighborhood Effects, and Community Resilience

Platform coverage and courier density are uneven across neighborhoods. Areas with lower smartphone penetration or fewer couriers may experience longer delivery times and narrower choice, influencing food access during crises. Community-based responses—such as buy-local campaigns, neighborhood delivery co-ops, or city-sponsored marketing—helped some districts mitigate exposure to platform fees and visibility constraints. Future emergency planning could integrate local digital infrastructure and training to ensure more equitable resilience.

6.6 . Policy Design Going Forward

Policy makers face two broad tasks. First, stabilization in crises: temporary liquidity support and targeted relief to high-exposure sectors can preserve productive capacity. Second, market governance in normal times: ensuring that platform markets stay contestable and that small sellers are not systematically disadvantaged by opaque ranking or take-rate escalation. Rather than permanent fee caps, one approach is structured transparency (e.g., clear disclosure of total take-rates and ranking factors) combined with procurement of shared digital tools for small businesses (white-label ordering, interoperable loyalty). Cities can also normalize outdoor dining frameworks to provide a low-fee, high-margin channel that complements delivery.

6.7 . Limitations and Future Research

The analysis is descriptive and relies on published aggregates and studies. Future work could estimate causal effects of platform adoption on survival using staggered platform entry, instrumental variables (e.g., pre-pandemic delivery infrastructure or cellular coverage), or matched samples of adopters and non-adopters. Welfare analysis should quantify consumer surplus from expanded variety and convenience against restaurant margin compression and potential fee pass-through. Finally, research on algorithmic governance—how ranking updates and sponsored listings affect small sellers—would illuminate fairness

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concerns central to platform-mediated resilience.

7. Conclusion

Platform dependence during COVID-19 afforded U.S. restaurants a critical, if imperfect, buffer against the collapse of dine-in demand. The ability to route orders through third-party marketplaces and logistics networks transformed shutdown conditions into survivable, low-margin operations for many establishments. At the same time, the costs of intermediation—commissions, increased competition for visibility, and limited data ownership—created a strategic bind for independents. The post-pandemic steady state will likely be hybrid: dine-in restored, off-premises elevated relative to 2019, and most operators straddling both third-party and direct digital channels. Policy should focus on ensuring that platform markets are transparent and contestable, while investing in digital capacity for small firms so that resilience does not require ceding long-term autonomy. The pandemic stress test demonstrated that digital readiness is no longer optional; it is foundational to resilience in a service economy exposed to systemic shocks.

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