

Literature Review (TEAM – F)

Post-Congestion Pricing in Manhattan and Citi Bike Operations

1. Impact of Congestion Pricing on Citi Bike Usage Patterns:

Several studies have examined the relationship between congestion pricing and shifts in transportation modes. Research by [Lei & Ozbay \(2021\)](#) indicates that congestion pricing leads to increased bike-sharing trips, particularly in high-traffic areas, as users seek alternative, cost-effective commuting options. Similarly, Wen et al. (2024) found that congestion pricing significantly influences Citi Bike travel patterns, with increased usage during peak hours and in areas with high vehicular congestion.

Further, [Sobolevsky et al. \(2018\)](#) analyzed the impact of Citi Bike on urban mobility and found that congestion pricing policies contribute to a shift from private vehicle use to shared mobility solutions. They observed a rise in Citi Bike trips in zones affected by the pricing scheme, particularly in lower Manhattan, where congestion pricing has the highest impact. This aligns with findings by Gutmann (2022), who noted that congestion pricing incentives influence Citi Bike ridership, particularly among short-distance commuters.

It is essential to examine these studies because they provide critical insights into how congestion pricing reshapes commuter behavior and the effectiveness of Citi Bike as an alternative transportation mode. Understanding these shifts allows policymakers to refine congestion pricing structures and make data-driven decisions to enhance urban mobility. By leveraging the findings from these studies, researchers can identify trends in travel demand, optimize Citi Bike station placements, and evaluate the need for complementary policies such as subsidies or dynamic pricing mechanisms. Furthermore, these insights help assess the sustainability of bike-sharing programs and their long-term role in reducing congestion and promoting eco-friendly commuting options.

Additionally, research by [Li & Vignon \(2024\)](#) expands on the behavioral shifts in commuter choices, identifying an increased dependence on Citi Bike in response to ride-hailing congestion fees. This shift indicates an emerging preference for bike-sharing as a cost-effective alternative, particularly during peak hours when congestion surcharges apply.

2. Changes in Trip Frequency, Duration, and Geographic Distribution

The geographic distribution of Citi Bike rides varies based on pricing policies and commuter behaviors. [Ashraf et al. \(2021\)](#) analyzed Citi Bike trip frequency and found that congestion pricing led to a rise in short-distance bike trips, suggesting increased substitution of Citi Bike for short car trips. Faghih-Imani & Eluru (2016) further observed that bike trips became more concentrated around congestion zones, indicating that Citi Bike served as an effective alternative for last-mile connectivity in affected areas.

Additionally, research by [Li & Vignon \(2024\)](#) highlights the influence of congestion fees on ridership patterns, with a noticeable uptick in Citi Bike usage in areas where congestion pricing made driving prohibitively expensive. Their study suggests that Citi Bike's role in alleviating congestion is substantial and may increase further with additional policy incentives. Similarly, [Kim \(2023\)](#) found that congestion pricing resulted in longer average trip durations, suggesting that users are relying more heavily on bike-sharing for multi-leg commutes rather than short, last-mile trips alone.

Moreover, Xu & Chow (2020) highlight seasonal variations in Citi Bike ridership, emphasizing that congestion pricing can lead to increased demand during summer months when biking conditions are more favorable. Their study suggests that seasonal adjustments in bike fleet distribution could optimize system efficiency.

3. Impact of New Bike Stations on Ridership

New bike station installations significantly impact ridership trends. [Xu & Chow \(2020\)](#) conducted a longitudinal study on the effects of bike infrastructure expansion in NYC, concluding that strategically placed bike stations enhance ridership and improve accessibility. Similarly, [Hossen \(2023\)](#) emphasized that increasing the density of Citi Bike stations in high-traffic areas leads to greater adoption, particularly following congestion pricing implementation.

Moreover, research by [Ford et al. \(2019\)](#) highlights how increased bike station accessibility improves the efficiency of Citi Bike as a transit alternative. Their study identified a positive correlation between the introduction of new Citi Bike stations and ridership levels, particularly in transit-dependent neighborhoods. In a similar vein, [Aljeri \(2020\)](#) explored Citi Bike expansion effects and found that station availability in proximity to public transport hubs significantly enhances ridership.

A study by Kim (2023) also examined how the introduction of e-bike stations influences trip duration and frequency, demonstrating that integrating electric-assist bikes into Citi Bike networks leads to a more diverse ridership base, encouraging more frequent and longer trips.

4. Policy Adjustments to Enhance Supply and Demand

To maximize the benefits of congestion pricing, policymakers must consider supply-demand adjustments in bike-sharing networks. [Kim \(2023\)](#) proposed dynamic pricing strategies for Citi Bike, aligning bike availability with demand surges. Additionally, research by [Faghih-Imani et al. \(2017\)](#) suggested integrating Citi Bike data with real-time transit updates to improve multimodal connectivity and enhance the overall efficiency of urban mobility.

Further policy recommendations from [Ashraf et al. \(2021\)](#) suggest subsidizing Citi Bike memberships for low-income commuters to improve accessibility and equity. [Sobolevsky](#)

[*et al. \(2018\)*](#) advocate for expanding Citi Bike infrastructure to underserved areas to ensure that congestion pricing does not disproportionately affect lower-income populations reliant on affordable transportation.

Additionally, [*Lei & Ozbay \(2021\)*](#) propose that Citi Bike expansion should prioritize strategic locations within congestion pricing zones to maximize efficiency, further encouraging shifts from private vehicle usage to bike-sharing.

Conclusion

Existing literature highlights the substantial influence of congestion pricing on Citi Bike usage, with evidence pointing toward increased adoption and evolving trip patterns. However, further research is required to quantify long-term behavioral shifts and optimize bike-sharing policies. This study will contribute by offering an empirical analysis of Citi Bike's post-congestion pricing operations in Manhattan, informing policymakers on effective strategies to enhance urban mobility.

References

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