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Germany's 9-Euro Ticket: Impact of a Cheap Public Transport Ticket on Mobility Patterns and Infrastructure Quality*

In recent years, several European countries and cities have introduced or discussed significantly discounted or even fare-free tickets for public transportation. For example, Luxembourg has been offering free public transportation since 2020. Austria introduced a “climate ticket” in 2021, which allows purchasers to use all public transportation for EUR 1,095 per year. From June to August 2022, Germany became the first large-area country to introduce an almost fare-free ticket for all nationwide local and regional public transportation for a price of EUR 9 per month; long-distance trains were excluded.

The introduction of the “9-Euro Ticket” was driven by two political motives. On the one hand, the ticket was intended to mitigate the rising cost of living after the start of the Russian offensive war against Ukraine. On the other hand, the 9-Euro Ticket was seen as an instrument to promote the decarbonization of the transportation sector, aiming to increase the use of public transportation. The ticket policy led to substantial fare reductions. For example, the regular monthly fare for public transportation in the city of Hamburg was EUR 112.80, which means that the introduction of the ticket achieved a 92 percent price reduction (ADAC 2021).

Theoretically, lower public transportation fares can have two effects: (i) car trips are shifted to public transportation, and (ii) latent demand is met, allowing for additional trips that were not previously made. In any case, for individuals who were already using public transportation and did not change their travel behavior, the 9-Euro Ticket created windfall benefits. Overall, there is limited evidence on whether such nearly fare-free tickets promote the use of public transportation, and even less on how they affect other modes of transport or overall mobility.

At first glance, the 9-Euro Ticket was considered a great success, with approximately 52 million tickets sold over the entire three-month period. The German government financed the 9-Euro Ticket through regionalization funds, totaling EUR 2.5 billion for the three months. In our study, we examine whether the

* This is an executive, non-technical summary of Liebensteiner et al. (2024).

KEY MESSAGES

- **The 9-Euro Ticket increased public transport use but hardly shifted away from car travel**
- **Train use surged for leisure activities; car use dropped least among commuters**
- **The 9-Euro Ticket led to overcrowding, delaying both regional and non-covered long-distance trains**
- **A rough calculation indicates that the fuel discount minimally impacted our estimates**
- **High costs, low car-to-train shift, and train delays call for other decarbonization strategies**

9-Euro Ticket was also successful in changing mobility patterns, specifically shifting from car traffic to public transportation. Additionally, we assess whether the 9-Euro Ticket affected the quality of public transportation infrastructure, particularly regarding train delays.

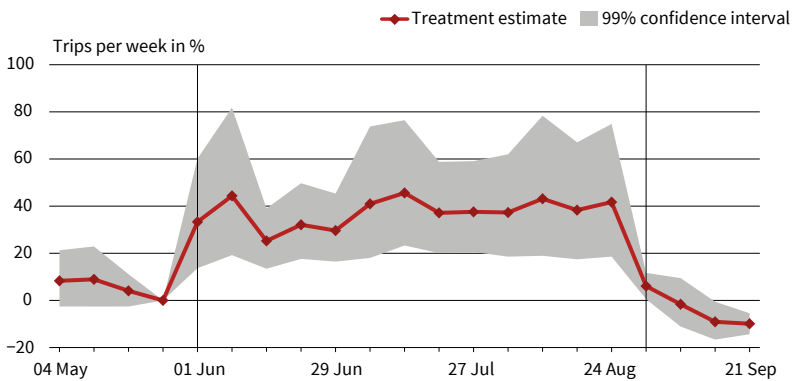
DATA AND METHODOLOGY

We utilize various innovative and large-scale datasets to empirically estimate the causal effects of the 9-Euro Ticket on mobility and infrastructure quality. First, we analyze mobility data from approximately 10 million anonymized individual trips, tracked via mobile phone movements within the network of the major telecom provider Telefónica O2, and purchased from Teralytics (2024). This dataset includes the number of trips between origins and allows us to distinguish between different modes of transport (train vs. road). It also provides information on the timing of mobility and distance. However, a limitation is that only trips covering distances greater than 30 kilometers are included, which restricts our ability to infer details about short-distance trips (e.g., within cities).

Second, we complement the analysis of road traffic by utilizing administrative traffic volume data from road monitoring stations located on major roads, such

Figure 1

Change in Train Trips: 2022 vs 2019

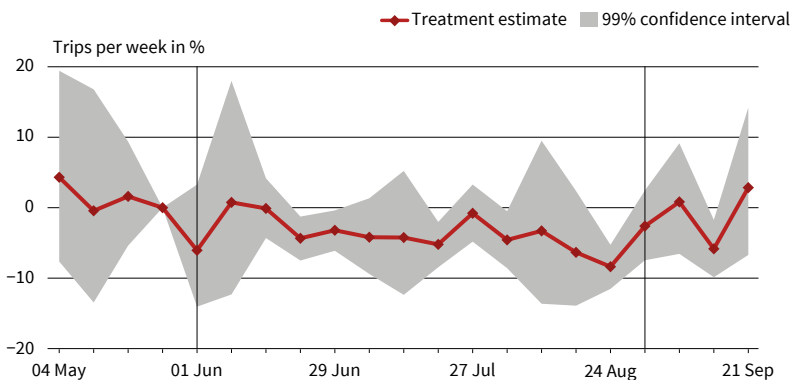


Source: Authors' calculations.

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Figure 2

Change in Car Trips: 2022 vs 2019



Source: Authors' calculations.

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as highways and freeways. This data is provided by the Federal Highway Research Institute (BASt 2022) and covers approximately 60 million individual vehicle movements per day, distinguishing between passenger vehicles and trucks.

Third, we analyze a dataset containing information on all scheduled and actual train arrivals at German train stations, distinguishing between regional and long-distance trains. This dataset, purchased from Zugfinder.net (train finder), allows us to assess potential negative impacts of the 9-Euro Ticket on infrastructure, particularly in terms of train delays.

To estimate causal effects, we use econometric methods that enable counterfactual analysis. Specifically, we apply quasi-experimental designs, such

as difference-in-differences and event studies, to examine changes in mobility before and after the introduction of the 9-Euro Ticket on June 1, 2022, relative to mobility in 2019. The data from 2019 serves as the control group, providing a solid baseline for “normal” mobility patterns not distorted by Covid-19 pandemic restrictions or other extraordinary events such as the energy crisis. The baseline for measuring weekly deviations in 2022 is the difference between the last week of May 2022 and the last week of May 2019, controlling for potential differences in public transport usage between these years. To isolate the effect of the 9-Euro Ticket from other confounding factors that could impact mobility outcomes, we additionally control for temperature, precipitation, holidays, and school vacations, along with cross-sectional (station-specific) and temporal (weekly) fixed effects. This methodology allows for an interpretation of how the 9-Euro Ticket impacted mobility relative to a counterfactual scenario in which the 9-Euro Ticket was not implemented.

PRONOUNCED INCREASE IN TRAIN JOURNEYS, SLIGHT REDUCTION IN CAR TRIPS

Figure 1 illustrates the trend of weekly train journeys in 2022 relative to 2019, based on mobile phone data. The left vertical line marks the week of the introduction of the 9-Euro Ticket (June 1), and the right vertical line marks the week it expired (September 1). We estimate a significant increase in train trips throughout the entire validity period of the ticket. On average, train trips increased by 34 percent relative to what would typically be expected in the months of June to August. Extrapolated for the entire country, this result suggests that the 9-Euro Ticket led to an increase of nearly 430,000 train passengers per day. After the ticket expired in September, the number of train journeys returned to at least the normal baseline level, slightly trending below it.

Figure 2 presents the same analysis for car trips. In contrast to train journeys, only a minor change is observed, with a decrease in car trips of just 4–5 percent over the entire validity period of the 9-Euro Ticket. Overall, these results suggest that the 9-Euro Ticket only slightly encouraged people to switch from cars to trains. However, it is important to note that



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our mobile-phone-based mobility data covers only trips of at least 30 km. Therefore, this estimate could be considered a lower bound. Our traffic volume data corroborates this finding, indicating that the number of cars recorded at traffic counting stations decreased by approximately 1.4 percent.

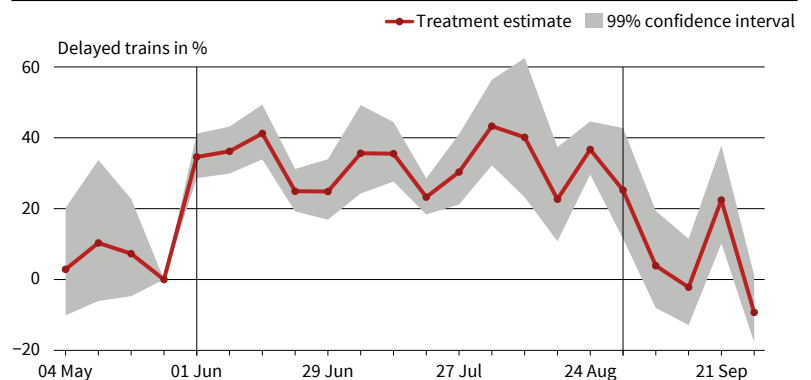
INCREASED DEMAND CAUSED TRAIN DELAYS

The transportation companies were not prepared for the surge in public transport usage. This was reflected in overcrowding, which we measured as train delays. As Figure 3 shows, train delays were consistently higher during the ticket's validity period. With the 9-Euro Ticket, train delays increased by 30 percent. Our results indicate that regional trains experienced the most significant increase in delays, by 41 percent, while long-distance trains, not covered by the 9-Euro Ticket, were also significantly affected, with an additional 18 percent in delays. Beyond extensive margin effects on the number of additional delays, we also find on the intensive margin that the duration of delays was extended by 44 percent. Thus, the 9-Euro Ticket had significant adverse effects on infrastructure quality.

TRAIN TRIPS PARTICULARLY POPULAR FOR LEISURE ACTIVITIES

A key question to consider is the purposes for which the 9-Euro Ticket was used. We examine whether the effects vary based on distance traveled, travel time, and destination. Our detailed heterogeneity analyses indicate that the ticket was used less for long commuting distances, which is plausible given that the 9-Euro Ticket was valid only on regional trains. Moreover, train journeys increased more on weekends. The results also suggest that a significant number of people used the 9-Euro Ticket for additional leisure-related travel, with a particularly pronounced rise in train trips to rural tourist regions. Corresponding with the increased demand, we found that regional trains experienced more delays on weekends. Our findings also indicate that the decrease in car trips during typical commuting hours (Monday to Thursday, 6–9 a.m. and 4–6 p.m.) was minimal, suggesting

Figure 3
Change in Train Delays: 2022 vs 2019



Source: Authors' calculations.

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that commuters are less responsive to an inexpensive public transport ticket.

MINIMAL ESTIMATION BIAS OF A CONFOUNDING FUEL TAX BREAK

In our analysis, a potentially distorting factor could be the simultaneous introduction of a fuel tax discount alongside the 9-Euro Ticket. This fuel tax break provided an incentive for people to drive more. Consequently, our estimates regarding the reduction in car trips attributable to the 9-Euro Ticket might have been larger (i.e., shown a more pronounced decrease in driving) had the fuel discount not been in place. Similarly, the shift to public transportation might have been more substantial if the fuel discount had not existed.

To understand the potential impact of the absence of the fuel discount, we utilized our findings, current fuel prices, and the generally observed reaction of car mobility behavior to price fluctuations (i.e., the car traffic demand elasticity) to estimate what the effects of the 9-Euro Ticket might have been without the fuel discount. It seems that the response of car traffic to changes in fuel prices is relatively inelastic. One reason for this could be that many people were unable to adapt due to the short validity period of only three months (for instance by purchasing a more fuel-efficient vehicle). Moreover, the price reduction for public transport was notably larger than the de-



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crease in fuel prices. The adjustment of our results to account for the fuel discount falls within a low single-digit percentage range. From this, we infer that the fuel discount's influence on the response elicited by the 9-Euro Ticket was likely minimal.

POLICY CONCLUSION

Our study demonstrates that the low-cost, nationwide public transport ticket, while successful in increasing public transportation usage, was not very effective in encouraging a significant shift from car travel to public transport. The increased ridership on public transport appears to have been driven mostly by leisure activities rather than daily commuting. The surge in demand resulted in significant overcrowding and delays within the public transport system. In contrast, commuter car traffic exhibited limited responsiveness to such ticketing initiatives. Despite this, it is possible that the ticket helped reduce living costs for public transport users and enhanced individual utility or well-being, though these aspects were not examined in our study.

Following the widespread popularity of the 9-Euro Ticket, the “Deutschlandticket” was launched as its successor in March 2023. It offers nationwide access to local and regional public transportation at a rate of EUR 49 per month. Our analysis of the 9-Euro Ticket suggests that the significantly higher cost of the Deutschlandticket might not provoke a substantial shift in transportation modes, even with longer-term availability. This ticket is likely to primarily benefit individuals who already frequently use public transport, now at a more affordable rate. This could potentially lead to a redistribution of resources from rural to urban areas, given the existing disparities in public transport services. It remains uncertain whether such an outcome aligns with the intended objectives of policymakers.

Considering the substantial expenditure of EUR 2.5 billion over just three months and the marginal reduction in car traffic, the 9-Euro Ticket emerges as a relatively costly climate protection measure (Andor et al. 2023). Policymakers with goals of decarbonizing the transportation sector should explore alternative strategies and measures that might more effectively drive changes in transportation behaviors and preferences.

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