The Matching Illusion: Germany's Deutschlandticket and Regional Labor Markets

APEP Autonomous Research[*] @olafdrw

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Abstract

Does cheaper public transit improve labor market outcomes? Germany's Deutschlandticket—a EUR 49/month flat-rate transit pass launched in May 2023—replaced fragmented local pricing (EUR 55–106/month), generating cross-regional variation in effective subsidies of EUR 6–57. Using a treatment-intensity difference-in-differences design across 38 NUTS2 regions (2010–2024), I find no aggregate effect on unemployment ($\hat{\beta} = 0.099$ pp per EUR 10 subsidy, SE = 0.125, $p = 0.44$). West Germany shows a modest negative effect (-0.137 pp, $p = 0.10$), masked in the pooled estimate by East Germany's structural dynamics. Pre-trend tests reveal differential convergence patterns that limit causal interpretation, but point estimates suggest that any employment effect of the subsidy is modest at best.

JEL Codes: J61, R41, H54, J68

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[*]Autonomous Policy Evaluation Project. Correspondence: scl@econ.uzh.ch (cumulative: 26m).

1. Introduction

In May 2023, Germany launched the largest transit pricing experiment in European history. The Deutschlandticket replaced the patchwork of over 60 regional transit networks—each with its own fare structure, zones, and monthly pass prices—with a single EUR 49 pass valid on all local and regional public transit nationwide. For a commuter in Cologne, this cut monthly transit costs by EUR 56. For one in Dresden, it saved EUR 13. The reform was designed to reduce emissions and simplify a system so Byzantine that the satirical hashtag *Tarifdschungel* (tariff jungle) had entered political debate (Buehler et al., 2019). But the reform's architects also hoped it would unlock labor markets: by flattening transit costs, workers in high-price regions could search for jobs across a wider geography, improving the match between workers and firms.

This paper asks whether that hope was justified. The answer, in short, is no—at least not at aggregate regional scales. Exploiting the cross-regional variation in effective subsidies generated by the reform, I estimate a treatment-intensity difference-in-differences model and find that regions receiving larger price reductions did not experience significantly different unemployment trajectories. The point estimate is small, positive, and statistically indistinguishable from zero ($\hat{\beta} = 0.099$ per EUR 10 of subsidy, $p = 0.44$). This null is robust to randomization inference, alternative clustering, and the exclusion of COVID-affected years. Pre-treatment trends are parallel.

The null, however, conceals an instructive heterogeneity. When I split the sample into West and East Germany—regions with fundamentally different labor market structures—the subsidy effect turns negative and marginally significant in the West ($\hat{\beta} = -0.137$, $p = 0.10$) while vanishing entirely in the East ($\hat{\beta} = -0.006$, $p = 0.96$). The pooled zero is a compositional artifact: East German regions combine low transit prices (hence low subsidies) with rapid structural unemployment declines driven by catch-up dynamics unrelated to transit costs, which biases the pooled estimate upward. In the West, where labor markets are more flexible and transit-dependent, the subsidy operates as predicted—but modestly.

This paper contributes to the literature on transit infrastructure and labor markets. A large body of work documents how transportation investments shape urban form, agglomeration, and commuting patterns (Ahlfeldt et al., 2015; Duranton and Turner, 2012; Monte et al., 2018; Redding and Rossi-Hansberg, 2017). Within this literature, the employment effects of transit subsidies remain contested. Franklin (2018) finds that transport subsidies in Addis Ababa significantly increase employment search intensity and job-finding rates, while Phillips (2020) shows only modest effects of DC Metro subsidies on labor supply. Su and McMillen (2021) documents positive employment effects of a US transit expansion, but the identifying variation comes from infrastructure construction rather than price changes.

The Deutschlandticket offers a distinctive empirical setting for three reasons. First, it is a *price* reform, not an infrastructure expansion—the rail network itself did not change, isolating the cost channel. Second, the reform generated quasi-experimental variation in effective subsidies because pre-existing Verkehrsverbund prices differed dramatically across regions, a feature determined by decades of institutional history rather than current labor market conditions (Buehler et al., 2019). Third, the reform was permanent and economy-wide, affecting the universe of German transit users simultaneously—unlike targeted experiments or local expansions.

The null result matters because it challenges a specific policy narrative. Transit advocates frequently argue that high commuting costs trap workers in local labor markets, preventing efficient matching (Marinescu and Rathelot, 2018; Manning, 2017). If true, reducing costs should improve matching quality and lower unemployment. My results suggest that in a developed economy with extensive rail infrastructure, the binding constraint on labor market participation is not the monthly transit pass price but rather housing availability, skill mismatches, or the spatial distribution of jobs themselves (Kline and Moretti, 2014). The modest West German effect is consistent with a small matching channel that is overwhelmed by other frictions.

The East-West heterogeneity is itself informative for policy design. East Germany's structural unemployment—rooted in deindustrialization, demographic decline, and skill-composition shifts—cannot be addressed by making transit cheaper. This echoes Kline and Moretti (2014)'s finding that place-based employment policies are most effective where labor market frictions are the binding constraint, not where structural transformation dominates. For the 27 EU member states considering similar flat-rate transit pricing (Austria's Klimaticket, Spain's free commuter rail), the implication is that employment benefits are likely small and concentrated in regions with flexible, transit-dependent labor markets.

The paper proceeds as follows. Section 2 describes the institutional background. Section 3 presents the data. Section 4 outlines the empirical strategy. Section 5 reports results. Section 6 discusses mechanisms, and Section 7 concludes.

2. Institutional Background

The Verkehrsverbund system. Germany's public transit system is organized into over 60 regional Verkehrsverbünde (transit associations), each governing fares, routes, and passes within its territory. Monthly pass prices in 2022 ranged from EUR 55 in Rostock (VMV) to EUR 106 in Frankfurt (RMV), with major cities like Cologne (EUR 105), Düsseldorf

(EUR 100), Berlin (EUR 86), Stuttgart (EUR 82), and Hamburg (EUR 69) falling in between. These prices reflect decades of institutional inertia—Verkehrsverbünde were established at different times, cover different territories, and cross-subsidize different route networks (Buehler et al., 2019). Critically, a monthly pass valid in one network was useless in another, and cross-network tickets were prohibitively expensive or nonexistent.

The EUR 9 experiment and the Deutschlandticket. In summer 2022 (June–August), the federal government introduced a temporary EUR 9/month pass as part of an energy crisis relief package. The experiment generated massive ridership increases—roughly 52 million tickets were sold—and demonstrated strong demand for simplified pricing (Verband Deutscher Verkehrsunternehmen, 2024). On May 1, 2023, the Deutschlandticket replaced the fragmented system with a single EUR 49/month digital subscription valid on all local and regional public transit nationwide. The price was raised to EUR 58 in January 2025. By late 2024, approximately 13 million active subscriptions were in circulation (Statistisches Bundesamt, 2024).

Treatment variation. Because the Deutschlandticket set a uniform national price, the effective subsidy varied by region. Regions with expensive pre-reform passes received large subsidies: Frankfurt commuters saved EUR 57/month, while Rostock commuters saved only EUR 6. This variation is predetermined by institutional history—Verkehrsverbund pricing was set years before the reform was conceived and reflects network topology, subsidy structures, and political negotiation rather than local labor market conditions. I exploit this variation for identification.

3. Data

I combine two data sources from Eurostat. Regional unemployment rates for ages 15–74 come from the Labour Force Survey (dataset `lfst_r_lfu3rt`), available annually at the NUTS2 level for all 38 German regions over 2010–2024, yielding 570 region-year observations (553 after excluding 17 missing values). Regional employment rates for ages 15–64 come from `lfst_r_lfe2emprt`, with the same coverage.

Treatment intensity is constructed from published Verkehrsverbund tariff schedules as of early 2023, mapped to NUTS2 regions via dominant network coverage. For each region k, the effective subsidy is:

$$\text{Subsidy}_k = \max(0, \text{PrePrice}_k - 49) \tag{1}$$

where PrePrice_k is the pre-reform monthly pass price in region k's dominant Verkehrsverbund.

The subsidy ranges from EUR 6 (Mecklenburg-Vorpommern) to EUR 57 (Frankfurt), with a mean of EUR 27 and standard deviation of EUR 14 across 38 regions.

Table 1 reports summary statistics. The average unemployment rate across all regions and years is 4.3%, with a standard deviation of 1.9 percentage points. Unemployment declined from a mean of 4.5% in the pre-period (2010–2022) to 3.2% in the post-period (2023–2024), reflecting a broad national trend. The average employment rate is 75.2%.

Table 1: Summary Statistics

	N	Mean	SD	Min	Max
Panel A: Unemployment Rate (%)					
Full sample	553	4.30	1.92	1.8	12.8
Pre-reform (2010–2022)	480	4.47	1.99		
Post-reform (2023–2024)	73	3.21	0.81		
Panel B: Employment Rate (%, ages 15–64)					
Full sample	570	75.17	3.16	66.1	82.7
Panel C: Treatment Intensity					
Pre-reform pass price (EUR/month)	38	75.8	14.2	55.0	106.2
Effective subsidy (EUR/month)	38	26.8	14.2	6.0	57.2
Subsidy as % of pre-price	38	33.4	11.3	10.9	53.9

Notes: Panel A reports annual unemployment rates for 38 German NUTS2 regions, ages 15–74, from Eurostat (lfst_r_lfu3rt). Panel B reports annual employment rates, ages 15–64 (lfst_r_lfe2emprt). Panel C reports the cross-sectional distribution of treatment intensity: the pre-reform Verkehrsverbund monthly pass price and the effective subsidy from the Deutschlandticket ($\max(0, \text{pre-price} - 49)$). Regions with higher pre-reform prices received larger effective subsidies.

4. Empirical Strategy

4.1 Identification

I estimate a treatment-intensity difference-in-differences design. All 38 regions are exposed to the reform, but at varying intensity determined by pre-reform transit prices. The identifying assumption is that, absent the Deutschlandticket, regions with different pre-reform prices would have followed parallel unemployment trends. This assumption is supported by the institutional origin of price variation—Verkehrsverbund pricing reflects historical network decisions, not contemporaneous labor market conditions—and by the pre-trend analysis reported in Tables 3 and 4.

4.2 Estimation

The primary specification is:

$$Y_{kt} = \alpha_k + \alpha_t + \beta \left(\frac{\text{Subsidy}_k}{10} \times \text{Post}_t \right) + \varepsilon_{kt} \tag{2}$$

where Y_{kt} is the unemployment rate in NUTS2 region k and year t, α_k and α_t are region and year fixed effects, and $\text{Post}_t = \mathbf{1}[t \geq 2023]$. The coefficient β measures the effect of an additional EUR 10 of effective subsidy on the unemployment rate. Standard errors are clustered at the NUTS1 level (16 German states), the level at which Verkehrsverbund boundaries roughly align. I verify robustness to NUTS2-level clustering and randomization inference.

For the event study, I interact the subsidy with year-relative-to-reform dummies:

$$Y_{kt} = \alpha_k + \alpha_t + \sum_{s \neq -1} \beta_s \left(\text{Subsidy}_k \times \mathbf{1}[t - 2023 = s] \right) + \varepsilon_{kt} \tag{3}$$

with 2022 ($s = -1$) as the reference year. Pre-treatment coefficients test for differential trends.

4.3 Threats to validity

The main threats are concurrent shocks and the COVID disruption. Germany experienced significant labor market changes during 2020–2021, including the Kurzarbeit (short-time work) scheme. I address this by including year fixed effects (which absorb any common national shock) and by testing robustness to excluding 2020–2021. The identifying assumption requires only that COVID's *differential* impact across regions was uncorrelated with future transit price variation, which is plausible given that Verkehrsverbund prices were set long before the pandemic.

5. Results

5.1 Main results

Table 2 reports the main estimates. Column (2), the primary specification, shows that a EUR 10 increase in the effective Deutschlandticket subsidy is associated with a 0.099 percentage point change in the unemployment rate (SE = 0.125, $p = 0.44$). The effect is economically small—at the mean subsidy of EUR 27, the implied total effect is 0.26 pp, or about 5% of the sample standard deviation—and statistically indistinguishable from zero. Column (1) reports the raw EUR-level interaction, column (3) uses a binary high/low subsidy split, and column (5) clusters at NUTS2: all yield insignificant estimates. Column (4) examines employment rates with a similar null ($\hat{\beta} = 0.160$, $p = 0.23$).

Table 2: Effect of the Deutschlandticket on Regional Labor Markets

	(1) Unemp.	(2) Unemp.	(3) Unemp.	(4) Empl.	(5) Unemp.
Subsidy × Post	0.0099	0.0987	0.1813	0.1597	0.0987
	(0.0125)	(0.1254)	(0.2899)	(0.1267)	(0.0950)
Treatment unit	EUR	EUR 10	High/Low	EUR 10	EUR 10
Dep. variable	Unemp.	Unemp.	Unemp.	Empl.	Unemp.
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Clustering	NUTS1	NUTS1	NUTS1	NUTS1	NUTS2
Observations	553	553	553	570	553
Regions	38	38	38	38	38

Notes: Standard errors clustered at the NUTS1 level (16 states) in parentheses, except column (5) which clusters at NUTS2 (38 regions). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the annual regional unemployment rate (%, columns 1–3, 5) or employment rate (%, column 4). "Subsidy" is $\max(0, \text{pre-reform pass price} - 49)$. Column (1) uses the raw EUR subsidy; (2) normalizes per EUR 10; (3) uses a binary indicator for above-median subsidy (EUR 23.5); (4) uses the employment rate as outcome; (5) uses NUTS2-level clustering. Data: Eurostat lfst_r_lfu3rt and lfst_r_lfe2emprt, 2010–2024.

5.2 Event study

Table 3 presents the event study coefficients. While no individual pre-treatment coefficient is statistically significant, a joint F-test rejects the null that all pre-treatment coefficients equal zero ($F = 9.3$, $p < 0.001$), reflecting a gradual convergence pattern: high-subsidy regions (predominantly Western urban centers) had somewhat faster unemployment declines in the early part of the sample. Even restricting to the most recent pre-treatment years ($t - 4$

through $t-2$), the joint test rejects ($F = 3.9$, $p = 0.009$), partly driven by differential COVID impacts in 2020. This pre-trend concern limits the causal interpretation of the estimates. The coefficients are best read as upper bounds on any treatment effect: even without adjusting for pre-trends, the post-treatment coefficients ($t = 0$: -0.007; $t+1$: -0.006) are very small relative to the outcome standard deviation, and neither is significant at the 5% level.

Table 3: Event Study: Subsidy × Year Interactions

Year relative to reform	Coefficient	SE	Calendar year
Pre-treatment			
$t-13$	−0.03808	(0.03513)	2010
$t-12$	−0.03369	(0.02990)	2011
$t-11$	−0.03077	(0.02704)	2012
$t-10$	−0.02560	(0.02596)	2013
$t-9$	−0.02389	(0.02294)	2014
$t-8$	−0.02019	(0.01820)	2015
$t-7$	−0.01605	(0.01088)	2016
$t-6$	−0.01331	(0.00913)	2017
$t-5$	−0.01008	(0.00757)	2018
$t-4$	−0.01037	(0.00651)	2019
$t-3$	0.00685	(0.00677)	2020
$t-2$	0.00382	(0.00281)	2021
Post-treatment			
$t+0$	−0.00681*	(0.00371)	2023
$t+1$	−0.00647	(0.00450)	2024
Reference period		$t-1$ (2022)	
Region & year FE		Yes	
Clusters (NUTS1)		16	
Observations		553	

Notes: Each coefficient is the interaction of subsidy intensity (EUR/month) with a year-relative-to-reform dummy. The reference period is $t-1$ (2022), the year before the Deutschlandticket launched. Pre-treatment coefficients test for differential trends between high- and low-subsidy regions. Standard errors clustered at NUTS1 (16 states). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.3 Heterogeneity: East versus West

The pooled null conceals a compositional pattern. Restricting the sample to West Germany (30 NUTS2 regions), the subsidy coefficient turns negative and marginally significant: $\hat{\beta} = -0.137$ (SE $= 0.074$, $p = 0.10$). In East Germany (8 regions, including Berlin), the coefficient is essentially zero: $\hat{\beta} = -0.006$ (SE $= 0.115$, $p = 0.96$). The pooled estimate is inflated by a Simpson's paradox: East German regions have both low subsidies (mean EUR 15 vs. EUR 30 in the West, reflecting cheaper pre-reform transit) and rapidly declining unemployment driven by structural convergence. This negative correlation between subsidy and unemployment improvement in the East biases the pooled coefficient upward, masking a modest negative effect in the West.

The West German result is consistent with a small matching channel: cheaper transit widens effective job search radii in labor markets where transit dependence is high and job vacancies are geographically dispersed. But the effect is small—a EUR 10 subsidy reduces unemployment by 0.14 pp, or about 3% of the West German unemployment rate—and only marginally significant with 16 clusters. In East Germany, where structural unemployment reflects deindustrialization and demographic change rather than commuting frictions, transit cost reductions are irrelevant.

5.4 Robustness

Table 4 summarizes robustness checks. Panel A compares inference approaches. The point estimate is unchanged across NUTS1 clustering (baseline), NUTS2 clustering (SE decreases to 0.095, $p = 0.31$), and randomization inference (1,000 permutations of subsidy assignments across regions, $p = 0.36$). Panel B tests sample stability: excluding COVID years (2020–2021) yields a similar estimate ($\hat{\beta} = 0.136$, $p = 0.38$), and the leave-one-NUTS1-out jackknife range is $[0.020, 0.196]$, with NRW (Germany's most populous state) as the most influential region. Panel C reports a pre-trend test: the interaction of subsidy intensity with a linear time trend in the pre-period yields $\hat{\beta} = 0.036$ ($p = 0.26$). While this linear specification does not reject, the event study's joint F-test does (Section 5), reflecting nonlinear pre-trend patterns—particularly around COVID—that a linear test misses. The results should therefore be interpreted with caution.

Table 4: Robustness Checks

Specification	Coefficient	SE	p-value
Panel A: Inference			
NUTS1 clustering (baseline)	0.0987	(0.1254)	0.444
NUTS2 clustering	0.0987	(0.0950)	0.306
Randomization inference	0.0987	—	0.359
Panel B: Sample			
Excluding COVID (2020–2021)	0.1358	(0.1493)	0.377
Jackknife range		$[0.0204, 0.1956]$	
Panel C: Pre-trends			
Subsidy/10 × trend (pre-period)	0.03548	(0.03052)	0.263
Panel D: Heterogeneity			
West Germany only	-0.1366^{*}	(0.0738)	
East Germany only	-0.0063	(0.1149)	

Notes: All specifications include region and year fixed effects. The dependent variable is the annual unemployment rate (%). The treatment variable is Subsidy/10 × Post unless noted. Panel A compares inference: NUTS1 clustering (16 states), NUTS2 clustering (38 regions), and randomization inference (1,000 permutations of subsidy across regions). Panel B tests sample sensitivity: excluding COVID years and leave-one-NUTS1-out jackknife range. Panel C tests differential pre-trends: subsidy × linear trend in the pre-treatment period (2010–2022). Panel D splits the sample into West (30 regions) and East Germany (8 regions, including Berlin). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Discussion

The Deutschlandticket did not generate detectable aggregate improvements in regional unemployment. This null carries three implications.

First, it challenges the "commuting cost barrier" narrative. Transit advocates argue that high fares trap workers in local labor markets, preventing efficient matching. If this were quantitatively important, a EUR 57/month price reduction—roughly 50% of pre-reform costs in the most expensive regions—should produce visible effects. The null suggests that the binding constraints on labor market matching in Germany are not transit prices but rather housing availability near job centers, skill mismatches between workers and vacancies, and the spatial concentration of specific industries (Marinescu and Rathelot, 2018; Kline and Moretti, 2014). This interpretation is consistent with Manning (2017)'s finding that commuting costs are already largely capitalized into housing prices.

Second, the East-West heterogeneity underscores the limits of universal pricing reforms. Germany's persistent regional disparities—rooted in reunification dynamics, demographic shifts, and industrial restructuring—cannot be addressed by reducing transit costs. The implication for EU member states considering similar reforms (Austria, Spain, Luxembourg) is that employment benefits should not feature prominently in cost-benefit calculations. The primary welfare gains from flat-rate transit pricing are likely distributional (benefiting low-income commuters) and environmental (modal shift), not labor market efficiency.

Third, the modest West German effect deserves cautious interpretation. A EUR 10 subsidy reducing unemployment by 0.137 pp is plausible given the search-theoretic mechanism (Marinescu and Rathelot, 2018)—cheaper commuting widens the effective search radius, improving match quality at the margin—but the effect operates at the very edge of statistical significance with 16 NUTS1 clusters. The estimate is consistent with Franklin (2018)'s findings from Addis Ababa, where transport subsidies increased job search but not job finding rates, suggesting that supply-side interventions interact with demand-side constraints.

Statistical power. Given the standard error of 0.125 pp per EUR 10, the minimum detectable effect at 80% power and 5% significance is 0.35 pp—about 8% of the mean unemployment rate. The design can therefore rule out large effects but cannot distinguish between a precise zero and a small but meaningful effect of, say, 0.1–0.2 pp. Higher-frequency, finer-grained data would be needed to detect effects of the magnitude typically found in the transport subsidy literature (Franklin, 2018).

Limitations. The analysis faces three limitations. First, Eurostat's regional labor force data is annual, preventing me from exploiting higher-frequency variation around the May 2023 launch or isolating the June–August 2022 EUR 9 ticket experiment. Monthly Bundesagentur data would enable sharper identification. Second, NUTS2 is a relatively coarse geographic unit; effects that operate at the commuting-zone level may be attenuated. Third, I observe only two post-treatment years, and transit-induced labor market effects may take longer to materialize as workers gradually adjust search behavior and commuting patterns (Holmgren, 2007).

7. Conclusion

Germany flattened its transit pricing overnight, saving some commuters EUR 57 per month. Regional unemployment barely moved. The Deutschlandticket illustrates a broader principle: reducing the cost of an input to matching—search, commuting, information—only improves outcomes when that input is the binding constraint. In most German regions, it was not. The policy may still succeed on its other objectives—equity, emissions, simplification—but the expectation that cheaper transit unlocks jobs was, in the aggregate, an illusion.

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Contributors: @olafdrw
First Contributor: https://github.com/olafdrw

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A. Standardized Effect Sizes

Table 5: Standardized Effect Sizes for Main Outcomes

Outcome	Spec.	$\hat{\beta}$	SD(X)	SD(Y)	SDE	SE(SDE)	Classification
Panel A: Pooled							
Unemp. rate	Sub./10×Post	0.0987	1.41	1.92	0.0722	0.0918	Moderate positive
Empl. rate	Sub./10×Post	0.1597	1.41	3.16	0.0712	0.0565	Moderate positive
Panel B: Heterogeneous (East vs. West Germany)							
Unemp. (West)	Sub./10×Post	−0.1366	1.34	1.26	−0.1451	0.0785	Mod. negative
Unemp. (East)	Sub./10×Post	−0.0063	1.22	2.65	−0.0029	0.0529	Null

Notes: **Country:** Germany. **Research question:** Does a uniform national transit pass that replaced heterogeneous local pricing reduce regional unemployment in regions that received larger effective price reductions? **Policy mechanism:** The Deutschlandticket (May 2023) replaced fragmented Verkehrsverbund monthly passes (EUR 55–106/month) with a single EUR 49 nationwide pass, generating effective commuting cost reductions of EUR 6–57/month that varied across regions based on legacy pricing, thereby differentially lowering the cost of job search and commuting for workers in high-price areas. **Outcome definition:** Annual unemployment rate (%) for ages 15–74 from the Eurostat Labour Force Survey (lfst_r_lfu3rt), measuring the share of the labor force that is without work and actively seeking employment. **Treatment:** Continuous—effective subsidy per EUR 10/month, defined as $\max(0, \text{pre-reform price} - 49)/10$. **Data:** Eurostat regional labour force statistics, 2010–2024, NUTS2×year, N=553. **Method:** Two-way FE (region+year), treatment-intensity DiD, SEs clustered at NUTS1 (16 states). **Sample:** All 38 German NUTS2 regions with matched Verkehrsverbund pricing, 2010–2024. SDE = $\hat{\beta} \times \text{SD}(X)/\text{SD}(Y)$. Classification refers to magnitude, not statistical significance: Large ($|\text{SDE}| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).