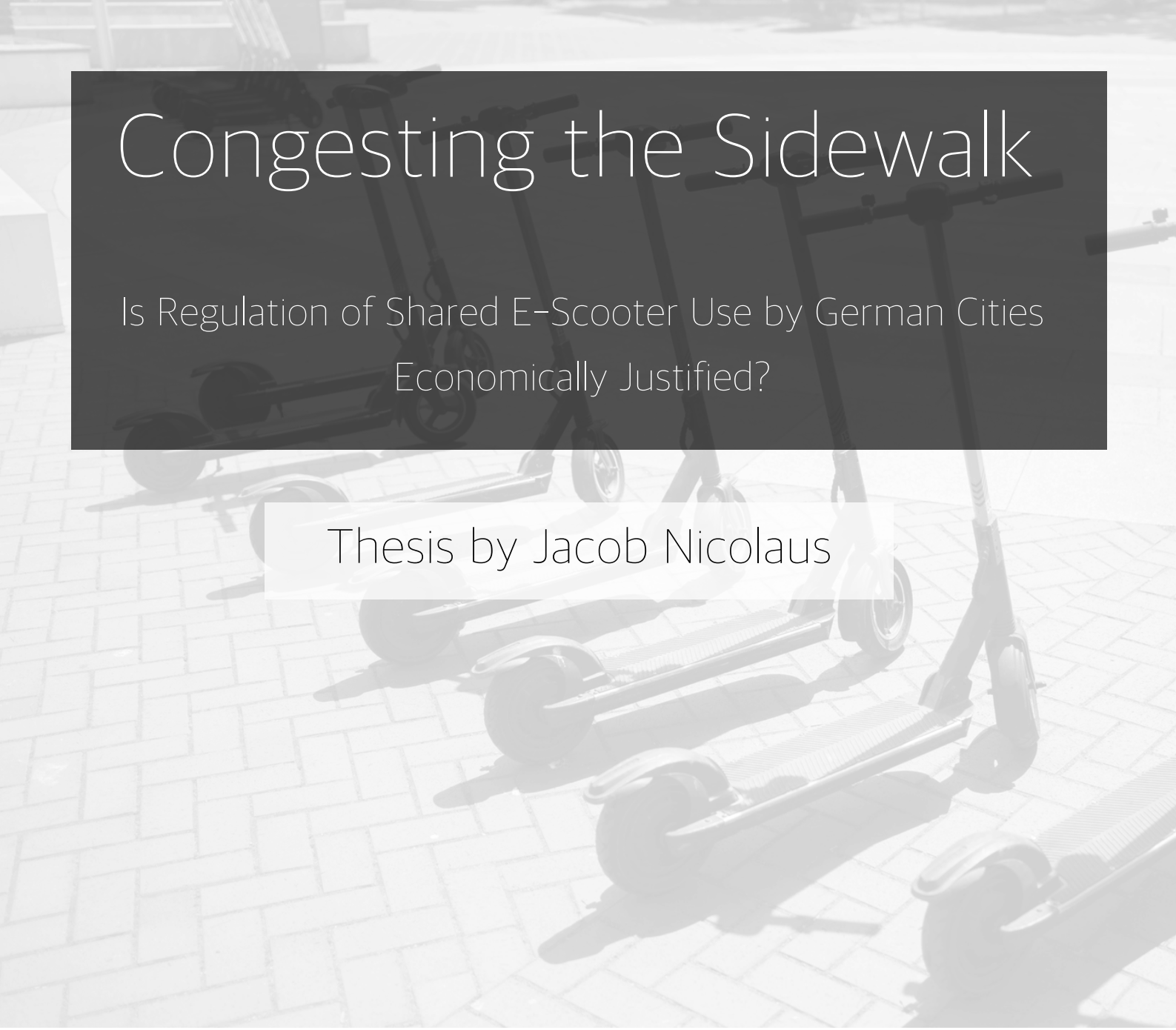

Congesting the Sidewalk

Is Regulation of Shared E-Scooter Use by German Cities Economically Justified?

Thesis by Jacob Nicolaus

EMLE-ID 22874

Supervisor Prof. Gilbert Bougi

August 2023

European Master in Law and Economics 2022/2023

ABSTRACT

With the advent of shared e-scooter in the free-floating model, cities all over the world are facing similar problems, one of which is the congestion of sidewalks. In German cities, legal insecurities have led to a variety of regulatory approaches. Applying the theoretical framework of the Law and Economics of regulation, this study provides an economic analysis of the problem and a perspective on it that has been neglected both in theoretical literature and regulatory practice. The analysis shows that e-scooter congestion of sidewalks is not so much a failure of the shared e-scooter market, but rather a failure of sidewalk provision and regulation. Nevertheless, regulation is, in principle, economically justified – as long as it concerns the distribution of space on the sidewalk. Other regulatory measures that fail to address the actual problem can hardly be justified from an economic point of view.

Keywords: E-Scooter Sharing, Regulation, Sidewalks

JEL Codes: K20, H40, K13, K11

Word Count: 12,537

LIST OF ABBREVIATIONS

Abbreviation	Meaning	Explanation
BKatV	Bußgeldkatalogverordnung	German Regulation on the Catalog of Fines
cf.	confer/conferatur	compare with
e.g.	exempli gratia	for example
eKFV	Elektrokleinstfahrzeugeverordnung	German regulation on small electric vehicles, including e-scooters
et al.	et altera	and others
etc.	et cetera	and so on
i.e.	id est	that is
p.	page	
pp.	pages	
QR code	Quick Response Code	Two-dimensional matrix barcode
StVG	Straßenverkehrsgesetz	German Road Traffic Act
StVO	Straßenverkehrsordnung	German Road Traffic Regulation
VVG	Versicherungsvertragsgesetz	German Insurance Contract Act
ZPO	Zivilprozessordnung	German Code of Civil Procedure

TABLE OF CONTENTS

1. Introduction

Paris was the first European city to allow shared e-scooters on its streets – since this year's April, it is the first one to prohibit them, too (Dylla, 2023). Various cities all over Europe face the question of how to deal with shared e-scooters, and similarly various the answers have been. A perfect illustration can be found in Germany, where legal uncertainties left some kind of discretion to the cities[1] when it comes to regulating shared e-scooter use. On city level, it is mainly one topic that generates heated discussions: the congestion of sidewalks by e-scooters.

The free-floating system that most e-scooter sharing relies on leads to idle e-scooters standing virtually everywhere on sidewalks, impeding the pedestrians' ability to properly use them (Button et al., 2020, p. 6). Reactions of German cities cover the entire spectrum of possible regulatory solutions, from complete prohibition, e.g., in the city of Aschaffenburg (Ecke, 2022), to no restrictions apart from "voluntary declarations of commitment"[2] that were agreed on in the city of Augsburg (Stadt Augsburg, 2023).

The width of that spectrum finds its cause (at least partly) in the aforementioned legal insecurities: From a legal point of view, it is still not clear whether parking of shared e-scooters falls under "public use" of sidewalks or constitutes their "special use" – only the latter requires the city's permission and thus opens the door for regulatory measures (cf. Bauer et al., 2022, pp. 29–34). The purpose of this permission has once been described by the Federal Administrative Court (*Bundesverwaltungsgericht*) as to balance conflicting interests when it comes to the use of the "public street as a scarce resource"[3] (Bundesverwaltungsgericht,

[1] The term „city" comprises towns and municipalities for the purpose of this thesis.
[2] „*Freiwillige Selbstverpflichtungserklärung*" – own translation.
[3] "*Knappes Gut öffentliche Straße*" – own translation.

1996). The Federal Administrative Court has not (yet) decided on the legal question (Bauer et al., 2022, p. 7). But whatever the answer to the legal problem – the underlying conflict is about the use of space on the public street as a scarce resource, and thus has an undeniable economic dimension. That is why an economic analysis of the problem is promising in order to answer the question that should be an aspect in every city's decision:

Is regulation on shared e-scooter use of sidewalks in German cities justified from an economic point of view?

That is the research question I will try to shed light on. A focus lies on the analysis of the problem itself in economic terms, as the answer to the research question will decisively depend thereon.

Literature on this problem specifically for German cities could not be found. But also in general terms, the underlying economic problem of shared e-scooters on sidewalks has rarely been addressed in literature. Only Button et al. (2020, p. 6) mention the problem, without engaging in a further analysis: "To economists this largely revolves around the well-established Coasian property rights problem […] In this case, it involves who has the right of way on roads and sidewalks."

While it is true that the Coasian property rights problem plays a role in this context, it is far from characterizing the problem comprehensively. My analysis will show, rather, that the problem is a combination of market failure and regulatory failure. Nonetheless, regulation can still be justified from an economic point of view.

The relevance of this analysis is both theoretical and practical in nature. Even though it focuses on the case of German cities, the insights of the economic analysis are of relevance for every city with a comparable institutional environment.

For German cities, to which the analysis is tailored, it provides important guidance in a question that concerns all of them. At the same time, the virtual absence of literature on that specific topic shows that this analysis fills a gap in theoretical Law and Economics literature.

2. Theoretical Framework, Methodology, and Limitations

Given the inherently normative character of the research question, the thesis follows the normative approach that analyzes the economic justifications for regulation (Pacces & Van den Bergh, 2012, p. 2), and thus takes public interest theories of regulation (Ogus, 2004, p. 3) as a starting point.

The normative criterion for assessing legal rules from an economic point of view is the maximization of social welfare, i.e., their efficiency (Pacces & Visscher, 2011, p. 3). Understanding regulation as "the discipline of individuals' and firms' behavior through legal rules which are defined by the following three attributes: compulsory, backed by criminal/administrative sanctions, and publicly enforced" (Pacces & Van den Bergh, 2012, p. 4), it is economically justified if it is efficiency-enhancing (Pacces & Van den Bergh, 2012, p. 4) by correcting market failures (Baldwin et al., 2012, p. 15). In the early stages of public interest theories, the existence of market failures was taken as a sufficient ground to justify regulation (Den Hertog, 2010, p. 28). This approach was challenged by Coase (1960), who not only showed that namely liability may lead to better outcomes, but that leaving the situation as it is has also to be taken into account as a solution (Coase, 1960, p. 18). The former is the reason why Ogus (2004, p. 28) does not only require a market failure, but also a private law failure to establish prima facie justification of regulation on economic grounds. That is what Coase (1960, p. 44) essentially

advocates for, a comparative institutional analysis between regulation and private law (Pacces & Van den Bergh, 2012, p. 6) That, even then, regulation might not be justified refers to the problem of regulatory failure, where, “in some situations, the cure (regulation) may be worse than the disease (market failure)” (Pacces & Van den Bergh, 2012, p. 6). For regulation to be justified from an economic point of view, its benefits must exceed its costs, too. In Ogus’ (2004, p. 30) words, “’market failure’ and ‘private law failure’ have to be compared with ‘regulatory failure’.”

In summary, this theoretical framework regards regulation as principally justified as a correction of (i) one or more market failures that are accompanied by a (ii) private law failure as long as (iii) its benefits exceed its cost.

This approach denies neither the criticism concerning public interest theories of regulation (cf. Den Hertog, 2010, pp. 42–48) nor does it ignore private interest theories of regulation. The latter are positive theories that take the rational individuals involved in regulatory implementation as a premise and predict the pursuit of these individuals’ interests (rather than the public interest) as the outcome of regulation (Pacces & Van den Bergh, 2012, p. 6). That becomes relevant in step (iii) as the cost of public choice (cf. Pacces & Van den Bergh, 2012, p. 6). But since the focus lies on the analysis of the economic problem itself, these are of rather minor importance for the purpose of this study.

The theoretical framework is applied to the concrete practical question of whether German cities should engage in regulation of free-floating shared e-scooters[4] on their sidewalks. That narrows down the analytical framework in three ways. First,

[4] For the purpose of this thesis, the term “e-scooter” refers to the ones that are shared in the free-floating model.

the object of study is the specific problem of sidewalk congestion that arises with the e-scooter market. Second, this object of study is embedded in an already existing legal environment that influences the behavior of the relevant actors. Third, even though the institutional and legal environment is the same for German cities, the concrete practical situation varies to a considerable degree.

The application to one particular practical problem requires some adaptations of the methodology that is derived from the theoretical framework. For an abstract study of regulatory justification, it would make sense to imagine the situation in a free market before identifying market failures. But since the congestion of sidewalks is only one symptom of a whole array of external effects of the e-scooter market, and since only the regulation by cities is examined, that approach is too broad for the purpose of this thesis. A further adaptation is required with respect to the cost-benefit analysis. As the costs and benefits will differ from city to city, a cost-benefit analysis will depend on the individual case one way or the other. The goal in this respect is to assess whether regulation can be justified *in principle* and to give parameters for that assessment. The main goal of this thesis remains the economic analysis of the problem of e-scooters congesting the sidewalk itself.

To focus the analysis on the problem, it is conducted as follows: After describing the e-scooter market, the legal environment with respect to e-scooters and German cities is displayed. The economic analysis takes the situation *in absence of regulation by the cities* as a starting point, analyzes the behavior of the involved actors, and then applies the three criteria that follow from the normative economic approach, adapted as outlined above. Then, changing the perspective from the e-scooter market to the analysis of sidewalks and streets[5], methodological

[5] For simplicity reasons, and because it is more fitting in the context of cities, the term “street” comprises highways, roads, and ways.

compromises have to be made. As will be shown, the step-by-step approach outlined here finds its limits when market failures and private law failures are interdependent and not sharply distinguishable, and when the problem is of rather abstract and complex nature – that requires a rather comprehensive presentation of the economics of streets and sidewalks.

Topic and formal requirements of this thesis result in further limitations: First, being a relatively new phenomenon and largely neglected in theoretical and empirical literature, the economic analysis of sidewalk congestion has often to be based on assumptions. Wherever possible, I will back them by empirical literature, making the latter's shortcomings as transparent as my assumptions themselves. Second, the economics of street provision and regulation are a whole theoretical field in itself which requires the analysis in this respect to remain rather cursory. Third, the legal and institutional setting in Germany results in a complex terminology. Since the differences are irrelevant for this thesis, I simplified and unified this terminology wherever possible.

3. Free-Floating E-Scooter Sharing

The first step to understand the problem from an economic perspective is to describe the practical circumstances that lead to the problem. To that end, the concept and functioning of the free-floating shared e-scooter system is displayed as well as the arising conflicts with pedestrians (→ 3.1. and → 3.2.). To illustrate the scope of the problem, I give a brief overview of the market for e-scooters in German cities (→ 3.3.). Because of its relevance for the economic analysis, the relationship between e-scooter provider and user is regarded more closely (→ 3.4.).

3.1. Concept and Functioning

Free-floating shared mobility is not limited to e-scooters, but generally describes sharing systems in which customers are not bound by rental stations, but rather pick the vehicles up wherever they find them, use them, and leave them wherever they are at their point of destination (Wunder Mobility, 2021). To provide the vehicle and its location, and to conclude the lease agreement, the shared mobility providers interact with their customers via an app (Barth & Kase, 2021).

E-scooters are motorized versions of kick-scooters (Fang et al., 2018). Their "shared" versions are owned by the providers that rent them for short-term usage (Fang et al., 2018). Customers have to create an account for using the provider's app, which they use to locate the closest available e-scooter and start the ride (and lease) by scanning the QR code attached to the vehicle (Mobilikon, 2023). To end his ride, the customer parks the e-scooter and finalizes the lease using the respective commands in the app (Mobilikon, 2023). Battery changes and relocation for inspection and maintenance services are conducted by providers who then place the e-scooters on the sidewalk again (cf. Verwaltungsgericht Bremen, 2023, paragraph 41).

From a public policy perspective, shared e-scooters can be seen as a solution for the so-called first/last mile problem – "the very short distances, usually a few miles or less, to get individuals from their origin or destination to or from the nearest transportation hub" (American Library Association, 2019). In that way, shared e-scooters are hoped to make public transportation as a less carbondioxide-intensive means of transportation more attractive (American Library Association, 2019), especially by replacing short-distance car trips (Bauer et al, 2022, p. 5). The first/last mile problem is not only a public policy issue, but

constitutes the main market gap that makes free-floating shared e-scooter systems interesting from the providers' perspective (cf. Button et al., 2022, p. 2). That is why the "free-floating" element is of such crucial importance for the business model. The less flexibility in parking the e-scooters, the less attractive they are for users, the less customers there are for e-scooter providers. This is illustrated by the the latters' sceptical reaction to the city of Leipzig's approach: Only allowing for hub-based e-scooter sharing heavily impedes the ability to address the first/last mile problem (Bauer et al., 2022, p. 36).

3.2. Conflicts with Pedestrians

Parking of e-scooters on sidewalks naturally causes conflicts with their other users, especially pedestrians. Parked e-scooters create an additional source for accidents (cf. Sikka et al., 2019, p. 2). That risk is especially relevant for elderly people, persons of reduced mobility, and people with disabilities (cf. Rodehau, 2020, p. 122). But even if it does not come to accidents, e-scooters can block streets, impede pedestrians' ability to use the sidewalk properly, and generally hamper their mobility (cf. Button et al., 2020, p. 6; Gössling, 2020, p. 7; Lopes de Carvalho, 2021, p. 12; Pestour, 2019, p. 12; Rodehau, 2020, p. 122; Tuncer et al., 2020, p. 3). Cluttering of e-scooters, additionally, is hardly aesthetically appealing (Button et al., 2020, p. 6).

Empirical assessments of these conflicts do not only face methodological problems, but their insights naturally lack transferability to other legal and practical situations than the one studied. Insofar, the following sources are rather hints than actual evidence of the conflicts. Trivedi et al. (2019, p. 3) found that five of 249 patients in connection with e-scooter accidents tripped over parked e-

scooters. In examination of, respectively, around 500 parked e-scooters, Fang et al. (2018, p. 3) and James et al. (2019, p. 1) observed six to ten percent of them obstructing pedestrians. In a non-representative online survey in Germany, 17 % of the over 3,000 participating pedestrians reported collisions with parked e-scooters – for the almost 300 participants with visual disabilities, that percentage rose to 68 % (Bauer et al., 2022, p. 16). 62 % of the former group and 87 % of the latter had to circumvent parked e-scooters (Bauer et al., 2022, p. 16). 70 % and 91 %, respectively, were angered by these e-scooters (Bauer et al., 2022, p. 16). The latter seems in line with another factor not to be underestimated – 77 % and 97 %, respectively, *feel* rather or very disturbed by wrongly parked e-scooters (Bauer et al., 2022, p. 13).

Again, these figures do not constitute a comprehensive empirical assessment. But they give an idea that, apart accident risk and sidewalk blocking, “soft” factors like subjective irritation might be part of these conflicts as well.

3.3. The Market in German Cities

With the German regulation on small electric vehicles (*Elektrokleinstfahrzeugeverordnung* – eKFV) entering into force in June 2019, the legal prerequisites for e-scooters being used on German streets were established (Carstens, 2023, p. 18). In the same year, already 50,000 shared e-scooters were used in German cities (Statista, 2023a). The cities concluded a legally non-binding memorandum of understanding with the providers (Rodehau, 2020, p. 49) – with limited success: Already in September 2019, the city of Bremen enacted mandatory rules (Carstens, 2023, p. 21). More cities were to follow (Rodehau, 2020, pp. 63–66). The following kinds of rules can be observed: Fees for sidewalk use,

limitation of service areas and establishment of restricted areas, limitation of the number of e-scooters, obligation to relocate e-scooters and reaction periods to do so, obligation to establish customer hotlines and provide data on e-scooter usage (Bauer et al., 2022, p. 33). For 2023, the turnover of the e-scooter market is estimated to amount to 193 million euro (Statista, 2023b).

3.4. Provider/User Relationship

The provider of shared e-scooters and their user are connected via a lease agreement (cf. Barth & Kase, 2021, p. 177). The terms of this agreement as well as the terms and conditions for using the provider's app are in part concerned with the user's parking behavior as well. Each of the four biggest e-scooter providers in Germany – Tier, Lime, Voi, and Bolt (Sandler, 2023) – has provisions on how and where to park e-scooters, makes reference to existing laws, and reserves the right to block or permanently deactivate the account and to demand compensation for fines to be paid to authorities (Bolt, 2023; Lime, 2023; Tier, 2023; Voi, 2023). Voi obliges the user to take a picture of the parked e-scooter after parking (Voi, 2023). The same is required by Bolt since August 1, 2023, under threat of an "enforcement fee" if the parking rules are not respected (Bolt, 2023). That is the first time that sanctions are provided for infringement of the parking rules themselves by a provider. A "soft" way to ensure that parking takes place at least in the service area is to only then allow for ending the lease in the app and thus ending the pay-per-minute mechanism (Bolt, 2023; Lime, 2023; Tier, 2023; Voi, 2023).

4. Legal Situation

Because of their potential influence on the e-scooter providers' and users' behavior, I describe the (federal) rules on liability and road traffic (→ 3.1. and → 3.2.). Then, the provisions of road law, the legal question of public use vs. special use, and the procedure and involved actors of permitting the latter are displayed (→ 3.3.), as they set the framework for the cities' actual possibilities, and/or are of relevance for a regulation cost-benefit-analysis.

4.1. E-Scooters and Liability

Even though e-scooters are motorized vehicles, they do not fall under the scope of the liability rules of the Road Traffic Act (*Straßenverkehrsgesetz* – StVG) so that there is no strict liability for e-scooter users and drivers in case of an accident (Amtsgericht Frankfurt am Main, 2021). Rather, general rules of German tort law are applicable (Tomson & Wieland, 2019, p. 448), i.e., liability for negligence. For accidents that involve parking e-scooters, liability of e-scooter users is rather improbable: Even if one would assume negligence of the last user, a victim would hardly ever be able to prove this in court (Tomson & Wieland, 2019, p. 450; Bachmor, 2023, p. 192). The reason is the "beyond a reasonable doubt" level of proof that German law requires also in civil procedures (Bacher, 2023, § 286 ZPO, paragraph 2). This threshold will hardly be reached in the cases in question (cf. Bachmor, 2023, p. 192).

The liability of providers is even more improbable as they are, normally, not the ones who park the e-scooter and thus do not cause the accident in a strict sense. Liability in these situations is theoretically possible under German tort law by assuming a duty to maintain safety (*Verkehrssicherungspflicht*) and its negligent

infringement (cf. Koch, 2020, p. 184), but has been rejected in the only published court decision in this respect (Landgericht Bremen, 2023). One way or the other, the problems of proving negligence would remain.

The practical constraints of liability are the reason why the role of insurances in this respect is limited. Liability insurance is mandatory for e-scooter providers (Jahnke, 2022, § 2 eKFV, paragraph 22), and covers accidents caused by the users as well (Koch, 2020, p. 184). But as the claim against the insurer is dependent on a claim against the e-scooter provider or user (cf. Burmann, 2022, § 115 VVG, paragraph 19), the same practical issues arise for the victim.

4.2. E-Scooters and German Road Traffic Law

E-scooters fall under the scope of the eKFV. They are small electric vehicles (*Elektrokleinstfahrzeuge*) in accordance with § 1 paragraph 1 eKFV (Jahnke, 2022, § 1 eKFV, paragraph 10). Before the eKFV was introduced in 2019, the use of e-scooters on German streets was generally prohibited (Jahnke, Vorbemerkung paragraph 6). Since June 14, 2019, they can be used on public streets as long as they are equipped with an insurance badge and granted an operational permit by the competent authority (Jahnke, 2022, Vorbemerkung eKFV, paragraph 13). Since e-scooters are classified as motor vehicles, the general rules of the German Road Traffic Regulation (*Straßenverkehrsordnung* – StVO) are principally applicable in accordance with § 9 paragraph 1 eKFV (Jahnke, 2022, Vorbemerkung eKFV, paragraph 16). However, when it comes to behavior in public traffic, e-scooters are rather treated like bicycle riders (Jahnke, 2022, § 11 eKFV, paragraph 2).

In detail, that means that e-scooter riders have to use roads in accordance with § 2 paragraph 1 StVO, and, if available, bicycle lanes in accordance with § 10 eKFV (Huppertz, 2019, p. 390). If they are designated for shared use of bicycles and pedestrians, sidewalks can be used for driving purposes by e-scooter riders, too – then, they have to adapt their speed to walking pace and are prohibited to hinder or endanger pedestrians (Jahnke, 2022, § 11 eKFV, paragraph 18). If an e-scooter rider fails to respect these rules, this constitutes a regulatory offence in accordance with § 14 eKFV (Jahnke, 2022, § 11 eKFV, paragraph 22). This offence will, under normal circumstances, be sanctioned with a fine from 15 to 30 Euro in accordance with number 238 to 238.3 of the annex to § 1 paragraph 1 of the Regulation on the Catalog of Fines (*Bußgeldkatalogverordnung* – BKatV).

When it comes to parking of e-scooters, the rules on bicycle parking are applicable, too (Jahnke, 2022, § 11 eKFV, paragraph 20). That means that road traffic law does not prohibit the parking of e-scooters on sidewalks (Kettler, 2003, pp. 210–212). However, the general rule of § 1 paragraph 2 StVO is applicable (Huppertz, 2021, p. 571): When parking the e-scooter, the rider has to "act in such a way as not to harm or endanger or, more than is unavoidable in the circumstances, to hinder or inconvenience any other person"[6]. Infringements are sanctioned with a fine of 10 to 35 Euro in accordance with number 1 to 1.4. of the annex to § 1 paragraph 1 BKatV – if the user can be identified. If that is not possible, the e-scooter provider will not be fined, but might bear the cost of the administrative procedure (Amtsgericht Hamburg-Altona, 2023). He can avoid this by disclosing the identity of the rider in question (cf. Amtsgericht Hamburg-Altona, 2023). But even if the user is identified – the question of what constitutes

[6] "[…] *hat sich so zu verhalten, dass kein Anderer* [sic] *geschädigt, gefährdet oder mehr, als nach den Umständen unvermeidbar, behindert oder belästigt wird*" – own translation.

hindering or inconvenience, and of what is unavoidable in the circumstances is not always easy to answer. Additionally, an infringement has to be proven if the user makes use of legal remedies, which confronts the competent authority with problems similar to the one of victims of accidents.

4.3. E-Scooters and German Road Law

The rules on road traffic need to be distinguished from road law, i.e., the rules on who builds streets and is responsible for their maintenance, on how the legal status of streets is established or changed, or on what use is abstractly permitted (cf. Weber, 2023) Road law is mostly enacted in the Road Acts of the respective German states (cf. Weber, 2023b).

Streets receive the legal status as a public street by means of their dedication as a public road (*Widmung* – Weber, 2023b). With the *Widmung*, the competent authority also decides about the abstract use of the street, e.g., for which purposes the street should be used (walking, bicycle riding, driving, etc.) or at which times (Sauthoff, 2023, paragraph 12).

In that way, the *Widmung* sets the framework for the use of public streets by everyone without permission, their so-called public use (*Gemeingebrauch* – Sauthoff, 2023, paragraph 60). In most of the Road Acts, the public use is limited to traffic purposes, i.e., for stops or for movement in the sense of a change of places (Sauthoff, 2023, paragraph 12). The question of what falls under “traffic purposes”, then again, depends on road traffic law (Bundesverwaltungsgericht, 1969).

Every use of the street that exceeds this public use is a so-called special use (*Sondernutzung* – Weber, 2023a). A typical case is the use of sidewalks for

placing tables by a restaurant. Other than public use, the special use of a street requires a respective permission by the competent authority (Weber, 2023a).

The distinction is of utter relevance for free-floating shared mobility. Whereas parking of private e-scooters on sidewalks falls under the public use of streets (cf. Jahnke, 2022, § 11 eKFV, paragraph 20), and hub-based e-scooter sharing constitutes a special use (Siegel et al., 2022, p. 489), the respective categorization is not clear for free-floating shared e-scooters (Siegel et al., 2022, p. 489). In absence of a decision by the Federal Administrative Court, two decisions of Higher Administrative Courts (*Oberverwaltungsgericht*) on free-floating bicycle (!) sharing illustrate the conflicting opinions (Siegel et al., 2022, p. 490). The Hamburgian Higher Administrative Court (*Hamburgisches Oberverwaltungsgericht*) decided that parking of shared rental bicycles on sidewalks is part of the public use of streets (Hamburgisches Oberverwaltungsgericht, 2009), while the Higher Administrative Court of North Rhine-Westphalia (*Oberverwaltungsgericht Nordrhein-Westfalen*) regarded it as special use (Oberverwaltungsgericht Nordrhein-Westfalen, 2020). In German legal literature, the debate does not only concern the question of which Higher Administrative Court is right, but also of whether the decisions are applicable to shared e-scooters or not (cf. Siegel et al., 2022, p. 490).

This legal uncertainty – together with the absence of special rules for parking of e-scooters designated by the federal lawmaker in the StVO – has opened an opportunity for cities to establish respective rules themselves, at least to a certain degree: Assessing free-floating shared e-scooter parking as a special use of public streets makes it dependent on a permit by the competent authority (Barth & Kase, 2021, p. 179). The decision on whether or not to grant a permit is at the

authority's discretion (Sauthoff, 2023, paragraph 68). The cities have the possibility to direct this discretion (Sauthoff, 2023, paragraph 70). Apart from only internally binding guidelines for the respective authority, they can enact municipal statutes (Joder, 2021, p. 1011). These so-called special use statutes (*Sondernutzungssatzungen*) are the tools for German cities to regulate shared e-scooter parking.

The competent organ on city level is the municipal council (Joder, 2021, p. 1011; cf. Drescher & Klamet, 2020, p. 857). The municipal counci is the representative body of the municipality (Pitrová, 2008, p. 65) – i.e., the city. Depending on state law, its members are elected every five or six years (Pitrová, 2008, p. 69).

5. Economic Analysis: Towards New Perspectives

The economic analysis is conducted from two perspectives: The one focusing on the e-scooter market (→ 5.1.) and the one focusing on streets and sidewalks (→ 5.2.).

5.1. The Free-Floating Shared E-Scooter Market

5.1.1. Situation without Regulation – Actors, Cost, and Behavior

To conduct the economic analysis with respect to the justification of regulation, the situation without such regulation needs to be analyzed. The main factors for the problem of blocked sidewalks to occur are the following: Availability of sidewalk space, number of e-scooters, behavior of the involved actors, and the legal environment (of which regulation is a part). Taking the sidewalk space and legal environment as given, regulation aims at the involved actors and their behavior.

This behavior is influenced by the legal environment and the e-scooter market. The number of e-scooters is, then, the result of the interactions and interdependencies of these factors. As the behavior of the involved actors is, therefore, crucial for the problem to occur, it forms the starting point of the economic analysis.

To that end, I undertake the following steps: First, I display the relevant actors (→ 5.1.1.1.). To analyze their intrinsic behavior and its influences on the problem, I display the costs of each of these actors in connection with the e-scooter sharing in general and the parking of the e-scooter in particular to examine the behavior of these actors under the rational choice assumption (→ 5.1.1.2.). Then, I analyze how this behavior is affected by the legal environment without regulation by the cities (→ 5.1.1.3.). As they play an important role for the cost-benefit analysis, I give a short overview on the behavioral aspects and incentives for each actor that may play a role in practice (→ 5.1.1.4.), before drawing a conclusion that works as the basis for further analysis (→ 5.1.1.5.).

5.1.1.1. Relevant Actors

Actions by at least three parties are necessary for the problem to occur: The e-scooter provider has to provide its client with the e-scooter that the latter has to park on the sidewalk. That alone is not a problem until the pedestrian as the third party uses the sidewalk on which the e-scooter is parked.

Of rather indirect relevance is the “next” e-scooter user as he plays a crucial role in the provider’s business model. In order for that to work, the e-scooter must be available on public space and accessible for that next user.

Of course, the individuals involved in the regulatory process and their interests are relevant, too. Due to the normative focus of this thesis, I only address them

in context with the providers' practical influences (→ 5.1.4.2.) and, thus, their relevance for the cost-benefit analysis.

5.1.1.2. Costs and Rational Behavior of the Actors

5.1.1.2.1. User

In order to use the e-scooter, the user has to bear several costs like downloading the provider's app, finding a free e-scooter, unlocking it, etc. When parking the e-scooter, these costs include finding a free spot on the sidewalk, getting off the e-scooter, and finishing the lease procedure via the provider's app.

Apart from situations in which he parks the scooter only temporarily (e.g., to buy something at a shop before continuing his ride), the sole interest of the rational user is to end his ride at least cost. That will lead him to leave the e-scooter where it is at that point: Any further action to park the scooter at a different place only involves additional cost for the client like looking for a proper spot to park and moving the e-scooter there. No matter how little they are, these costs are not balanced by any benefits for the user. He does not care how the next user will reach the e-scooter, or how the sidewalk is used after he left.

What does potentially influence his behavior are the requirements the provider imposes on him when using the app to finish the ride, which, e.g., might not be possible in all parking areas depending on the provider's respective policy. Due to the payment mechanism (→ 3.4.), the user is incentivized to follow the restrictions imposed on him by the provider. Which restrictions are imposed, then again, depends on the provider's decision (→ 5.1.1.2.2.).

The user can only park the e-scooter if he uses it in the first place. That depends on e-scooter availability, their price, alternative means of transportation, the user's preferences, etc. In short, the user's behavior as part of the dynamics of the shared e-scooter market also plays a role for the problem to occur.

5.1.1.2.2. Provider

As part of the typical costs of running a business, the provider especially bears the cost of purchasing, maintaining, and charging the e-scooters, as well as the costs of developing, maintaining, and providing the app. The parking location of e-scooters affects his costs insofar as it determines where the e-scooters have to be picked up for maintenance or charging.

For the provider's behavior, the more relevant costs are the ones of the user. For the free-floating model to work, parking the e-scooter must be as cheap as possible for the user. Any further parking action that increases the user's cost renders the model less attractive. However, the provider has to keep all users' cost in mind, namely also the "next" user's cost of finding the e-scooter and starting his ride with it. With respect to finding the e-scooter, the next user will be rather indifferent to the place of parking, as he has to use the app including its map and locating system one way or the other. If it is harder to access, e.g., because it is parked next to a tree, in between bicycles, or other physical obstacles, reaching the e-scooter comes at a higher cost. But these costs are rather avoided than induced by the prior client's parking behavior: The parking spot that was reached by the prior client at his lowest cost will more often than not align with the most accessible spot for the next client, at least when it comes to static physical obstacles.

For the problem to occur, the e-scooter has to be provided in the first place. The less e-scooters there are on the streets, the less often the problem will arise. Also, the price set by the provider influences the number of users and frequency of use. Here, again, the dynamics of the shared e-scooter market of which the provider's behavior is a part influence the problem's occurrence.

That means that the provider has little intrinsic reason to influence the user's parking behavior (apart from its location in the service area of the provider). Not only would parking restrictions alone lessen the attractivity of the e-scooter to the user, their "enforcement" via the app (e.g., taking a photo of the parked e-scooter to end the ride) would generate further cost for the user. That all providers in Germany do have rules on parking in their terms and conditions, and that Voi and Bolt require their users to take pictures (→ 3.4.) does not contradict this conclusion – these terms and conditions are already made under the impression of specific regulation by the cities (→ 3.3.) and, thus, do not allow for inferences to the intrinsic incentives for providers.

5.1.1.2.3. Pedestrian

From the pedestrian's perspective, more relevant than the costs of provider and user are the ones these actors save by using the free-floating model. Compared to a traditional, hub-based rental system, the provider saves significant cost, e.g., costs of providing storing and commercial spaces, employment costs, or at least costs of hubs themselves. What makes the e-scooter attractive in the first place is the drastically reduced cost of searching, enabling, and starting the e-scooter due to its ubiquitous availability. That is only possible by using the sidewalk as a space for parking, but also for offering and accepting the lease agreement via the

app. For the pedestrian, that increases the cost of using the sidewalk, as he has a higher accident risk, needs to circumvent more obstacles, and possibly finds it less aesthetically appealing (→ 3.2.).

It might be doubted that these costs prevent the pedestrian from using the sidewalk in general. But they force him to be more cautious and mobile in order to avoid accidents. Insofar, he does need to adapt his behavior.

5.1.1.3. Constraints by the Legal Framework

The legal environment as outlined above (→ 4.) already sets certain constraints independently of the cities' regulation.

At least the increased risk of accidents is potentially addressed by the liability provisions already in place. In theory, the user who parks the e-scooter in a way that infringes § 1 paragraph 2 StVO – i.e., blocking the sidewalk – and thus causes an accident of a pedestrian tripping over the e-scooter is liable for the accident cost. In practice, especially the problems of proof that the injured pedestrian faces make liability of both the user and the provider highly improbable (→ 4.1.). That is why the theoretical liability hardly affects the provider's or user's behavior.

The infringement of § 1 paragraph 2 StVO itself is sanctioned by a fine (→ 4.2.). But the difficulties with defining and proving the infringement and identifying the infringing user limit the deterring effect of the provision. The user will hardly have to fear regulatory sanctions for inappropriate parking, and the fine would not be very significant, anyway (→ 4.2.). Therefore, the effect on the user's behavior can assumed to be rather low. The provider itself does not have to fear a fine but – if at all – might have to bear the cost for the administrative procedure if he does not

help identifying the user (→ 4.2.) The definitory and proving problems remain. The provider might be incentivized, in that way, to provide the user's identity which then might affect the latter's parking behavior. But given the remaining insecurities with regard to him actually being sanctioned, the additional effect will hardly be significant.

Of course, all the constraints by the legal framework indirectly affect the occurrence of the problem. Only to name a few: The provisions of road traffic law make e-scooter riding less attractive and thus potentially reduce customer demand. At the same time, provisions like the mandatory insurance to be concluded by the providers increases their cost and thus affects their prices. In that way, the number of e-scooters is potentially affected, again dependent on the market dynamics.

5.1.1.4. Behavioral and Other Aspects

5.1.1.4.1. User

Certain psychological effects might play a role for the user's parking behavior. The observation that parking of e-scooters bias towards certain locations can of course be explained with these locations' attractivity to e-scooter users (Button et al, 2020, p. 6). But another part of the explanation could be that the place where other e-scooters are parked sets an example for the user who is about to end his ride. At least German jurisprudence assumes an effect of setting an example (*Vorbildwirkung*) in the context of parking cars (Heß, 2022, § 12 StVO, paragraph 94). Findings that parking racks and painted parking areas attract e-scooters (Karlsen et al., 2021) also give a hint that some kind of bandwagon or herd effects play a role in this context.

However, even if these behavioral assumptions hold true, that would only imply further aggravation of the problem – the potential of blocking the sidewalk increases with a rising number of e-scooters at the same place.

What could have an effect on the e-scooter user, though, is the fact that rules on parking the e-scooter do exist, as vague as they might be (→ 4.2. and → 5.1.3.). Despite their lack of deterring effect due to enforcement problems (→ 5.1.3.), their existence alone might exercise a certain disciplining effect on e-scooter users. However, that would require the provision to be generally known, and even then, its effect remains rather speculative. A decisive effect on user behavior, therefore, cannot be generally assumed.

5.1.1.4.2. Provider

Two strategic considerations might have influenced the providers' behavior – in opposing directions. The voluntary self-restrictions that were concluded after initiation of the e-scooter market in Germany (→ 3.3.) can be seen as an effort to prevent city regulation in the first place. At the same time, the advent of the shared e-scooter market was, to a certain degree, characterized by the strive for – real or perceived – first mover advantages in heavy competition (cf. Kompass International, 2023). The self-restriction would tend to lead to less e-scooters, while the first mover advantages would set incentives to increase the number of e-scooters and lower prices. Given the bad experiences of the cities with the former, the latter seem to have had the more dominant effect maybe in connection with the general heavy competition in an emerging market.

5.1.1.4.3. Pedestrian

That the objective cost for the pedestrian – higher accident risk and street blocking – might be subjectively higher was already indicated above (→ 3.2.). The apparently high degree of irritation generated by parked e-scooters might be explained with their sudden and quick appearance in 2019 (→ 3.3.): When an infrastructure that was until then primarily reserved to pedestrians suddenly is occupied to a significant degree by a new means of transportation, a hostile attitude seems plausible. However, the objective costs for pedestrians are undeniable and will not disappear even if pedestrians should get used to their presence on pavements.

5.1.1.5. Summary

All these observations remain to a certain degree speculative. Also, the rational choice assumption may be less equipped to answer a practical question of how and where to park an e-scooter. The problem in that regard is not only the little number of empirical studies, but also their lack of transferability (→ 3.2.). What is illustrated by this analysis, though, is that it is mainly the e-scooter providers' and users' behavior that determines how and where e-scooters are parked. Their behavior is also the main determinant for the shared e-scooter market which, then again, influences number and dissemination of e-scooters and thus the frequency of the problem. The point is that neither provider nor user have an intrinsic reason to include the pedestrians cost into consideration when acting. The legal environment has, at best, marginal influence on that situation, and behavioral effects are at least ambiguous. In general, there are plenty of effects that influence the situation and are influenced by each other which has to be taken into account in a

cost-benefit analysis. But the main conclusion for the economic analysis is that the pedestrians' costs and interests hardly play a role in the behavior that leads to the problem.

5.1.2. Market Failure

The first step in the economic justification is to identify market failures. With respect to the free-floating shared e-scooter market, the failure can be seen in the negative externalities it causes.

The term of "externalities" essentially describes the cost or benefit to a third party that is induced by an economic activity, without that positive or negative effect being reflected in the market price of said activity (Mulligan, 2023, p. 1; Ogus, 2004, p. 21) or, more general, without affecting those participating in the activity (Félix et al., 2023, p. 2; Cowen, 1992, p. 2). In case of negative externalities, that leads to a misallocation of resources: The difference between private cost and social cost of the activity induces a higher activity level than the socially appropriate one (Ogus, 2004, p. 35). As simple as the definition might seem, it faces several difficulties when applied (Ogus, 2004, pp. 36–38). Namely two of these difficulties are of significance in the case of e-scooters on sidewalks: First, the third party on which the external costs of the activity are imposed might be compensated by indirectly profiting of that same activity (Ogus, 2004, p. 36). Second, and more importantly, attributing the externality to one specific activity which is then characterized as "unilateral" poses the risk of misled conclusions (Ogus, 2004, p. 37). As Coase (1960, p. 2) pointed out, that unilateral perspective focuses on an injurer/victim dichotomy and thus blurs the view on the reciprocal nature of the problem. Taking the typical example of pollution, focusing on the "polluter" ignores

the underlying conflict over the competing use of a single resource, in this case, the atmosphere (Ogus, 2004, p. 36 f.). That does not deny the existence of externalities, even though the Coasian approach criticizes their characterization as market failures (Schwartz, 2013) and directs the attention to transaction costs as the core problem. This plays an important role when it comes to the question of private law failures.

Applied to the question of e-scooters on sidewalks, that means the following: As pointed out above (→ 5.1.1.), the free-floating system involves various costs of different actors, namely the ones of providers, users, and pedestrians. The essential activity is the lease of the e-scooter between the provider and the user, and their respective cost determine the activity level: The user bears his own costs that arise in connection with the lease, one of which is the price for the lease that reflects the provider's costs. If the price lies, e.g., for strategic reasons (→ 5.1.1.4.2.), below cost level, the costs are borne by the provider himself. One way or the other, these costs are internalized by the participants in that activity. The same holds true for the costs inflicted on the "next" e-scooter user: How and where the previous user parks the e-scooter affects how costly it is for him to use the e-scooter himself. Even though he is technically a third party to the lease between the provider and the user before him, his costs are taken into account by the provider and thus determine the activity level. Furthermore, the possibly higher cost – depending on the provider's requirements for use – in connection with finding the e-scooter and starting the ride are compensated by the lower costs when ending his own ride.

But these are not the only costs in connection with the free-floating model. What none of the participants in the activity takes into account are the pedestrian's

costs, namely the higher accident risk, the cost of circumvention, and the aesthetical cost (→ 5.1.1.2.3.). They are irrelevant for the user, and the price of the activity does not reflect them as the pedestrian's behavior simply is not a relevant factor for the market of free-floating shared e-scooters. Supply and demand, price and quantity in that market are not affected by any of the pedestrian's costs, benefits, or behavior. His costs are, therefore, the social costs that exceed the private costs as internalized by the e-scooter market. In that difference between social and private costs lies the market failure of externalities in this case.

5.1.3. Private Law Failure

As Coase (1960) demonstrated, the Pigouvian conclusion that externalities must be internalized by means of regulation is misled: The mere existence of an externality and thus higher than socially optimal activity level (→ 5.1.2.) does not mean that its internalization would achieve the optimal activity level. In a world without transaction costs, this level would be reached under the sole condition of clearly defined property rights (Coase, 1960, p. 2) – but even with transaction costs, private law will often be better equipped to reach that level than regulation (Pacces & Van den Bergh, 2012, p. 5). Not only does it allow for efficient negotiation solutions if transaction costs are low – moreover, namely tort law has advantages if participants in the activity can better assess the risk and weigh it against its benefits (cf. Shavell, 1984, p. 359; p. 371). It also has significantly lower administrative costs (Rose-Ackerman, 1994, p. 152; Shavell, 1984, p. 364). Weaknesses of tort law, on the other hand, occur when harm is diffuse and thus affects many people in a small way (Rose Ackerman, 1994, p. 152).

What does this mean for the externalities of shared e-scooters? First of all, transaction costs in this case are exorbitant. Apart from the definitory problems of property rights in this respect, an e-scooter user would have to negotiate with every pedestrian that potentially passes by the e-scooter. Even if this was possible, the number of pedestrians would lead to hold-out and free riding problems. That is why the comparative institutional analysis (Pacces & Van den Bergh, 2012, p. 6) with the above-mentioned criteria is relevant. Applied to the externalities of e-scooters, it is necessary to distinguish between the externalities the pedestrian is affected by: Accident risk, circumvention cost, and aesthetical cost.

The latter two constitute cases where the issue of harm diffusion arises. The costs of circumvention are low for the individual pedestrian, even though many pedestrians are potentially affected. The diffusion is even higher for aesthetical costs. A further problem that arises in this respect is the difficulty to assess the cost of circumvention and the aesthetical cost – how should they be measured? For liability to work, courts need to decide for concrete amounts of money to be paid, and if the losses are immeasurable, they need to be estimated. But that would hardly ever lead to the correct number of losses, not even on average, so that the deterrent effect would be quite arbitrary. Even if that was not the case, the supposedly low sums would hardly justify the additional administrative cost of legal procedures. The combination of high transaction costs with low, dispersed, and immeasurable costs is, therefore, indeed a case where the instruments of private law fail to internalize externalities.

The case is different, though, for the externality of increased accident risk. Provider, pedestrian, and especially user dispose over the information that is relevant to assess optimal activity and care level. A problem arises only with respect to the

deterrence of the user as the actor with the most relevant activity (→ 4.1.): The deterrent effect is diminished as he is often not identifiable in case of an accident. Moreover, his negligent behavior can hardly be proven. And third, even if he should be identified and held liable, there is no guarantee that he will be able to compensate the potentially high accident losses ("judgment-proof" – cf. Shavell, 2003, chapter 4, p. 5).

But all these issues can be satisfactorily addressed with private law instruments. Identification of the user is no longer a problem if the provider is vicariously liable for accidents – he is identifiable and can use contractual means (→ 3.4.) to pass liability (and thus the deterring effect) on to the user. The problems of proof are reduced by holding user and provider strictly liable for accident losses. That would also reduce the "judgment-proof" problem which can be further addressed by means of insurance.

This cursory overview does not replace a thorough tort law analysis. But it illustrates that private law failure can hardly be assumed with respect to the higher risk of accidents. That does not mean that the actually applicable rules of German tort law would be satisfactory. In fact, only the third issue is addressed with the mandatory insurance system in place (→ 4.2.) – the non-applicability of strict and quasi-vicarious liability has been criticized (Tomson & Wieland, 2019, p. 450). But that is not a failure of private law *per se*, but more of its concrete design.

Insofar, regulation in order to lower the accident risk can hardly be justified from an economic point of view.

5.1.4. Cost-Benefit Considerations

With respect to the externalities of circumvention and aesthetical costs, justifying regulation from and economic point of view is principally possible. However, especially the character of these potentially saved costs makes a definite answer impossible.

On the cost side, administrative costs have to be taken into account. Special use statutes have to be discussed, enacted, possibly adapted, and enforced. Since it is the municipal council who enacts them, and since this council consists of local politicians, public choice costs are to be expected. Of course, every restriction goes at the expense of e-scooter providers and users, reducing efficiencies of the e-scooter market. The size of these costs depends also on the chosen form of regulation: A cap on the number of e-scooter will, e.g., incur significant costs on the e-scooter market, but rather low enforcement costs – whereas a designation of parking zones will have the opposite result depending on the number of such zones. Some costs are also relativized because some of their determining factors are already in place. The enforcement of parking zones would be the task of personnel that already enforces parking rules for cars, anyway. How much additional cost that means, then again, depends on the number of personnel that is already in place.

On the benefit side, regulation faces the same problem as liability with respect to the measurability, only to a lesser extent. Regulation does not need to exactly quantify the individual losses – but the inability to do so necessarily introduces a high degree of uncertainty to any cost-benefit analysis. The benefits are the saved aesthetical and circumvention costs. They will seldomly exceed degrees of inconveniences for the individual pedestrian, and especially aesthetical costs

are highly subjective. What makes these costs significant is their frequent occurrence: For one pedestrian, they might be neglectable, but since they occur every single time a pedestrian passes an e-scooter, the aggregation of these small individual costs may very well result in high social costs. On the other hand, also regulation cannot avoid all the costs. Especially aesthetical costs would hardly be reduced by anything less than largely prohibiting e-scooters. Additionally, the cost of circumvention might not be addressed by liability – but they can be indirectly affected by a proper liability system that addresses the risk of accidents (→ 5.1.3.), as an accident risk reducing way of parking can be assumed to coincide with less obstacles and thus less need for circumvention. One way or the other, the benefits of regulation depend to a large degree on an estimation of their weight, which not only deprives them of an objective assessment, but potentially increases the weight of public choice costs on the cost side.

That is why there is no definite answer when it comes to the justification of the cities' regulation with respect to externalities. Also, when it comes to accident risk – the absence of an *abstract* private law failure does not mean that the concrete private law rules in place do not fail, and they lie outside of the scope of what the cities can decide on. If the federal legislator would adapt strict and vicarious liability for e-scooter providers, the case for regulation by the cities would be rather weak, as this would probably significantly lower the cost of circumvention as well. But with respect to the legal environment in place, namely the immeasurability of benefits makes a definite answer impossible, at least when it comes to externalities as a ground for economic justification.

5.2. Streets and Sidewalks

The economic justification for regulation is at least ambiguous with respect to the market of e-scooters and their externalities. But the above analysis is only one side of the coin. The main reason is that the focus on externalities of this market leaves out one important, if not the decisive factor for externalities to happen: the sidewalk itself. The core problem is the conflicting use of the same resource, and the transaction costs that arise with these conflicts. But unlike the atmosphere, that Coase used as one example (→ 5.1.2.), the sidewalk (and the street in general) is not a resource that is naturally there, but something that has to be provided and by definition requires a designation as such. In the case of German cities, it is publicly provided and regulated.

Public provision and regulation are the reason why the problem of e-scooters in streets of German cities is rather one of regulatory failure (→ 5.2.1.). Nevertheless, public provision and regulation of streets are economically justified (→ 5.2.2.), and, therefore, so is regulation of e-scooter parking – at least to some extent (→ 5.2.3.).

5.2.1. Regulatory Failure

One simple reason for regulatory failure can be that “regulation can be mistaken” (Pacces & Visscher, 2011, p. 11). That was the case in German e-scooter regulation, on many different levels. Unlike in many other countries, the *de facto* ban of e-scooters on German streets in general before 2019 (→ 3.3.) put the legislator in the position to comprehensively prepare for e-scooter sharing before it was introduced. With respect to e-scooter parking, that failed.

A first point is the lack of necessary infrastructure. If streets and, thus, sidewalks are publicly provided, it is the regulator's task to organize enough space for the traffic participants. The emergence of a new means of transportation, then, requires adaptation of infrastructure if the existing space is not sufficient. That did not happen in German cities.

If the existing space is deemed sufficient, its distribution is a regulatory task if the space is publicly provided. In that respect, the legislator failed as well. By simply referring e-scooters to sidewalks for parking purposes, some kind of tragedy of open access was created: The congestion problems that were negligible when the sidewalk was mainly reserved for pedestrians were suddenly and significantly aggravated by opening it to a new competitor for space. The general rule of § 1 paragraph 2 StVO is too vague to effectively steer the use, and lacks enforcement – another failure of public authorities.

Another issue is the exception of e-scooters from strict liability rules for motorized vehicles (→ 4.1.). Of course, that is a matter of private law. But since strict liability in Germany is, unlike in common law systems, not developed by judges but requires a legislatory determination, the source of the problem is the same.

Insofar, the importance of externalities of the shared e-scooter market is heavily relativized. The problems with e-scooters would not occur without them – but that is true for virtually every market activity. The general skepticism towards externalities as market failures is even more justified when the actual source of the problem lies in (the lack of) public provision and regulatory failures. The problem would not occur if it was not for the latter.

5.2.2. Economic Analysis of Public Street Provision and Regulation

That the problem of shared e-scooters on sidewalks is mainly a problem of regulatory failure does not mean that public provision and regulation of streets *per se* is a problem – quite the contrary: Publicly providing streets is economically justified, as the following analysis will show.

It is hard to imagine what a free market for streets in cities could look like. Of course, not much creativity is needed to imagine the privatization of *existing* streets (cf. Benson, 2017, p. 185). But that would not be very helpful in an economic characterization. Especially in the densely populated cities of the European kind, streets developed somewhat organically as the space between buildings before being constructed with public means. To some extent, location and administration were, therefore, predestined before modern market economies were even in place. That and the interdependencies between streets and their surroundings make their economic characterization difficult.

These issues are the reason why the methodology was adapted in this respect (→ 2.). The economic justification of streets being publicly provided and regulated relies on multiple grounds. Streets respond to (at least dimensions) of market failures like public goods (→ 5.2.2.1.) and natural monopolies (→ 5.2.2.2.), but also rely on transaction cost considerations (→ 5.2.2.3.). Together, these elements lead to economic justification of public street provision and regulation in German cities (→ 5.2.2.4.).

5.2.2.1. Streets as Public Goods

Public goods are characterized by two aspects, their non-excludability and their non-rivalrous consumption (Cowen, 2023). As accepted these basic

characteristics of public goods are, as unclear are the exact definitions. A good is said to be non-rivalrous if it can be consumed by one person without harming the ability of another to do so (Ogus, 2004, p. 33). But of course, that latter characteristic is not necessarily constant as public goods, too, can experience crowding at a certain level of use (Cowen, 1992, p. 4). More problematic is the second part of the definition: A good is non-excludable if it impossible to exclude the ones who do not pay for it (Samuelson & Nordhaus, 2010, p. 37). But whereas some authors restrict the term to *technically* impossible excludability (Bouckaert, 2020, paragraph 6), others also assume non-excludability if the cost of doing so is prohibitive (Ogus, 2004, p. 33). More elaborated definitions include the consequences of public goods in the definition itself (Benson, 2017, p. 172 f.).

As far as they mean the same phenomenon, these characteristics of public goods are the reason why markets cannot be expected to provide them efficiently. Without the possibility to exclude, it does not make sense for a consumer to pay for the good – he enjoys its benefits one way or the other and is thus induced to free ride (Ogus, 2004, p. 33). In absence of the consumers' willingness to pay, no producer will be incentivized to provide them (Ogus, 2004, p. 33). Thus, a public institution is needed with the ability to raise the funds for providing the good and the political authority to decide on quantity and quality of that provision (Ogus, 2004, p. 33).

When it comes to the question of whether streets are public goods, the unclear definitions result in different answers. Often, the public good character is simply claimed (cf. Cooter & Gilbert, 2022, p. 541; Cowen, 1992, p. 4; Schäfer & Ott, 2012, p. 79), or only shortly argued for with reference to the prohibitive cost of exclusion (cf. Ellickson,1996, p. 1173; Morales & Kettles, 2009, p. 23). Benson

(2017, p. 208) argues that roads can also be club goods, private goods, or common pool resources depending on the institutional surrounding, which he thus deems crucial for the characterization. Without engaging in a comprehensive discussion – the theoretical possibility of excluding users via tollbooths is accepted as much as the principal possibility of institutional settings deciding over the character of a good (cf. Bouckaert, 2020, paragraph 6). At the same time, it can be hardly denied that immense costs – both for street owners and users – would indeed arise if tollbooths had to be installed to exclude users like car drivers, but also bicyclists and pedestrians. If the possibility is accepted that definitory problems in the context of public goods are to some extent unavoidable (Hasselgren, 2018, p. 35), Den Hertog's characterization of roads as having a "public good dimension" (Den Hertog, 2010, p. 40) appears to be a reasonable approach in this respect.

5.2.2.2. Streets as Natural Monopolies

Natural monopolies arise "when production has high fixed costs but low marginal costs" (Cooter & Gilbert, 2022, p. 72). Consequently, a single firm is better equipped to generate the industry output than are multiple, competing firms (Samuelson & Nordhaus, 2010, p. 669). Competition would lead to less efficiency in this case. On the other hand, this situation would, indeed, result in a monopoly: With an incumbent producer present, the (potential) competitor would have to incur the high fixed cost, but would never be able to recoup them from customers given the competition by the incumbent producer (Cooter & Gilbert, 2022, p. 72; Den Hertog, 2010, p. 32). The incumbent producer could, therefore, generate monopoly rents (Den Hertog, 2010, p. 32; Ogus, 2004, p. 30) Apart from other

concerns like “wars of attrition” (Den Hertog, 2010, p. 32), this dilemma of having either a socially harmful monopoly or socially harmful competition is generally assumed to justify public provision or at least heavy regulation of these industries (Den Hertog, 2010, p. 33).

Roads are often taken as a standard example of natural monopolies (De Palma & Monardo, 2019, p. 1), being already mentioned by Walras (Mosca, 2008, p. 333). Even if you ignore the issues and costs of exclusion (→ 5.2.2.1.), the exorbitant cost of purchasing the land and building the street would result either in monopoly prices or inefficiencies due to duplication. The entry costs are even more aggravated in densely populated cities, where most of the space is already distributed so that the purchase of land alone could hardly be borne by private actors. To recoup the fixed costs, the street provider would have to demand high tolls – which he would be able to do due to his monopoly position. Insofar, the problems typically associated with natural monopolies can be expected to arise in a free market for streets.

5.2.2.3. Transaction Cost Considerations

In connection with streets, transaction costs play an important role.

As already mentioned (→ 5.2.1.2.), one factor for the high entry costs is the cost of land purchase. These costs are aggravated if – as typically in cities – real property is dispersed over many owners and many small parcels. That creates hold-out problems increasing the transaction costs for that land purchase (Benson, 2017, p. 185; Morales & Kettles, 2009, p. 24).

Another aspect is the user mobility as one of the major functions of streets (Morales & Kettles, 2009, p. 24). Even if exclusion via tollbooths is theoretically

possible, the execution would lead to massive transaction costs as every user would have to frequently stop in order to pay, severely impeding the street's quality as a way for transportation.

The issue of tollbooths could be, theoretically, addressed by agreements between street owners. But they would face another problem, the one of coordination (Ogus, 2004, p. 41 f.): In order to achieve the purpose of streets as transportation ways, there would have to be some kind of standardization. Transaction costs would be enormous if there was a different way of tolls to be used, a different street design, or a different set of rules to be respected. To avoid that, street owners would have to undertake costly coordination efforts, and the possibility of doing so would be limited to a regional level. Even if a private national association to unify the rules would be thinkable – that would be more costly than efficiency enhancing compared to governmental regulation using the public channels to communicate the rules (cf. Ogus, 2004, p. 42).

The reference to the historical development of streets hints to another relevant aspect: the path dependency of institutional evolution (Benson, 2017, p. 185). Transaction costs might vary from one institutional setting to another. But simply comparing the transaction costs of the status quo with the ones of an alternative institutional setting and switching to the latter if the former one's are higher would ignore the cost of switching – and they can be enormous and easily exceed efficiency savings. The greater the scale of an institutional setting, the longer it is in place, and the more different is the alternative, the costlier is the replacement. For a transition from public street provision to a free market of streets, these factors can be assumed to cause enormous costs.

5.2.2.4. Summary

These considerations show that it is not so much a single market failure that regulation responds to, but rather a combination of their elements and further aspects of transaction costs. That makes it necessary to take these aspects into account comprehensively: E.g., even if the theoretical possibility of tollbooths raises doubts about the non-excludability criterion of public goods, they would drastically increase transaction costs and aggravate the socially harmful monopoly effects of streets as a natural monopoly. Similarly, hold-out problems cannot be ignored when discussing the latter. But not only on the justification side, the interdependency of the different elements leads to conclusions that only seem to be circular. If the solution to address natural monopolies is, e.g., public franchising in connection with price and quality regulation (cf. Ogus, 2004, p. 32), that aggravates the cost aspect of excludability by diminishing the prospects of their recoupment. That, again, would put more weight on the public good dimension and strengthen the arguments for regulation from that perspective.

Similarly, a privatization of existing road fails to consider this variety of market failure dimensions. The problems with building roads in a free market in the first place do not hinder the possibility of enhancing efficiency of their use by privatizing them (Benson, 2017, p.185). But the prediction that the transaction cost of tollbooths at every street corner would soon be reduced by mergers of the street owners (Benson, 2017, p. 185) is not only rather speculative, it also ignores the natural monopoly dimension – without completely eliminating the additional transaction costs of tollbooths. Even if you assume efficiency savings with respect to allocation and maintenance (cf. Benson, 2017, p. 185), it is rather unlikely that they outweigh the aggravated cost of monopoly and tollbooths.

When looking at the concrete case of streets in German cities, the importance of path dependency becomes clear: Even if all the other problems are assumed away so that a change to a free market for streets would generate efficiency savings (cf. Benson, 2017, p. 185) – even then, these savings would hardly justify the costs of replacing a system that an entire economy is used to and that has been in place for decades, let alone the political cost of telling the population that they now have to pay for something that they at least perceive as free.

That does not mean that public provision of streets is the only thinkable, or the perfect economic solution. There is a variety of regulatory forms that can address market failures (cf. Ogus, 2004, pp. 121–334). But the impossibility to assign specific problems to a distinct, separate source of market failure continues when it comes to the appropriate forms of regulation. Here, again, the path dependency considerations play a role, as the cost of switching from a decade-long use of tried institutions that bureaucrats, enforcers, and addressees are used to will make it hard to justify to new regulatory forms, even if they generate efficiencies.

The outlined problems show that an unambiguous answer is hardly possible given the various considerations that influence the economic reasoning and that are, moreover, also dependent on the practical and institutional context. What can be said, though, is that the arguments against public provision of streets are mostly concerned with only some of the underlying aspects. Applying a more comprehensive point of view raises severe doubts about their appropriateness. That and the element of path dependency allows for assessing the public provision of streets as economically justified.

5.2.3. Justification of Regulation of E-Scooter Parking

The principal economic justification of public street provision and regulation serves as the foundation for justifying – to some extent – the regulation of shared e-scooter parking on sidewalks. Acknowledging that the economic problem is one of regulatory failure with respect to streets and not so much of a failure of the shared e-scooter market also changes the perspective on regulation in this respect. It is not so much an intervention in the shared e-scooter market but rather a symptom of the public provision of streets – and only as such it can be justified.

The economic justification of providing streets publicly goes in hand with accepting that an optimal solution is unlikely to be reached: A free market would not produce efficient outcomes, and regulation naturally suffers from distortions like administrative costs, information deficits, and costs of public choice (cf. Pacces & Visscher, 2011, p. 11). Consequently, the search for the optimal solution is a search for a second-best solution by nature. That search requires constant adaptation: Where the lack of market mechanisms hinders an “automatic” reaction to changes in demand (e.g., private street owners adapting infrastructure or the rules for using their streets), the regulator has to ensure that reaction. That is by nature slower and based on imperfect information compared to a market. But if the latter is not feasible, it is the second-best solution.

Applied to the e-scooter problem, that means the following: Regulation by the cities should rather be seen as an adaptation of already existing regulation of sidewalk use given the new demand for sidewalk space. That existing regulation is economically justified for a reason that has nothing to do with e-scooters, and that is the failure of a free market to efficiently provide streets in combination with the path dependency of institutional evolution. Even if the latter argumentation

should not be accepted – what can hardly be doubted is that the question of e-scooter parking is not the decisive tipping point that justifies a switch to an ostensibly efficient free market system of street provision. That is why, in consequence, regulation of the sidewalk with respect to shared e-scooters is economically justified.

However, that does not mean that everything the cities would decide for would automatically be justified. A major restriction has to be made with respect to the object of regulation: Because it is justified as regulation of the sidewalk and not of the e-scooter market, forms of regulation that exclusively address the latter and only have side-effects on the former – and not the other way around – cannot enjoy economic justification. Prohibiting e-scooter sharing entirely, limiting the number of e-scooters, obliging providers to relocate e-scooters, to establish customer hotlines, and to provide data on e-scooter usage (→ 3.3.) only address symptoms of the problem and not the problem itself – the assignment of sidewalk space.

Another reservation has to be made insofar as cost-benefit considerations are always relevant. In this case, they face the limits that were outlined above (→ 5.1.4.), mainly because the benefits are not quantifiable. But that does not mean that the search for a second-best solution would always need to take the costliest solution. Even if, e.g., the designation of parking zones would address the economic problem, their use has not necessarily to prescribed via command-and-control rules and the associated costs. If there are indications that the designation of parking zones alone can serve as a nudge (→ 5.1.1.4.1.), the limitation to that measure could be cost saving.

Lastly, the insight that externalities of the e-scooter market are not so much the problem does not mean that positive side-effects of addressing them with non-regulatory measures cannot play a role in the decision of how to regulate. If the federal legislator should, e.g., adapt the rules on strict liability of e-scooter users and providers, that would presumably already have an impact on the occurrence of the problem (→ 5.1.4.), possibly reducing the need for further sidewalk regulation.

The bottom line, however, remains the same: Acknowledging that the problem is one of adapting sidewalk regulation and not of shared e-scooter market failure allows for economic justification of the former as a necessary consequence of economically justified public provision of streets.

6. Conclusion

The economic analysis of the problem of shared e-scooters on sidewalks shows that the focus on e-scooters and their externalities blocks the view on the actual problem, the provision and designation of sidewalk space. Consequently, regulation that exclusively addresses the former is not justified from an economic perspective. With respect to the latter, though, the economic analysis leads to the unsatisfactory result that regulation is economically justified – without giving measures to assess the extent of it. Apart from the above-mentioned restrictions (→ 5.2.3.), the efficiency of regulatory instruments depends a lot on the concrete circumstances in every city and on how the concrete costs and benefits are estimated there. For cities with a high demand for shared e-scooters, it could make sense to adapt the infrastructure and redistribute sidewalk and street space. Other cities might have less conflicts, anyway, and can therefore afford to not

adapt regulation at all. That might explain while there is, already now, such a diversity in regulation by German cities.

Widening the perspective, the analysis maybe shows the limits of economic analysis. The more concrete the object of analysis gets, the more it deviates from stylized models, and the higher the degree of complexity of the problem in question – the less clear the result of analysis will be. That does not lessen its importance, as the problem of shared e-scooters on sidewalks shows. Its economic analysis might not result in an a simple yes-or-no-answer to the research question of whether regulation of that problem is economically justified. But it allows for a new perspective on the problem that has been largely neglected by literature and, more importantly, German cities themselves: From an economic point of view, regulation of shared e-scooters on sidewalks is not justified – but regulation of sidewalks with respect to shared e-scooters, in principle, is.

BIBLIOGRAPHY

American Library Association (2019, January 8). *Micro Mobility*. American Library Association.

http://www.ala.org/tools/future/trends/micromobility

Amtsgericht Frankfurt am Main (2021). Urteil vom 22. April 2021 – 29 C 2811/20. *BeckRS 2021, 46966*.

Amtsgericht Hamburg-Altona (2023). Beschluss vom 23.01.2023 – 327b OWi 1/23.

Bacher, K. (2023). § 286 ZPO. In Vorwerk, V., & Wolf, C. (Eds.), *BeckOK ZPO, 49. Edition, Stand: 1. Juli 2023*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

Bachmor, S. (2023). Umgekippter E-Scooter – Auskunftsanspruch gegen Halter. *Straßenverkehrsrecht, Heft 5*, 191–192.

Baldwin, R., Cave, M., & Lodge, M. C. (2011). *Regulation: Theory, Strategy, and Practice (2nd Edition)*. Oxford University Press.

https://doi.org/10.1093/acprof:osobl/9780199576081.001.0001

Barth, S., Kase, S. (2021). Die Nutzung des öffentlichen Straßenraums für Shared Mobility-Dienste. *Neue Zeitschrift für Verwaltungsrecht, Heft 4*, 177–181.

Bauer, U., Hertel, M., Klein-Hitpaß, A., Hardinghaus, M., Leschik, C., Cyganski, R., & Oostendorp, R. (2022). *E-Tretroller in Städten: Nutzung, Konflikte und kommunale Handlungsmöglichkeiten.* Deutsches Institut für Urbanistik.

https://backend.repository.difu.de/server/api/core/bitstreams/05e4cb02-91f6-4aa4-be13-560d4f0157af/content

Benson, B. L. (2017). Are Roads Public Goods, Club Goods, Private Goods, or Common Pools? In Hall, J. (Ed.), *Explorations in Public Sector Economics – Essays by Prominent Economists* (pp. 171–213). Springer.

https://doi.org/10.1007/978-3-319-47828-9

Bolt (2023, August 1). *Terms of use for Bolt E-Vehicles in Germany*. Bolt.

https://assets.ctfassets.net/tk7rwcciwvbq/0iHLinGXR0epoK-MOD4FE0/9a86b876e5df8b20cf613d92c82893cb/230401_rentals_T_Cs_ENG.pdf

Bouckaert, B. A. R. (2020). *Economic Analysis of Property Law Cases*. Routledge. https://doi.org/10.4324/9781315777580

Bundesverwaltungsgericht (1969). Urteil vom 12. Dezember 1969 – VII C 76/68.

Bundesverwaltungsgericht (1996). Urteil vom 4. Juli 1996 – 11 B 24/96.

Burmann, M. (2022). § 115 VVG. In Burmann, M., Heß, R., Hühnermann, K., & Jahnke, J. (Eds.), *Straßenverkehrsrecht – Kommentar, 27. Auflage*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

Bußgeldkatalog-Verordnung vom 14. März 2013 (BGBl. I S. 498), die zuletzt durch Artikel 5 der Verordnung vom 20. Juli 2023 (BGBl. 2023 I Nr. 199) geändert worden ist.

https://www.gesetze-im-internet.de/bkatv_2013/BJNR049800013.html

Button, K., Frye, H., & Reaves, D. (2020). Economic regulation and E-scooter networks in the USA. *Research in Transportation Economics 84*, 100973.

https://doi.org/10.1016/j.retrec.2020.100973

Carstens, C. (2023). *Neue Regeln der multimodalen Straße: Erkenntnisse aus einer Analyse der Regulierung von E-Scootern in Deutschland und den USA.* Deutscher Städtetag.

https://www.staedtetag.de/files/dst/docs/Publikationen/Weitere-Publikationen/2023/fachveroeeffentlichung-e-scooter-regulierung-deutschland-usa-2023.pdf

Coase, R. H. (1960). The Problem of Social Cost. *The Journal of Law & Economics, Vol. 3,* 1–44.

https://doi.org/10.1086/466560

Cooter, R. D., & Gilbert, M. D. (2022). *Public Law and Economics*. Oxford University Press.

https://doi.org/10.1093/oso/9780197655870.001.0001

Cowen, T. (1992). Public Goods and Externalities: Old and New Perspectives. In Cowen, T. (ed.), *Public Goods and Market Failures – A Critical Examination*. Transaction Publishers.

Cowen, T. (2023). Public Goods. *EconLib*.

https://www.econlib.org/library/Enc/PublicGoods.html

De Palma, A., & Monardo, J. (2021). Natural Monopoly in Transport. In Vickerman, R., *International Encyclopedia of Transportation* (pp. 30–35). Elsevier.

https://doi.org/10.1016/b978-0-08-102671-7.10006-5

Den Hertog, J. A. (2010), Economic Theories of Regulation. In Pacces, A.M., & Van den Bergh, R. (Eds.), *Regulation and Economics* (pp. 25–96). Edward Elgar Publishing.

https://doi.org/10.4337/9781782540465

Drescher, D., & Klamet, J. (2020). Fortgeschrittenenklausur – Öffentliches Recht: Kommunalrecht und Straßenrecht – Der eiskalte Gemeinderat. *Juristische Schulung, Heft 9*, 855–860.

Dylla, C. (2023, April 3). *Au revoir, la trottinette! Leihroller-Verbot in Paris.* Tagesschau.

https://www.tagesschau.de/ausland/europa/frankreich-paris-elektroroller-103.html

Ecke, B. (2022, January 19). *Stadtrat entscheidet: Kein E-Scooter-Verleih in Aschaffenburg*. Bayrischer Rundfunk.

https://www.br.de/nachrichten/bayern/stadtrat-entscheidet-kein-e-scooter-verleih-in-aschaffenburg,SuwvVuI

Elektrokleinstfahrzeuge-Verordnung vom 6. Juni 2019 (BGBl. I S. 756), die durch Artikel 9 der Verordnung vom 20. Juli 2023 (BGBl. 2023 I Nr. 199) geändert worden ist.

https://www.gesetze-im-internet.de/ekfv/BJNR075610019.html

Ellickson, R. C. (1996). Controlling Chronic Misconduct in City Spaces: Of Panhandlers, Skid Rows, and Public-Space Zoning. *The Yale Law Journal, 105 (5*), 1165–1248.

Fang, K., Weinstein Agrawal, A., Steele, J., Hunter, J. J., & Hooper, A. M. (2018). Where Do Riders Park Dockless, Shared Electric Scooters? Findings from San Jose, California. *Mineta Transportation Institute Publications*.

Félix, R., Orozco-Fontalvo, M., & Moura, F. (2023). Socio-economic assessment of shared e-scooters: do the benefits overcome the externalities? *Transportation Research Part D 118*, 103714.

https://doi.org/10.1016/j.trd.2023.103714

Gössling, S. (2020). Integrating e-scooters in urban transportation: Problems, policies, and the prospect of system change. *Transportation Research Part D 79*, 102230.

https://doi.org/10.1016/j.trd.2020.102230

Hamburgisches Oberverwaltungsgericht (2009). Beschluss vom 19. Juni 2009 – 2 Bs 82/09.

Hasselgren, B. (2018). *Transport Infrastructure in Time, Scope and Scale – An Economic History and Evolutionary Perspective.* Palgrave Macmillan.

https://doi.org/10.1007/978-3-319-79054-1

Heß, R. (2022). § 12 StVO. In Burmann, M., Heß, R., Hühnermann, K., & Jahnke, J. (Eds.), *Straßenverkehrsrecht – Kommentar, 27. Auflage*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

Huppertz, B. (2019). Die neue Elektrokleinstfahrzeuge-Verordnung. *Neue Zeitschrift für Verkehrsrecht, Heft 8,* 387–391.

Huppertz, B. (2021). Rechtsfragen bei der Verwendung von E-Tretrollern, *Neue Zeitschrift für Verkehrsrecht, Heft 11,* 567-572.

Jahnke, J. (2022). § 1 eKFV. In Burmann, M., Heß, R., Hühnermann, K., & Jahnke, J. (Eds.), *Straßenverkehrsrecht – Kommentar, 27. Auflage*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

Jahnke, J. (2022). § 11 eKFV. In Burmann, M., Heß, R., Hühnermann, K., & Jahnke, J. (Eds.), *Straßenverkehrsrecht – Kommentar, 27. Auflage*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

Jahnke, J. (2022). § 2 eKFV. In Burmann, M., Heß, R., Hühnermann, K., & Jahnke, J. (Eds.), *Straßenverkehrsrecht – Kommentar, 27. Auflage*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

Jahnke, J. (2022). Vorbemerkung eKFV. In Burmann, M., Heß, R., Hühnermann, K., & Jahnke, J. (Eds.), *Straßenverkehrsrecht – Kommentar, 27. Auflage*. C. H. Beck.

References to provision of the act (§) and paragraphs as indicated in the source.

James, O., Swiderski, J. I., Hicks, J., Teoman, D., & Buehler, R. (2019). Pedestrians and E-Scooters: An Initial Look at E-Scooter Parking and Perceptions by Riders and Non-Riders. *Sustainability 11*, 5591.

https://doi.org/10.3390/su11205591

Joder, K. J. (2021). Anforderungen an straßenrechtliche Sondernutzungssatzungen unter Berücksichtigung klima- und umweltrechtlicher Belange. *Neue Zeitschrift für Verwaltungsrecht, Heft 7,* 1010–1015.

Karlsen, K. Johnsson, E., Fyhri, A., & Pokorny, P. (2021). Parking Solutions for Shared E-Scooters – Summary. *TØI Report 1821.*

Kettler, D. (2003). Das Abschleppen von Fahrrädern. *Neue Zeitschrift für Verkehrsrecht, Heft 5*, 209-216.

Koch, R. (2020). Opferschutzlücke bei E-Scooter- und E-Bike-Unfällen? *Neue Juristische Wochenschrift, Heft 4*, 183–188.

Kompass International (2023). Export Zone – Understanding first mover advantage in internationalization. *Kompass International*.

https://www.solutions.kompass.com/blog/understanding-first-mover-advantage-in-internationalisation/

Landgericht Bremen (2023). Urteil vom 16. März 2023 – 6 O 697/21. *BeckRS 2023, 4342*.

Lime (2023, January). User Agreement Germany. Lime.

https://www.li.me/en-de/user-agreement

Lopes de Carvalho, C. (2021). Free-Floating Shared E-Scooters – Users' Perspective in Lund and Malmö – Sweden.

https://repositorio-aberto.up.pt/bitstream/10216/135337/2/486086.pdf

Mobilikon (2023, June 23). *E-Scooter Sharing*. Mobilikon.

https://www.mobilikon.de/massnahme/e-scooter-sharing#:~:text=Um%20einen%20E%2DScooter%20auszuleihen,der%20Vorgang%20per%20App%20beendet.

Morales, A., & Kettles, G. (2009). Healthy Food Outside: Farmers' Markets, Taco Trucks, and Sidewalk Fruit Vendors. *Journal of Contemporary Health Law & Policy, 26(1)*, 20–48.

Mosca, M. (2008). On the origins of the concept of natural monopoly: Economies of scale and competition. *The European Journal of the History of Economic Thought, 15(2)*, 317–353.

https://doi.org/10.1080/09672560802037623

Mulligan, C.B. (2023). Beyond Pigou: externalities and civil society in the supply–demand framework. *Public Choice, 196*, 1–18.

https://doi.org/10.1007/s11127-023-01064-x

Oberverwaltungsgericht Nordrhein-Westfalen (2020). Beschluss vom 20. November 2020 – 11 B 1459/20.

Ogus, A. (2004). *Regulation: Legal Form and Economic Theory*. Hart Publishing.

https://doi.org/10.5040/9781472559647

Pacces, A. M., & Visscher, L. (2011). Methodology of Law and Economics. In van Klink, B., and Taekema, S. (Eds.), *Law and Method. Interdisciplinary Research into Law* (pp. 85–107). Mohr Siebeck.

Available at SSRN: https://ssrn.com/abstract=2259058

Page references to SSRN version.

Pacces, A.M., & Van den Bergh, R. (2012). An Introduction to the Law and Economics of Regulation. In Pacces, A.M., & Van den Bergh, R. (Eds.), *Regulation and Economics* (pp. 1–22). Edward Elgar Publishing.

https://dx.doi.org/10.2139/ssrn.1914417

Pestour, A. (2019). Approche socio-économique des enjeux relatifs aux trottinettes électriques en libre-service en France. *Economies et finances*.

https://dumas.ccsd.cnrs.fr/dumas-02296773

Pitrová, M. (2008). Municipalities in the Federal Republic of Germany – Progress and Current Situation. *Politics in Central Europe*, *4(1),* 59–74.

Rodehau, A. (2020). E-Scooter im Straßenverkehr - „Hilfsmittel oder Gefahrgut“? Einfluss von Städten und Nutzern auf das neue Mobilitätsangebot.

https://www2.tuhh.de/mobillab-hh/wp-content/uploads/sites/31/2021/04/012_Rodehau_Masterthesis_E-Scooter_voe.pdf

Rose-Ackerman, S. (2009). Law and Regulation. In Caldeira, G. A., Kelemen, R. D., & Whittington, K. E. (Eds.), *The Oxford Handbook of Law and Politics*. Oxford University Press.

https://doi.org/10.1093/oxfordhb/9780199208425.003.0033

Samuelson, P. A., & Nordhaus, W. D. (2010). *Economics, 19th Edition.* McGraw-Hill/Irwin.

Sandler, A. (2023, April 25). *E-Scooter in Berlin 2023: Diese E-Roller fahren in der Hauptstadt.* Inside digital.

https://www.inside-digital.de/ratgeber/e-scooter-berlin-anbieter-preis-hauptstadt-2023

Sauthoff, M. (2023). § 21 Das Mandat im Straßenrecht. In Johlen, H., & Oerder, M., *Münchener Anwaltshandbuch Verwaltungsrecht, 5. Auflage*. C. H. Beck.

References to paragraphs as indicated in the source.

Schäfer, H.-B., & Ott, C. (2012). *Lehrbuch der ökonomischen Analyse des Zivilrechts*, 5. Auflage. Springer Gabler.

Schwartz, P. (2013). Ronald Coase, the Unexpected Economist. *EconLib*.

https://www.econlib.org/library/Columns/y2013/SchwartzCoase.html

Shavell, S. (1984). Liability for Harm versus Regulation of Safety. *The Journal of Legal Studies, 13(2)*, 357–374.

Shavell, S. (2003). *Economic Analysis of Accident Law*. NBER Working Paper 9694.

https://doi.org/10.3386/w9694

References to chapters and pages as indicated in the source.

Siegel, T., Jaster, N., & Knoblauch, F. (2022). Berliner Straßenrecht im Umbruch – zugleich ein Beitrag zur rechtlichen Einhegung neuer Mobilitätsformen. *Landes- und Kommunalverwaltung, Heft 11*, 488–493.

Sikka, N., Vila, C., Stratton, M., Ghassemi, M., & Pourmand, A. (2019). Sharing the sidewalk: A case of E-scooter related pedestrian injury. *American Journal of Emergency Medicine 37*, 1807.e5–1807.e7.

https://doi.org/10.1016/j.ajem.2019.06.017

Stadt Augsburg (2023, April 19). *Feste Abstellflächen für E-Scooter in der Innenstadt*. Stadt Augsburg.

https://www.augsburg.de/aktuelles-aus-der-stadt/detail/feste-abstellflaechen-fuer-e-scooter-in-der-innenstadt

Statista (2023, April 12). *Statistiken zum Thema E-Scooter*. Statista.

https://de.statista.com/themen/7054/e-scooter/#topicOverview

Referred to as "Statista (2023a)".

Statista (2023, July). *E-Scooter Sharing – Deutschland*. Statista.

https://de.statista.com/outlook/mmo/shared-mobility/gemeinsame-fahrten/e-scooter-sharing/deutschland

Referred to as "Statista (2023b)".

Straßenverkehrs-Ordnung vom 6. März 2013 (BGBl. I S. 367), die zuletzt durch Artikel 11 der Verordnung vom 20. Juli 2023 (BGBl. 2023 I Nr. 199) geändert worden ist.

https://www.gesetze-im-internet.de/stvo_2013/BJNR036710013.html

Straßenverkehrsgesetz in der Fassung der Bekanntmachung vom 5. März 2003 (BGBl. I S. 310, 919), das zuletzt durch Artikel 16 des Gesetzes vom 2. März 2023 (BGBl. 2023 I Nr. 56) geändert worden ist.

https://www.gesetze-im-internet.de/stvg/BJNR004370909.html

Tier (2023, June 6). *General Terms and Conditions*. Tier.

https://www.tier.app/germany-tcs-german

Tomson, C., & Wieland, A. (2019). E-Scooter: Die Fahrt ist frei, aber wer haftet? *Neue Zeitschrift für Verkehrsrecht, Heft 9*, 446–450.

Trivedi, T. K., Liu, C., Antonia, A. L. M., Wheaton, N., Kreger, V., Yap, A., Schriger, D., & Elmore, J. G. (2019). Injuries Associated with Standing Electric Scooter Use. *JAMA Network Open 2(1),* e187381.

https://doi.org/0.1001/jamanetworkopen.2018.7381

Tuncer, S., Laurier, E., Brown, B., & Licoppe, C. (2020). Notes on the practices and appearances of e-scooter users in public space. *Journal of Transport Geography 85*, 102702.

https://doi.org/10.1016/j.jtrangeo.2020.102702

Verwaltungsgericht Bremen (2023). Beschluss vom 24. Mai 2023 – 5 V 829/23. *BeckRS 2023, 13873*.

References to paragraphs as indicated in the source.

Voi (2023). *Nutzungsbestimmungen*. Voi.

https://www.voi.com/de/voi-user-agreement-12rr/

Weber, K. (2023). Sondernutzung. In Weber, K., *Weber kompakt, Rechtswörterbuch, 8. Edition, Stand: 1. April 2023*. C. H. Beck.

Referred to as "Weber (2023a)".

Weber, K. (2023). Straßen- und Wegerecht. In Weber, K., *Weber kompakt, Rechtswörterbuch, 8. Edition, Stand: 1. April 2023*. C. H. Beck.

Referred to as "Weber (2023b)".

Wunder Mobility (2021, August 4). *A complete guide to free-floating vehicle sharing models.* Wunder Mobility.

https://www.wundermobility.com/blog/free-floating/

Background picture in title: Freepik.com