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# Current Practice in Funding of Urban Transport: The Case of Germany

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## 1. Introduction

Germany is a federally organised nation with a vertically tiered system of responsibilities separated between the federal level (Bund), the federal states (Bundesländer), districts (Kreise) and municipalities (Gemeinden). There are sixteen Länder, three of which are city states (Berlin with 3.4 million inhabitants, Bremen 550,000, Hamburg 1.7 million). The districts are either unitary urban districts (Kreisfreie Städte, 116 in total) or rural districts consisting of several municipalities (Landkreise, 313). Of the total German population of 82.2 million inhabitants, 30% live in cities with more than 100,000 inhabitants and a further 27% in cities with more than 20,000 inhabitants (Deutscher Städtetag, 2007). The German constitution strongly supports the principle of subsidiarity, i.e. decisions are generally taken on a decentralised basis, with federal and state competences defined in the constitution. Municipalities have the constitutional right of self-administration. Because cities can either have the status of a federal state, an urban district or municipality within a rural district, their administrative responsibilities vary greatly.

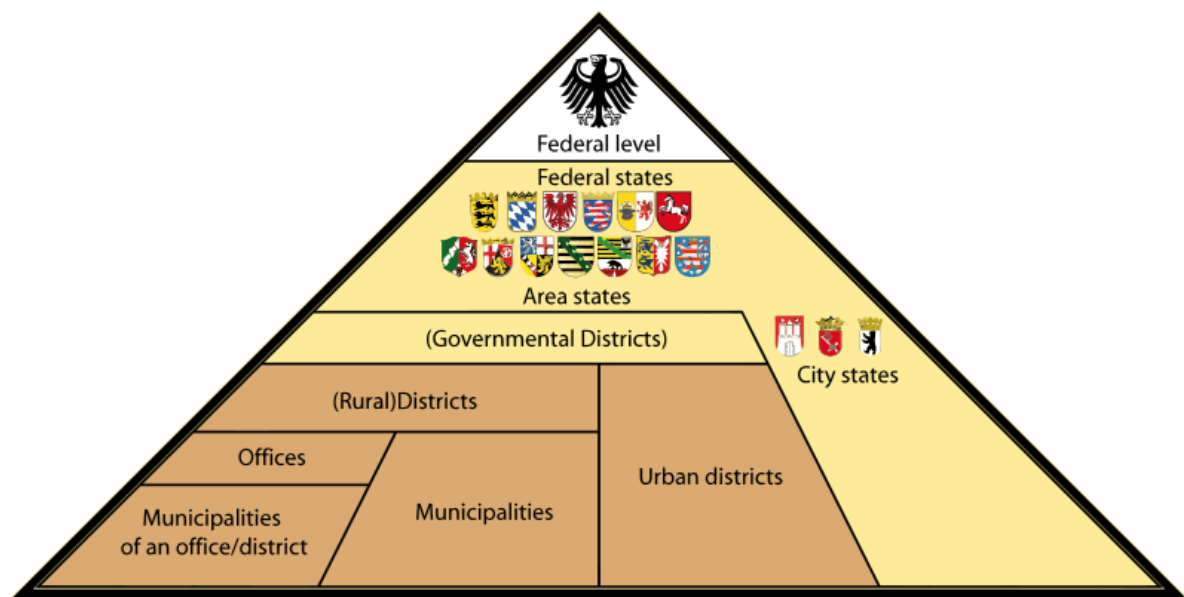


Figure 1: Administrative Levels in Germany (Liuzzo, 2006)

## 2. Principle sources of funding

The principle sources of funding for urban transport in Germany are divided between these administrative levels and differ with the type of transport services to be delivered. These are

- investments into federal and state infrastructure,
- regionalisation funds for local rail services,
- grants for municipal transport investments,
- European funds on regional development,
- funding from the municipal budgets,
- compensation payments for concessionary fares, and
- revenues from passenger fares.

## **2.1 Funding federal and state infrastructure in urban areas**

The federal government plans and funds the national railway infrastructure and federal roads (Bundesfernstraßen). These are motorways (Bundesautobahnen) and highways of national significance (Bundesstraßen). In particular the federal highways bear a significant amount of local traffic in urban areas. The federal government strategically decides about as well as funds the federal roads and the states administer them through their administrative bodies (Regierungsbezirke, governmental districts), i.e. they carry out the project planning, construction, and operation on behalf of the federal government. The main sources of funding investments into and maintenance of federal roads are federal taxes and, since 2004, revenues from the Heavy Goods Vehicle (HGV) Toll (Lkw-Maut) which is passed through the infrastructure fund VIFG (VerkehrsInfrastrukturFinanzierungsGesellschaft, see Gühneemann & Koskenoja, 2007). In addition, a small number of federal public-private-partnership (PPP) projects for bridges and tunnels within urban areas utilising private sources of funding have been carried out. In 2009, the planned investments into federal roads are 5.57 billion Euros, of which 2.17 billion € are provided through the HGV toll (VIFG, 2009).

State roads (Landesstraßen) are administered by the federal states and funded through the state public budgets. The states receive major parts of their budgets through tax transfers of certain taxes which are raised at the federal level, e.g. the vehicle taxes and part of the VAT. The tax levels and the proportions received by each state are decided at the federal level but need the consent of the assembly of federal states (Bundesrat). First PPP projects for state and community roads are currently under development. There is no data available on the overall share of funding that is spent on federal and state roads within urban areas. As an example, according to the most recent investment plan 2006-2010 grants for federal roads in the three city states amount to € 365 million in Berlin, € 320 million in Bremen, and € 678 million in Hamburg (BMVBS, 2007).

The main instrument of federal infrastructure planning is the federal infrastructure master plan (Bundesverkehrswegeplan, BVWP). This contains a list of priority projects for investments, ranked according to the results of a project appraisal (see Rothengatter, 2005). At the core of this is a cost-benefit analysis, complemented by an environmental risk and a spatial impact assessment. Projects with a benefit-cost ratio above one are classified in two priority categories of which the “first priority” projects are included in the investment plans until 2015. A quota system is then applied for the distribution of investments between the states. The states among other bodies issue lists of potential projects as an input to the process, and they are consulted after a first list of priority projects for transport infrastructure investments has been developed by the federal Ministry of Transport. With the exception of the three city states, municipalities can only influence investments into urban federal infrastructure indirectly through the states and their Members of Parliament. The situation is similar for investments into state roads where each federal state develops its own master plan or program and consults with the municipalities. States apply their own ex-ante appraisal methods, based on recommendations for standardised assessment methods. In conclusion, though federal and state roads play an important role in transport within urban areas, the decision about investments and funding is taken at higher administrative levels.

Investments for national rail infrastructure projects are negotiated between the Federal government and the infrastructure company of the German railways, DB Netz AG. As a general rule, the federal government funds rail infrastructure construction costs for priority projects included in the transport master plan as an interest free loan for which the network company has to back the annual depreciation through track charges. The share of the state contribution to the construction is negotiated between the company and the federal government with a possible elimination of projects if negotiations fail. The project implementation then lies with the DB Netz AG. All this influences the level infrastructure provision as well as track charges and, hence, the quality and costs of urban rail services.

## **2.2 Regionalisation funds for local rail services**

According to German railway law (Allgemeines Eisenbahngesetz AEG), local rail traffic is defined as (heavy) rail traffic that is mainly determined to satisfy urban, suburban or regional demand, i.e. when the majority of trips taken on these services is shorter than 50km or 1 hour total travel time. In the course of the railway reform in 1996, the responsibility for funding local rail services was transferred from the former national railways to the federal states. Since then, local rail services have to be tendered, which has led to a considerable increase in competition and transport volume in that market. The railways carried 2.2 billion passengers in 2007, of which 95% used local trains. The transport volume was 79.3 billion pkm (57% on local trains) (BMVBS, 2008). Some federal states themselves take on the role as executive authority (Aufgabenträger) that is responsible for administering and tendering these services, others have authorised regional co-operative associations (kommunale Zweckverbände). In total, there are 27 executive authorities for local rail services in Germany whose current annual purchasing volume amounts to more than 5.2 billion Euro for close to 630 million train kilometres delivered by 69 train operating companies (BAG-SPNV).

As compensation for the regionalisation of railway services, a fixed amount of funds is transferred from the federal general budget to the states according to the regionalisation act (Regionalisierungsgesetz RegG). A budgetary law in 2005 by the federal government led to a reduction of these funds to a basis of 6.61 billion Euro, partly compensated for by additional fund transfers after a compromise between the federal government and the states so that in total 6.775 billion Euros are budgeted for these funds in 2009. Some federal states have partly balanced the reduction by their own funds while other passed them on completely to the executive authorities who in turn have to reduce the cost of services.

About 75 % of these funds are used for operating local rail services, 10% for rolling stock and infrastructure and 15% for general local public transport. In some federal states, a growing share of these funds is actually used for grants for operating costs of road base public transport (Krichel, 2007).

## **2.3 Grants for municipal transport investments**

Local authorities (districts and municipalities) themselves are responsible for providing and maintaining district roads (Kreisstraßen) and communal roads (Gemeindestraßen) as well as local public transport. They can apply to the federal states for grants for investments in roads with a regional connective function, for cycling infrastructure and local public transport.

This system of grants for communal transport investments has significantly changed in recent years. Until 2004, 0.03 DM per litre on the mineral oil tax was earmarked for local transport infrastructure investments. This was replaced by a fixed budget of 1.67 billion Euros in 2004. This budget was divided according to the Gemeindeverkehrsfinanzierungsgesetz (GVFG, local community transport financing act) between urban transport research (0.5%), a federal program (20% of the remaining budget) and state programs. The state contributions are proportionally divided between the federal states according to their share of registered vehicles with some adjustments made for the city states and the five new federal states. Within the state programs, grants of up to 75% of costs could be given with the remaining funds provided by the states or local authorities. The states had to apply for these funds with programs for community road infrastructure investments (KStB Kommunalen Straßenbau) and for investments into public transport (non-DB infrastructure and vehicles).

With the reform of the federal institutions the provisions regarding the former state programs have been abolished in 2007 (Entflechtungsgesetz EntfIG, decentralisation act) with the aim to gradually transfer responsibilities to the lower administrative levels. The federal states now receive a financial transfer for state grants equalling the former state programs of 1.34 billion

Euros proportionally divided amongst them. Figure 2 shows the development of the federal financial aids for municipal investments since 1970. The financial transfer is earmarked for investments in urban transport but each federal state can now set its own conditions for grants. In general, the states require that projects have to be part of an integrated transport plan or similar and that they are economically viable. For public transport investments, the latter has to be shown by using a standardised evaluation method to determine social cost-benefit-ratios (“Standardisierete Bewertung”, see Intraplan, Heimerl, 2000). For roads, recommendations exist for an economic assessment based on a social cost-benefit analysis (“Empfehlungen für Wirtschaftlichkeitsuntersuchungen an Straßen (EWS) (1997)”, FGSV 1997) which can be adopted and amended by the states. The share of funding provided by the states in their state grants varies and lies mostly between 75% and 85%. It is foreseen to review the earmarking for transport and allow investments into other sectors by the end of 2013. The annual transfer payments are available until 2019. Each state has to provide an annual report on the expenditure of the grants to the federal government, and in turn requires the municipalities to provide the necessary information.

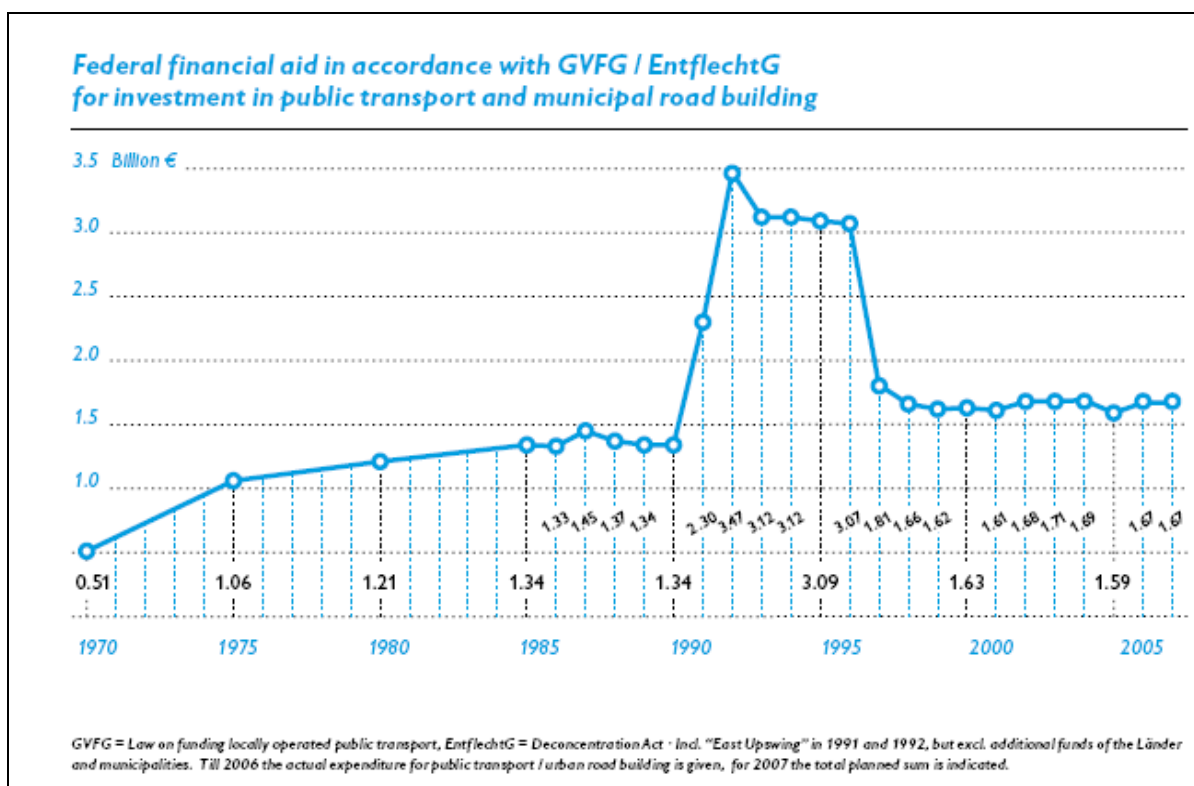


Figure 2: Federal grants for communal transport according to GVFG / EntflechtG (VDV, 2007)

The federal program has been retained and funds large public transport projects whose costs exceed € 50 million, mostly urban rail (S-Bahn), light rail and underground projects. Up to 60% of eligible costs can be funded by the federal program; the rest has to be funded by the states or local authorities. Non-eligible costs (e.g. planning costs) have to be carried by the rail infrastructure company, commonly the Deutsche Bahn Netz AG. The process of obtaining funding has two steps: firstly, the project is taken onto a list of potential projects. For each of these projects the standardised evaluation to determine social cost-benefit-ratios (“Standardisierete Bewertung”, Intraplan, Heimerl, 2000) has to be carried out. Secondly, if the project complies with the economic criteria, it is then included in the funding program, which represents a financial and planning contract between the administrations (Ott, 2005).

## **2.4 European funds on regional development,**

European funds for regional development (EFRE) is available for funding of infrastructure investments in particular in the new federal states. The federal program amounts to 1.52 billion € in the time horizon 2007-2013 and is available for investments in the federal infrastructures and co-financed by the federal government and the states.

Six federal states receive EFRE funding with the aim of convergence, the other 11 with the aim of improved competitiveness and employment. Each state has developed its own operational programme, in which funding for transport infrastructure is often included. However, the eligibility criteria for projects differ between states. There is no data available on the total share of transport investments in the programmes.

## **2.5 Municipal budget funding**

The remaining urban road infrastructures with a purely local function and municipal contributions to public transport have to be funded from the local public budgets. The main sources of income for municipalities are a municipal share of income taxes, local taxes on commercial activities (Gewerbesteuer) and ground ownership (Grundsteuer), tax transfers from the federal government and states, as well as fees and charges. Total revenues in municipalities with more than 20,000 inhabitants amounted to 77 billion Euros, of which close to 50% were net revenues from local taxes and 18% from tax transfers. Each local authority has the constitutional right to determine its own local tax rate within certain limits. Therefore, and due to economic differences, e.g. the local tax revenues in the thirteen cities above 500,000 inhabitants vary between less than 300 Euros per capita and year (Berlin, Leipzig) and more than 1,000 (Düsseldorf, Frankfurt) (Deutscher Städtetag, 2007). In addition, most municipalities in Germany show high budgetary deficits, i.e. part of their funding is through debts.

Only a small amount of local taxes and charges can be directly attributed to transport purposes. For example, owners of land have to pay fees that are earmarked specifically for road related services, e.g. for street cleaning and development of sites. Parking charges can also add up to a sizeable source of income for cities, although taking opportunity costs of foregone alternative use of space should be taken into account. Since local expenditure on transport affects various accounts, there is no general statistic on the level of funding. ICLEI (Krauth 2001 and Erdmenger & Führ, 2005) analysed the expenditure and revenues from car transport for selected cities in Germany and came to the conclusion that car traffic is subsidised with 100 to 250 Euros annually per inhabitant by the local authorities. The majority of these costs stems from planning, administration and maintenance of urban roads. This lack of transparency on the true costs of transport can lead to inefficient allocation of resources, which has led to the proposal to use least-cost-planning methods as applied in the utility sectors also in the transport planning of municipalities (see e.g. Bracher et al., 2001).

An additional source of funding for public transport is done through cross-subsidisation within municipal companies between other services, in particular energy provision, and public transport. Public transport has long profited from funding through this so-called "Querverbund", however it is unclear whether this unique German way of funding will remain an option in the longer term due to European competition laws and deregulation in the energy markets which led to falling profits from those charges.

Generally, a major factor determining how public transport is authorised and to what extent it is financially supported is whether services are considered 'commercially viable' (eigenwirtschaftlich) or 'services of general interest' (gemeinwirtschaftlich). Services of general interest are subsidised by the local authorities and have to be tendered in accordance with European law. For commercially viable services operator need to obtain a concession and

then has to fulfil operational and service criteria in exchange for the right to solely deliver these services. The authority awarding the concession needs to ensure that the services fit into the municipality's public transport plan, which has to be developed in all federal states except Hamburg. Its usual time horizon is five years, or ten years if investments are included and describes the expected development of public transport networks, demand, services, quality of vehicles and facilities, financing and fare structures. If several companies apply for concession, a competitive situation arises in which the licensing authority can choose the best service. Then it is in the operating company's responsibility to ensure cost recovery. However, their revenues include the compensation payments for concessionary fares and, in the case of communal operators, cross-subsidisation through the "Querverbund". Because it is in the discretion of the (mostly communal) operating companies to decide whether they regard a service as commercially viable or not, they tend to avoid the tendering process. As a consequence, communal companies in many regions still have a monopoly on public transport services with little incentive to reduce the high public subsidies (Karl, 2002, p. 8).

## **2.6 Passenger Revenues and compensatory payments**

Other sources of funding for public transport are revenues from fares and public compensation payments for concessionary fares for people in education and the disabled. According to the railway and public transport laws, pupils, students and trainees/apprentices can purchase seasonal cards at reduced fares. As compensation, the operating companies receive a compensatory payment from the federal states which is set at 50% of the difference between the revenue from these cards and the cost of producing the necessary services. With the decline in numbers of pupils and students due to the demographic development in Germany, this source of funding is likely to decline in future. Disabled passengers travel for free, and operators are compensated accordingly. Most operators also offer special deals on seasonal cards for senior citizens in order to attract passengers.

Estimate of the share of revenue funding versus subsidies and other funding sources vary. Borrmann & Peistrup (2006) estimate that passenger revenues amount to about 42.7% of revenues while 18% came from compensation payments, around 7% from investment grants and 32% from public subsidies. The association of public transport operators VDV report a cost recovery of about 74% for 2007 which includes passenger revenues and compensatory payments (VDV, 2007).

## **3. Summary of findings**

The German system of urban infrastructure funding is strongly influenced by its organisation as a federal state. Table 1 summarises the main characteristics of the different funding sources. The share of different sources of funding can vary greatly at the municipal level and overall figures are not reported in the national statistics. As an example, a distribution of the shares of different funds can be found in its integrated transport development plan for the city state of Berlin that estimates the available financial transport funds 2003 – 2015 (medium scenario), see Table 2. Of this, about 4.6 billion can be flexibly used by the city for various transport related purposes as listed in Table 3. These figures, however, cannot be scaled up to the national level as Berlin is in a special situation with its characteristics as a city state, seat of the government, reunited city, excessive public debts and low car ownership (360 cars/ 1000 inhabitants compared to national average of 674).

Table 2: Financial volume 2003-2015 for transport in Berlin (Senatsverwaltung, 2003)

Source	Estimated Volume 2003-2015 [billion Euro]	Share
federal investments roads	0.8	4.9%
federal investments rail	3.2	19.5%
federal investments inland waterways	4.6	3.5%
<b>Total federal investments</b>	<b>4.6</b>	<b>28 %</b>
regionalisation funds	4.5	27.3%
local transport investments (federal and state) (GVFG)	0.73	4.4%
vehicle taxes (state budget)	2.33	14.1%
EFRE/GA funding	0.15	0.9%
parking and special use fees	0.07	0.4%
other, general state / municipal budget	4.1	24.9%
<b>Total state controlled</b>	<b>11.9</b>	<b>72 %</b>

Table 3: Use of flexible state controlled funds for transport in Berlin 2003-2015  
(Senatsverwaltung, 2003)

Purpose	Estimated Volume 2003-2015 [billion Euro]	Share
Road network maintenance	3	65.2%
Maintenance rail network	0.3	6.5%
Road infrastructure	0.4	8.7%
Public transport infrastructure	0.5	10.9%
Measures to improve cycling	0.15	3.3%
Measure to improve state infrastructure / freight transport	0.05	1.1%
Organisational and "soft" measures	0.2	4.3%

On the national level, taking the different types of funding of investments together, Germany has developed extensive transport networks which are among the densest worldwide, and a very high level of public transport services, see Tables 4 and 5.

Table 4: Transport Infrastructure lengths (BMVBS, 2008)

Roads 1000 km (2007)		Railways 1000 km (2005)		Public Transport 1000 km (2003)	
- Motorways	12.59	- Electrified	22.97	- Rapid rail	1.475
- Federal highways	40.42	- not electrified	18.34	- Light rail	3.694
- State	86.61			- Trolley bus	0.115
- District	91.56				
<b>Total</b>	<b>231.18</b>	<b>Total</b>	<b>41.31</b>	<b>Total</b>	<b>5.284</b>
Communal roads (1990)* (old federal states)					
- urban	199.4				
- non-urban	127.6				

\*no data available after 1990

Table 5: Local public transport figures 2006 (BMVBS, 2008)

Local public transport 2006	Vehicle km [million]	Length of lines [1000 km]	Passengers carried [million]*	Passenger km [million]	Revenue** [million €]
Municipality owned companies					
• Rapid rail systems (Underground, elevated)	2,775		8,378	47,465	10,500
• Light rail systems (Trams)	301				
• Buses	1,961	371			
Private companies	513	334	726	34,329	
Taxi and hired car companies					3,590

\*double counting included when changing vehicle type

\*\* Including compensation payments



Laaser and Rosenschoon (2001) analysed income from and expenditure in the transport sector. In total over all administrative levels public revenues from fuel taxes, vehicle taxes, fares and fees are higher than expenditure (without external costs). However, even after transfer of funds between federal levels, local authorities showed a large deficit of 15.6 million DM in 2000.

In summary, the German system of urban transport funding is characterised by the following strengths and weaknesses:

- The funding through grants for communal transport investments has generally led to a high standard of urban transport infrastructure and services.
- There is a high level of integration of public transport services. One reason is the large degree of public control, either by provision through executive authorities and city owned companies or through tendering. Another reason is the co-operation of operators in the transport authorities.
- Roads are generally well engineered and maintained, though a growing share of the budgets needs to be set aside for maintenance and renewal.
- Public transport is highly subsidised. Even if leaving out the discussion whether compensatory payments are included under or seen as payments for receiving a service, there is a substantial support for operating and investment costs.
- Due to the many levels of funding, the German system is characterised by a high level of complexity which leads to a lack of transparency of funding.
- The mix of responsibilities between administrative levels leads to inefficiencies: E.g. a report by the President of the Auditor General's Office in Germany (Engels, 2004) criticises states that there are growing problems in particular regarding two issues: Firstly, the system of federal roads was originally designed for long-distance traffic but carries a considerable amount of regional traffic today, specifically on the highways. Besides, many highways have been converted by the states to federal roads which allowed them to claim federal funding. In the planning process, the bottom-up procedure leads to inefficiencies due to the assessment of more than 1500 single projects which are proposed by the different bodies.
- There is a substantial lack of funds at the municipal level due to municipal debts. The amount of transfers from the federal level to the municipalities is even expected to decrease further which will worsen the gap of funding.
- The calculation of shares for the states based on car ownership favours richer states and appears to be in contrast to policy goals of promoting alternative forms of transport.
- Revenues from annual vehicle taxes play an important role in financing state transport budgets but are fixed at the federal level. Currently there is a discussion on changing the calculation basis to a CO<sub>2</sub> emissions linked tax. However, despite a generally accepted positive environmental impact, there is some resistance from the federal states as they fear a decrease in funding.
- Hidden subsidies for road transport can be considerable (even not regarding externalities).
- There is little involvement of the private sector. One of the tasks of the VIFG is to promote PPPs also on the communal level.

Table 1: Overview of sources of urban transport funding in Germany

Source	Type of policy supported	Administrative Level			Flexibility	Planning instrument	Eligibility assessment	Source of funds
		Budget decision	Decision on use	Administration				
Federal infrastructure in urban areas	Road and heavy rail investments, traffic management, maintenance	federal	federal	state / governmental districts	low	National transport master plan	project proposals by Länder and other stakeholders; formal assessment	general taxes, partly user tolls, limited private
State infrastructure in urban areas	Road investments, traffic management, maintenance	state	state	state / governmental districts	low	State general / integrated transport plans or programmes	individual by state, usually includes economic and wider appraisal	state budgets (transfer of taxes raised at federal level)
Regionalisation funds for local rail services	Regional and local heavy rail services, rolling stock, general public transport	federal	state / Executive authorities	Executive authorities	low		Fixed state shares; tendering of services	federal taxes transferred en block to states, partly complemented by state budgets
Grants for (large) municipal transport investments (federal programmes)	Large public transport investments (mainly light + rapid rail)	federal	federal / state	federal	medium		Standardised economic appraisal method	national budget, co-funded by state / local budgets, some private involvement in planning costs
Grants for municipal transport investments (state programmes)	Road investments, walking and cycling facilities, traffic management, public transport facilities, parking facilities	federal	state	state	high	Local public transport plans	individual by states; standardised economic appraisal for public transport investments; municipalities apply for grants and have to report on use of funds	federal taxes transferred en block to states, partly complemented by state budgets
Municipal budget funding	Local road investments and maintenance, public transport operations, walking and cycling facilities	local	local	local	high	Local integrated plans, Local public transport plans	individual by municipality	Municipal budgets: Local taxes and tax transfers from national budgets and between municipalities; specific fees (parking, development); cross-subsidisation
Compensatory payments	Reduced pt fares for people in education and the disabled	depends on uptake	operators	states	low	-	-	state budgets
Passenger revenues	Pt operations	depends on uptake	operators	operators	low	-	-	private (passengers)

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## Abbreviations

AEG	- Allgemeines Eisenbahngesetz
BVWP	- Bundesverkehrswegeplan
GVFG	- Gemeindeverkehrsfinanzierungsgesetz, local community transport financing act
HGV	- heavy goods vehicles
pkm	- passenger km
PPP	- Public private partnership
tkm	- ton km
VAT	- value added tax
VIFG	- Verkehrsinfrastrukturfinanzierungsgesellschaft

## Translation of key terms

For many terms from German legislative documents and transport planning, there is no standard translation. Therefore, following list provides the author's translations of the key terms used in this paper.

Bund	- federal government, federal level
Länder	- federal states, states
Stadtstaaten	- city states
Kreise	- districts
Gemeinden	- municipalities
Regierungsbezirke	- governmental districts
Schienenpersonennahverkehr (SPNV)	- local rail transport
Öffentlicher Nahverkehr ÖPNV	- local public transport
S-Bahn	- urban rail
Schnellbahn	- rapid rail (includes urban rail and subways)
Grundsteuer	- ground ownership tax
Gewerbesteuer	- local commercial tax
Aufgabenträger	- executive authority
Bundesverkehrswegeplan	- federal infrastructure master plan
Autobahn	- motorway
Bundesstraße	- federal highway
Landesstraße	- state road
Kreisstraße	- district road
Gemeindestraßen	- communal roads