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Pigouvian Concept Analysis *Tax* and *Earmarking Tax* in the Implementation of Motor Vehicle Tax

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ARTICLE INFO	ABSTRACT
Keywords: *Motor Vehicle Tax,* *Pigouvian Tax ,* *Earmarking Tax*	*The increasing ownership of motorized vehicles of the motorcycle type in DKI Jakarta, on the one hand, is a potential for vehicle tax revenue that contributes to regional taxes that can be used to improve road infrastructure, on the other hand, it causes problems of congestion and air pollution. The research method used is the literature study method to discuss about analysis concept the Pigouvian tax and earmarking tax in the implementation of motor vehicle tax policies. The results of the study indicate that the implementation of motor vehicle tax reviewed from the Pigouvian tax concept is in the application of progressive tax rates to control the negative external impacts caused by motor vehicles such as congestion, traffic accidents, air pollution, all of which cause social costs that tend to be greater in urban environments, one of which is in DKI Jakarta which has an impact on losses reaching IDR 100 trillion each year from the accumulation of excessive fuel consumption, corrected travel time losses due to congestion, the impact of air pollution caused by burning fuel oil and others. The implementation of motor vehicle tax reviewed from the earmarking tax concept, motor vehicle tax is included in the classification of fixed taxes with reference to a certain percentage of the minimum allocation of 10 percent intended for improving road infrastructure and transportation modes.*

INTRODUCTION

Tax is one of the fiscal instruments to control the negative externalities caused by motor vehicles, so it is appropriate for the tax system to charge motor vehicles that cause air pollution and congestion that have a detrimental impact on society and a cost burden on the government. Judging from the tax regulations in Indonesia, it has accommodated the *Pigouvian Tax concept* in the form of incentives and disincentives. Pigouvian tax is a tax levy on each unit of *output* from a pollutant source into an amount that is proportional to the marginal damage effect it causes by charging it to the efficient *output level*. In addition, seen from the implementation, *earmarking tax* seems to be more successful in the context of local government because there is a closer relationship between beneficiaries and taxpayers and users of public services can more easily express their preferences through political voting and thus increase tax morale. Characteristics of the *earmarked taxes concept* that can be used to impose taxes on motor vehicles where the proceeds from motor vehicle tax collections are used for road repairs, improvements to road facilities and infrastructure, as well as providing security and safety for motor vehicle drivers (Bohanon et al., 2014; Lazuardi, 2021; Newbery & Santos, 1999; Rosdiana, 2018a)

Pigouvian tax as a tax instrument imposed on motor vehicle ownership is applied to control air pollution caused by motor vehicles so that government intervention is needed in the form of policies to limit the number of motor vehicle ownership by imposing progressive taxes, while seen from the application of *earmarking tax* on motor vehicle tax, a minimum of ten percent of total tax revenue must be allocated. The allocation is intended for the construction and/or maintenance of roads and the improvement of public transportation modes and facilities. Both tax concepts are accommodated in tax regulations in Indonesia through laws issued in 2022 regulating financial relations between the Center and the Regions and one of them is implemented in DKI Jakarta through regional regulations issued in 2024 regulating regional taxes and levies by implementing progressive taxes on motor vehicle ownership. Judging from the number of motor vehicle ownership in DKI Jakarta which has increased every year, it is known that the type of motor vehicle that is most numerous is motorbikes compared to passenger cars and buses, as shown in table 1.

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Table 1 Number of Motor Vehicles by Vehicle Type (Unit) in DKI Jakarta 2020 – 2023

Type Vehicle	Year			
	2020	**2021**	**2022**	**2023**
Passenger Car	3,365,467	3,544,491	3,766,059	3,836,691
Bus	35,266	36,339	37,180	38,612
Motorcycle	16,141,380	16,711,638	17,304,447	18,229,176
Amount	**19,542,113**	**20,292,468**	**21,107,686**	**22,104,479**

Source: BPS DKI Jakarta processed by the author (2024).

Table 1 shows the number of motorized vehicles in DKI Jakarta in the period from 2020 to 2023 has increased in number every year, dominated by motorcycles. This indicates the large number of motorized vehicle ownership in DKI Jakarta which increases every year as a potential for motor vehicle tax revenue in DKI Jakarta. The realization of Motor Vehicle Tax revenue in DKI Jakarta recorded by the DKI Jakarta Provincial Revenue Agency in 2020 to 2023 is shown in table 2.

Table 2. Realization of Motor Vehicle Tax (PKB) Revenue in DKI Jakarta 2020 – 2023

Year	Realization of PKB Receipts	Growth Percentage
2020	Rp. 7,879,223,484,468	
2021	Rp. 8,532,903,649,938	108%
2022	Rp. 9,404,927,298,262	110%
2023	Rp. 9,410,000,000,000	100%

Source: DKI Jakarta Regional Revenue Agency processed by the Author (2024).

Table 2 shows the realization of Motor Vehicle Tax revenue in DKI Jakarta during the period 2020 to 2023 experienced growth in the realization of its revenue which contributed to regional tax revenue. The increasing number of motorized vehicles also contributed to road improvements where the government can collect motor vehicle tax which is included in the regional tax category. Motor Vehicle Tax is a significant source of income because this tax is classified as a luxury item. On the other hand, the higher the progressive tariff imposed on Motor Vehicle Tax, the greater the taxpayer's avoidance behavior on Motor Vehicle Tax (Jainuri, 2019)

Motor Vehicle Tax related to externalities *bottom-up approach* by referring to efficient tax structure for road users. Efficiency requires road users to be charged externality costs (for noise, pollution, accidents and others) that are charged to the community which requires identifying and calculating externality costs then establishing functional relationship between those costs and road (or fuel) usage, and setting available taxes or controls at optimal level (Cnossen, 2005)

Policymakers can apply Pigouvian taxes appropriately to the externalities caused by motor vehicles. Imposing taxes directly that are correlated with externalities is often not technically or politically feasible, such as taxing vehicle emissions, policymakers impose a tax on motor vehicle fuel. Meanwhile, *earmarking Tax* imposed on motor vehicles can increase taxpayer compliance by increasing procedural benefits that can be achieved through two different mechanisms, namely: (1) *earmarking tax* increases taxpayer awareness of the potential benefits of taxes paid on motor vehicle ownership; and (2) this opportunity allows taxpayers to actively participate in policy decisions by positioning themselves as policy makers rather than policy makers. Taxpayer awareness can be seen from the sincerity and desire of taxpayers to fulfill their obligations. Taxpayer awareness of taxation is very necessary to increase the ability to pay taxes (Sofyaningsih & Hardiningsih, 2011). Taxpayer awareness, tax knowledge, tax sanctions and public service accountability have a positive effect on motor vehicle taxpayer compliance (Barile et al., 2024; Knittel & Sandler, 2018; Nahumury et al., 2018; Putri & Wibawa, 2023) *Tax* consciousness according to Buehler (1940) quoted by Geyik. et.al (Geyik et al., n.d.) is explained as a phrase that can be called "*tax education*", "*tax awareness*", or "*knowledge* of *taxation*", also known as "*tax responsibility* ", and " *broadening the tax base* " to instill wise thinking to low-income taxpayer groups that for every nominal amount of government spending, income must be obtained through taxation or other means as well as to increase greater taxpayer participation in tax contributions. Rahayu (2010)defines taxpayer compliance as taxpayer compliance in implementing applicable tax provisions. Compliant taxpayers are taxpayers who comply with tax obligations in accordance with the provisions of laws and regulations. Based on the description above, the author is interested in discussing it by focusing the discussion on the analysis of *the Pigouvian tax* and *earmarking* concepts. *tax* on the implementation of motor vehicle tax policy.

Several studies have explored the application of taxation in managing the negative externalities caused by motor vehicles. Tikoudis et al. (2015) emphasized the role of Pigouvian taxes in addressing the social costs associated with congestion and air pollution. Similarly, Knittel and Sandler (2018) highlighted the efficiency of implementing environmental taxes to mitigate externalities caused by transportation activities. Meanwhile, Rosdiana (2018a) discussed the practical implications of earmarking taxes, particularly in improving road infrastructure and public transport systems, showcasing their dual role in raising revenue and encouraging sustainable practices.

Although previous studies have addressed the conceptual foundations and applications of Pigouvian and earmarking taxes, there is limited research that combines these approaches to evaluate their effectiveness specifically within the context of motor vehicle taxation in urban settings like DKI Jakarta. Furthermore, the

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intersection of progressive tax rates with their impact on taxpayer compliance and environmental benefits remains underexplored, leaving a gap in understanding the holistic impact of these tax strategies.

This study uniquely examines the implementation of Pigouvian and earmarking tax concepts in the motor vehicle taxation framework, specifically focusing on DKI Jakarta as a case study. By integrating these two tax approaches, the research offers an innovative perspective on how they can synergize to address congestion, air pollution, and improve taxpayer compliance. This is further complemented by an analysis of regional tax regulations issued in 2024, highlighting their contemporary relevance and application.

The primary objective of this study is to analyze the application of Pigouvian and earmarking tax concepts in motor vehicle taxation and their effectiveness in mitigating negative externalities in DKI Jakarta. This research aims to provide actionable insights for policymakers to optimize tax strategies that balance revenue generation with environmental and social goals. The benefits of this study include offering a comprehensive framework for other urban areas facing similar challenges and contributing to the academic discourse on sustainable tax policies. Additionally, the findings can enhance public awareness and compliance, ultimately leading to improved infrastructure and environmental conditions.

METHOD

This study uses a literature study method. Zed (2008) states that the literature study method is a series of activities related to the method of collecting library data, reading and recording, and processing writing materials. In other words, literature review *focuses* on the results of writing related to the main problem in writing.

Literature study according to Cooper (2014) is said to be a form of research that critically examines or reviews knowledge, ideas, or findings contained in the body of academic - *oriented literature*, and formulates theoretical and methodological contributions to a particular topic being studied. The literature study approach is used by researchers to discuss the analysis of *the Pigouvian tax* and *earmarking* concepts. *tax* on the implementation of motor vehicle tax policy.

RESULTS AND DISCUSSION
Analysis of the *Pigouvian Tax Concept* in the Implementation of Motor Vehicle Tax Policy

Optimal taxation of the concept put forward by Pigou plays an important role in the study of transportation economics where transportation activities produce negative externality impacts, such as congestion, traffic accidents, air pollution, all of which cause social costs *that* tend to be greater in urban environments, where population density is denser, and more people are exposed to gas emissions released by motor vehicles. On the other hand, the heterogeneity of air pollution as an externality caused by private motor vehicles by imposing a uniform tax rate is a poor instrument to overcome these externalities (Tikoudis et al., 2015); (Knittel & Sandler, 2018).

Problems related to the increasing number of motor vehicle ownership with the level of congestion and air pollution are one of which is found in DKI Jakarta as the capital city and metropolitan city. The results of the TomTom Traffic survey in 2023 stated that Jakarta is one of the most congested cities in Asia with a congestion index in 9th position out of 387 cities in 55 countries and 6 continents. The congestion index in Jakarta, on average, takes 23 minutes 20 seconds to travel 10 km. From the results of the Jakarta Urban Transport Phase 2 study, it is known that in 2023 there were around 21 million people traveling and only 18.86 percent used public transportation because they predominantly used private motorized vehicles causing congestion which has an impact on losses of up to IDR 100 trillion each year from the accumulation of excessive fuel consumption, corrected travel time losses due to congestion, the impact of air pollution caused by burning fuel oil and others (Rizal, n.d.; Saepuloh & Kusumah, 2024)

Judging from the pollution that is potentially caused by motorized vehicle users, it can be seen as *a social cost* that needs to be borne by the polluter. This is the justification for the implementation of *the Pigouvian Tax,* where the increase in costs imposed on polluters reflects *the social cost* so that the implementation of the tax internalizes the externalities experienced by society. One form of *Pigouvian Tax* is a disincentive policy by implementing environmental taxes and levies. Several examples of the application of motor vehicle tax instruments used as environmental economic instruments, with the aim of encouraging consumers to choose vehicles that have a lower environmental impact. Determining the environmental weight coefficient requires an economic study to determine the optimal tax burden in order to encourage people to change their choice of vehicles by switching from using private motorized vehicles to public transportation (Lazuardi, 2021).

Earmarking Tax Concept in the Implementation of Motor Vehicle Tax Policy

Earmarking tax according to Michael (Michael, 2008) is said to be *the budgeting practice of dedicating tax or other revenues to a specific program or purpose.* This practice typically involves depositing tax or other revenues into a special account from which the legislature appropriates money for the designated purpose.

Earmarking or *earmarked* is one approach in the field of public financial management, especially in the field of budgeting or allocation of spending. The term *earmarking* in the context of public financial management is defined as a condition where a particular source of state revenue is allocated to a particular activity or public service. *Earmarking is often associated in the context of taxation, so that then the term earmarked* emerged and

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became popular. *taxes*. *Earmark tax* is a tax levied to finance certain specific expenses. (Agustianto et al., 2019; Rosdiana, 2018a)

In designing *earmarking tax* in regional taxes, especially in heterogeneous communities, the central government needs to clarify the types of spending and the percentage of spending allocation. This is first, more in line with the substance of regional autonomy that accommodates local wisdom, local choices, and local voices. *Earmarking policy design* Flexible *tax can accommodate the heterogeneity of community characteristics, both rural and urban communities, and allocate spending so that it is effective in meeting community needs. Second, this will avoid mismatch* between spending allocation and local community needs. Thus, it will support efficiency and effectiveness in the provision of public goods or services (Rosdiana, 2018b).

Earmarking is an obligation of the provincial government to allocate part of the regional tax revenue to fund the development of facilities and infrastructure that can be directly enjoyed by taxpayers and the entire community. *Earmarking* is intended to improve the quality of service gradually and continuously and at the same time create *good governance* and *clean government*. In practice, *earmarking* still contains errors in allocating and creating an inflexible budget. This can happen if the process of implementing tax earmarking is not carried out properly. The process of implementing *earmarking tax* in question starts from preparation, implementation, and evaluation. Allocation errors will be found in the preparation process, because in this process the determination of the allocation of Motor Vehicle Tax is carried out. At this stage of the evaluation, many allocation errors will be found, an example of an allocation error is in financing from tax earmarking results, the government tends to prioritize one program and pay less attention to other programs (Anggoro, 2017; Pattarani, 2018)

Earmarking tax emphasizes the relationship between taxes collected and benefits received by the public, especially from government spending, is a crucial issue. However, *earmarking tax* is also debatable. Proponents of *earmarking tax* suggest that this tax secures the availability of funds to provide certain public services or to increase accountability for the use of tax revenues. Politically, *earmarking tax* has several advantages in ensuring the availability of reliable and predictable funds to run government programs and increasing support for the government in fundraising. However, one criticism of *earmarking tax* is lower budget flexibility because part of the budget allocation is predetermined so that the government will find it difficult to reallocate spending derived from tax revenues. A flexible budget is needed for the government to anticipate environmental changes (Mendikbud, 2020)

The advantages of applying earmarking *tax allocation* are to provide a guaranteed and reliable revenue stream for a program to spend. Most of its advantages are the main elements of the core principles of *earmarking*, namely: (1) Funding guarantee. Allocation of funds is intended to protect or eliminate spending programs from competing with other budget priorities for revenue; (2) Budget predictability and planning. Allocation of funds implicitly promises funding at least at the level of allocation of funds that allows for long-term planning and budgeting and can facilitate the delivery of public services; (3) Depoliticization of funding decisions. Allocation of funds, especially those that have been determined by tax laws or regulations, can eliminate funding decisions from political turmoil. This can affect the overall funding level, the allocation of funds is considered to have determined the right level. Allocation of funds can provide political protection to make some unpopular funding decisions or prevent the diversion of funds to more politically popular alternatives (Michael, 2008).

The application of *earmarking tax* on motor vehicle tax is included in the classification of fixed taxes. Fixed taxes refer to a certain percentage that is specifically determined by law or regional regulations. Motor Vehicle Tax is one type of regional tax budgeted by the regional government with a minimum allocation of 10 percent of motor vehicle tax intended for improving road infrastructure and transportation modes. The existence of a budget allocation from the results of motor vehicle tax collection in accordance with the regulations is expected to be explained or informed to the public about the benefits or use of regional tax funds that have been paid (Rosdiana, 2018a)

Fixed taxes have advantages because they clearly determine the amount of their allocation. Therefore, there is no doubt in the application of earmarking taxes. However, fixed *earmarking taxes* also have disadvantages because they have the potential to reduce the flexibility of local governments to formulate policies based on priority scales or public needs. Moreover, in such cases, the amount of allocation is moderate or large (50% or more of tax revenue). This issue deserves attention because it is related to the concept and policy of decentralization in Indonesia. Strict *earmarking tax regulations* for fixed types with a relatively large percentage at the central government level have the potential to cause problems at the local government level in implementing policies due to the potential for mismatches between the allocation of specified spending and the real needs of the government. This will make it difficult to allocate through *earmarking taxes* (Rosdiana, 2018b).

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that the application of motor vehicle tax from the analysis of the *Pigouvian tax concept* is in the application of progressive tax rates as tax optimization intended to control the negative external impacts caused by motor vehicles such as congestion, traffic accidents, air pollution, all of which cause social costs that tend to be greater in urban environments, one of which is in DKI Jakarta, including cities with an average congestion level of 23 minutes 20 seconds to travel 10

km, resulting in losses of up to IDR 100 trillion each year from the accumulation of excessive fuel consumption, losses in corrected travel time due to congestion, the impact of air pollution caused by burning fuel oil and others. The application of motor vehicle tax from the analysis of the *earmarking tax concept*, motor vehicle tax is included in the classification of fixed taxes with reference to a certain percentage that is specifically determined by law or regional regulations with a minimum allocation of 10 percent intended for improving road infrastructure and transportation modes. The existence of a budget allocation from the results of motor vehicle tax collection in accordance with the regulations is expected to be explained or informed to the public about the benefits or use of regional tax funds that have been paid.

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