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# Free-Rider Problem Under Provision of Public Goods

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# Free-Rider Problem Under Provision of Public Goods

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## • Abstract:

Every government that provides public goods faces an inherent problem known as the free rider problem. Governments, whether federal, state, or local continuously confront the task of managing free riders and minimizing this issue. The free-rider problem arises when individuals or organizations benefit from a public good or service without contributing to its provision. This leads to fewer contributors, which can result in groups producing less of the good than is socially optimal. The free-rider problem is closely linked to the concept of public goods or services, which has been extensively studied in both theoretical and empirical research. This research explores the free-rider problem by examining its meaning and real-world examples, analyzing its causes and negative effects, and finally investigating potential solutions.

**Keywords:** Free-Rider, Public Goods, Government, Contribution, Negative impacts, Solutions, Tax Evasion, Digital Age.

## • Introduction:

The free rider is a very common problem in the field of public goods; the provision of public goods, which are characterized by their non-rivalry in consumption and non-excludability, presents a one-of-a-kind challenge known as the free-rider problem. This phenomenon occurs when individuals benefit from public good without contributing to its provision, undermining collective action and hindering the efficient allocation of resources.

An example of a market failure in economics is the free rider problem. It is an inefficient distribution of goods or services that stem from the nature of public goods, making it difficult to exclude non-contributors from enjoying their benefits. This situation encourages individuals to be free riders through the efforts of others, resulting in under-provision or even the complete absence of the public good. In other words, because it is impossible, or highly expensive, to exclude people from the benefits of a public good once it is produced, there is an incentive for consumers to free ride on the contributions of others.

The implications of the free-rider problem are far-reaching, impacting various aspects of society and the economy. Insufficient investment in public goods can lead to suboptimal outcomes in critical areas such as environmental protection, infrastructure development, and social welfare programs. For example, inadequate action on climate change or a lack of investment in public health initiatives can have severe negative consequences for society. Additionally, the free-rider problem can exacerbate inequality, disproportionately affecting the most vulnerable populations due to the under-provision of public goods.

To overcome the free-rider problem, a multifaceted approach is required, addressing both individual and collective incentives. This research paper explores various strategies and mechanisms aimed at

mitigating free-riding and promoting the effective provision of public goods. It examines the roles of government intervention, social norms, and private initiatives in incentivizing contributions and fostering cooperation. By understanding the underlying causes of free-riding and evaluating the effectiveness of different solutions, this paper aims to identify new opportunities for public good provision in an increasingly interconnected world.

## • Research Problem:

Given the challenges to the provision of public goods outlined in the introduction, it becomes crucial to find effective solutions to the free-rider problem. As a classic challenge in the provision of public goods, the free rider problem arises when individuals consume benefits without contributing, which leads to market failure and under provision. Therefore, this research aims to address the central question:

- What are the effective strategies to tackle the free-rider problem, considering its causes, impacts, and solutions, while comparing the Egyptian perspective with international practices?

## • Research Objectives:

This research aims to comprehensively investigate the free-rider problem through the following objectives:

1. To clarify and define the meaning of the free-rider problem.
2. To analyze and identify the underlying causes of the free-rider problem.
3. To evaluate and examine the negative impacts of free-riders on various sectors and systems.
4. To propose and explore potential solutions to mitigate the free-rider problem.

5. To evaluate and examine the effects of the digital age on the free-rider problem.
6. To highlight comparative data and trends by providing a statistical overview of the free-rider problem in Egypt and selected nations.
7. To arrive at significant findings and develop practical recommendations based on the research outcomes.

## • Research Methodology:

The following research methodologies will be employed to comprehensively analyze the free-rider problem:

1. Descriptive-Analytical Method: This method will be utilized in Sections I, II, III, and IV of the research. Section I: will involve describing and analyzing the concept of the free-rider problem, section II: its causes, section III: its negative impacts, and section IV: the proposed solutions.
2. Comparative Method: This method aims to identify similarities and differences in the problem's impact and scope. It will be applied in Section V of the research, where a comparison will be conducted between the free-rider problem in Egypt and selected nations.
3. Statistical Method: This method provides a statistical overview of the free-rider problem in Egypt and the selected nations, through the analysis of tables, data, and figures related to the problem's impact and scope. It will also be used in Section V.

## • Previous Research:

In the context of public goods, the "free-rider problem" has been a subject of extensive research across various disciplines, including political, sociology, economics, and law. Here's a breakdown of influential studies and key areas:

**1. Paul A. Samuelson (1954) [(1)]:** Paul Samuelson's foundational work in economics primarily focused on the theoretical modeling of public goods. Aiming to clarify the fundamental differences between public and private goods, He meticulously defined these goods as non-rivalrous and non-excludable. Samuelson demonstrated that market mechanisms inherently struggle to provide public goods efficiently. His key conclusion was that the characteristics of public goods require governmental or collective intervention to address the market failures.

**2. Beata Merickova and Nikoleta Jakuš Muthová (2019) [(2)]:** This paper aims to explore consumer behavior in relation to public goods by assessing their willingness to pay and testing the free rider theory. It provides a critical analysis of conventional economic theories on public goods as employs experimental economics and market failures to clollect relevant data. Through an economic experiment, the study examines the rate of voluntary contributions for public goods and identifies influencing factors such as education, utility, and gender. The findings reveal that over 60% of consumers are willing to voluntarily contribute.

**3. Alex Armand, Britta Augsburg and Antonella Bancalari (2022) [(3)]:** This study explores the link between public service provision and free-riding in low- and middle-income countries. An experiment was conducted in poor neighborhoods of two Indian cities, where residents face sanitation shortages, leading them to free ride either by disposing of waste in shared areas or using paid community toilets. The

(1) Paul A. Samuelson: The Pure Theory of Public Expenditure. In The Review of Economics and Statistics, 1954, 36(4). ISSN 0034-6535. P. 387–389.

(2) Beata Merickova and Nikoleta Jakuš Muthová: The Value of Public Good. Free Rider Problem, Conference: Current trends in public sector research : proceedings of the 21st international confe enceAt: Šlapanice, July 2019, P.2.

(3) Armand, Alex; Augsburg, Britta; Bancalari, Antonella (2022): Public service delivery and free riding: Experimental evidence from India, IFS Working Paper, No. W22/16, Institute for Fiscal Studies (IFS), London, https://doi.org/10.1920/wp.ifs.2022.1622.

findings indicate that enhancing service quality reduces free-riding but may exclude some residents. While their willingness to pay fees remained unchanged, there was an increased demand for improved public services. An awareness campaign about the consequences of free-riding raised awareness but did not lead to behavioral change. The study suggests that addressing free-riding requires support for using services after providing basic free services.

**4. Rapheal Andrew Luccasen (2012)[(1)]:** This research study builds on existing literature about public goods crowding-out by examining how participant heterogeneity affects contributions. It focuses on factors like personality traits, demographic characteristics, and other-regarding preferences. While previous studies mainly looked at altruism and gender differences, often with conflicting results, this study highlights the varying conclusions regarding contributions to public goods from men and women. What sets this research apart is that it is the first experiment to analyze public goods crowding-out by investigating both individual contributions and crowding-out at the same time. Additionally, it does not provide feedback to participants about others' contributions. The study underscores the need for further research on how feedback affects public goods crowding-out among diverse participants. Overall, it adds new insights into how various factors influence contributions to public goods and the responsiveness to tax-financed contributions, along with the importance of considering participant heterogeneity.

- **The Distinction of this Study from previous Studies:**

The current study differs from the previous one in its objectives and methodology, even though all explore behaviors linked to

(1) Rapheal Andrew Luccasen; Individual Differences in Contributions And Crowding-Out Of A Public Good, Scottish Journal of Political Economy, Vol. 59, No. 4, September 2012, file:///C:/Dr.Ahmed/English%20research/1-%20FreeRider%20Problem%20Under%20provision%20of%20Public%20Goods/References/47-47-47-47-47.pdf.

public services and collective responsibility. While previous studies focused on the effects of incentives, specific field experiments, and participant characteristics on behaviors like 'free-riding' or 'public goods crowding-out,' this study aims for a deeper understanding of the 'free-rider' concept itself, particularly its effects and causes in the context of digital transformation. Additionally, it heavily relies on statistical analysis to provide quantitative data that enhances its theoretical insights, enabling comparisons of trends at both national and international levels and assessing the effectiveness of proposed solutions. Thus, this study presents a more comprehensive view of the 'free-rider' phenomenon, supported by statistical evidence, compared to previous research focused on specific experiments and factors.

- **Research Plan:**

This paper is structured into four sections as follows:

Section I : Meaning of Free-Rider Problem.

Section II : Causes of Free-Rider Problem.

Section III: The Negative Impact of Free-Riders.

Section IV : Solutions to the free-rider problem.

Section V : A Statistical Overview of the Free Riding Problem in Egypt and Selected Nations.

## Section I

## Meaning of Free rider problem

The free rider problem is an economic concept relating to market failure. It occurs when individuals benefit from resources, goods, or services without contributing to their cost. To understand the concept and implication of free riders, we start with the differentiation of public goods versus private goods:

### 1.The differentiation of public versus private goods:

### 1.1. Public Goods:

The term public good was first defined by Paul Samuelson [(1)]. The public good is defined as a good that brings the indivisible benefit and spread it across the whole company regardless of whether individuals want or don't want the goods to expend [(2)].

In other words, the term "public goods and services" refers to the various offerings provided by governments, ranging from streetlights to national defense and judicial systems.

Economists use the term "public good" in a more specific way to define goods (or more often, services) that possess two key characteristics: non-rivalry in consumption and non-excludability. For a good or service to be classified as a public good both characteristics must be present to a significant degree [(3)], and so public goods that are completely non-rival in consumption and are non-excludable.

### 1.2.Private Goods:

Private goods are those goods and services consumed by individuals to satisfy their personal wants, such as food, clothing, cars, etc.

(1) Paul A. Samuelson: The Pure Theory of Public Expenditure. In The Review of Economics and Statistics, 1954, 36(4). ISSN 0034-6535. P. 387–389.

(2)Beata Merickova and Nikoleta Jakuš Muthová: The Value of Public Good. Free Rider Problem, Co ference: Current trends in public sector research: proceedings of the 21st international conferenceAt: Šlapanice, July 2019, P.2.

(3)Holley H. Ulbrich, "Public Finance in Theory and Practice" Routledge – Taylor & Francis e-Library, 2nd Edition, 2011, P.93.

A private good is characterized by being rival in consumption, meaning that when one person consumes it, others are prevented from consuming the same good. For instance, if you buy and eat an apple, no one else can eat that same apple. Similarly, when you purchase twenty liters of gasoline for your car, you acquire a private good, as no one else can use that gasoline once you have obtained it. Consequently, private goods grant ownership exclusively to the purchaser. This implies that the total quantity of private goods available for consumption must be shared among all consumers. For example, if 100 cars are produced in an economy with 101 individuals, at least one person will not be able to own a car. On the other hand, public goods are available to all consumers equally [(1)].

Additionally, suppliers of private goods have the ability to exclude individuals who are unwilling to pay for them, and Consumers express their preferences through effective demand and market prices. These revealed preferences serve as important signals for producers, guiding them to produce the goods that individuals desire [(2)].

## 2.Funding for Public Goods:

Public goods are funded through fees, taxes, licenses, and fines. The characteristics of public goods often determine the type of funding public goods receive. For example, taxes are the revenue choice in national defense where it is clearly shared consumption, and excluding someone would be virtually impossible. Another example of funding through taxes where consumption is shared, and one cannot be excluded from benefiting from education. Fees and licenses are used to participate in and fund the activity because the public good is an activity for which the nonrival principal does not hold and someone can be excluded. State

(1) Michael L. Marlow, "Public Finance Theory and Practice", Harcourt Brace & Company, USA, 1995, P.118.

(2) A. Senthilkumar, "Public Finance and IT Law", P.12.

often requires fishing and hunting licenses for people to participate in those activities. To enter national and state parks, users are often charged a fee, without a driver's license and a license plate an individual cannot drive [1].

## 3. Public Goods and the Free Rider Problem:

One issue that arises with providing public goods is the "free rider" problem. Public goods are accessible to everyone if they are available to anyone, which creates a strong incentive for individuals to avoid contributing to their costs. As a result, some people take advantage of this situation and become "free riders," benefiting from the goods without paying for them. If free riding becomes too common, it can become difficult to finance the goods or services [2].

When there are many users or residents, free riders understand that their small contributions to the cost of a public good do not significantly affect its availability. One adopting this mindset can enjoy the benefits of the public good without bearing any costs. However, if many people think this way, it becomes impossible to fund the public good, and it may never be created. This is why goods and services that have both a very low rivalry and a very low excludability are typically provided by the public sector and financed through taxes [3].

### 3.1. Definition of the Free Rider Problem:

"Free rider" is defined as: "activity is broadly defined in advanced economic theory as consumption of public goods without bearing the costs of its production in a share proportional to propensity to consume" [4].

(1) David Anthony Dieterle, "Economics: The Definitive Encyclopedia from Theory to Practice", Volume 1: Foundations of Economics", ABC-CLIO, LLC, 2017, P.340. Retrieved at: Economics_ The Definitive Encyclopedia from Theory to -- Dieterle, David Anthony -- 4 Volumes, 2017 -- Greenwood _ ABC-CLIO -- 9780313397073 -- dda2113f2b1c651f6fc0c99b06bc668a -- Anna's Archive.pdf

(2) Joshua E. Greene, "Public Finance an International Perspective", World Scientific Publishing Co. Pte. Ltd., 2021, P.33.

(3) Holley H. Ulbrich, op. cit, P.95.

(4) Olga Pyrkina and Andrey Yudanov, "Free-Rider Problem: Simulating of System Convergence to Stable Equilibrium State by Means of Finite Markov Chain Models", Second International Conference, MSBC 2022 Vilnius, Lithuania, September 21–23, 2022 Proceeding, P.78. Retrieved at http://www.file:///C:/Users AHMED%20PC/Downloads/978-3-031-33728-4.pdf

Additionally, "Free riders" are those who enjoy the benefits of public goods without contributing to the costs of provision" [(1)].

Likewise, "free riders" are those who consume more than their fair share of a public resource, or shoulder less than a fair share of the costs of its production [(2)].

According to Scott Rockart, the free rider problem occurs when individuals do not contribute to a good from which they derive benefits, or understate their expected benefits from that good, leading to the under-provision of that good [(3)].

We can also define free riders as individuals who benefit from a good or service provided by the government without contributing to its provision or paying for it.

### 3.2. Examples of Free-Rider Problem [(4)]:

**3.2.1.Public Schools:** Whether parents are contributing to the funding through property taxes or not, public school is an institution that welcomes all students. It is sustained by the financial support of property taxpayers. Therefore, people can still give their children an education even if they don't pay taxes by free-riding

**3.2.2. Herd Immunity:** Herd immunity is achieved when a sufficient number of people get vaccinated against a disease, protecting everyone, including those who haven't been vaccinated. Some people

(1) Manoj K, "Free Rider Problem", Retrieved at https://www.scribd.com/document/26760502/Free-Rider-Problem

(2) Jane H. Leuthold, "A Free Rider Experiment for the Large Class", College of Commerce and Business Administration, University of Illinois at Urbana-Champaign, Faculty working Paper No. 92-0157 August 1992, P.1. Retrieved at http://www.file:///C:/Users/AHMED%20PC/Downloads/978-3-031-33728-4.pdf

(3) Scott Rockart, "Free-Rider Problem", The Palgrave Encyclopedia of Strategic Management", DOI 10.1057/978-1-349-94848-2_736-1 Retrieved at 978-1-349-94848-2_736-1 (1).pdf

(4) Retrieved at 10 Free Rider Problem Examples (2025) and https://www.masterclass.com/articles/free rider-problem

benefit from the protection provided by others even if they choose not to get vaccinated.

**3.2.3. National Defense:** The military provides general safety and security from foreign adversaries. Therefore, some of us are considered to be free riders, as not all people step up to be soldiers. In other words, the military will protect the beneficiaries of national defense whether they paid their taxes to support it or not.

**3.2.4. Public Parks:** Recreation facilities like public parks are open to everyone, even though only locals pay city council taxes that ensure their upkeep.

**3.2.5. Streetlighting:** Everyone will enjoy the benefits of streetlights, and you can't stop it, regardless of whether or not they pay the taxes.

## Section Ⅱ

## Causes of free-rider problem

The causes of the free-rider problem branch into:

### 1. Non-Excludability Characteristic in Public Goods Provision:

An important characteristic of public goods is that they are non-excludable. For example, when the government provides public goods like national defense, it ensures the safety of all residents. This means that once safety is provided, it cannot be withheld from anyone; everyone benefits equally. In contrast, private goods can be provided exclusively to those who are willing to pay for them [(1)], from the previous non excludability ensuring to free-riders that they are not going to be excluded from benefiting from a public good, and that is what encourages them to free ride.

### 2. Non-rivalry in Consumption:

More reasons for free riding are that public goods are nonrival in consumption. This implies that you and I can both consume the good simultaneously without affecting each other's ability to enjoy it. One person's consumption does not reduce the amount available for others. The private market typically does not provide such goods because private entrepreneurs cannot profit from their production. Consequently, there is a role for government to supply public goods that offer benefits valued by citizens, which the private market fails to deliver [(2)], so that the absence of the free-riders contribution in the finance of provision in public good won't substantially impact obtainability. This creates an incentive to exploit the system, leading to under-provision of public goods as people avoid contributing while still enjoying the benefits.

(1)Holley H. Ulbrich, "Public Finance in Theory and Practice" Routledge – Taylor & Francis e-Library, 2nd Edition, 2011, P.93.

(2) Holley H. Ulbrich, Op. Cit, P.93.

### 3 . Difficulty in Measuring Individual Contribution:

At the heart of the problem of the free-rider lies the difficulty in measuring individual contributions of public goods, which are provided via voluntary contributions, this element significantly weakens the relationship between individual effort and the benefits received.

### 4. Large Group Sizes:

The individual effort decreases when a group grows larger, as the individual contribution of each member becomes less noticeable. Reaching a sense of anonymity and a decreased sense of responsibility is because the relative impact of one person's work diminishes as the number of participants increases. Social loafing explains the group size paradox, where working in a group, individuals exert less effort to achieve a goal than when they work alone. This is often due to the diffusion of responsibility, where people feel less accountable for the outcome because they believe others will or should take on the burden of work [(1)].

On the other hand, smaller groups often have stronger social bonds, which may exert a form of peer pressure that encourages contribution. For instance, high levels of participation will be seen by a close-knit community working on a neighborhood project due to the personal connections between members [(2)].

### 5. Lack of Awareness:

People might not be aware of the costs associated with providing a service or maintaining a resource. For instance, they may not realize the financial burden involved in keeping a public road clean and safe.

(1) Retrieved at Group Size: "The Group Size Paradox: How Numbers Influence Free Rider Dynamics" - FasterCapital

(2) Retrieved at Group Size: The Group Size Paradox: How Numbers Influence Free Rider Dynamics - FasterCapital

## Section III

## The Negative Impact of Free-Riders

Though free riding attracted the attention of economists and lawyers for the most part, the significance of the phenomenon suggested notable ramifications for society [(1)], so we need to explore the issue from different points of view to understand the negative impact of free riders. Here are some insights that shed light on the problem:

### 1. Under-provision of public goods [(2)]:

The free-rider problem can lead to under-provision or no provision at all, as there may not be enough people willing to pay for it and the costs of providing the goods are not being shared fairly. This results in a tragedy of the commons, where the depletion or degradation of public good is because of their overuse. If people can benefit from a public good without paying for it, they have an incentive to free ride.

### 2. The Tragedy of the Commons:

This term describes a situation where a shared resource is overused and depleted due to a lack of regulation or control. Free ridership is a significant reason for this phenomenon. When people use a resource without contributing to its upkeep, it becomes overused, leading to depletion. Overfishing in the oceans is a classic example, where unregulated fishing has led to a depletion of fish stocks.

### 3. The Economic Perspective:

From an economic perspective, market failure can be a cause of free ridership. When individuals benefit from a resource without paying

(1) Philippe Fontaine: Free Riding, Journal of the History of Economic Thought / Volume 36 / Issue 03 / September 2014, P. 367.

(2) Retrieved at: https://www.coursesidekick.com/economics/77191 and Common good: Preserving the Common Good: Tackling the Free Rider Issue - FasterCapital

for it, there is no incentive for anyone to contribute. This can lead to underinvestment in the resource, ultimately resulting in its collapse.

### 4. The Social Perspective:

Free ridership can negatively impact social cohesion. Resentment and a breakdown of trust happen when individuals feel that others are taking advantage of a shared resource. This can ultimately result in a breakdown of the community itself, as people withdraw and stop contributing to the common good.

## Section Ⅳ

## Solutions to the free-rider problem

The free-rider problem can be addressed broadly through motivational solutions or structural solutions. Motivational solutions, such as forming group identity, appeal to an individual's concern for other outcomes in the provision of public goods, while structural solutions, like punishment, involve changing the rules and outcomes in the provision of public goods [(1)], here are some solutions to the free-rider problem in the provision of public goods:

### 1. Tax:

There would be no free riders when all consumers are required to pay taxes. The cost of national defense can be sustained when everyone pays taxes. There would be no free riders when taxes are paid by everyone. Also, everyone will enjoy the benefit [(2)]. Even though taxation policies vary across geographies, the general idea is that tax revenue will be rearranged to pay for the use of public goods [(3)]. There would be no free riders if everyone paid taxes.

### 2. Market Interventions:

To discourage free riding, certain market interventions might help. For example, requiring consumers of a non-excludable good or service to sign a contract enforceable by law that obligates them to pay for what they consume [(4)].

(1) M. Anandarajan and A. Anandarajan, "E-Research Collaboration- Theory, Techniques and Cha lenges) E-Research Collaboration and the Free-Rider Problem: Communication Solutions. Springer Heidelberg Dordrecht London New York, 2010, P.279.

(2) Retrieved at: https://corporatefinanceinstitute.com/resources/economics/free-rider/#:~:text=By%2requiring%20everyone%20to%20pay,would%20be%20no%20free%20riders.

(3) Retrieved at: https://www.economicsonline.co.uk/managing_the_economy/the-free-rider problem-2.html/

(4) Retrieved at: What Is the Free Rider Problem? [With 5 Solutions] | Outlier

### 3. Bundling public goods with private goods:

Public goods can be bundled with private goods. For example, movie theaters and parks, a movie theater could sell tickets that include access to a public park.

### 4. Make a public good private:

There would be no free riders if public goods could be limited by requiring consumers to pay for the public good. For example, a picnic area, a community park with walking trails, and a playground. Anyone can use the park without limitations, including people who don't contribute to its upkeep. It happens when some benefit without paying their share, leading to the "free-rider" problem. Implementing a membership system with a small annual fee is a solution.

### 5. Mutual monitoring:

To ensure everyone is contributing to the cost of public goods and to point out any free-riding behaviors, there should be mutual monitoring between society members. If the shirkers are punished the mutual-monitoring systems will work. Requiring trust and loyalty between group members so that when they mutually monitor each other there will be a sense of peer pressure and wanting to be the best for everyone. This can translate into intrinsic motivation [(1)].

### 6. Social pressures and personal appeals:

In some cases, to reduce the number of free riders and to collect resources for the public good, social pressures and personal appeals can be used instead of the force of law. For example, neighbors sometimes form an association to carry out beautification projects or to patrol their area after dark to discourage crime, this happens in low-income countries,

(1) Overcoming the 'free-rider problem' in a group project in the organisation, Reg. No: 2004956, EC262 Term Paper.

where social pressure strongly encourages all farmers to participate. An attempt to use social pressure to discourage free riding and to generate an outcome that will produce a public benefit can be viewed in many fundraising efforts, Including raising money for the endowments of colleges and universities and for local charities [1].

### 7. Advertising:

Advertising can be used to raise awareness of the importance of public goods and to encourage people to contribute.

### 8. Raising awareness:

Educating individuals about the costs associated with public goods and the significance of contributing can help reduce unintentional free riding.

### 9. Highlighting the impact:

Emphasizing how personal actions contribute to the problem can encourage people to take responsibility.

### 10. Increase social consciousness and promote a sense of community:

Increasing social consciousness with respect to a reference group is a way to enhance other-regardingness and thus avoid the free-rider problem. Self-abnegation, empathy, and feelings of oneness and intimacy with a group lead to collective action. These feelings among members of a group with a common culture and historical background are often more intense [2]. Also, fostering a feeling of shared ownership and responsibility can motivate individuals to contribute.

(1) Retrieved at: What is a free rider? (article) | Khan Academy

(2) Anthony N. Rezitis: Research topics in Agriculture and Applied Economics 77_94, Chapter 5: The Evolution of Solutions to the Free Rider Problem in US Agricultural Bargaining Cooperatives, Consta tine Iliopoulos, National Agricultural Research Foundation & Agricultural University of Athens, Bentham Science Publishers Ltd, 2009, P. 86-87.

### 8. Incentivizing contributions:

Providing rewards or recognition for contributions can encourage participation.

- **The Effects of the Digital Age on the Free-Rider Problem.**

Digital transformation helps minimize free-riding by facilitating revenue collection, improving monitoring, using data analysis to optimize public goods distribution, enabling community funding, and enhancing transparency. On the other hand, it may lead to technical loopholes for evasion, privacy risks, high costs, a growing digital divide, and potential inequalities in accessing public services. Below we will mention the positive and negative effects of digital transformation on the free-rider problem in the provision of public goods.

### 1. The positive and negative effects of digital transformation on the free-rider problem in the provision of public goods:

- Exacerbation of the Free-Rider Problem in the Digital Age.
- Improving monitoring mechanisms and transparency.
- Enhancing efficiency in revenue collection.
- Increasing the possibility of allocating public services.
- Stimulating community participation.
- Improving data management and decision-making.

### 2. The positive and negative effects of digital transformation on the free-rider problem in the provision of public goods:

- High costs of implementation and operation.
- Possibility of evasion by electronic means.
- Lack of comprehensiveness of digital transformation
- Privacy and security issues.
- Potential to create new forms of injustice.

## Section V

## A Statistical Overview of the Free-Riding Problem in Egypt and Selected Nations

In this section, we will explore the issue of free riding in the field of public goods in several countries, including Egypt. Obtaining accurate statistics on free riding can be challenging, as it often involves unreported behavior. One of the most significant forms of free riding is tax evasion, where companies and individuals take advantage of public services without fulfilling their tax obligations. By examining the tax evasion phenomenon, we can gain important insights. Tax evasion exemplifies free-riding.

### 1. Egypt:

The Egyptian Tax Authority estimates that the extent of tax evasion constitutes a substantial portion of potential tax revenues, reflecting the widespread occurrence of "free-riding" behavior in this area. Consequently, the extent of tax evasion can be viewed as a measure of the "free-riding" challenge in Egypt, which calls for applying the principle of tax justice and taking effective measures to combat this phenomenon.

The Egyptian Tax Experts Association confirmed that tax evasion, despite its decline, is still a major problem that deprives the state treasury of up to EGP 800 billion annually, which requires urgent solutions, especially for the most tax-evading categories [(1)].

According to the founder of the Egyptian Tax Experts Association, the tax evasion rate has decreased from 55 to 40% over the past three years thanks to electronic systems and the application of the electronic

(1) Retrieved at: https://www.almasryalyoum.com/news/details/3239073 , Published on Friday, 16/08/2024.

invoice and receipt, and that the rate is expected to decrease to 25% by 2030 with the completion of the automated tax system [1].

Data shows that tax evasion in Egypt is a significant issue, resulting in substantial losses of money to the public treasury. This situation highlights the prevalence of the "free-riding" phenomenon, where certain individuals benefit from public services without making fair contributions. The reduction in the tax evasion rate from 55% to 40% due to the implementation of electronic systems indicates progress in combating this phenomenon.

However, challenges remain, requiring the application of tax justice and effective measures to minimize "free-riding" and ensure a fair distribution of financial responsibilities. Efforts aimed to achieve a tax evasion rate of 25% by 2030, which would greatly reduce the "free-riding" problem.

## 1. Bulgaria:

Table 1 shows tax evasion rates in Bulgaria for the period 2000-2020:**Table 1. Tax Evasion Rates in Bulgaria (2000-2020)**

| Year | Tax Evasion Rate (%) |
|---|---|
| 2000 | 25.4 |
| 2005 | 27.1 |
| 2010 | 24.9 |
| 2015 | 22.5 |
| 2020 | 23.5 |

Source: Ahmet Niyazi Özker et al.: tax evasion in europe: causes and consequences, Innovative and Economics Research Journal, Volume 13, No. 1, 2025.

(1) Retrieved at: https://www.almasryalyoum.com/news/details/3239073 , Published on Friday, 16/08/2024.

Table 1 indicates that tax evasion in Bulgaria has been a persistent issue since 2000, with rates remaining high. Despite minor fluctuations, there has been no significant decrease over the past 20 years, suggesting that efforts to combat evasion have been ineffective. Stronger measures, such as simplified laws and improved oversight, are needed. This ongoing evasion creates a 'free-riding' environment, where some benefit from tax-funded public services without contributing, undermining the state's ability to deliver these services efficiently and increasing inequality.

### 3. Romania:

**Table 2 shows tax evasion rates in Romania for the period 2000-2020:Table 2. Tax Evasion Rates in Romania (2000-2020)**

| Year | Tax Evasion Rate (%) |
|---|---|
| 2000 | 28.0 |
| 2005 | 29.5 |
| 2010 | 26.8 |
| 2015 | 25.1 |
| 2020 | 27.1 |

Source: Ahmet Niyazi Özker et al.: tax evasion in europe: causes and consequences, Innovative and Economics Research Journal, Volume 13, No. 1, 2025.

Table 2 shows a general trend in tax evasion rates in Romania, with a slight decrease between 2005 and 2015, followed by an increase by 2020. This indicates that efforts to enhance compliance and simplify tax laws have not been very successful, as the tax structure remains complex, hindering efficient collection. Persistent tax evasion and ineffective simplification of laws worsen the problem of "free riding" in the area of public goods. This reduces public revenues, weakening the state's ability to provide high-quality services. It also encourages unfair profiteering, as evaders benefit from services without paying their fair share, and increases inequality, placing a heavier burden on committed taxpayers.

## 4. Hungary

Table 3 shows tax evasion rates in Hungary for the period 2000-2020:

**Table 3. Tax Evasion Rates in Hungary for the Period 2000-2020**

| Year | Tax Evasion Rate (%) |
|---|---|
| 2000 | 22.0 |
| 2005 | 23.7 |
| 2010 | 21.5 |
| 2015 | 20.1 |
| 2020 | 25.9 |

Source: Ahmet Niyazi Özker et al.: tax evasion in europe: causes and consequences, Innovative and Economics Research Journal, Volume 13, No. 1, 2025.

Table 3 shows that tax evasion rates in Hungary declined until 2015, then rose slightly. This trend suggests that Hungarian tax reforms initially had some success, but later issues led to an increase in evasion. This indicates that ongoing problems in the tax system and effects from past issues continue to negatively impact tax compliance. Such volatility in tax compliance encourages "free riding," where some individuals benefit from public services without contributing fairly, thereby reducing the resources available to finance these services. As these problems persist, the state's ability to provide public goods and services efficiently and fairly is weakened.

## Conclusion

The free rider problem is a significant issue in public goods, as they are non-excludable and non-rivalry, making them accessible to everyone regardless of their contribution. This creates an incentive for individuals to use these goods without paying, leading to insufficient provision or even a lack of essential services. Public goods funded through fees, licenses, and taxes are vulnerable to this issue, with examples like national defense, public schools, public parks, street lighting, and herd immunity showing how people can gain benefits without contributing.

The free-rider problem represents a market failure where individual rational behavior clashes with collective well-being, emphasizing the importance of public sector intervention and funding strategies to address the problem and maintain the availability of public goods. The temptation to gain without giving leads to negative outcomes, primarily resulting in under-provision of essential services and creating a "tragedy of the commons." Economically, this results in market failure, discouraging investment, leading to resource collapse, while socially, it fosters resentment, erodes trust, and can fracture community cohesion.

Addressing the free-rider problem requires a multifaceted approach, including traditional methods like taxation and market interventions, strategies such as promoting community awareness, leveraging mutual monitoring, and fostering social pressure. The digital age adds complexity but also presents opportunities to address this issue, presenting both challenges and solutions. A successful approach requires a blend of motivational strategies and structural mechanisms, tailored to the specific context and leveraging both traditional and digital tools.

Obtaining accurate statistics on free riding can be challenging, as it often involves unreported behavior. One of the most significant forms

of free riding is tax evasion, where companies and individuals take advantage of public services without fulfilling their tax obligations.

The statistical overview in this paper shows that tax evasion, a significant and persistent challenge, undermines public revenue and exacerbates inequality in Egypt, Bulgaria, Romania, and Hungary. Despite progress in Egypt through electronic systems, substantial losses persist, highlighting the need for strengthened enforcement. Bulgaria, Romania, and Hungary show fluctuating but high evasion rates, indicating insufficient efforts to combat the issue. Simplified tax laws, consistent enforcement, and improved oversight are necessary.

Combating free riding is essential for sustainable public goods provision, promoting social equity, and fostering a fair economic system.

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# مشكلة الراكب المجانى فى توفير السلع العامة

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● الملخص:

تواجه كل حكومة تقدم السلع العامة مشكلة أساسية تُعرف بمشكلة الراكب المجاني. تواجه الحكومات، سواء كانت فيدرالية أو ولائية أو محلية، باستمرار مهمة إدارة الراكبين المجانيين وتقليل هذه المشكلة. تنشأ مشكلة الراكب المجاني عندما يستفيد الأفراد أو المؤسسات من سلعة أو خدمة عامة دون المساهمة فى توفيرها. يودي ذلك إلى تقليل عدد المساهمين، مما قد ينتج عنه إنتاج مجموعات أقل من السلعة مما هو مثالي اجتماعيًا. ترتبط مشكلة الراكب المجاني ارتباطًا وثيقًا بمفهوم السلع أو الخدمات العامة، والتي تم دراستها بشكل موسع فى كل من الأبحاث النظرية والتجريبية. تستكشف هذه الدراسة مشكلة الراكب المجاني من خلال فحص معناها وأمثلة من العالم الحقيقي، وتحليل أسبابها وأثارها السلبية، وأخيرا التحقيق فى الحلول المحتملة.

الكلمات المفتاحية: الراكب المجاني، السلع العامة، الحكومة، المساهمة، الاثار السلبية، الحلول، التهرب الضريبي، العصر الرقمي.