

## A Literature Review on Whether the Assertion that a Reasonable Public Goods Decision Can Only Come from a Competent Public Authority is a Corollary of Arrow's Impossibility Theorem

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### Abstract

**Purpose/Significance** Arrow's Impossibility Theorem was stated and proven by Kenneth Joseph Arrow, one of the recipients of the 1972 Nobel Prize in Economics. When defining Arrow's Impossibility Theorem, the New Economic and Financial Dictionary includes as a corollary that "a reasonable public goods decision can only come from a competent public authority." This corollary relationship has been widely disseminated online and taught in classrooms, becoming established as a correct assertion along with Arrow's Impossibility Theorem. However, this inferential relationship is not rigorous and is even erroneous, which could mislead research in multiple disciplines in China, including public choice theory, public economics, welfare economics, and administrative law, onto the wrong path. Therefore, it is necessary to clarify the source and correct it theoretically, thereby promoting the healthy development of related disciplines.

**Method/Process** Using the literature research method, this paper traces the origin and development of this corollary relationship, clarifies the connotation and extension of related concepts in different disciplines, as well as the evolution logic of relationships among these concepts, and investigates the relationship between Arrow's Impossibility Theorem and public goods decision-making.

**Results/Conclusion** Relevant literature indicates that the assertion that "a reasonable public goods decision can only come from a competent public authority" was first associated with Arrow's Impossibility Theorem in the article "Administrative Coercion and the Realization of Public Interest." Later, it was excerpted when compiling the entry for Arrow's Impossibility Theorem in the New Economic and Financial Dictionary, becoming a corollary of the theorem and acquiring the implication that as long as Arrow's Impossibility Theorem holds, public goods can only be imposed by public authority or dictatorship. During

this process, the conceptual connotations of public goods and public authority shifted in different disciplinary contexts, and the logical foundation of their relationship also evolved. Therefore, treating the assertion that a reasonable public goods decision can only come from a competent public authority as a corollary of Arrow's Impossibility Theorem is not very rigorous. Arrow's Impossibility Theorem does indeed pose a decision-making dilemma for public goods, but research in the field of public choice does not believe that this dilemma should be resolved through imposition or dictatorship by public authority. On the contrary, they are committed to the institutional design of voting mechanisms to ensure that the provision of public goods is determined by the public.

## Full Text

### Preamble

A Literature Examination of Whether the Statement that a Reasonable Decision on Public Goods Can Only Come from a Competent Public Authority Is a Corollary of Arrow's Impossibility Theorem

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### Abstract

**[Purpose/Significance]** Arrow's Impossibility Theorem (AIT), formulated and proved by Kenneth Joseph Arrow—a 1972 Nobel laureate in Economics—is defined in the *New Economic and Financial Dictionary* as implying that “a reasonable decision on public goods can only come from a competent public authority.” This corollary relationship has been widely disseminated online and taught in classrooms, becoming established as a correct conclusion derived from AIT. However, this purported corollary is neither rigorous nor valid and risks misleading research in public choice, public economics, welfare economics, administrative law, and related disciplines in China. It is therefore necessary to clarify this theoretical misdirection and steer these fields toward proper development.

**[Method/Process]** This study employs literature examination to trace the origin and evolution of this corollary relationship, clarifying the connotations and extensions of relevant concepts across different disciplines and analyzing the logical evolution of relationships among these concepts to investigate the connection between AIT and public goods decision-making.

**[Result/Conclusion]** Relevant literature reveals that the statement was first linked to AIT in the article “Administrative Compulsion and the Realization of the Public Interest” published in *Legal Studies* (Volume 2). It was later excerpted by the *New Economic and Financial Dictionary* in its entry on AIT,

becoming established as the dictionary definition and a corollary of the theorem. This interpretation suggests that as long as AIT holds, public goods can only be imposed or dictated by a public authority. However, during this process, the conceptual meanings of “public goods” and “public authority” have shifted across disciplinary contexts, and the logical foundation of their relationship has evolved, rendering the corollary relationship untenable. While AIT does indeed pose challenges for public goods decision-making, research in public choice does not conclude that such dilemmas should be resolved through authoritarian imposition. Instead, scholars are committed to designing voting mechanisms that ensure public goods provision is determined by the citizenry.

**Keywords:** public goods decision-making; public authority; Arrow’ s Impossibility Theorem; literature examination

**Classification Numbers:** F061.4 (Welfare Economics); F091.3 (Modern Economic Thought since 1640); C34 (Analysis, Research, and Appraisal); D902 (Legal System and Democracy); D630.1 (State Organs Work); G353.1 (Information Analysis and Research)

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The statement that “a reasonable decision on public goods can only come from a competent public authority” has circulated widely online as a corollary of Arrow’ s Impossibility Theorem. Where does this corollary relationship originate? This paper conducts a literature examination of this claim and finds that the relationship is neither rigorous nor reliable.

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The Baidu Baike entry for Arrow’ s Impossibility Theorem states in its “Proof” section: “Arrow’ s Impossibility Theorem reveals that if numerous members of society have different preferences and there are multiple alternative options, it is impossible to achieve a result that satisfies everyone under a democratic system. The theorem demonstrates that relying on simple majority voting principles, it is impossible to select a common order from various individual preferences. Consequently, a reasonable decision on public goods can only come from a competent public authority, and it is generally impossible to achieve coordinated collective choice results through voting processes.” In this passage, the statement about public authority is presented as a corollary of AIT.

Online lecture notes on political science and microeconomics, as well as review answers for “Western Economics,” similarly present this statement as a corollary

of AIT, demonstrating its widespread dissemination in teaching and examinations.

Arrow's Impossibility Theorem states that "if individuals can freely rank at least three alternatives, and if the social ranking must satisfy positive association with individual rankings and independence of irrelevant alternatives, and if the social ranking is complete and transitive, then the social preference ordering based on individual preference orderings must be either imposed or dictatorial" [1]. Thus, AIT itself only demonstrates that rational social preference orderings cannot be formed from individual preference rankings across at least three alternatives. From this, one might infer that if choosing among at least three public goods based on voting-derived preference orderings, no rational social preference ordering can emerge. Therefore, public voting cannot directly determine outcomes when selecting among three or more public goods.

However, there remains a logical gap between "public goods cannot be directly decided by public voting" and "can only be decided by a competent public authority." This leap requires demonstrating that no other institution can determine public goods' reasonableness or provision through alternative means. Even after such demonstration, one must still define what constitutes a reasonable public good, how public authorities should decide on provision, what decision-making methods are competent, and which are not. Only by addressing these questions can the statement be considered complete.

If a theorem implies a corollary, the corollary necessarily holds when the theorem holds. If "a reasonable decision on public goods can only come from a competent public authority" were indeed a corollary of AIT, then AIT's validity would mean public goods decisions could only be dictated or imposed by a public authority. Is this statement truly a corollary of AIT? How did it become one? And is the statement itself valid? This paper examines these questions.

## 1. The Documentary Origin of the Corollary Relationship

Based on our research, the statement was first associated with AIT in the article "Administrative Compulsion and the Realization of the Public Interest" in *Legal Studies* (Volume 2) [2]: "As Arrow's Impossibility Theorem reveals, relying on simple majority voting principles, it is impossible to select a common order from various individual preferences. Consequently, a reasonable decision on public goods can only come from a competent public authority, and it is generally impossible to achieve coordinated collective choice results through voting processes." Yi Aidong (2014) [3] cited this passage when introducing Arrow. The *New Economic and Financial Dictionary* later excerpted this passage in its entry on AIT [4], establishing it as the dictionary definition and a corollary of the theorem. The authority of a dictionary suggests this corollary relationship has been accepted by academia, exerting considerable influence on the teaching, research, and application of AIT.

The original article used AIT to argue whether "law represents the unanimous

will of all citizens.” While the author affirmed this proposition, other scholars argued that such law does not exist. The author employed AIT to prove that unanimous will indeed does not exist, yet maintained the legal fiction of “law as unanimous will” based on the presumption of administrative act validity. This presumption holds that once an administrative act is established, it is presumed legal and demands respect from all organs, organizations, and individuals regardless of its actual legality. Because the article’s subject was law, the “public goods” mentioned should specifically refer to legal products, while “public authority” specifically denotes the people or their representative legislature (p. 64), distinct from administrative organs and referring to legislative bodies with law-making power (p. 67). The article emphasized that administrative compulsion power is legitimate only when authorized by legislative bodies and aimed at realizing public interest, and that such power should maximize alignment with public interest. While prioritizing public interest, the article also stressed protecting individual rights and achieving balance between public and private interests.

This article primarily addressed the legitimacy of administrative compulsion based on public interest, with its references to public goods and public authority being specific rather than general. Moreover, as the article was not specifically about AIT, its discussion of the relationship between public goods and public authority cannot serve as a corollary of AIT. When excerpted by the *New Economic and Financial Dictionary* and presented as a definition and corollary of AIT, divorced from its original context, “public goods” and “public authority” become generalized concepts referring to all public goods and authorities. Under this generalization, does the logical reasoning and conclusion remain valid?

## 2. Exposition of AIT and Public Goods Decision-Making in Classic Textbooks

Gao Hongye’s *Western Economics*, likely the most widely distributed and used authoritative textbook in China (currently in its 8th edition), addresses both AIT and public goods. AIT is discussed in Chapter 9 on general equilibrium and welfare economics [5], but without reference to public goods. Public goods and common resources are addressed separately in Chapter 11 on market failure and microeconomic policy, which explicitly states that “handling public goods and resources involves ‘collective choice’ related to government behavior. Collective choice is the process by which all participants determine collective action plans through mutual consultation according to certain rules. Public choice theory particularly focuses on collective choice problems related to government behavior” (p. 432), indicating that this section addresses the governmental process for public goods, including decision-making. This section covers three topics:

- (1) **Collective choice rules:** unanimity rule, majority rule, weighted rule, and veto rule. These rules emphasize democratic principles—though they may assign different weights to individuals, they absolutely do not involve dictatorship or imposition by public authorities.

- (2) **Optimal collective choice rules:** Two theoretical models are mentioned.
  - a. *Cost model:* Considers external costs and decision-making costs, essentially the model used by Buchanan and Tullock in *The Calculus of Consent*.
  - b. *Probability model:* Seeks to minimize the possibility that collective decisions deviate from individual preferences, demonstrating the central role of popular will in public goods provision.
- (3) **Efficiency of the government official system:** Addresses inefficiency caused by lack of competition, bureaucratic expansion, and high costs, proposing measures such as decentralizing public sector power, contracting private provision of public services, and promoting competition between public and private sectors and among local governments.

Thus, Gao's textbook emphasizes the central role of public will and democratic rules in governmental processes for public goods, with no mention of dictatorship or imposition. Instead, the proposed measures aim to reduce and disperse government power.

Majority rule has proven to be the rule that minimizes the possibility of collective decisions deviating from individual preferences (p. 434). But what proportion should define the majority? Wang Fujun et al. [6] suggest adopting Buchanan and Tullock's two criteria: first, selecting majority rules based on unanimity to ensure individual rights; second, ensuring participants decide under conditions of uncertainty about the future to guarantee the rule benefits everyone.

AIT indeed proves under relatively loose conditions that "social preferences" cannot be reasonably formed from different individual preferences. That is, without dictatorship, no social welfare function exists that applies to all individual preference types [7][8], and no non-dictatorial democratic process can produce a social preference ordering that reflects all individuals' preferences while inheriting their characteristics [9]. AIT shattered some previously held truths and gave us new understanding of public choice and democratic institutions. The "minority obeys majority" principle we champion fails to satisfy "Arrow's five conditions," and just as markets can fail, public choice principles can also cause democratic failure. Therefore, the rationality of majority rule is "limited" [10], indicating that Western economics has not completely solved resource allocation problems [7][11]. However, regarding decision-making power over public goods, classic textbooks still advocate broader and deeper democratic decision-making based on respect for individual will, rather than delegating authority to public authorities for dictatorship or imposition.

What, then, is the actual relationship between public goods, public authorities, public goods decision-making, and AIT?

### 3.1. Conceptual Connotation Shifts Across Disciplinary Contexts

Public goods are social products. Almost all textbooks emphasize their non-excludability and non-rivalry in consumption. Scholars typically classify social products based on these two attributes, as shown in the table below.

**Table 1 Classification of Social Products According to Rivalry and Excludability**

	Rivalrous Consumption	Non-Rivalrous Consumption
<b>Excludable</b>	Private goods (fruit, grain, clothing)	Quasi-club goods (artificially scarce goods like cable TV, cinemas, lectures)
<b>Non-Excludable</b>	Common resources (clean air, biodiversity)	Public goods (national defense, streetlights)

Non-excludability means that when one person consumes a good, others cannot be prevented from consuming it. Non-rivalry means public goods can be consumed simultaneously by many people with zero marginal cost for an additional consumer—one person’s consumption does not reduce the amount available to others.

The non-excludability and non-rivalry of public goods allow consumers to enjoy them without bearing production costs, creating a “free-rider” problem. Since individual consumers are unwilling to pay production costs and prefer to benefit without contributing, public goods cannot be provided through individual market decisions and must instead be provided by the government [9]. Broadly defined, government refers to all state power organs, including legislative, administrative, judicial, and military bodies, representing public power—in this sense, government is the public authority. From this perspective, the statement that “public goods cannot be provided through individual market decisions and must be provided by government” aligns with “a reasonable decision on public goods can only come from a competent public authority.” However, this latter statement originates from Yin Bocheng’s *Western Economics Exercise Guide*, where “public goods” in economics refers to social products with non-excludability and non-rivalry, and “government” refers to the narrow sense of government—the executive branch of state power, or administrative organs. In contrast, “Administrative Compulsion and the Realization of the Public Interest” is an administrative law article where “public goods” refers specifically to legal products, not all public goods, and “public authority” specifically denotes legislative bodies, distinct from administrative organs. In law, where concepts

have specific meanings, this statement is correct. But “public goods,” “government,” and “public authority” carry different connotations across economics, administrative science, and law.

When excerpted by the *New Economic and Financial Dictionary* as a definition of AIT, divorced from its original context, the statement generalizes “public goods” and “public authority” to mean that all reasonable public goods decisions can only come from a competent public authority.

Is this generalized statement a corollary of AIT? This paper argues it is not. In Western economics textbooks, the view that public goods must be provided by government is not inferred from AIT but rather from the non-excludability and non-rivalry of public goods and the resulting free-rider problem.

In its generalized form, can all reasonable public goods decisions only come from a competent public authority? Clearly not. If “public authority” specifically means legislative bodies, then ordinary public goods—such as whether to install streetlights—do not require legislative decisions. Public goods exist at different levels, and even government in the broad sense, as public authority, has different jurisdictions. The relationship between public goods decisions and public authorities is complex and cannot be generalized. We must examine the evolution of this relationship.

### 3.2. Evolutionary Logic of the Relationship Between Public Goods Provision and Public Authority

Gao Hongye’ s textbook does not elaborate further on public goods provision, merely noting that market mechanisms are unsuitable and that government must provide them [5]. Zhang Xuefeng’ s “13th Five-Year Plan” textbook states that government involvement in public goods provision is inevitable [12]. Sun Ye [13] and Wang Fujun et al. [6] explicitly propose combining market mechanisms to solve public goods supply problems, arguing that market failure provides the basis for government involvement.

Public goods are supplied for the entire society’ s collective consumption, and their non-rivalry and non-excludability necessitate government provision in some form. These characteristics arise from the non-divisibility of public goods production—they must be produced as a whole for societal use, cannot be divided into small units, and cannot be purchased individually at a certain price. Consumers’ preferences for public goods cannot be expressed through payable prices, preventing market prices from guiding resource allocation. Because public goods cannot be subdivided, their consumption cannot be determined by market prices, and the price mechanism cannot accurately reflect societal supply and demand. Consequently, public goods must be provided by government according to collective needs. If people were asked to produce these goods based on price-expressed preferences, no one would reveal their preferences, hoping others would produce while they free-ride,

making public goods production impossible. Thus, markets fail in public goods production [9].

Most textbooks and supplementary materials cite non-rivalry, non-excludability, free-rider behavior, and market failure as reasons for government provision. However, some journal articles argue that non-excludability and non-rivalry are neither necessary nor sufficient conditions for public sector provision, and that market failure derived from these characteristics cannot effectively explain the logic of public goods provision. Public goods are not the result of market failure; rather, externalities in production and consumption create interdependent utilities, and this interdependence—rather than market failure—is the logical basis for defining government and market boundaries [14]. Gao Hongye [5] also views externalities as the cause of market failure. While public goods create externalities, not all goods with externalities are public goods. To correct resource allocation distortions from externalities, Western microeconomic theory proposes taxes and subsidies, corporate mergers, and property rights assignments [5]—solutions that operate between enterprises or between enterprises and government, not necessarily requiring government provision. International research identifies market failure causes (asymmetric information, agency problems, distributional effects, unobservable product quality) as determinants of public goods provision methods [15]. Some scholars agree that public goods are not market failure products but attribute public sector provision to the social nature of labor in producing social products [16].

However, the non-divisibility of public goods production is not definitively established. Buchanan argued that between divisible private goods and completely indivisible pure public goods lie intermediate club goods [17], which are indivisible within clubs but divisible between clubs. National defense, for example, is shared by all citizens within a country, but Chinese citizens cannot enjoy U.S. defense protection, so different governments decide. Similarly, different organizations decide on different goods—overuse of common resources creates tragedy of the commons, necessitating payment restrictions that form clubs. Labor products containing special human intelligence, such as software, face no overuse problems, but free use eliminates developers' returns and discourages development. Developers charge users and create privileges for paying users, forming clubs [18]. Club goods are shared within clubs but inaccessible to outsiders.

Traditional views hold government as the main provider of public goods, but with expanding public goods categories and diversified governance trends, government shows clear deficiencies in provision. Non-governmental organizations play important roles with unique advantages [19], and in regions with developed market economies, market provision of public goods has begun to play a leading role [16]. Currently, public goods production and provision have diversified, with administrative, (public welfare), and competitive methods jointly regulating production [20]. Sun Ye [13] and Wang Fujun et al. [6] explicitly propose combining market mechanisms to solve supply problems, arguing that

while market failure provides the basis for government involvement, this does not mean government should produce all public goods, let alone completely replace their provision, especially for quasi-public goods (some textbooks call these common resources). Lack of competition causes inefficiency, officials pursuing self-interest lead to bureaucratic expansion and budget maximization, and lack of supervision creates rent-seeking and corruption—causing government failure, excessive supply, or supply of unneeded goods. Practical solutions must reconcile the government-market dilemma through compromises like competitive bidding and private production to solve efficiency problems. This means government provision does not require direct government production; combined government-market approaches can leverage both advantages for effective outcomes. In practice, provision methods include direct government provision, government contracting with private entities, authorized operation, subsidies, and private provision [21]. The 2021 Peking University Press *Public Economics* (3rd edition) edited by Huang Hengxue argues that public economic subjects show polycentric trends, with government, private sector, communities, non-profits, public enterprises, and international organizations all participating in and influencing public goods production and provision [22].

The trend toward diversified public goods provision has deeper historical roots. Adam Smith's *The Wealth of Nations* argued that the invisible hand of free markets would guide correct production quantities and types, maintaining equilibrium and opposing government intervention. However, practice revealed contradictions between organized production within individual enterprises and anarchic social production, leading to overproduction crises. Reflection on these crises birthed Keynesianism, which attributed crises to insufficient effective demand and advocated fiscal policy to expand aggregate demand. While effective, this created stagflation problems, and government inefficiency or ineffectiveness in public goods supply caused government failure. With declining Keynesian interventionism, market liberalism resurged, forcing relaxation of government monopolies on public goods and introducing privatized competition. Under the dual failures of market and government, public goods provision must seek coordinated development paths between the two [23].

Thus, the relationship between public goods provision and public authority is an evolving concept. Different provision subjects form complex relationships based on public goods' varying characteristics and consumer groups. Different types of public goods require different production organizations, consumption patterns, and decision-making bodies. We cannot simply assert that public goods decisions can only come from public authorities. Huang Hengxue [22] summarizes this evolution:

The traditional view holds that government, as an authoritative organization coordinating interests among subjects, is the sole decision-making body for public economics, while decision-makers in other fields can only indirectly influence government through various means. However, this traditional view ignores democratic

system requirements. Under democratic politics, government is only the formal decision-making body, or a delegated one; the ultimate decision-makers are ordinary voters and the interest groups formed among them.

## 4. Decision Principles, Constraints, Difficulties, and Solutions for Public Goods

Regardless, government holds an important position in public goods provision. Western textbooks explicitly state that in most cases, public goods must be provided by government [18], especially national defense, law, public policy, and basic research. Most countries have specialized agencies for public goods production: defense ministries for defense products, people's congresses for legal products, and funding agencies for basic research. These government bodies do not dictate or impose decisions but exercise delegated decision-making power on behalf of the public, with citizens retaining ultimate authority. How can public authorities ensure citizens' decision-making rights are realized? What principles should guide this process, what difficulties arise, and how should they be resolved?

### 4.1. Decision Principles and Constraints for Public Goods

Public goods should be provided according to collective social needs. Whether they satisfy these needs is the gold standard for judging reasonableness, representing the supreme principle of public goods decision-making. This principle must be followed regardless of whether provision comes from government agencies, public welfare institutions, or private enterprises.

In Buchanan's view, government as a public interest agent should compensate for market economy deficiencies, enabling citizens as economic agents to achieve higher social utility than without government intervention [24][25]. Upholding people-centered principles and scientific democracy are fundamental working principles of China's government. How should public authorities operate to realize citizens' decision-making rights and ensure popular sovereignty?

Take public policy—the most public of products—as an example. Generally, relevant government departments formulate and implement policies under constitutional authority or regulatory constraints, either independently or after public voting on proposals. In this process, government leaders possess considerable power and discretion, often making decisions based on their understanding of common interest, available information, and personal utility maximization principles to secure benefits for themselves. Buchanan argues that constraint mechanisms must limit public authorities' behavior, creating positive pressure between power holders and public interest to ensure those in privileged positions cannot excessively pursue private gain. Otherwise, no matter how noble the officials, public interest may be intentionally or unintentionally harmed. In this sense, public choice theory emphasizes that we should not casually delegate power to

increase social welfare and ensure equality to privileged institutions and then piously await their benevolence. The rational approach is to subject these privileged institutions or individuals to hard constraints, with citizens genuinely—not merely formally—holding ultimate decision-making power over these constraints [24].

#### 4.2. Decision-Making Difficulties and Solutions for Public Goods

The supreme principle of public goods provision is meeting public demand. Determining what public goods society collectively needs is the core issue. If provision relies solely on top-down decision-making, the principal-agent chain may be too long and relationships too ambiguous, leaving citizens without channels to express needs or reveal preferences, without rights or means to supervise decision-making processes, and without actual participation in public affairs decisions. This can result in public goods supply that fails to represent real demand, causing undersupply, inefficiency, gaps, or even excess burdens and provision failure. Therefore, conducting public opinion surveys to understand real needs is key to solving public goods provision problems. Only by understanding collective demand for public goods can government provide what groups need [26].

Because public goods consumption is non-excludable and non-rivalrous, the marginal cost of an additional consumer is zero while production levels remain unchanged. Individuals can enjoy public goods without bearing production costs, creating free-rider behavior and psychology. During public opinion surveys and voting, individuals often hesitate to reveal true needs, express lower demand than actual, or abandon expression due to insignificant individual impact or high expression costs [18]. Some vulnerable groups lack capacity to express needs [27], and even in economically developed Shanghai, institutional barriers exist in public goods provision [28].

Thus, the first difficulty in public goods decision-making is understanding true public demand. Liang Liping (2006) [29] discusses how public policy must interact and integrate with public recognition. As a broader concept, public goods provision must also be public-based: demand information comes from the public, provision requires close cooperation between providers and citizens, and effectiveness can only be tested through public feedback. Therefore, citizens should participate comprehensively in public goods decision-making, deepening their understanding of functions and significance, understanding why provision occurs as it does, and improving effectiveness and satisfaction. Only by fully considering citizens' interest appeals can power holders provide public goods that best meet social needs and public acceptance.

Increasing convenience of demand expression, providing unimpeded channels, and reducing expression costs can help public authorities understand real needs. To address the concealment of true demand due to free-rider psychology, Clarke designed a mechanism taxing individuals pivotal to public goods provision to

reveal true demand. Zhong Genyuan and Chen Zhihong [30] call this tax on pivotal individuals “Clarke tax.” Andrew Scott’s textbook terms it a “demand-revealing mechanism,” which can reveal public demand but cannot ensure tax revenues exactly equal project costs, potentially creating large surpluses. Abelson (2018) [33] summarizes two methods for revealing true demand: (1) revealed preference methods observing public consumption behavior of products and substitutes under different circumstances through hedonic price analysis, travel expenditures, and defensive expenditures using market and industrial data; and (2) stated preference methods using contingent valuation and choice modeling to analyze survey results.

In summary, public goods decisions involve delegated authority exercised by public authorities on citizens’ behalf. The supreme principle is ensuring provision meets public needs. The more scientific, democratic, and institutionalized the decision-making process, the better public goods will satisfy collective needs [32]. Public goods provision cannot be dictated or imposed by public authorities. Their behavior must be constrained to ensure citizens retain decision-making power over provision to deliver truly needed public goods. However, due to non-excludability and non-rivalry, once produced, no individual can be prevented from using public goods, eliminating incentive to pay production costs. Consequently, citizens are unwilling to express demand to avoid costs, express lower demand than actual, or forego expression altogether, making it difficult for authorities to grasp true needs. This is the first difficulty in decision-making, requiring authorities to design effective mechanisms that facilitate individual expression of true demand and achieve integration between provision and public recognition.

## 5. Public Goods Decisions and Arrow’s Impossibility Theorem

After individuals express true demand and authorities collect it, aggregating divergent needs to reflect collective will becomes the key challenge. Because individual demands often conflict, scientifically aggregating inconsistent preferences to obtain a collective ordering that reflects group will is an unavoidable problem. If public goods provision involves choosing among at least three alternatives, and decisions must be based on individual preference orderings expressed through voting, voting paradoxes may arise, implicating AIT. AIT demonstrates that individual preference orderings across at least three alternatives cannot be aggregated into a group preference ordering satisfying collective will—any method produces either dictatorial or imposed orderings. Therefore, due to AIT, aggregating different individual preference orderings to obtain a collective demand ordering becomes the second difficulty in public goods provision.

### 5.1. Textbook Expositions

What are the solutions to this difficulty? Consulting experts in political science, public administration, and economics and reviewing domestic and international works and textbooks on public economics, political economics, microeconomics, public management, and administrative management reveals that most discuss AIT and public goods separately. Only three textbooks connect them.

Scott (2009) [31] provides a profound discussion, laying groundwork in Part 2 on “Preferences, Utility, Demand, and Uncertainty” and addressing their deep relationship in Part 8 on “Factor Markets and the Origins of Class Struggle” under “Public Goods, Strategic Voting Behavior, and Government’s Role.” After discussing how voting cycles create the paradox underlying AIT, the author states: “To break these cyclical social preferences, society may have to rely on some external authority, which is precisely what we strive to avoid.” This suggests we should avoid relying on external authority rather than delegating to public authorities.

Abelson (2018), in Chapter 9 of Part 4, restates AIT and related commentary, concluding that most group decision difficulties stem from differing individual values, and that groups with similar values more easily reach agreement. Therefore, private clubs, locally empowered groups, and local government units are often more effective means of providing public goods.

Huang Hengxue (2021, p. 158) [22], discussing political influences in public economic decision-making, borrows public choice theory to argue that “decision-making processes rooted in the economic domain are actually made in the political domain, where enterprises and consumers ultimately influence economic policy decisions as voters and interest groups. AIT shows that majority principles cannot represent the will of most society members, and that modern democratic political decision-making has insurmountable internal contradictions. Therefore, economic decision-making is a political process conducted through democratic procedures in the political domain, and the inherent contradictions in these democratic procedures necessarily lead to errors in economic decisions.”

Although this discusses problems in public economic decision-making due to AIT, public goods provision is a primary object of public economic decision-making, making the analysis applicable.

### 5.2. Analysis of Textbook Expositions

Regarding errors caused by inherent contradictions in democratic procedures, Huang Hengxue [22] argues that only scientific and democratic decision-making can provide foundations for good decisions. AIT represents an inherent contradiction in democratic procedures that causes decision-making errors. To avoid errors, one must first resolve these inherent contradictions before applying democratic procedures—yet the book proposes democratic decision-making as a solution without addressing how to resolve AIT’s inherent contradictions,

creating circular reasoning. However, the book's proposed scientific methods – “establishing correct decision-making thinking, basing decisions on correct economic theory and objective reality, fully obtaining necessary information, and following reasonable decision-making procedures” –and democratic methods– “democratizing decision-making processes, decentralizing decision-making power, breaking monopolies to promote competition, and elevating economic policies to constitutional status” –combined actually propose solutions to public goods decision-making difficulties.

Current expositions on AIT and public goods provision do not precisely reveal their relationship, instead generalizing AIT's application scenarios. AIT primarily addresses choices among at least three alternatives where different individual preference orderings prevent formation of a consistent group ordering. If economic policy or public goods choices involve only two alternatives—for example, yes/no decisions on provision—voting cycles do not occur. Arrow proved that in such cases, social ordering of the two alternatives is possible, establishing the logical foundation for two-party systems (p. 56) [1]. Here, majority principles can reflect the will of most members.

Regarding public goods provision scale or content involving three or more alternatives, voting cycles may occur, implicating AIT and creating the second difficulty. However, public goods provision does not rely solely on individual preferences expressed through voting. Provision scale is generally determined through cost-benefit analysis, which raises the difficulty of individuals concealing their true demand due to non-rivalry and non-excludability (Krugman and Wells, 2020, p. 436) [18]. Section 5 already reviewed various solutions to this problem.

For difficulties in choosing among three or more public goods, Abelson (2018) [33] argues that people with similar values more easily reach agreement, suggesting government should empower or establish organizations based on different groups' needs to more effectively provide different public goods. This matches Huang Hengxue's solution of decentralizing decision-making power (p. 163) [22]. Huang's scientific methods—basing decisions on correct theory, reality, information, and procedures—essentially correspond to Abelson's revealed preference methods for uncovering true demand. Different public goods have different characteristics and provision methods, requiring different approaches to reveal true demand and optimize provision. Abelson further analyzes decision-making characteristics for education, environment, industrial policy, and information security. For public goods that cannot be divided by population, such as public policy, many textbooks mention Buchanan's methods for reaching consensus on decision-making rules and procedures.

### 5.3. The Relationship Between AIT, Public Goods Decision-Making, and Public Authority

Although public goods provision faces many difficulties, not all stem from AIT. Provision content and scale depend not only on individual preferences but also on bargaining among social strata and interest groups, requiring government as an authoritative organization to coordinate. Difficulties arising from AIT are not without solutions. Therefore, inferring that “a reasonable decision on public goods can only come from a competent public authority” from AIT is insufficiently rigorous.

Logically, if choosing among at least three public goods based solely on individual preference orderings from voting, without cost-benefit information, and only through aggregating individual orderings to obtain group orderings, then AIT proves the resulting group ordering can only be dictatorial or imposed. Adding the condition that decisions can only come from public authorities, the logical corollary is that public goods decisions must be dictated or imposed by public authorities. Although “competent” is a qualifying term, without explaining how competence resolves AIT’s internal contradictions, the only logical inference from AIT is dictatorship or imposition—yet no textbook suggests public goods decisions should be dictated or imposed.

How, then, should we judge whether public authorities are competent for public goods decisions? Andrew Scott’s textbook includes a section on “Government as Institutional Designer,” arguing government should design voting mechanisms where Nash equilibrium outcomes align with group expectations. The author believes such institutions exist under certain conditions but that detailing their design exceeds the book’s scope, noting theoretical progress and predicting exciting developments. Tullock’s 1971 essay “Public Decisions as Public Goods” expressed pessimism about public goods decision-making processes [34], but current research in public choice on decisive coalitions [35] and judgment aggregation theory [36] has brought new hope for scientifically and reasonably solving AIT, suggesting public authorities can become competent institutional designers capable of finding group true demand behind inconsistent individual orderings through democratic systems and mechanism design.

## 6. Conclusion

According to our research, the statement “a reasonable decision on public goods can only come from a competent public authority” was first linked to AIT in “Administrative Compulsion and the Realization of the Public Interest” in *Legal Studies* (Volume 2). The article used AIT to argue whether “law represents the unanimous will of all citizens,” with specific references to public goods and public authority. Later excerpted by the *New Economic and Financial Dictionary* as a corollary of AIT, it became widely circulated online and taught in classrooms. However, the concepts of public goods and public authority differ between economics and administrative law, and their meanings shift when borrowed across

disciplines, making the corollary relationship untenable.

The view that public goods decisions can only come from public authorities aligns with the traditional perspective of government as the sole authoritative coordinator and public economic decision-maker. However, this tradition stems from public goods' non-excludability and non-rivalry, production indivisibility, and resulting free-rider problems—more deeply, from externalities and the social nature of labor in producing public goods—rather than from AIT.

The inference from AIT that public goods decisions can only be made by competent public authorities implies dictatorship or imposition, yet no textbook advocates this. Moreover, public authorities' decisions on whether, how much, and what public goods to provide must be based on citizens' true needs, as the primary principle is ensuring provision meets public demand. Modern democratic political theory holds that the view of government as the sole decision-maker ignores democratic requirements—under democracy, government is merely the formal or delegated decision-maker, while ultimate decision-makers are ordinary citizens and the interest groups they form. Citizens express demand for public goods through complaints and ultimately decide on provision through voting.

Due to non-excludability and non-rivalry, citizens can enjoy public goods without bearing costs, creating free-rider behavior. In surveys and voting, citizens are often unwilling to reveal true demand to avoid costs, express lower demand, or forego expression due to insignificant individual impact or high costs [18]. Some vulnerable groups lack capacity to express needs [27], and even in economically developed Shanghai, institutional barriers exist [28]. This is the first difficulty in decision-making: authorities must design mechanisms to encourage expression of true demand.

After citizens express true demand, aggregating different needs to reflect collective will is the next challenge. If provision scale or content involves at least three alternatives and decisions must be based on individual preference orderings from voting, voting cycles may arise, implicating AIT and creating a second difficulty. Current public economics and microeconomics offer corresponding solutions: cost-benefit analysis for scale decisions, and decentralizing decision-making power to groups with similar values for content decisions—empowering or establishing organizations to more effectively provide different public goods to different groups. Different public goods require different methods to reveal true demand and optimize provision. For indivisible public goods like public policy, many textbooks mention Buchanan's methods for reaching consensus on decision-making rules and procedures.

Thus, difficulties in public goods decision-making caused by AIT should not be resolved through dictatorship or imposition. Public authorities should serve as institutional designers, creating voting mechanisms that reveal true public demand while achieving performance consistency with provision goals. This represents a major challenge for modern public authorities. Current research progress in decisive coalitions and judgment aggregation theory in public choice

may help public authorities become competent institutional designers, enabling them to identify group true demand behind inconsistent individual orderings through democratic institutions and provide public goods that satisfy real needs.

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