

Article

The Fundamental Economic Problem: The Infinity of Needs and The Scarcity of Resources

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Abstract: This paper examines the fundamental economic problem arising from the persistent conflict between unlimited human wants and the scarcity of economic resources available to satisfy them. The study provides a theoretical and analytical examination of the nature of economic needs, economic goods, and the mechanisms through which scarce resources are allocated among competing uses. Particular attention is given to the dynamic character of human needs, the relative distinction between essential and luxury goods, and the economic relationships between substitute and complementary goods. The study also systematically analyzes six major categories of production factors: land and natural resources, fixed capital, working capital, labor, entrepreneurial ability, and information. Each factor is considered in terms of its economic characteristics, productive role, and specific form of scarcity. The methodological approach is descriptive and analytical and is based on established principles of economic theory and the systematic classification of economic resources. The analysis demonstrates that scarcity is not uniform across production factors but takes different forms depending on the nature, availability, and productivity of each resource. The findings further indicate that the interaction and complementary use of production factors determine the productive capacity of an economic system and influence its ability to satisfy continuously expanding human wants. Particular emphasis is placed on economic efficiency, full employment, and the effective utilization of productive capacity as essential mechanisms for improving resource allocation. The study also highlights the importance of opportunity cost and the production-possibility constraint in understanding the trade-offs inherent in every economic decision. The analysis concludes that technological progress, improved human capital, entrepreneurial innovation, and effective information management can expand the productive potential of scarce resources, but cannot completely eliminate the fundamental problem of scarcity. The paper provides a conceptual framework for understanding how individuals, firms, and governments can improve the efficiency of resource allocation while responding to continuously changing economic needs.

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1. Introduction

Humanity exists within a complex web of diverse biological, economic, social, political, and spiritual needs. Within this framework, economic (material) needs occupy a paramount position. Material needs represent the comprehensive set of requirements essential for the stable functioning, sustenance, and development of individuals, firms, and society as a whole [1].

Consumer needs are inherently boundless and dynamic. They can be broadly categorized into primary (essential) needs and luxury items. It is critical to note that this

classification is relative; a good deemed a primary necessity for one consumer or period may serve as a luxury element under different socioeconomic circumstances. The formation of these needs is driven not only by biological imperatives but is also heavily influenced by consumer mentality, living environments, cultural backgrounds, social status, national values, as well as technological progress and globalization processes [1].

This relativity of need is well illustrated across historical periods and income levels. Goods once considered exceptional luxuries — private telephones, personal computers, or air travel — have, within a single generation, become near-universal necessities in many economies, while other goods have moved in the opposite direction as substitutes emerged. This constant reclassification demonstrates that the boundary between 'necessity' and 'luxury' is not fixed by the physical properties of a good but by the prevailing social, technological, and economic context in which it is consumed [1], [2].

Much like individuals, business enterprises and state institutions exhibit distinct sets of needs. For instance, firms require physical buildings, machinery, raw materials, and labor resources to organize production. Conversely, the state — representing the collective interests of citizens — demands public infrastructure (such as schools, hospitals, and roads) and security (defense) systems to maintain social welfare [2].

At the enterprise level, needs are further shaped by the competitive environment in which a firm operates: a manufacturing company's need for advanced machinery differs qualitatively from a service company's need for skilled personnel and digital infrastructure, yet both are equally constrained by the same underlying scarcity of capital and resources. At the level of the state, public needs are additionally complicated by the fact that they must be financed collectively through taxation and public borrowing rather than through the direct market transactions that satisfy individual consumer needs [2].

This distinction between privately financed and collectively financed needs is closely related to the classical economic concept of public goods — goods such as national defense, street lighting, or basic scientific research that are, in varying degrees, non-excludable and non-rival in consumption, meaning that one citizen's enjoyment of the good does not diminish its availability to others and that excluding non-payers is often impractical. Because private markets tend to under-supply such goods when left entirely to voluntary exchange, the state typically assumes primary responsibility for their provision, financed through compulsory taxation rather than the direct pricing mechanisms that govern most private goods. This institutional division of labor between private markets and public provision represents one of the earliest and most durable solutions that societies have developed for allocating scarce resources across the full spectrum of individual and collective needs [2], [4].

The vehicles used to satisfy these economic demands are termed economic goods. While certain goods are provided directly by nature in a ready-to-consume state (e.g., water, air, and wild flora or fauna), the vast majority must be produced through human economic activity [2].

In economic theory, depending on how they satisfy human needs, these goods are categorized into two primary groups:

1. Alternative goods: Capable of satisfying the identical need (e.g., fulfilling the demand for meat products through beef, mutton, or poultry) [3].
2. Interdependent goods: Can only satisfy a specific need when utilized together (e.g., an automobile and its fuel) [3].

The distinction between alternative (substitute) and interdependent (complementary) goods carries direct practical significance for producers and policymakers alike. When the price of one substitute good rises, consumer demand typically shifts toward its alternatives, whereas an increase in the price of one complementary good tends to depress demand for its paired good as well. Understanding this relationship allows firms to anticipate how changes in one market segment will ripple through related markets, and allows governments to anticipate the broader economic consequences of taxation or price regulation imposed on a single category of goods [3].

It is worth noting that the substitute-complement relationship is rarely absolute; the degree of substitutability between two goods exists on a continuum rather than as a binary property. Beef and poultry, for example, may be close substitutes for a consumer primarily concerned with protein content, yet imperfect substitutes for a consumer whose preferences are shaped by taste, price sensitivity, cultural dietary norms, or religious dietary restrictions. Recognizing this continuum allows economic analysis to move beyond a simple two-category classification toward a more nuanced understanding of cross-price elasticity of demand, which measures precisely how sensitive the quantity demanded of one good is to a change in the price of another [3].

A further layer of complexity arises from the fact that the same pair of goods can shift between substitute and complementary relationships depending on context. Electric and gasoline-powered vehicles, for instance, function as substitutes for the general need of personal transportation, yet electric vehicles and charging infrastructure function as strict complements, since the value of one is largely contingent on the availability of the other. This dual example illustrates why classification of economic goods must always be anchored to the specific need being analyzed rather than treated as an immutable property of the good itself [1], [3].

The historical evolution of economic thought on needs and goods is itself instructive. Classical economists such as Adam Smith and David Ricardo were primarily concerned with the production and distribution of tangible physical goods under conditions of relatively stable technology, whereas the marginalist revolution of the late nineteenth century shifted attention toward the subjective valuation of goods by individual consumers, laying the theoretical groundwork for the modern understanding of demand, utility, and the substitute-complement distinction employed throughout this paper [1], [2].

Globalization has added a further dimension to the analysis of economic needs that was largely absent from earlier stages of economic thought. As national economies have become increasingly interconnected through trade, capital flows, and digital communication, consumer needs in one country are now shaped not only by domestic cultural and economic conditions but also by exposure to goods, services, and lifestyles originating elsewhere. This cross-border diffusion of consumption patterns tends to accelerate the expansion of material wants described earlier, since new categories of goods can spread across national boundaries far more rapidly than they could in earlier historical periods, reinforcing the dynamic and unbounded character of needs that this paper identifies as the first pillar of the fundamental economic problem [1], [2].

2. Materials and Methods

To provide a structured analysis, economic resources — commonly referred to by economists as the factors of production — are systematically categorized into six distinct dimensions [4]. Economic resources encompass all natural, human, and man-made means utilized in the process of manufacturing goods, rendering services, and executing work. These resources constitute the fundamental building blocks of any economic system [4].

The methodological approach adopted in this study is descriptive-analytical: rather than testing a numerical hypothesis against empirical data, the paper draws on established economic theory to construct a systematic classification of production factors and to trace the logical structure of the core economic problem. This approach is appropriate for a foundational, theory-building topic of this kind, where the objective is conceptual clarification rather than statistical estimation [4], [7].

The methodology of this framework evaluates inputs based on the following structural criteria, which are summarized comparatively in Table 1 below and then discussed in turn.

Table 1. The six factors of production evaluated in this study.

Factor of production	Core definition	Illustrative examples
Land (natural resources)	Naturally occurring inputs	Agricultural fields, mineral

Factor of production	Core definition	Illustrative examples
	supplied by nature in finite capacity	deposits, water bodies, forestry resources
Fixed capital	Durable, man-made assets used across long-term production cycles	Industrial plants, machinery, transport logistics, ICT infrastructure
Working capital	Non-durable assets consumed within a single production cycle	Raw materials, fuel, components transferred into the final product
Labor	Aggregate physical and mental capabilities exerted to produce goods and services	Manual workers, engineers, builders, economists
Entrepreneurial ability	Skill in combining other factors, bearing risk, and implementing innovation	Business founders and managers coordinating land, labor, and capital
Information	Data, expertise, and managerial competence used to guide decisions	Market data architectures, proprietary know-how, analytics systems

Land (Natural Resources): This category includes all fertile land, agricultural fields, mineral deposits, water bodies, and forestry resources that nature provides in a finite capacity [4]. Because these resources are, for practical purposes, fixed in aggregate supply and cannot be manufactured, their allocation among competing uses — agriculture, urban development, industrial extraction, or conservation — is one of the oldest and most persistent problems in economic policy [4].

Fixed Capital: This comprises all durable, man-made assets deployed over long-term production cycles. It includes industrial plant structures, machinery, manufacturing equipment, transport logistics, and information-communication technologies (ICT). The process of acquiring and accumulating these physical assets is defined as investment [4]. Notably, liquid monetary funds are designated as financial capital rather than productive resources, as currency alone cannot directly generate output [5]. This distinction matters because an economy can accumulate large monetary reserves without a corresponding increase in productive capacity unless that money is actually converted into physical or human capital through investment [5].

Working Capital: Unlike fixed capital, these non-durable assets are consumed entirely within a single production cycle. They transfer their total value to the final product and form its physical substance [5]. Effective management of working capital — ensuring that raw materials and intermediate inputs arrive neither too early, which ties up storage and financing costs, nor too late, which halts production — is a central concern of operational and supply-chain management in modern firms [5].

Labor: This represents the aggregate of physical and mental capabilities exerted by individuals to deliver goods and services. It encompasses the specialized efforts of workers, engineers, builders, and economists [4]. The productivity of labor as a factor of production is not fixed; it can be enhanced through education, professional training, improved workplace organization, and access to complementary capital equipment, which is why human capital investment is treated by many economists as inseparable from labor as a resource category [4].

Entrepreneurial Ability: This is the distinct human skill required to strategically combine the other factors of production (land, labor, and capital), bear systemic economic risks, and implement operational innovations [4], [5]. The entrepreneur inherently absorbs substantial systemic risks associated with managing a business. Within a market economy, profitability is never guaranteed; operations can culminate in net losses [5]. Consequently, entrepreneurs hazard not only their financial capital but also dedicate their time, labor, and professional reputation to market uncertainties.

Because this factor cannot be stored, transferred, or mechanically replicated in the way land or fixed capital can, it is often regarded as the scarcest and most decisive factor determining whether a given combination of resources is deployed successfully [5].

Information: In the modern knowledge economy, this dimension encapsulates the data architectures, proprietary expertise, and managerial competencies essential for optimizing corporate decision-making and analyzing market dynamics [6]. In the contemporary knowledge-driven era, information functions as a paramount economic resource, serving as a cornerstone for corporate strategy, data architectures, and market adaptability [6]. Unlike land or fixed capital, information as a resource is not necessarily depleted by use — the same market data or technical know-how can, in principle, inform multiple decisions simultaneously — which gives it distinctive economic properties and has motivated growing scholarly attention to the economics of information as a field in its own right [6].

It should be emphasized that these six factors rarely operate in isolation from one another in practice; they function as complementary inputs whose productivity depends on the availability and quality of the other factors with which they are combined. Land without fixed capital investment in irrigation or machinery yields far less agricultural output than the same land improved through such investment; labor without adequate training or complementary tools achieves lower productivity than trained labor equipped with modern equipment; and even the most capable entrepreneur cannot generate output without access to some minimum combination of land, capital, and labor to organize. This interdependence among factors is a recurring theme that reappears in the Results and Discussion sections below, where the aggregate scarcity facing an economic system is shown to be a composite of the specific scarcities affecting each individual factor [4], [5].

Finally, it is useful to note that the relative importance of each factor of production has shifted historically alongside changes in technology and economic structure. Agrarian economies were historically organized primarily around land and labor; the industrial era elevated the importance of fixed capital and, later, entrepreneurial organization of large-scale production; and the contemporary knowledge economy has elevated information and specialized human capital to a position of comparable or even greater importance than traditional physical capital in many high-value sectors. This historical progression does not imply that any factor has become obsolete — agricultural land, for example, remains as essential as ever — but rather that the marginal contribution of each factor to overall economic output varies across historical periods and across sectors of the economy [4], [6].

3. Result

The institutional framework wherein a society deploys these productive resources to manufacture material goods and satisfy economic demands is defined as an economic system [1]. The entirety of this system revolves around two fundamental, interconnected realities, which economists collectively term the core economic problem:

1. The material needs and desires of society — including individuals, enterprises, and public institutions — are infinite and structurally unbounded [2].
2. The economic resources required to produce the goods and services capable of satisfying these wants are inherently finite, scarce, and rare [4].

A closer examination confirms that human, corporate, and state demands expand continuously over time. Rather than remaining static, these needs undergo constant renewal and multiplication. Driven by shifting lifestyles, cultural evolutions, evolving consumer tastes, and rapid technological progress, obsolete goods are systematically displaced by innovative alternatives [1]. This continuous emergence of new product and service categories perpetually expands the boundaries of human desire.

Accordingly, the overarching objective of all economic activity is to optimize resource allocation to achieve the maximum possible satisfaction of these expanding, infinite demands [2], [4].

This brings us to the second fundamental dimension: the scarcity of economic resources. If the aggregate volume of resources were infinite, every individual could attain total saturation of their desires without trade-offs. However, while human material wants mirror a boundless ocean of aspirations, the productive inputs available to satisfy them are strictly finite [4]. Consequently, the production frontier of any society falls structurally short of satisfying the aggregate demands of its citizens.

Arable land for agriculture, mineral reserves for heavy industry, physical capital, raw inputs, highly skilled labor, specialized experts, and well-capitalized entrepreneurial agents are all quantitatively restricted [4], [5]. This structural scarcity imposes a permanent and inescapable constraint on society's capacity for total welfare. Consequently, the historical pursuit of absolute material abundance — wherein all human wants are simultaneously met — remains an unattainable theoretical ideal [2].

This structural conflict between the two forces described above — expanding wants on one side and bounded resources on the other — is represented schematically in Figure 1. The diagram depicts the boundless, irregularly expanding field of material needs surrounding a fixed, bounded core of available resources, visually capturing why the resulting gap between the two constitutes the central problem that all economic activity must address.

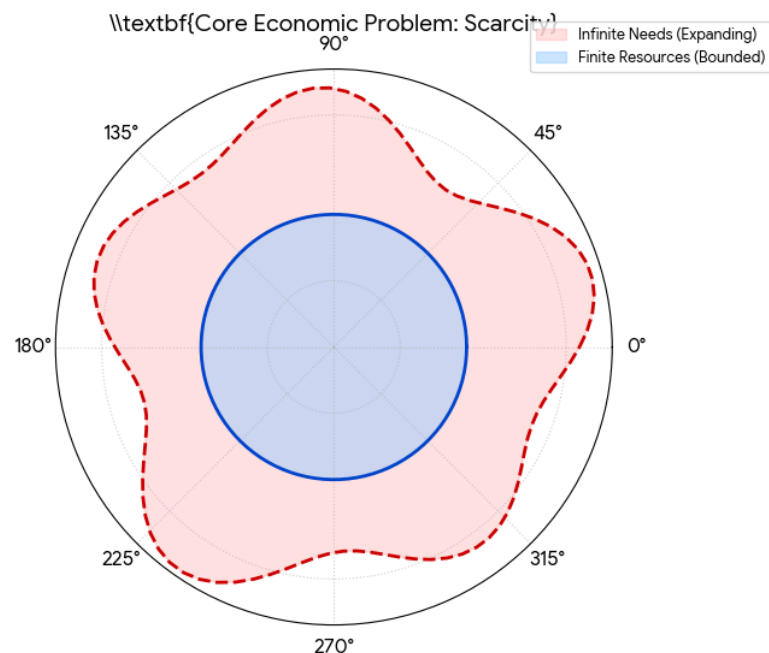


Figure 1. The core economic problem: expanding infinite needs versus bounded finite resources.

As the figure illustrates, the inner circle representing finite resources remains structurally bounded, while the outer, irregular boundary representing material needs continues to expand outward. The shaded area between the two boundaries is a visual representation of the persistent, unsatisfied demand that defines every real-world economic system, regardless of its level of development or its particular institutional or political arrangement.

This structural gap between the two boundaries depicted in Figure 1 has a further important implication: because the boundary of resources is comparatively slow-moving while the boundary of needs expands continuously, the absolute size of the unsatisfied gap tends to persist, and in some respects widen, even as an economy grows in absolute terms. Economic growth — achieved through capital accumulation, technological innovation, or improvements in labor productivity — pushes the inner boundary of resources outward, but historical experience suggests that the outer boundary of material wants tends to expand at a comparable or even faster pace, driven by the very technological and cultural changes that enable growth in the first place. This observation is consistent with the classical economic insight that rising income and consumption

tend to generate new categories of want rather than eliminating scarcity altogether [1], [2], [4].

A further result of this analysis concerns the differentiated nature of scarcity across the six factors of production discussed in the Methods section. Land, as a natural resource, exhibits an essentially fixed aggregate supply that can be marginally expanded only through costly processes such as land reclamation. Fixed capital, by contrast, can be expanded through investment, though such expansion requires time, savings, and the availability of the very resources — labor, raw materials, entrepreneurial coordination — that are themselves scarce. Working capital is scarce in a different sense: it is not fixed in aggregate supply but must be continuously replenished, making its scarcity a matter of flow rather than stock. Labor supply is bounded by demographic factors and can be enhanced qualitatively, though not unlimitedly, through education and training. Entrepreneurial ability appears to be the most narrowly distributed of the six factors, since it depends on individual aptitude, risk tolerance, and experience that cannot be readily transferred or mass-produced. Information, finally, occupies a distinctive position: while its reproduction cost is low once produced, the capacity to generate, interpret, and act upon high-quality information remains scarce and unevenly distributed across firms and individuals [4], [5], [6].

These differentiated forms of scarcity also interact with one another in ways that can either compound or partially offset the overall constraint facing an economic system. An abundance of entrepreneurial talent, for instance, can partially compensate for a shortage of fixed capital by identifying more efficient organizational arrangements for the capital that is available, while an abundance of information can reduce the effective scarcity of labor by enabling better matching between workers' skills and the jobs in which those skills are most productively deployed. Recognizing these interactions is essential for interpreting the results of this study correctly: the six factors of production should not be treated as independent, additive sources of scarcity, but as an interconnected system whose aggregate constraint on output depends on the specific combination and relative abundance of each factor within a given economy [4], [5], [6].

4. Discussion

Given that societal wants are infinite while inputs are finite, absolute satisfaction is impossible [2]. Economists therefore focus on how society can manage scarce inputs optimally to achieve maximum utility [4]. This introduces the concept of economic efficiency. While efficiency is broadly applied in technical and technological fields to measure performance, economic efficiency specifically quantifies the critical relationship between inputs (costs) and outputs (results) [7].

More precisely, economic efficiency measures the volume of output or net profit generated per unit of resource consumed during the production process [7]. To maximize the output of goods and services from its constrained resource base, an economic system must strive toward full employment and full production capacity [7], [8], [9].

Full employment implies the comprehensive mobilization of all available, viable resources within the economy. This dictates that the economic system must provide employment opportunities for the entire able-bodied labor force [8]. Similarly, it requires that all arable agricultural land, industrial factories, and manufacturing plants are actively utilized rather than left idle [7].

The practical pursuit of full employment and full production capacity is complicated in real economies by frictional and structural factors: workers moving between jobs, mismatches between the skills demanded by employers and those held by the labor force, and the time required for capital to be reallocated from declining industries to expanding ones. Consequently, the theoretical ideal of full resource utilization is best understood not as a literal state that any economy permanently occupies, but as a benchmark against which the efficiency of actual resource allocation can be measured over time [7], [8], [10].

Viewed together, the findings summarized above support a coherent interpretation of the fundamental economic problem. Because the six factors of production examined in this study are each subject to their own particular form of scarcity — geographically fixed land, capital that must be accumulated through investment, working capital that is consumed in use, labor whose productivity depends on training and organization, entrepreneurial capacity that cannot be mechanically reproduced, and information whose economic value depends on timely and accurate access — the aggregate constraint facing any economic system is more complex than a single undifferentiated notion of 'scarcity' might suggest. Policy and management responses aimed at improving economic efficiency must therefore be tailored to the specific factor or combination of factors that constitutes the binding constraint in a given context, rather than treating scarcity as a uniform obstacle to be addressed by a single universal remedy [4], [7], [8], [11].

In this light, the conflict between infinite wants and finite resources depicted in Figure 1 should not be read as a pessimistic verdict on the limits of economic progress, but rather as the analytical starting point from which the entire discipline of economics proceeds: the persistent gap between the two boundaries is precisely what makes questions of production, distribution, and efficient resource allocation meaningful and necessary in every society, at every level of development [1], [2], [7].

It is also worth situating this discussion within the broader framework of opportunity cost, a concept closely linked to the fundamental economic problem examined throughout this paper. Because resources devoted to producing one good or service are, by definition, unavailable for producing an alternative good or service, every allocation decision made by an individual, a firm, or a state necessarily involves forgoing some other possible use of the same resources. The production-possibility frontier — a standard analytical tool in introductory economics — formalizes this trade-off by depicting the maximum combinations of two goods that a society can produce given its available resources and technology, with any point beyond the frontier representing an aspiration that current resource constraints render infeasible. Viewed this way, the boundary of finite resources in Figure 1 can be understood as one particular representation of the same underlying production-possibility constraint that governs all economic decision-making [4], [7], [12].

The policy implications of this framework are significant. Because full employment and full production capacity represent theoretical ideals rather than states that any real economy permanently achieves, economic policy is more accurately understood as a continuous process of narrowing the gap between actual and potential output rather than a one-time achievement of a fixed target. Fiscal policy, monetary policy, education and labor-market policy, and industrial policy can each be understood as different levers aimed at mobilizing underutilized land, capital, labor, or entrepreneurial capacity, or at improving the efficiency with which already-mobilized resources are combined. Recognizing which specific factor of production constitutes the binding constraint in a given economy at a given time — whether it is a shortage of skilled labor, insufficient fixed capital investment, or limited access to timely market information — is therefore a prerequisite for designing policy interventions that address the actual source of inefficiency rather than treating scarcity as an undifferentiated, monolithic obstacle [7], [8], [13].

Finally, the analysis presented in this paper carries implications not only for national economic policy but also for managerial decision-making at the level of the individual firm. A firm seeking to improve its own economic efficiency must similarly diagnose which of the six factors of production constitutes its binding constraint — whether insufficient fixed capital, an undertrained workforce, inadequate access to raw materials, or a deficit of timely market information — before allocating scarce managerial attention and financial resources toward relaxing that constraint. In this sense, the fundamental economic problem examined at the level of an entire society reproduces itself, in miniature, within every individual enterprise operating in a market economy [4], [5], [7], [14].

An additional dimension worth noting in this discussion concerns the role of technological change as a partial, though never complete, resolution of the tension depicted in Figure 1. Historically, technological innovation has repeatedly expanded the effective boundary of finite resources without requiring a proportional increase in the underlying physical stock of land, labor, or raw materials — mechanization increased the output obtainable from a given quantity of agricultural land, and digital information technologies have increased the value that can be extracted from a given stock of raw data. This suggests that the boundary of resources in Figure 1 is not entirely static in the way the diagram's fixed inner circle might suggest at first glance, but is itself subject to gradual, technology-driven expansion, even as it remains persistently outpaced by the more rapidly expanding boundary of material wants [1], [4], [6], [15].

It is equally important to acknowledge the limits of this framework. The stylized division of the economic problem into two clean boundaries — infinite wants and finite resources — necessarily simplifies a far more complex reality in which needs, resources, and the technologies that connect them interact dynamically and are further shaped by institutional arrangements, cultural values, and political choices that lie partly outside the domain of economic analysis narrowly defined. The framework presented here should therefore be understood as a foundational analytical lens rather than a complete descriptive model of any specific economy, and it is best applied in conjunction with the more detailed empirical and institutional analysis that subsequent, more specialized branches of economics provide [2], [4], [7].

5. Conclusion

This paper has examined the fundamental economic problem — the structural conflict between the infinite and continuously expanding material wants of individuals, firms, and states, and the finite, scarce resources available to satisfy them. Beginning from a classification of economic needs and goods, the analysis proceeded through a systematic examination of the six core factors of production — land, fixed capital, working capital, labor, entrepreneurial ability, and information — before demonstrating how their combined scarcity gives rise to a persistent and, in an absolute sense, unresolvable gap between aggregate demand and aggregate productive capacity.

The analysis further showed that this gap is not merely a theoretical abstraction but the practical foundation for the concept of economic efficiency, understood as the optimization of the relationship between resource inputs and productive outputs. Achieving full employment of the labor force and full utilization of available land and fixed capital were identified as the principal mechanisms through which a society narrows, though never entirely eliminates, the distance between its actual and potential level of output.

Taken as a whole, the framework developed in this paper reinforces a central premise of economic science: that the discipline exists precisely because resources are scarce relative to the wants they must satisfy, and that the ongoing search for more efficient means of allocating land, capital, labor, entrepreneurial ability, and information constitutes the core practical task facing individuals, enterprises, and states alike. Future research building on this theoretical foundation might usefully examine how the relative weight of each factor of production shifts across different stages of economic development, how specific national or sectoral case studies illustrate the binding-constraint framework proposed in the Discussion section, and how emerging digital and information technologies continue to reshape the boundary of what a given stock of finite resources is capable of producing.

In closing, it is worth restating the practical value of the IMRAD structure adopted in this paper for a topic of this nature. By separating the descriptive classification of needs, goods, and productive resources (Introduction and Methods) from the analytical demonstration of how these elements interact to produce the fundamental economic problem (Results), and from the broader interpretive and policy implications of that problem (Discussion and Conclusion), the paper aims to provide both a self-contained

theoretical account and a foundation on which more specialized, empirically oriented studies of particular sectors, countries, or time periods can subsequently build.

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