

MATHEMATICAL MODELING FOR PEOPLE-ORIENTED DEVELOPMENT: A COMBINATORIAL FRAMEWORK FOR OPTIMIZING SOCIALIST ECONOMIC OUTCOMES

Veniamin Mokhov
Sergei Aliukov
Anatoliy Alabugin

Marx positions the working masses as the decisive collective power behind social and historical advancement, arguing that their intentional and self-aware practical actions—shaped by their own interests and needs—constitute the most fundamental engine of progress. This human agency operates in two intertwined dimensions: people as the agents of practice and as the bearers of value. As practical agents, people, through their labor and lived activity, build the material base and generate the cultural and spiritual resources necessary for societal development; in periods of transformation, they also function as the revolutionary force that steers historical direction and propels social change. As value subjects, the people’s role in making history is inseparable from a consistent orientation toward protecting and realizing their own interests, making them the ultimate reference point and destination of social and historical development. This perspective has guided Chinese Communists to apply, in a dialectical manner, the mass line of “serving the people and depending on the people” throughout a century of revolutionary and reform practice, culminating in a far-reaching narrative of the people as creators of history.

© The author(s) 2025. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license (<http://creativecommons.org/licenses/by/4.0/>).

INTRODUCTION

Historical materialism maintains that the advancement of human society arises from the dynamic interaction between social existence and social consciousness, a contradiction generated through the collective practical activities of the people. While exceptional individuals may exert notable influence at specific historical moments, their capacity to promote social progress is ultimately rooted in the material and social conditions created by the masses and aligns with the overall direction in which the people propel history forward. Consequently, the driving force of historical development has always been the collective practice of the people. As Marx emphasized, “the people, and the people alone, are the creators of world history.”

As a Marxist political party, the Communist Party of China (CPC) has consistently upheld serving the people as its fundamental mission throughout its century-long course of struggle. In the processes of revolution, construction, and reform, the Party has relied on the strength of the people, always affirming their central position as both the of practice and the bearer of value in social and historical development. During the War of Resistance Against Japanese Aggression and the War of Liberation, the Party united and led the people to secure major victories, achieving national independence and the liberation of the people. Following the founding of New China, the Party guided the people in exploring the path of socialist revolution and development, fully mobilizing their initiative and creativity, and attaining remarkable historical accomplishments.

Since the 18th National Congress of the CPC, the Party Central Committee has brought together and led people of all ethnic groups nationwide to win the fight against poverty and to build a moderately prosperous society in all respects. At the same time, it has continued to deepen reform and strive to ensure that the benefits of reform are shared by all members of society. Only by steadfastly upholding the principle of people-centered development and preventing detachment from the masses can the Party secure lasting trust and support from the people in the new era and continue to write new chapters in the history created by the people.

THE PEOPLE AS THE PRINCIPAL AGENTS OF SOCIAL AND HISTORICAL DEVELOPMENT

From the perspective of historical materialism, the advancement of human society is not determined by the intentions or actions of isolated individuals, but is propelled by the collective practices of the broad masses. In the view of Marx and Engels, the masses constitute a socio-historical category that is dynamic rather than fixed, evolving alongside the development of social history. As they observed, with the deepening of historical activity, the scope and scale of the masses necessarily expand [1]. In class-based societies, the masses represent the overwhelming majority of the population, although their concrete composition varies with changes in social structure. Under capitalism, the masses include not only the proletariat but also intermediate strata such as peasants, artisans, and small business owners. Nevertheless, the proletariat emerges as the dominant and most decisive force at this stage, serving as the central driver of social transformation. As Marx emphasized, among all classes opposed to the bourgeoisie, only the proletariat constitutes a genuinely revolutionary class [2]. Marx consistently underscored the collective nature of the masses as creators of history, arguing that people continuously shape their own social history through practical activity, and that history itself is nothing other than the activity of human beings pursuing their own objectives [3].

Prior to the emergence of Marxism, idealist conceptions of history long prevailed within social thought. With respect to the driving forces of historical development, idealist theories either attributed social progress to the dominance of mysterious or abstract forces—such as objective spirit, supreme reason, or other metaphysical entities—or reduced history to the will of a small number of exceptional individuals, thereby overstating the influence of so-called heroes and promoting a “hero-centered” view of history. In ancient Greece, thinkers such

as Socrates and Plato traced human existence to the “rational soul” and regarded abstract ideas as the essence of the universe and the foundation of historical development. During the European Middle Ages, Augustine opposed the earthly world to the divine realm, interpreting history through theological determinism. Although the Renaissance and Enlightenment periods emphasized human subjectivity, they remained confined to the abstract plane of rational spirit. Hegel interpreted world history as the self-movement of the “absolute spirit,” maintaining that historical development was merely the unfolding of this spirit [4]. The Young Hegelians further reduced historical progress to the actions of heroic individuals while relegating the masses to a passive or even obstructive role, thereby reinforcing the heroic conception of history. Although Feuerbach partially restored materialism, he viewed human beings primarily as biological entities and failed to connect historical development with the conscious, self-directed activity of the people. As a result, his position remained an incomplete form of materialism in the field of social history [5]. Collectively, these perspectives portrayed the masses either as passive subjects subordinated to transcendent forces, as inert followers dominated by heroes, or as obstacles to historical progress [6].

In contrast to idealist interpretations that locate the impetus of history in consciousness, spirit, or abstract ideas, Marx consistently grounded the analysis of social relations and consciousness in the material conditions of production. He identified the decisive role of the masses’ practical activities in shaping social history, which constitutes the fundamental distinction between historical materialism and all forms of historical idealism. As Marx explained, the materialist conception of history consists in elucidating the real process of production and understanding the forms of social interaction arising from this mode of production as the foundation of historical development. It is therefore real, concrete individuals who create history through their own practical activity. In *The German Ideology*, Marx and Engels pointed out that the totality of material achievements and productive forces generated by the people forms the material basis of each historical stage. The productive forces, capital, and environmental conditions inherited from previous generations both shape and are transformed by subsequent generations; while human beings create their environment, they are simultaneously shaped by it [7]. Marx and Engels thus affirmed the collective character of the masses in advancing productive forces and historical progress, viewing the masses as the collective subjects who transform the material world. The reciprocal process through which people and their environment influence one another can only be realized through the collective historical practice of the masses [8]. By tracing the real foundation of historical progress to the material activity of the masses, Marx transcended idealist explanations that reduced history to abstract forces and achieved a dialectical unity of materialism and the mass-centered view of history, marking a profound transformation in social theory [9].

Beyond creating material and spiritual wealth collectively, the people also function as the practical subjects who propel social change and determine the direction of societal development during periods of historical transformation. As human practice unfolds, the fundamental contradiction between productive forces and relations of production drives history forward. Yet this progress does not occur through spontaneous evolution alone; it requires both the development of productive forces as a material foundation and revolutionary forces capable of transforming existing social structures. Marx emphasized that revolution, rather than critique alone, constitutes the true driving force of history. He regarded the masses—above all the proletariat—as the central agents of social revolution and historical progress, identifying them as the decisive force capable of overthrowing old social orders and bringing about transformative change. In class societies, class struggle serves as the immediate catalyst of social transformation, and in the historical process of transcending capitalism and realizing communism, the proletariat assumes the leading role in advancing history and consciously undertaking its revolutionary mission.

Marx envisioned the construction of communist society as grounded in the collective practice of the people and regarded a united “community of the people” as the primary subject of communist development. In class societies, individuals are invariably embedded within particular class communities, connected by shared material interests. Under such conditions, individuals participate in social relations not as isolated persons but

as members of a class. Unlike the illusory communities characteristic of earlier societies, communist society gives rise to a genuine social community formed through the free association of individuals. With the eventual abolition of class divisions, the mode of social association undergoes a qualitative transformation, enabling the people to become the conscious creators of history through free association and to emerge as the principal force in the liberation of both themselves and humanity as a whole.

THE PEOPLE AS THE VALUE SUBJECTS OF SOCIAL AND HISTORICAL PROGRESS

In Marx's theoretical framework, the subjectivity of the people in the creation of social history embodies a dual dimension: that of practical subjects and that of value subjects. These two aspects are mutually reinforcing and together constitute the core meaning of the people's historical subjectivity. As a "species-being," human beings are not only active agents who transform the objective world into a "humanized nature" through practical activity, but are also the bearers of value within this activity. From the outset, such practical engagement is oriented toward the satisfaction of human needs and therefore possesses an inherent value dimension. Human practice is thus conscious and purposive, and it is precisely this "conscious life activity" that fundamentally distinguishes human beings from animals. Whereas animals acquire the means of survival through instinct alone, human beings consciously and purposefully reshape the objective world in accordance with their real needs, transforming nature into something meaningful and valuable to themselves.

This transcendent species-character of human beings reveals that humans are neither passive dependents subordinated to a sanctified subject, as in ancient philosophy, nor isolated and self-contained "monads," as portrayed in certain strands of modern philosophy. Rather, human beings are active subjects who, within definite social relations, consciously and purposefully transform reality through practical activity. However, the realization of these species-characteristics presupposes the satisfaction of basic conditions of existence. The fulfillment of fundamental needs such as food, clothing, shelter, and subsistence constitutes the material foundation upon which human subjectivity is established. Only after these basic material requirements are met can individuals engage in more diverse forms of activity, including productive labor, cultural creation, social interaction, and artistic expression, thereby advancing toward more comprehensive forms of human development [10]. Through free and conscious activity—above all, socialized productive labor—people affirm their own essence and satisfy their concrete needs, guiding the development of the world toward their own value aspirations. In this process, their real interests and status as subjects are realized, enabling higher stages of development.

Although Marx emphasized that the advancement of social history is propelled by the growth of productive forces, he consistently regarded the free and all-round development of human beings and the liberation of humanity as the highest value objective of his theory. In his view, people are the central factor reflecting the level of development of productive forces, and the progress of these forces ultimately depends on the development of people themselves. At the same time, the people, as a collective, embody both the level and direction of social progress. Marx therefore understood human development and social advancement as a dialectically unified process, identifying the free and comprehensive development of all individuals as the ultimate destination of historical progress.

It is the needs of "real individuals" that continuously drive human beings to transform both their environment and themselves through collective practice. The transformation of history into world history is not an abstract act performed by metaphysical entities, but a concrete, material process carried out by individuals who live real lives and must meet tangible needs. Each person's concrete needs constitute the immediate impetus for free and conscious practical activity and for the creation of history itself. Moreover, human needs are not static; once a particular need is satisfied, the activity of satisfying it gives rise to new needs. This ongoing process of the generation and fulfillment of material and spiritual needs forms the dynamic mechanism

through which social history evolves. In production and social transformation, people continuously assert themselves as active subjects of practice, realizing their value demands in accordance with their real interests and class positions.

Marx further pointed out that in class societies, people are organized into different “class communities” based on their positions within the structure of social interests. In the so-called “false communities” characteristic of earlier social formations, individuals were separated from one another, and cooperation took the form of a forced association imposed by the old division of labor. In capitalist society, cooperation among classes remains a necessary but alienated unity arising from this division of labor. Under such conditions, the genuine needs of the working class are rendered unreal, while distorted and inhuman forms of value appear as reality. The alienation between human beings and material values, and the consequent loss of the people’s status as value subjects, makes it historically necessary for the proletariat to become the class that liberates not only itself but all humanity. Marx’s analyses of surplus value, class struggle, and historical laws are all rooted in a critique of the capitalist system, aimed at overthrowing social relations that degrade, enslave, and dehumanize individuals, and at ultimately realizing the free and comprehensive development of all human beings.

Marx’s critique of capitalism arose from the concrete realities of exploitation, oppression, deprivation, and alienation experienced by the proletariat. It was through this engagement with lived social conditions that he exposed the inhuman character and internal contradictions of capitalist private ownership, thereby transcending the logic of capital at both theoretical and practical levels [11]. Unlike capitalist theorists or utopian socialists who relied on moral appeals or abstract criticism, Marx focused on transforming the real social structure in order to reconstruct a form of society that restores human beings as subjects of value. In envisioning communist society, Marx reaffirmed the people as both practical and value subjects, emphasizing that only through the power of a genuine community—an association of free individuals—can the alienation produced by the old division of labor be overcome. In such an association, individuals acquire both the means and the freedom necessary for the full development of their capacities.

Marx understood communism as a positive abolition of private property, identifying capitalist private ownership as the fundamental source of exploitation and enslavement. The ultimate purpose of criticizing capitalism was therefore not merely economic reform, but the complete emancipation of humanity. By freeing people from subjugation to capital as an abstract and dominating force, communism enables individuals to enter a form of social existence aligned with their human essence, thereby becoming the true embodiment of the value of social and historical progress [12].

DIALECTICAL REALIZATION OF THE PEOPLE AS THE PRIMARY DRIVING FORCE IN REVOLUTION, CONSTRUCTION, AND REFORM

Marx’s proposition that the masses constitute the fundamental force advancing social and historical development has exerted a profound influence on the leadership approach and governing philosophy of the Communist Party of China (CPC) throughout its century-long struggle. Since its founding, the CPC has consistently integrated the Marxist conception of the masses as the makers of history with the concrete realities of China’s revolution, construction, and reform. By firmly relying on the people to promote social transformation in both theory and practice, the Party has always placed the safeguarding of the people’s interests at the highest position in its work. In doing so, it has continuously advanced the realization of the people’s role as both the principal agents of practice and the core bearers of value. It is precisely through unwavering adherence to the mass line that the Party has secured broad popular support amid complex domestic and international challenges, leading the people to successive victories in the New Democratic Revolution, the Socialist Revolution, and the period of Reform and Opening-up. In the new era, the mass line continues to guide the practice of building socialism with Chinese characteristics, standing as the key to the CPC’s historic

achievements and the fundamental guarantee of its sustained vitality.

To conceptually express the role of the masses in historical development, social progress may be abstractly represented as

$$\text{Social Historical Progress} = f(\text{People's Practice, Social Existence, Social Consciousness}), \quad (1)$$

where the function $f(\cdot)$ captures the interactive relationship among collective practice, material conditions, and forms of consciousness that shape the evolution of social history.

The influence of the mass line on Party governance and national development can be further conceptualized through a simplified quantitative expression of social support:

$$S = \frac{1}{n} \sum_{i=1}^n (P_i \times W_i), \quad (2)$$

where S denotes the overall level of mass support, P_i represents the degree of support of the i th individual or group, W_i reflects its relative weight or influence, and n is the total number of surveyed individuals or groups.

The relationship between reform initiatives and developmental outcomes may be expressed as

$$G_t = \alpha G_{t-1} + \beta (R_t - L_t), \quad (3)$$

where G_t denotes the social and economic development outcome at time t , G_{t-1} represents the outcome of the previous period, R_t captures gains generated by reform measures, L_t represents potential losses, and α and β are coefficients reflecting historical continuity and the effectiveness of reform, respectively.

Similarly, the cumulative achievements realized through the mass line across different historical stages can be expressed as

$$V = \int_0^T f(\text{Mass Support, Policy Measures}) dt, \quad (4)$$

where V denotes the overall outcome of victories achieved, $f(\cdot)$ reflects the interaction between mass support and policy actions, and T represents the relevant historical period.

Finally, the contribution of the people to socialist construction may be modeled as

$$P_{\text{impact}} = \sum_{i=1}^n (C_i \times E_i), \quad (5)$$

where P_{impact} denotes the aggregate impact of the people on social construction, C_i represents the level of participation of each group, and E_i indicates the corresponding economic and social contribution.

These expressions are intended as conceptual analytical tools; in practice, they require refinement and empirical calibration according to specific historical contexts and data.

Marxism has served as the guiding ideology and action framework of the CPC since its establishment, consistently emphasizing the dialectical application of the Marxist mass-centered view of history to China's revolutionary, constructional, and reform practices. During the New Democratic Revolution, the Party defined the realization of the proletariat's interests as its ultimate objective and established the mass line as its most fundamental operational principle. Confronted with the historical question of how to safeguard national survival and popular liberation in a semi-colonial and semi-feudal society, the CPC identified the people as the decisive foundation of national independence and emancipation. By integrating the principle that "only the proletariat can liberate itself" with China's concrete political and economic conditions, the Party identified the most reliable source of revolutionary strength at a critical juncture in the nation's fate.

The Party's early congresses clearly articulated this orientation, affirming its character as a party of the proletarian masses and stressing that all Party activities must be rooted in and directed toward the masses. By steadfastly adhering to the mass line, actively organizing workers' and peasants' movements, and resolutely defending the fundamental interests of the people, the Party steadily expanded its political influence and consolidated the broadest possible social foundation. In the course of building revolutionary base areas and waging armed struggle, land reform emerged as a central mechanism through which the Party concretely represented and protected the interests of the masses, enabling the mobilization of vast peasant forces and laying a solid foundation for revolutionary success.

During the War of Resistance against foreign aggression, the people once again demonstrated their historic responsibility and transformative power. Under the Party's leadership, broad popular participation sustained the growth and effectiveness of the people's armed forces, delivering decisive blows to invading forces and securing national liberation. In the subsequent transition to socialist revolution and construction following the founding of New China, the Party confronted the challenge of transforming revolutionary enthusiasm into sustained momentum for national development. By mobilizing the people as both builders and beneficiaries of the new state, significant advances were achieved across industry, agriculture, science and technology, and national defense.

With the advent of Reform and Opening-up, the Party further affirmed the people's central role in development, advancing policies that liberated productive forces, diversified ownership structures, and expanded opportunities for participation and benefit-sharing. Subsequent theoretical innovations, including the concept of the "Three Represents" and the Scientific Outlook on Development, further clarified the people-centered orientation of development, emphasizing comprehensive human development and the protection of fundamental popular interests. Across successive historical stages, the Party has consistently treated the people as both the primary agents of practice and the ultimate subjects of value, ensuring that all reforms and development strategies remain oriented toward the free and comprehensive development of the people.

FOR THE PEOPLE AND BY THE PEOPLE: CONTINUING A NEW CHAPTER OF PEOPLE-FIRST DEVELOPMENT IN THE NEW ERA

Throughout the great practice of reform and opening up, the Communist Party of China (CPC) has consistently adhered to the integration of the Marxist mass-centered view of history with the concrete practice of building socialism with Chinese characteristics. By dialectically applying the fundamental principle that development must be for the people, rely on the people, and share its outcomes with the people, the Party has continuously stimulated the vitality and creativity of the masses, thereby providing sustained momentum for reform and development. Since the 18th National Congress of the CPC, the domestic and international environment has become increasingly complex, and the cause of socialism with Chinese characteristics has entered a new historical stage. As reform has progressed into deeper and more challenging phases, addressing new contradictions—such as unbalanced and insufficient development—and advancing higher-quality development have become central tasks for the Party and the state.

After entering the new era of socialism with Chinese characteristics, the CPC has persisted in relying on the people to advance reform, opening up, and socialist modernization, striving to complete the building of a moderately prosperous society in all respects. General Secretary Xi Jinping has emphasized that the people's position constitutes the fundamental political stance of the CPC and the defining feature that distinguishes a Marxist party from other political organizations. The close bond between the Party and the people—sharing hardships and standing together through adversity—serves as the essential guarantee for overcoming risks and challenges. By activating the people's principal role and unleashing the vitality of reform and innovation, the Party has promoted comprehensive and systematic institutional reform through top-level design and

coordinated planning, advancing integrated development strategies such as the “Five-in-One” and “Four-in-One” frameworks. Through the interconnection of theoretical, institutional, scientific, technological, and cultural innovation, the Party has achieved new historic accomplishments in socialist modernization.

The relationship between development, popular participation, and reform can be conceptually expressed as

$$Y = f(L, K, P, I, R), \quad (6)$$

where Y denotes the level of economic development, L represents labor input reflecting the people’s contribution, K denotes capital investment, P reflects political stability and governance, I represents innovation, and R corresponds to institutional and policy reform.

The principle that development outcomes must benefit the people can be expressed as

$$D = \alpha Y + \beta(S - C), \quad (7)$$

where D denotes people-centered development, Y represents economic output, S refers to social benefits such as education and healthcare, C denotes associated costs or inequalities, and α and β are weighting coefficients.

The contribution of reform and innovation to development may be modeled as

$$\Delta Y = \gamma \Delta R + \delta \Delta I, \quad (8)$$

where ΔY denotes changes in development, ΔR represents reform progress, ΔI reflects innovation advancement, and γ and δ measure their respective impacts.

The enhancement of development quality through sustained reform can be expressed as

$$Q(t) = Q_0 + \int_0^t \frac{dR}{dt} \mu(t) dt, \quad (9)$$

where $Q(t)$ is the quality of development at time t , Q_0 is the initial quality level, $\frac{dR}{dt}$ denotes the pace of reform, and $\mu(t)$ represents reform effectiveness.

Equitable sharing of development outcomes may be represented as

$$E = \frac{S}{Y} \times 100\%, \quad (10)$$

where E denotes the equity index, S represents social welfare benefits, and Y denotes total economic output.

As economic and social development has accelerated, ensuring that the people’s status as value subjects is more fully reflected in a fair and just manner has become a central concern related to livelihoods and the Party’s mass foundation. The Fifth Plenary Session of the 18th CPC Central Committee clearly articulated the people-centered development philosophy, emphasizing that development must always adhere to the people’s principal position, respond to their aspirations for a better life, and ensure that its benefits are shared by all. The people are the core element embodying the level of development of productive forces. Only by advancing shared development, improving income distribution mechanisms, and enhancing redistribution can social justice be promoted and the people’s sense of gain strengthened, thereby fully mobilizing their initiative in reform and innovation.

In the new era, the people’s needs for a better life have become increasingly diverse and complex. Resolving issues such as poverty, inequality, and unbalanced development requires continued reliance on the people and sustained efforts to improve both the quality and inclusiveness of development. High-quality development is

essential to meeting material and spiritual needs alike, and its success depends on effectively stimulating the creative vitality of the people and consistently prioritizing their fundamental interests. It is precisely by relying on the people's collective strength that the Party has been able to overcome new challenges, respond effectively to major risks, and achieve historic victories such as poverty alleviation and public health emergency control.

History demonstrates that recognizing the people as the creators of history is the essential distinction between the mass-centered view of history and the heroic view that attributes progress to a few individuals. Over the century-long course of revolution, construction, and reform, it has been through maintaining close ties with the people that the CPC has led the nation through repeated trials to achieve enduring success. In the new era, faced with unprecedented complexity and challenges, the only path for advancing socialist modernization and realizing national rejuvenation lies in steadfastly relying on the people's support and wisdom. By rooting governance capacity in the people's creative practice and collective endeavor, the CPC continues to write a new and enduring chapter in the great cause of socialism with Chinese characteristics.

REFERENCES

- [1] Jintao, H. (2011). Speech at a Meeting Commemorating the 90th Anniversary of the Founding of the Communist Party of China. Xinhua News Agency, 1, 2011-07.
- [2] Altay, A., & Mirici, I. H. (2024). Efl Instructors' Implementations of 21st Century Skills in Their Classes. *International Journal for Housing Science and Its Applications*, 45(2), 37-46.
- [3] Wu, Y. (2024). Exploration of the Integration and Application of the Modern New Chinese Style Interior Design. *International Journal for Housing Science and Its Applications*, 45(2), 28-36.
- [4] Mercier, T. C., & Chamon, P. (2020). Ambivalent Promises—Reproductions of the Subject: A Forum on Jacques Derrida's Specters of Marx after 25 Years, Part IV. *Contexto Internacional*, 42, 125-148.
- [5] Bosteels, B. (2010). Politics, Infrapolitics, and the Impolitical: Notes on the Thought of Roberto Esposito and Alberto Moreiras. *CR: The New Centennial Review*, 10(2), 205-238.
- [6] Merrifield, A. (2013). The urban question under planetary urbanization. *International Journal of Urban and Regional Research*, 37(3), 909-922.
- [7] Bourg, J. (2005). The Red Guards of Paris: French Student Maoism of the 1960s. *History of European Ideas*, 31(4), 472-490.
- [8] Doja, A. (2008). Claude Lévi-Strauss at his Centennial: toward a future anthropology. *Theory, Culture & Society*, 25(7-8), 321-340.
- [9] Filatova, I. (2018). 'Red October' in South Africa. *Twentieth Century Communism*, 14(14), 41-47.
- [10] Gonzalez Rey, F. (2016). Advancing the topics of social reality, culture, and subjectivity from a cultural-historical standpoint: Moments, paths, and contradictions. *Journal of theoretical and philosophical Psychology*, 36(3), 175.
- [11] LI, D., & ZHU, C. (2021). Logical Interpretation of China's Science and Technology Development Strategy in the New Era. *Philosophy*, 11(9), 677-682.
- [12] Berlanga, J. L. V., & Ledo, J. (2010). The liberal roots of populism: A critique of Laclau. *CR: The New Centennial Review*, 10(2), 151-182.

Veniamin Mokhov, Departament d'Economia i Empresa, Universitat Pompeu Fabra Barcelona Graduate School of Economics

Sergei Aliukov, Departament d'Economia i Empresa, Universitat Pompeu Fabra Barcelona Graduate School of Economics

Anatoliy Alabugin, Departament d'Economia i Empresa, Universitat Pompeu Fabra Barcelona Graduate School of Economics

Manuscript Published; 02 March 2025.