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A Structured Financial Framework for Sharing the Benefits of Technological Innovation against the Backdrop of the 'K-shaped' Divergence

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ABSTRACT

As China's economic growth model gradually shifts from labour-intensive to technology- intensive, capital-intensive and knowledge-intensive, profound changes are taking place in the structure of employment, sources of income and patterns of wealth distribution. New growth drivers such as artificial intelligence, semiconductors, new energy, biotechnology and high-end manufacturing are capable of generating high levels of productivity and corporate value; however, their capacity to directly absorb ordinary employment is relatively limited, and capital gains tend to be concentrated among entrepreneurs, technical talent, venture capital firms, private equity funds and high-net-worth investors. At the same time, the contraction of traditional industries is driving some workers towards platform-based employment, temporary services and freelance work, which may result in a pronounced K-shaped divergence in economic development. Building upon the analytical framework for science and technology finance with Chinese characteristics proposed by Professor Yang Zhaojun, this paper introduces the 'Science and Technology Finance Pool' mechanism. Through government guidance, fund-of-funds operations, a diversified asset pool, secondary securitization, risk stratification, risk retention and a cash flow waterfall structure, this mechanism transforms a portion of the growth returns from technology enterprises into standardised products with distinct risk-return profiles. This paper argues that, whilst the Sci-Fin Pool cannot replace employment, education and social security policies, it can serve as an important institutional supplement linking technological innovation, capital circulation and the property income of ordinary households..

1. Introduction

Scientific and technological innovation has become a key driver of productivity growth, industrial upgrading and enhanced national competitiveness. Sectors such as artificial intelligence, semiconductors, new energy, biotechnology and high-end manufacturing are gradually emerging as the core sources of future economic growth. From the perspective of national development, continuing to promote scientific and technological innovation is not a matter of choice, but rather a prerequisite for breaking away from a low-value-added development path, enhancing self- reliance in key technologies and competing on the international stage.

However, the transition from old to new growth drivers does not automatically result in an equitable distribution of benefits. In the past, sectors such as property, low-end manufacturing, large-scale infrastructure and traditional services, despite having limited technological barriers, were able to absorb a large workforce. Ordinary households primarily shared in the fruits of economic growth through stable employment and wage income. Technology-intensive industries, by contrast, rely more heavily on research and development, data, intellectual property, specialised talent and capital investment. A technology company may generate significant market value, yet it may not necessarily create a corresponding number of jobs. In addition, technology firms often face financing constraints because lenders may ration credit when confronted with imperfect information (Stiglitz & Weiss, 1981). Furthermore, the capital gains generated by technological innovation are typically shared first and foremost by founders, key staff, venture capital funds, private equity firms and professional investors with access to private markets.

Consequently, the issue that truly requires discussion at present is not whether to continue developing technology, but rather how to mitigate the pressures on employment and wealth disparity during the transition period whilst fostering new growth drivers, thereby enabling more ordinary households to share in the long-term value created by technological

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innovation. Against this backdrop, this paper proposes the ‘Technology-Finance Pool’ framework, which seeks to convert the growth returns of technology enterprises into financial interests that are stratifiable, manageable and transferable through financial structural design.

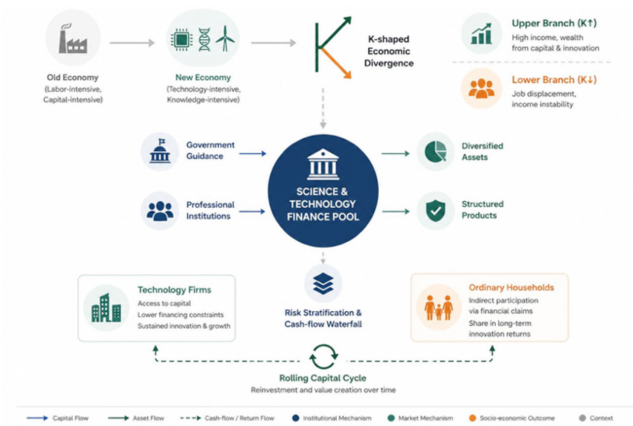

Figure 1. Conceptual Framework of the Proposed Science and Technology Finance Pool

2. The Transition from Old to New Growth Drivers, Flexible Employment and the K-shaped Distribution

The number of people in flexible employment in China has continued to grow over the past few years. According to relevant statistics cited in the original manuscript, the number of people in flexible employment stood at approximately 200 million in 2021 and 240 million in 2024; some studies and market reports project that this figure may rise further to approach 320 million in the future. Although authoritative data sources for these figures should be provided prior to formal submission, the structural trends they reflect warrant attention: the growth in flexible employment is not merely a reflection of greater freedom in working arrangements, but may also be a passive consequence of the reduction in stable jobs during the transition between old and new industries.

Traditional growth drivers are typically labour-intensive. The property sector, for instance, can generate a vast number of jobs in construction, renovation, building materials, household appliances, estate agency and property management; low-end manufacturing can absorb a huge number of industrial workers; and infrastructure development can also create extensive direct and indirect employment. When these sectors are in a phase of expansion, workers can participate in economic growth through employment and wage income, even if they do not possess capital.

New growth drivers, by contrast, are typically technology-intensive, capital-intensive and knowledge-intensive. Artificial intelligence firms may command high valuations, but their core roles are primarily concentrated in specialised areas such as algorithms, engineering, computing power, product development and capital operations. Although the semiconductor, new energy and biotechnology sectors have relatively long industrial chains, the main benefits are often concentrated in technology, capital, management capabilities and leading enterprises. New growth drivers can expand the overall economic output, but they do not necessarily create the same number of stable jobs with the same entry barriers as in the past.

The resulting K-shaped distribution encompasses both labour income and capital income. Those in the upper arm of the K-shaped curve typically possess technical skills, capital resources, specialised education and access to high-growth assets, enabling them to benefit from both higher wages and capital appreciation. Those in the lower arm, however, may be affected by declining profits in traditional industries, job losses and the replacement of skills by technology, shifting from stable employment to flexible forms of work such as food delivery, ride-hailing, live- streaming, domestic services and temporary work. As the gap between the two extremes widens, the pressure on the middle-income group will also gradually increase.

K-shaped polarisation does not imply that technological development should be halted. If we continue to rely on low-value-added and labour-intensive industries, China may remain locked for the long term into industrial segments characterised by low profits, susceptibility to substitution and dependence on key technologies. The real institutional challenge lies in ensuring that, whilst developing artificial intelligence, semiconductors, new energy and high-end manufacturing, the benefits generated by technological progress are not concentrated solely among a select few capital and technology groups. In addition to enhancing workers' skills, improving social security and enhancing public services, expanding the channels through which ordinary households can access investment income is also a vital complementary measure to alleviate K-shaped polarisation.

3. Theoretical Framework

This paper draws upon the analytical framework for science and technology finance with Chinese characteristics proposed by Professor Yang Zhaojun. This framework combines macro- level institutional design with micro-level financial contracts. At the macro level, its operational logic is reflected in a cyclical mechanism comprising government guidance, the operation of fund-of-funds, asset securitisation, and the sale and reinvestment of securitised products; at the micro level, it emphasises the design of incentive-compatible contracts under conditions of information asymmetry. Technology enterprises are characterised by high risk, light-asset structures and uncertain future cash flows, making it difficult for them to rely entirely on traditional bank financing. Because investors cannot perfectly observe project quality, adverse selection may arise (Akerlof, 1970). In addition, agency conflicts may emerge between fund managers, financial intermediaries, entrepreneurs and external investors due to information asymmetry (Jensen & Meckling, 1976).

Professor Yang Zhaojun's framework demonstrates that government-guided capital, professional fund management, asset pooling and securitisation can form a sustainable capital cycle. Asset pools can diversify some non-systemic risks, whilst tiered securities allow for the reallocation of residual risks across products with different priority rankings. The KeRong Pool does not replace this theory, but builds upon it to further propose product-based mechanisms such as a rolling unified fund pool, secondary securitisation, risk retention and cash flow waterfalls.

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4. The KeRong Pool Model

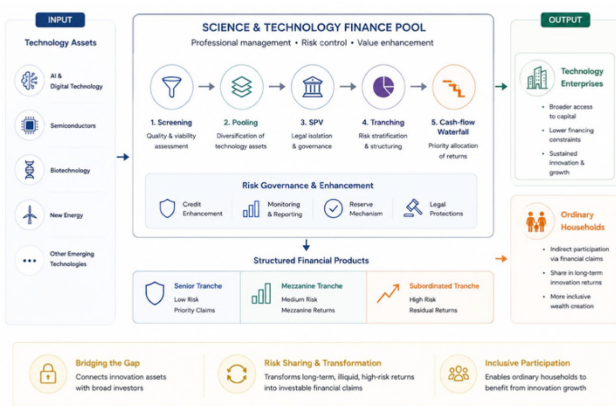

Figure 2. Institutional Architecture of the Proposed Science and Technology Finance Pool

The KeRong Pool is a unified asset pool managed by professional institutions. According to delegated monitoring theory, specialised financial intermediaries can reduce information costs and improve monitoring efficiency between entrepreneurs and investors (Diamond, 1984). Its underlying assets may include equity interests in technology enterprises, units in technology-themed funds, revenue-right certificates or existing project securities. Eligible assets, following technical, commercial, legal and financial due diligence, are incorporated into a diversified investment portfolio and transferred to a legally independent special-purpose vehicle, which then issues financial products backed by the cash flows of the asset pool.

The first tier of financing occurs when technology enterprises raise capital through equity, preference shares, convertible securities, profit-sharing agreements or fund units. The second tier of financing occurs when a fund of funds or wealth management institution acquires and consolidates these interests, and then issues new securities based on the pooled assets. As it is established fund units or project interests, rather than the original cash flows of a single enterprise, that may be securitized, this process can be understood as secondary securitization. This structural design extends the classic pooling and tranching framework proposed by DeMarzo (2005), in which securitisation reallocates risks among investors with different information and risk preferences.

A rolling asset pool can enhance the efficiency of capital circulation. When underlying assets mature, are exited, default or are sold, the associated funds may be used, within a specified reinvestment period, to repay investors or to acquire new eligible assets. However, to prevent the manager from replacing existing assets with lower-quality ones, the KeRong Pool must establish clear eligibility criteria, concentration limits, independent valuations, restrictions on related-party transactions, regular disclosure requirements and trustee oversight.

5. Risk Stratification and Cash Flow Allocation

A Kerong Pool may issue products with different priority levels of repayment. Seniorinvestors are the first to receive interest and principal; mezzanine investors bear higher risk andreceive higher expected returns; and subordinated investors absorb losses first and share theremaining returns after the senior and mezzanine tiers have been repaid. In principle, subordinated tranches should be held primarily by the manager, the originator, government-guided funds or other professional institutions, in order to achieve risk-sharing and alignment ofinterests.

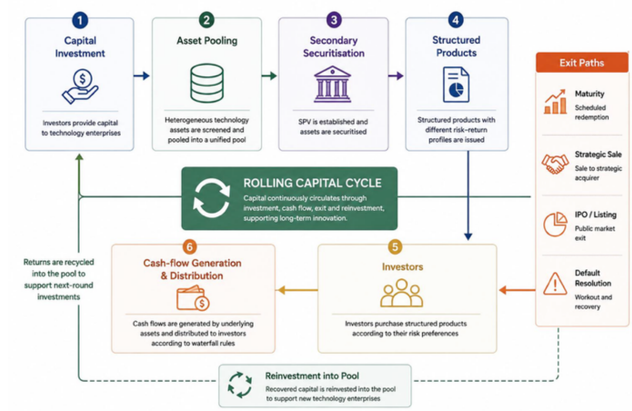

Figure 3. Risk Stratification and Cash-flow Waterfall of the Science and Technology Finance Pool

The cash flow waterfall should be executed in accordance with pre-set rules. Cash flows generated by the asset pool shall first be used to pay taxes, custodian fees, audit fees and necessary operating costs; secondly, to replenish the liquidity account and risk reserve; subsequently, to pay interest and principal to senior and mezzanine investors in that order; and finally, to distribute the remaining returns to subordinated investors. Should the default rate, valuation decline or liquidity indicators trigger pre-set thresholds, cash flows that would otherwise have been allocated to subordinated investors shall be prioritised for replenishing the reserve or repaying senior investors. Such structured allocation reallocates risks among investors with different risk preferences through tranching (DeMarzo, 2005). Meanwhile, financial intermediaries can further enhance market liquidity by transforming illiquid assets into tradable securities (Gorton & Pennacchi, 1990).

6. Contract Design to Ensure Alignment of Incentives

The effective operation of the KeRong Pool hinges crucially on the contractual arrangements. As fund managers possess information regarding asset selection, post-investment management, valuation and exit timing, agency conflicts inevitably arise between managers and investors (Jensen & Meckling, 1976). Therefore, managers' remuneration should not be linked solely to transaction volume, but should combine a moderate fixed management fee, deferred performance fees, co-investment, recourse clauses and the assumption of subordinated risk in order to mitigate short-term profit-seeking behaviour and moral hazard. Such incentive mechanisms are consistent with optimal contract design under moral hazard (Holmström, 1979). Asset originators and financial intermediaries also need to retain a portion of the risk. If securities firms or private equity firms are able to transfer all risk immediately upon the assets entering the fund pool, they may lack sufficient incentive to conduct due diligence. Retaining a portion of the risk and linking remuneration to long-term performance can address this issue. For technology entrepreneurs, a balance should be struck between protecting investors and maintaining entrepreneurial incentives through staged financing, milestone payments, convertible securities and conditional control rights.

7. Contract The KeRong Pool's Response to the 'K-shaped' Divergence

The significance of the KeRong Pool lies not only in assisting technology enterprises with financing, but also in attempting to transform the way ordinary households participate in technological growth. In the past, the dividends of technology enterprises' growth were primarily shared among founders, venture capital firms, private equity firms, high-net-worth individual sand leading financial institutions. If ordinary households were to invest directly in individual technology projects, they would face prohibitively high information costs, liquidity risks and the risk of failure. Through professional screening, asset diversification and structured tiering, the KeRong Pool enables ordinary households to participate indirectly in the returns from technological innovation via relatively senior cash flow claims, rather than bearing the full risk of a single project directly. This mechanism cannot replace employment policies, nor can it guarantee returns or eliminate risk. Its purpose is to provide households that rely primarily on wage income with an additional potential source of investment income. As technological innovation gradually becomes the main driver of economic growth, whilst the ability of traditional industries to provide stable employment declines, the ability of ordinary households to hold a portion of new economy assets in a reasonable manner will directly influence their capacity to share in future growth. Consequently, the Science and Technology Financing Pool can be understood as a financial institutional response to K-shaped polarisation. It does not seek to transform everyone into risk investors, but rather, through risk stratification and professional management, builds a bridge between technology enterprises and investors with varying risk appetites. Its objective is tonsure that technological innovation serves not only industrial upgrading but also, under prudent regulation and within manageable risk parameters, facilitates broader participation in wealth creation.

8. Risks and Limitations

The Kerong Pool faces practical constraints such as valuation, correlation, liquidity and information transparency. Unlisted technology enterprises lack continuous market prices, and their valuations are highly dependent on technical feasibility, commercialization progress and future financing environments. Even when assets originate from different enterprises, they may share common exposure to risk factors such as subsidy policies, interest rates, regulation, supply chains and capital market liquidity. Consequently, independent valuation, prudent discounting, penetrative analysis and stress testing are indispensable.

Long-term, illiquid private assets should not underpin products that promise short-term or daily redemptions. The product term must align with the cycle of the underlying assets. Government participation must also be clearly defined and limited, and must not create expectations of an unconditional safety net. Before being formally made available to retail investors, the KeRong Pool should first undergo data simulation, pilot schemes with professional investors and regulatory sandbox testing.

9. Conclusion

Innovation-driven growth is simultaneously transforming production structures, employment patterns and wealth distribution. Technology companies are capable of creating immense value, but the associated returns are often concentrated among those who possess technology, capital and access to specialised investment channels. The contraction of traditional industries, coupled with the growth of flexible employment, leaves some ordinary workers facing income instability and insufficient asset accumulation, which may result in a more pronounced K-shaped economic divergence. Building upon Professor Yang Zhaojun's framework for technology finance, the 'Science and Technology Finance Pool' combines government guidance, fund-of-funds operations, a diversified asset pool, secondary securitisation, risk stratification, risk retention and a cash flow waterfall mechanism. Its aim is neither to hinder technological development nor to sell high-risk assets directly to ordinary households, but rather, through financial structural design, to convert the growth returns of technology enterprises into financial equity interests across different risk tiers.

Whilst the 'Science and Technology Finance Pool' cannot single-handedly resolve issues of employment and income inequality, it can serve as an institutional supplement to policies on education, employment, social security and taxation. It seeks to address a core question: when technological innovation becomes the primary source of future economic growth, how can ordinary people continue to share in that growth? The answer presented in this paper is that, through prudent innovation in technology finance, the opportunities for ordinary households to participate in the returns from technology capital can be expanded, ensuring that technological progress not only drives industrial upgrading but also creates long-term value for a broader segment of society.

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