

To the Specialised Academic Council
of Sumy State University

REVIEW

**by the official opponent Doctor of Economic Sciences, Professor,
First Vice-Rector of Poltava University of Economics and Trade,
Nataliia Pedchenko
on the dissertation work**

Yang Yu

**performed for the Doctor of Philosophy degree in the Speciality (program
subject area) 073 "Management" in the field of study 07 "Management and
Administration" on the topic "The management of state financial resources in
China's higher education: Enhancing regional equity, efficiency, and
adequacy of financial provision."**

1. Relevance of the thesis

The effective management of state financial resources in higher education is a critical component of a nation's educational framework, distinguishing the developmental levels of countries and significantly influencing the growth of educational output, access to quality education, and the future intellectual capital of a society. Moreover, at the regional level, stability in educational funding impacts private investment in education, the cost of educational services, the quality of educational assets, and the growth of educational institutions. Universities, through the allocation of financial resources, the provision of educational loans, and the facilitation of academic and research services, contribute to the intellectual foundation of a nation, thereby promoting regional stability and development. The coordinated operation of higher education institutions and the effective management of their financial resources are conducive to regional stability, while issues within the higher education financial system can pose risks to the broader educational and economic landscape.

The relationship between the management of state financial resources in higher education and regional stability is based on mutual influence. Higher education institutions with adequate financial resources have sufficient reserves to mitigate potential shortfalls, enhancing their capacity to withstand economic and social shocks. Conversely, insufficient financial provisioning in higher education can lead to systemic risks, educational instability, and even regional crises, which is particularly pertinent in the context of current socio-economic and political upheavals (such as the global financial crisis of 2008, regional economic disparities, the COVID-19 pandemic, and geopolitical tensions). Therefore, establishing, maintaining, and

regulating the adequacy of financial resources in higher education is a prerequisite for ensuring regional stability and development.

The considerations underscore the relevance and prospects of the thesis topic, which aims to deepen the theoretical and scientific methodological foundations and to propose practical suggestions for improving the assessment methods of the impact of state financial resource management in higher education on regional stability and development.

2. The degree of validity of the scientific positions, conclusions and recommendations formulated in the dissertation

The comprehensiveness and objectivity of the scientific findings in Yang Yu's dissertation were largely ensured by the author's utilization of a combination of general scientific methods (such as scientific abstraction, analysis, synthesis, induction, and deduction) and specialized techniques for an in-depth evaluation of the impact of state financial resource management in higher education on regional equity, efficiency, and adequacy. Specifically, the preparation of the thesis, in alignment with the set objectives, was based on the application of the following methodologies: bibliometric analysis – to define the concepts of "state financial resource management," "regional equity," "efficiency," and "adequacy" and their interrelations (Chapter 1); historical and comparative methods – to identify the principal stages of the formation of regulatory support for financial resource management in higher education (Chapter 1); principal component analysis – to filter relevant indicators of financial resource management and regional development.

Practical calculations and economic-statistical modelling in the thesis were conducted using statistical data analysis packages such as Statistica 12, StataSE 18, and MS Excel. The visualization of the systematization of the conceptual and categorical apparatus of "state financial resource management" and "regional development" and their interrelations was carried out using geographic information systems.

The scientific and theoretical foundation of the study is constituted by national educational policies, directives from the Ministry of Education, resolutions of the State Council, regulations of international organizations such as the World Bank, UNESCO, and OECD on educational finance, and the analytical base is formed by national statistical data, international ratings, and analytical data on higher education funding and regional development.

All these elements ensured the validity and reliability of the scientific provisions, conclusions, and recommendations formulated in the thesis.

3. Relationship of the dissertation to scientific plans, programmes, basic and applied research

The main provisions of Yang Yu's doctoral dissertation are consistent with the research directions of Sumy State University, including: "The Management of State Financial Resources in Higher Education: Enhancing Regional Equity, Efficiency, and Adequacy of Financial Provision" which aligns with the university's focus on socio-economic challenges in the context of digitalization (state registration number 0121U114364); "Convergence of Economic and Educational Transformations in the Context of Digitalization" which explores the coordinated development of economic and educational systems (state registration number 0121U114570); and "The Innovative Drivers of the Growth of the Country's Macroeconomic Stability" which examines the interconnection between effective management of state financial resources in higher education and macroeconomic stability (state registration number 0121U114396).

Within these research frameworks, Yang Yu developed methodological approaches to assess the convergence and disparities in higher education fiscal expenditures in China, evaluated the effectiveness of state financial expenditures in the context of improving higher education management, and coordinated undergraduate education with regional economies in mainland China's provinces. The dissertation also established a new methodology for assessing funding adequacy in higher education, based on calculating standard expenditures per student across different regions, and examined the role of investment in education in stimulating economic growth, considering the contributions of human and intellectual capital.

Furthermore, the dissertation work is in line with the university's research on "Transformation of the Financial System and Strategic Priorities of its Development" (state registration number 0121U114477), where the optimization of the system of horizontal transfer payments for the balanced inter-regional distribution of state resources within the framework of the management of state financial resources in higher education in China was explored.

In summary, Yang Yu's dissertation work is well-integrated with the research priorities of Sumy State University, contributing to the understanding and improvement of financial resource management in higher education, with a focus on regional equity, efficiency, and adequacy. The research provides valuable insights and practical recommendations for policymakers and educators, supporting the university's commitment to advancing knowledge and addressing contemporary socio-economic issues.

4. Novelty of scientific positions, conclusions and recommendations formulated in the thesis

The dissertation offers theoretically grounded and statistically validated research findings characterised by scientific originality. The evaluation of China's management of state financial resources in higher education employs a systematic methodology that integrates σ -convergence, absolute β -convergence, and conditional β -convergence of per capita general public budget funding. This method analyses the temporal horizontal trend of financial expenditures in higher education, assessing whether regional differences in financial allocations are diminishing, evaluating the rate of convergence trends, and accounting for structural determinants. The study assesses the efficacy of state financial resource management in higher education across a decade, concentrating on convergent and divergent patterns in the consistency of financial assistance.

The three-stage Data Envelopment Analysis (DEA) methodology proposed by the author is of considerable practical significance for assessing the effectiveness of higher education funding in China. This model identifies the main sources of inefficiency and provides practical recommendations for enhancing resource allocation and utilisation in the education sector.

The dissertation introduces a novel methodological framework for evaluating the sufficiency of funding in higher education, essential for maintaining the quality and accessibility of education. Through the calculation of standard expenditures per student across various areas, the author offers a novel instrument for policymakers to tackle regional inequities and enhance educational spending.

Moreover, the thesis presents an enhanced framework for analysing the relationship between educational investment and economic growth, accounting for both direct and indirect effects through the perspective of human and intellectual capital. This thorough investigation enhances the current understanding of the role of education in economic growth.

The notions of "state financial resource management," "regional equity," "efficiency," and "adequacy" have been further delineated in the thesis, drawing upon the synthesis of the conceptual and categorical frameworks established in the scholarly works of both foreign and Chinese researchers. The established theoretical conceptual model of the interplay between state financial resource management in higher education and regional development is significant, providing a novel theoretical basis for forthcoming research and policy formulation in this domain.

5. Reliability of the provisions, conclusions and recommendations formulated in the thesis

The validity of the assertions, conclusions, and recommendations presented in Yang Yu's dissertation is unquestionable, as each phase of the research is meticulously documented with sequential illustrations and citations to pertinent

sources. Comprehensive statistical data, which underpin the analysis and findings, are systematically organized and included in the appendices of the thesis. This thorough approach ensures transparency and allows for the verification of the research outcomes, thereby reinforcing the credibility of the scientific contributions made by the study.

6. Completeness of reflection of research results in published scientific works

The principal outcomes of Yang Yu's doctoral research are disseminated across 11 scientific publications, totalling 11.01 printed pages. The author's individual contribution amounts to 8.85 printed pages, which includes: 1 article in a scientific journal indexed by the Web of Science, 6 articles in specialized scientific journals of Ukraine categorized as "B" level, and 4 conference proceedings. These publications reflect the original research and theoretical contributions made by the author in the field of state financial resource management in higher education.

7. Testing the results obtained

The main theoretical provisions and statistically substantiated scientific results of Yang Yu's doctoral dissertation were presented and discussed at various scientific and practical national and international conferences, including the 4th International Scientific and Practical Conference "Digital transformations and innovative technologies in the economy: challenges, realities, strategies" (Sumy, Ukraine, 2023), the 2nd International Scientific and Practical Conference "Socio-Economic Challenges" (Sumy, Ukraine, 2022), the International Scientific and Practical Online-Conference "Financial Markets, Institutions and Risks" (Sumy, Ukraine, 2021), and the 8th International Scientific and Practical Conference "Problems and prospects for the development of the financial and credit system of Ukraine" (Sumy, Ukraine, 2023). These conferences provided a platform for rigorous evaluation and favourable feedback on the dissertation's main provisions.

8. The significance of the research for science and practice, ways to use its results

The results of the research conducted address the pressing scientific issue of refining the theoretical and methodological principles for assessing the impact of state financial resource management in higher education on regional equity, efficiency, and the adequacy of financial provision. The practical significance of the scientific outcomes lies in their application to enhance the effectiveness of state governance and regulation of the financial sector in education, ensuring the stability and orientation of the higher education system to macroeconomic needs. This may include the

development of new regulatory strategies and the refinement of macroeconomic forecasting mechanisms by state authorities, as well as the formation of risk management vectors and policies for maintaining an adequate level of financial resource management in higher education institutions.

It is worth noting that certain provisions of the doctoral work have already been implemented in the activities of Sumy State University, in scientific research within the project "Socio-economic challenges in the context of digitalization of social relations" (state registration number 0121U114364), and in the educational process within the course "Budgetary Management." Additionally, the findings have been applied in the activities of the European Marketing and Management Association (EUMMAS), the NGO "Center for Lifelong Education," and the Eastern European Association for Civic Education (EENCE), contributing to the improvement of financial resource management in higher education at various levels.

9. Assessment of the content of the thesis and its completeness in general

Yang Yu's doctoral dissertation is a completed scientific work consisting of 260 pages, including 213 pages of the main text. In accordance with the regulatory requirements, which were fully adhered to by the author, the structure of the work includes the following elements: an abstract, introduction, three chapters, general and intermediate conclusions for each chapter, a list of references with 240 entries, and 5 appendices.

In the introduction, the author discusses the relevance of the research, arguing for the necessity of further development of the theoretical and methodological aspects of assessing the impact of state financial resource management in higher education on regional equity, efficiency, and the adequacy of financial provision. The research objectives, subject, object, and tasks of the doctoral study are defined. The results of the bibliographic analysis conducted by Yang Yu indicate the theoretical and practical aspects that are important for the research and are covered by the dissertation.

The first chapter (Pages 29-95) of the dissertation primarily focuses on the theoretical underpinnings and international experiences related to the management of state financial resources in higher education, with a particular emphasis on regional equity, efficiency, and the adequacy of financial provision. The research conducted in this chapter includes:

- 1) The chapter establishes a theoretical framework for understanding the management of state financial resources in higher education. It emphasizes the importance of financial resource allocation in alleviating disparities in educational resources and supporting the comprehensive development of the higher education sector. This theoretical analysis is crucial for setting the stage for the empirical

research that follows, providing a conceptual lens through which to view the allocation of financial resources.

2) The chapter compares the experiences of China with those of other countries, such as the United States, the United Kingdom, and Japan. This comparative analysis helps to identify unique methods of resource allocation and their effects on regional equity and educational quality. By learning from international practices, the research aims to offer insights for optimizing the allocation of educational resources in China.

3) The chapter highlights a significant increase in academic attention to higher education resource allocation in recent decades. It underscores the growing importance of this issue amidst rapid economic development and the shift into the information technology era. Understanding global trends is essential for China to align its educational resource allocation strategies with international best practices.

4) The chapter discusses China's initiatives to balance the allocation of higher education resources, which are consistent with national policy goals. It notes the increasing scholarly focus on the significance of financial resources in the sector but also recognizes the ongoing difficulties in achieving equitable resource allocation and the considerable regional inequalities.

The significance of the research in the first chapter lies in its comprehensive approach to understanding the complex issue of financial resource management in higher education. By combining theoretical analysis with international comparisons and an examination of global trends, the chapter provides a solid foundation for the subsequent empirical analysis. It helps to identify areas where China can improve its resource allocation strategies to enhance educational quality, promote regional equity, and support the strategic national objectives of building human capital and fostering social mobility. This foundational work is essential for developing policy recommendations that can lead to more effective and equitable management of state financial resources in higher education.

The second chapter (Pages 96-182) of the dissertation delves into the regional differences, convergence, and efficiency in the allocation of financial resources for higher education in China, presenting findings relevant to the management of state financial resources in higher education. The research conducted in this chapter includes:

1) The chapter examines the disparities in the allocation of state financial resources for higher education management in China. It assesses the effectiveness of state financial expenditures in the context of improving higher education management in China. This research is significant as it provides insights into the horizontal trends of higher education financial expenditures over time (σ -convergence) and examines whether financial expenditures on higher education in each region converge towards the same steady-state equilibrium level (absolute β -convergence). Understanding

these trends is crucial for policymakers to address regional imbalances and promote equitable access to quality education.

2) The chapter evaluates the efficiency of state financial expenditures in higher education using econometric models such as Data Envelopment Analysis (DEA). This analysis helps to identify regions with high efficiency and those that are underperforming, providing a basis for targeted interventions to improve resource utilization. The significance of this research lies in its potential to enhance the overall efficiency of higher education funding, ensuring that resources are used optimally to achieve educational goals.

3) The research also explores the coordination between undergraduate education and regional economies in mainland China's provinces. By analyzing the alignment of educational investments with regional economic needs, the study aims to identify strategies for optimizing the distribution of educational resources to support regional development. This is particularly important as it can help to reduce regional disparities and promote balanced economic growth across different areas of China.

The significance of the research in the second chapter is manifold. It contributes to a deeper understanding of the current state of financial resource allocation in higher education in China, highlighting areas of inequity and inefficiency. The findings provide valuable data and analysis that can inform policy decisions aimed at improving the management of state financial resources. By focusing on regional differences and convergence, the chapter offers practical insights into how to achieve a more equitable and efficient distribution of educational funds, which is essential for enhancing the quality and accessibility of higher education and supporting China's broader socio-economic development goals.

The third chapter (Pages 183-226) of the dissertation focuses on regional equity and the adequacy of financial provision in the management of state financial resources of higher education in China. The research conducted in this chapter includes:

1) The chapter examines the role of investment in education in stimulating economic growth, considering both the direct and indirect impacts of human and intellectual capital. This research is significant as it provides a comprehensive understanding of how educational investment contributes to economic development, which is essential for formulating policies that enhance the efficiency of educational spending and its broader economic impact.

2) The study reflects on the differentiation of state regional expenditure on education, considering the natural, economic, and social development of regions. This research aims to enhance the equity and adequacy in the management of state financial resources in higher education. The significance of this research lies in its potential to address regional disparities in educational funding, ensuring that

resources are allocated in a manner that promotes both equity and efficiency, thereby supporting the overall development of higher education across different regions.

3) The chapter also focuses on the optimization of the system of horizontal transfer payments for the balanced inter-regional distribution of state resources within the framework of the management of state financial resources in higher education in China. This research is crucial for achieving a more balanced allocation of financial resources, which can help to reduce regional inequalities and promote social cohesion and economic stability.

The significance of the research in the third chapter is that it provides a detailed analysis of the financial mechanisms that support higher education and their impact on regional development. By examining the direct and indirect effects of educational investment, the chapter offers insights into how to maximize the economic returns from educational spending. Furthermore, by addressing the differentiation in state regional expenditure and optimizing transfer payments, the research contributes to the development of policies that can enhance regional equity and the adequacy of financial provision in higher education. This is vital for ensuring that all regions have the necessary resources to provide quality education, which is a key driver of social mobility and economic growth. Overall, the findings of this chapter can inform strategic decisions aimed at improving the management of state financial resources in higher education, with the goal of achieving more equitable and effective outcomes.

The conclusions of the dissertation clearly and concisely highlight and organize the scientific results obtained, confirming the achievement of the defined objectives and tasks of the research.

10. Absence (presence) of a violation of academic integrity

The dissertation's scientific results were achieved solely by the author. From collaborative works, only concepts and contributions specifically developed by the applicant were incorporated into the thesis.

Yang Yu's dissertation demonstrates no breaches of academic integrity. It has been established that the references to primary sources for textual and illustrative borrowings are accurate; no instances of deliberate distortion were found. The research process adhered to ethical standards and guidelines established under the Law of Ukraine "On Education." The thesis appropriately cites relevant sources from both domestic and international origins, offers precise information about the employed methods and findings, and fully respects copyright and related intellectual property regulations. Therefore, it is concluded that the applicant has satisfactorily fulfilled the academic integrity requirements.

11. Discussion points and shortcomings of the thesis

In evaluating the dissertation by Yang Yu on "The Management of State Financial Resources in Higher Education: Enhancing Regional Equity, Efficiency, and Adequacy of Financial Provision," while acknowledging the significant contributions and thorough research presented, it is also important to consider potential areas for further enhancement. Here are some points that could be seen as limitations or areas for future research:

1) Although the dissertation provides a robust theoretical foundation for understanding the management of state financial resources in higher education, there is potential to expand this framework to encompass a broader array of international perspectives and models. Such an expansion could offer a more comprehensive understanding of the global context and identify potential best practices. For instance, in Chapter 1, a deeper comparative analysis of different countries' approaches to managing financial resources in higher education could enrich the theoretical underpinnings.

2) The dissertation highlights significant regional disparities in higher education funding but could benefit from a more in-depth analysis of the socio-economic and cultural factors contributing to these disparities. Understanding these underlying factors would aid in formulating more targeted and effective policy recommendations. For example, in Chapter 2, a further exploration of how different regions' levels of economic development, cultural backgrounds, and social structures impact the allocation of educational resources could be undertaken.

3) The finding that higher education funding in China is generally insufficient is critical. However, the dissertation could more extensively explore the long-term implications of such underfunding on educational quality, research output, and regional development. This would help to fully understand the challenges faced by the higher education sector and develop corresponding strategies. For instance, in Chapter 3, case studies or long-time series data analysis could be used to examine the specific impacts of underfunding on educational quality and regional economic development.

4) While the dissertation offers valuable suggestions, these could be further strengthened by devising more specific strategies for different regions, taking into account their unique economic, social, and educational contexts. This would enhance the practical applicability of the research findings. For example, in Chapter 3, specific resource allocation and management strategies could be proposed for the eastern, central, and western regions to better meet their actual needs.

5) The dissertation concludes with practical recommendations for improving the management of financial resources in higher education. Future work could focus on the implementation of these recommendations and the development of monitoring mechanisms to assess their long-term effectiveness. For example, a detailed

implementation plan could be proposed in the conclusion section, along with suggestions for establishing a monitoring and evaluation framework to ensure the effective execution and continuous improvement of the recommendations.

6) A comparative analysis with other sectors that receive state funding could provide additional insights into the unique challenges and opportunities faced by higher education. This could help identify transferable strategies and lessons learned. For example, in Chapter 2, a comparison of the funding allocation models in higher education with those in healthcare, infrastructure, and other public sectors could reveal the uniqueness and commonalities of the higher education field.

7) The research could benefit from a more detailed examination of how the management of financial resources impacts student outcomes, such as graduation rates, employment rates, and overall student satisfaction. This would help assess the effectiveness of resource allocation from a student-centred perspective. For example, in Chapter 3, a section could be added to specifically analyze how financial resource management affects students' academic and career development.

The above remarks are of a recommendatory and debatable nature and do not deprive the scientific results of the dissertation research of a high scientific and methodological level.

12. General conclusion of the thesis and its compliance with the established requirements

Yang Yu's doctoral dissertation, titled "The Management of State Financial Resources in Higher Education: Enhancing Regional Equity, Efficiency, and Adequacy of Financial Provision," conducted at Sumy State University, is a well-structured and comprehensive scientific study. The research introduces innovative scientific and methodological approaches, along with practical tools, to evaluate the impact of managing state financial resources in higher education on regional equity, efficiency, and funding adequacy. The dissertation is distinguished by the relevance of its chosen topic, the originality of its scientific contributions, and the thoroughness of its analysis, meeting the established standards for the Speciality 073 "Management" in the field of study 07 "Management and Administration".

In accordance with the Order of the Cabinet of Ministers of Ukraine No. 44, dated January 12, 2022, "On Approval of the Procedure for the Award of the Degree of Doctor of Philosophy and Cancellation of the Decision of the Once-Established Specialized Academic Council of the Higher Education Institution, Scientific Institution on the Award of the Degree of Doctor of Philosophy," this dissertation fulfils all the necessary criteria. Therefore, Yang Yu merits the conferment of the

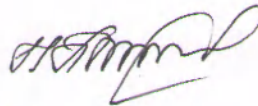
degree of Doctor of Philosophy in the Speciality 073 "Management" in the field of study 07 "Management and Administration".

OFFICIAL OPPONENT

Doctor of Economic Sciences, Professor,

First Vice-Rector,

Poltava University of Economics and Trade



Nataliia Pedchenko



Особистий підпис *Н. Педченко*
ЗАВІРЯЮ
Начальник відділу кадрів ПУЕТ
В. Заломберг