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Shi, Yongjing

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COMPETITION AND COORDINATION OF CHINA'S REGIONAL ECONOMY IN THE CONTEXT OF DIGITAL ECONOMY

Yongjing Shi

Southern Federal University, Rostov-on-Don, Russia, yushi@sfedu.ru,
<https://orcid.org/0000-0002-1765-8525>

Abstract. The regional coordination strategy has been implemented for more than two decades in China. At the critical time when China is building a moderately prosperous society and moving towards common prosperity, narrowing the regional economic gap is a key issue to be addressed. With the rapid development of digital economy, a new driving force has been formed for regional economic development. This article first analyzes the connotation and current situation of regional economic coordination in China, and then explores the role of digital economy in narrowing the regional economic gap. It finds that: the overall regional coordination in China has been improved; in particular, the inter-regional economic gap has been gradually reduced. However, the problem of intra-regional economic disparity is still very serious. Digital economy can promote regional economic growth, but this economic growth is universal. So, when digital economy promotes regional economic coordination, it also leads to a continuous widening of regional economic disparity. Finally, this article puts forward practical policy suggestions to respond to the regional economic gap that may be widened by digital economy.

Keywords: regional coordination, gini coefficient, theil index, digital economy

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КОНКУРЕНЦИЯ И КООРДИНАЦИЯ РЕГИОНАЛЬНОЙ ЭКОНОМИКИ КИТАЯ В КОНТЕКСТЕ ЦИФРОВОЙ ЭКОНОМИКИ

Юнцзин Ши

Южный федеральный университет, Ростов-на-Дону, Россия, yushi@sfedu.ru,
<https://orcid.org/0000-0002-1765-8525>

Аннотация. Стратегия региональной координации осуществляется в Китае уже более двух десятилетий. В критический момент, когда Китай строит «среднезажиточное общество» и движется к всеобщему процветанию, ключевым вопросом, требующим решения, является сокращение регионального экономического разрыва. В условиях стремительного развития цифровой экономики сформировалась новая движущая сила регионального экономического развития. В статье анализируется значение и текущая ситуация региональной экономической координации в Китае, а затем исследуется роль цифровой экономики в сокращении регионального экономического разрыва. Обнаружено, что общая региональная координация в Китае улучшилась; в частности, постепенно сокращается межрегиональный экономический разрыв. Однако проблема внутрирегионального экономического неравенства по-прежнему очень серьезна. Цифровая экономика может способствовать региональному экономическому росту, но этот экономический рост универсален. Таким образом, когда цифровая экономика способствует региональной экономической координации, это также приводит к постоянному увеличению регионального экономического неравенства. Кроме того, в статье выдвигаются предложения по практической политике реагирования на региональный экономический разрыв, который может увеличиться цифровой экономикой.

Ключевые слова: региональная координация, коэффициент Джини, индекс Тейла, цифровая экономика

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China is a vast country with different factor endowments among different regions. The innate geographic conditions, the era-specific policy emphasis, and different technology levels have combined to result in the economic development gap between regions. In the early years of New China, it developed a state of low-level coordination as the country relocated industries from coastal areas to the central and western regions on a large scale to strengthen national defense security and maintain economic balance (Li, 2020)^[1]. By 1978, in order to achieve economic growth, the country implemented the reform and opening up policy, and the eastern region experienced rapid economic growth by virtue of its good location conditions and policy advantages. During the same period, a series of measures such as land property rights system reform and tax sharing reform stimulated local governments' enthusiasm, but they also intensified local protectionism, and the economic gap between China's regions began to widen gradually. With the expansion of China's economy and the beginning of the period of building a moderately prosperous society, the country began to pay attention to the problem of economic disparity between regions and proposed for the first time in the Ninth Five-Year Plan to adhere to the goal of coordinated regional economic development and gradually narrow the regional development gap. In the two decades since then, the country implemented a series of strategies such as the Grand Development Plan of Western China, the Revitalization of Northeast China, Rise of Central China, and the Pioneering Development of Eastern China, which had narrowed the economic gap between regions. However, the gap is still very large (Liu et al. 2020)^[2]. As China has built a moderately prosperous society and begins to enter a new stage of building a comprehensive socialist modern state, the issue of regional coordination remains crucial and involves the sustainable development of the country. On the one hand, long-term economic disparities between regions will inhibit China's development potential and may even breed social conflicts when the disparities become too large. On the other hand, international competition has become more intense in recent years, and at a time when China's foreign trade is being hampered and its industrial and supply chains are facing security problems, China must pay attention to the pulling role of domestic demand and the domestic industrial layout to promote regional economic coordination and maintain the country's sustainable and healthy economic development.

Digital technology has triggered a new round of economic revolution. Throughout history, the emergence of each technological revolution has changed the economic layout to some extent. For one-part, digital technology has improved production efficiency by empowering traditional industries, and it has given rise to a number of new industries. For another part, data becomes a key element in digital economy, so digital technology can also digitize the traditional elements to a certain extent. The virtual and networked nature of data can reduce transaction costs, promote innovation and knowledge spillovers, and thus foster economic growth. So, will the flourishing digital economy ultimately lead to growing economic disparities between regions or promote regional economic coordination? Due to different methods and perspectives of research, the existing findings of academic studies on this issue can be divided into three categories. Yang (2021) believes that the role of digital economy in promoting economic development is more obvious in developed regions than that in less developed regions. He argues that there is a digital divide between regions, and less developed regions will fall into a vicious circle of backward economic level and lagging digital economy development^[3]. On the contrary, Duan et al. (2020) states that digital economy can solve the regional segmentation, enable less developed regions to give full play to their comparative advantages to produce differentiated products, so as to promote economic growth and narrow the regional gap^[4]. Moreover, Zhang et al. (2021) points out that digital economy has played a certain role in promoting regional coordination from the perspective of industrial structure upgrading, but there is also a threshold value for the promotion of regional economic growth by digital economy^[5].

From the perspective of the importance of regional economic coordination to the healthy development of China's economy and the rapid development of digital economy, the pathways and research findings on the role of digital economy in regional economic development vary widely. Furthermore, because the strategy of regional economic coordination has been deepening for more than two decades, the early understanding of the connotation of regional economic coordination has changed dramatically. Therefore, this article tries to first analyze the connotation of regional economic coordination, and then put forward certain policy suggestions for promoting regional economic coordination in China, taking into account the current situation of China's regional economic development and the pathways that digital economy promote regional economic development.

1. What is Regional Coordination?

China has long been concerned with the issue of regional economic disparities. Since the Ninth Five-Year Plan, the country has made the promotion of regional economic coordination an important strategic goal. Subsequently, the academic circle has also begun to conduct relevant studies on the issue of regional

economic coordination. Initially, scholars focus on the concept definition and evaluation of regional coordination^{[6]-[8]}. Subsequently, some scholars have conducted related studies on mechanisms and policies to promote regional economic coordination^{[9]-[12]}. At present, the strategy of regional economic coordination has been implemented for more than two decades, and the relevant connotation has been changing continuously. Apart from that, at this stage, China has already achieved the goal of building a moderately prosperous society and is moving toward a socialist modernization country. In the new era, the connotation of regional economic coordination must be deepened and updated in a timely manner in order to solve the problem of regional economic development gap and achieve common prosperity.

Regarding the concept of regional economic coordination, Tan^[6] points out that the similarities of the academic community are mainly reflected in the recognition that regions should be interconnected, that the economy can develop together, and that the economic gap is gradually reduced. The differences in the definition of the connotation of regional economic coordination are mainly reflected in the content and scope of coordination. For example, whether the regional economic coordination strategy only coordinates the economy or it coordinates the whole society with the economy as the core? Is the regional economic coordination strategy implemented among regions or in the same region? Tan believes that regional economic coordination refers to coordinated economic development among regions. He points out that coordinated regional economic development is fundamentally different from sustainable regional development, and the former should focus mainly on the economy. Chen^[8], on the other hand, includes the equalization of public goods in the coordinated regional economic development. Even in recent empirical studies, scholars' different indicators for measuring regional economic coordination reflect varied perceptions of its connotation. Some use GDP per capita to measure regional economic coordination^[13], and others adopt comprehensive indicators such as economy, people's livelihood, environment, and innovation^[14]. There are studies specifically on intra-regional economic coordination^[15] and inter-regional economic coordination^[16]. In summary, there is still some controversy in the academic community about the connotation of regional economic coordination.

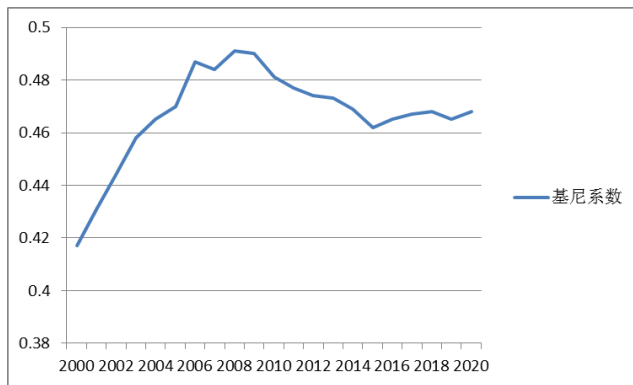
In national documents, from the Ninth Five-Year Plan to the Eleventh Five-Year Plan, the understanding of coordinated regional economic development has focused on inter-regional economic development. However, in the Tenth Five-Year Plan, the requirement of protecting environment had been initially mentioned, and the chapter name Promoting Regional Economic Coordination in the Ninth Five-Year Plan was changed to Promoting Coordinated Regional Development, which has been continued to this day. In the Eleventh Five-Year Plan, in addition to further proposing to narrow the gap between public services and people's living standards, there is also a preliminary mention of strengthening the intra-regional division of labor and collaboration represented by urban clusters. In the Twelfth Five-Year Plan, for the regional development, requirements such as harmony between human beings and nature, equalization of public services, and scientific planning of functional positioning and industrial layout of each city in the city cluster have been clearly brought up. The connotation of regional economic coordination begun to shift from economic focus to taking the economy as the center while considering the environment and public services, and paying attention to intra-regional economic coordination while narrowing the economic gap between regions. In the Thirteenth Five-Year Plan, the role of openness in promoting regional economic coordination was further emphasized, and for the first time, attention was paid to the marine economy. In the Fourteenth Five-Year Plan, it is clearly proposed to build a regional economic layout for high-quality development, and to achieve regional economic growth while paying attention to the innovative, coordinated, green, open and shared development of regions. In sum, it can be concluded that regional economic coordination refers to the interconnection of regions and the gradual integration of markets within regions. It also means that the gap between people's living standards should be gradually narrowed as the economy grows together.

2. Current Development Situation of China's Regional Economy

2.1. Data Analysis of Regional Economic Coordination in China

At present, the measurement of regional economic disparity is mainly based on Gini coefficient, Theil index, variation coefficient and composite index. In view of the above understanding of the connotation of regional economic coordination, this article adopts Gini coefficient and Theil index to analyze the current situation of regional coordination in China. Gini coefficient is an indicator used to measure the income disparity of residents in a country or region, which can comprehensively reflect the disparity of regional development levels. Theil index can divide the overall economic development differences of a country into inter-regional differences (TBR) and intra-regional differences (TWR), so that the sources of economic differences can be analyzed more clearly. In addition, depending on the weights, the Theil

index can be divided into the GDP-weighted Thiel T index and the population-weighted Thiel L index. This article chooses the Theil T index to divide China into the East, Central, West and Northeast¹ parts. The four parts are analyzed using the specific calculation process that is referred to Liu (2020).



Gini Coefficient
Fig. 2-1. Change in Gini Coefficient in China, 2000-2020

Source: China Statistical Yearbook, National Economic and Social Development Statistical Bulletin, World Bank and other information

As shown in Figure 2-1, after the regional coordination strategy was systematically proposed and implemented in the Tenth Five-Year Plan, China's Gini coefficient continued to rise, but after 2008, it steadily declined. Despite the upward trend in 2016, the overall trend is unchanged, indicating that the income gap in China was gradually narrowing. But compared with the international warning line of Gini coefficient of 0.4 or the initial Gini coefficient of China, the current Gini coefficient of China is still very high. In particular, 2020 shows another upward trend, all indicating that China still needs to make great efforts in narrowing the income gap and moving towards common prosperity.

According to Figure 2-2, the regional economic disparity in China has shown an overall decreasing trend from 2003 and stabilized after 2012. The trend of TBR, which measures the inter-regional economic disparity, is the same as the trend of the Thiel index. The trend of TWR, which measures the intra-regional economic disparity, also shows a downward trend but with a small magnitude. It has a brief increase in 2018, and the intra-regional disparity starts to be larger than the inter-regional economic disparity, which fully indicates the effectiveness of the policy focusing on inter-regional economic coordination at the early stage of China's implementation of the regional coordination strategy. But it also shows that intra-regional economic disparity in China now continue to face serious problems. From Figure 2-3, it can be clearly seen that the regional disparity in the east and west regions vary significantly and are much higher than those in the center and east regions. It further shows that in addition to focusing on the economic disparity between regions, intra-regional economic coordination is also a key issue to be addressed when implementing regional coordination strategies in China.

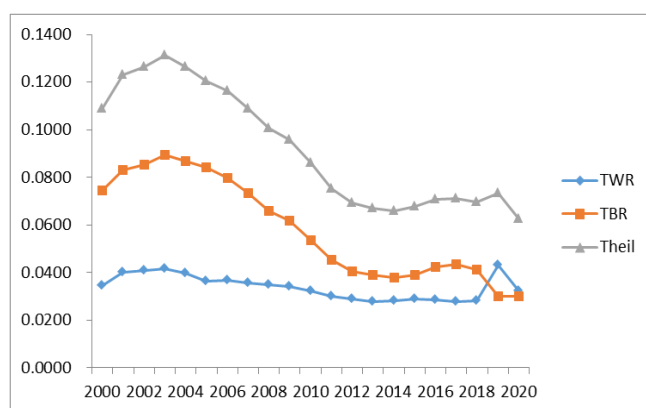
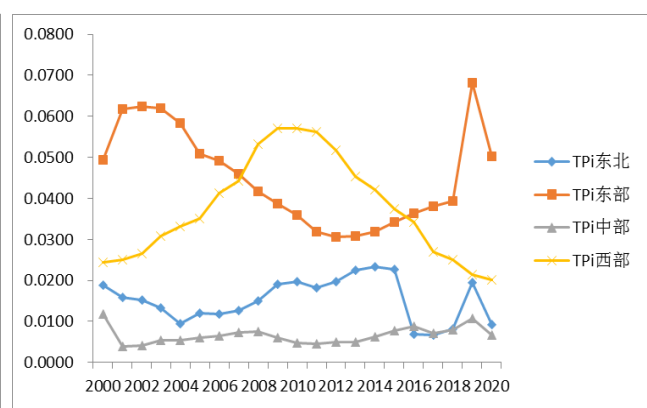


Fig. 2-2. Change in Thiel Index in China, 2000-2020



Northeast China, Eastern China, Central China, Western China
Fig. 2-3. Change in Thiel Index in Different Regions of China, 2000-2020

¹ East includes: Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan; Central includes: Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan; West includes: Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang; Northeast includes: Liaoning, Jilin and Heilongjiang.

2.2. Regional Economic Coordination Strategy Implemented in China

China has been implementing the regional coordination strategy for more than two decades. By continuously learning lessons from the implementation of the strategy and taking into account China's actual situation, China has now developed a path where the government and the market work together to promote regional economic coordination. Through a series of major plans such as the spatially systematic planning of the main functional areas, major regional strategies, coordinated development of the four regions and the ocean economy, the government has provided a strategic orientation for the development of each region. Subsequently, through specific supporting measures, such as issuing the Opinions on Building a More Perfect Institutional Mechanism for Factor Market Allocation, it promotes market integration, stimulates market vitality, and provides prerequisites for enterprises to carry out a reasonable division of labor layout, thus enabling each region to fully rely on its own characteristic resources to follow the path that suits it. In order to achieve high-quality economic development, the government plays a coordinating role for regions with special tasks such as ecological function zones and agricultural product regions, and supports them through inter-regional benefit compensation mechanisms such as transfer payments. For special types of backward regions such as border and revolutionary areas, the government implements transfer payments and other means while also providing one-to-one assistance by means of regional cooperation and mutual assistance to promote coordinated regional economic development as a whole.

In addition to a series of strategic plans for inter-regional economic coordination, in order to boost regional economic growth, the government also pays full attention to the role of economic growth poles such as central cities and city clusters on the development of the whole region. It is proposed to give full play to the radiation effect of the growth level on the peripheral areas, forming a synergistic situation of functional division of labor and staggered development, and narrowing the economic gap within the region.

3. The Impact of Digital Economy on Regional Economic Development

Many factors have resulted in the regional economic development gap today. On the one hand, the natural conditions of different regions have caused the gap; on the other hand, the gap is formed due to external reasons such as national policies and the international environment, with national policies playing a major role. The natural conditions of a region mainly include geographical conditions and factor endowments. For example, coastal areas are naturally characterized by foreign trade economy. The factor endowment of a region directly determines the economic structure of the region. For instance, the fertile soil creates the grain silo in the northeast and the rich resources enable the energy output in the northwest. These different economic structures, together with national policies and international environment of the same period, have led to different rates of regional economic development at different stages. At the early days of New China, the inward relocation of industries was implemented to protect the national industry. Then, in order to achieve high economic growth, the low value-added foreign trade economy was adopted. At present, in the face of China's industrial transformation and upgrading and the intensification of the Sino-US conflicts, the double-cycle strategy and high-quality economic development is carried out. Therefore, national goals at different stages have led to different development results in different regions. Moreover, due to the to protect Matthew effect, rich regions become richer and poor regions become poorer.

The rapid development of digital economy has become an inevitable trend of social development, and the academic community confirms and agrees with the role of digital economy in promoting economic growth from different perspectives^{[17][18]}. Firstly, the core of digital economy – digital technology and data can improve the production efficiency of manufacturing and service industries, and the replicability and sharing of data can also break the limitations of factor scarcity, with the role of increasing returns to scale that traditional factors do not have. Secondly, digital technologies such as big data, cloud computing and the Internet of Things have also reduced transaction costs and improved market efficiency. Thirdly, digital technologies have expanded the market scope, as reflected in the emergence of new industries and the development of online markets, which have greatly activated the market potential. Finally, from the perspective of improving consumer confidence, stimulating consumption and promoting economic growth, in the era of digital economy, all the information is data-driven and stored, and the traceability of such data makes market competition fairer. The rapid development of block chain technology further reduces the risk of information tampering, improves the authenticity of information and boosts market credit. These economic growth-enhancing effects are universal in nature^[19], so whether the economic growth promoted by digital economy narrows the relative economic gap between regions or widens it?

On the one hand, the initial investment in digital technology requires large capital costs and labor costs, which are not available in less developed regions. So, developed regions take the lead in the digital economy, forming a first-mover advantage^[3]. Then, both the innovation caused by digital economy and digital platform, which is an important carrier of digital economy, may cause monopoly due to the imperfect state regulation and the sticky market of platform economy, thus further widening the economic gap between regions. Last, the automation and intelligence of digital technology improve productivity while greatly reducing the demand for labor, especially for low-skilled labor^[20]. Moreover, due to regional inequality in public services, a relatively larger proportion of low-skilled labor is found in less developed regions. The employment resulting from the new business model generated by the digital economy can also face imperfect protection mechanisms to the detriment of individual interests, which in turn indirectly leads to regional development disparities.

On the other hand, while the digital economy is inclusive in terms of reducing transaction costs and developing online markets and new business models, these properties are more important for less developed regions. The less developed regions have a natural disadvantage in trade due to the imperfect infrastructure. There are inconvenient transportation and information asymmetry in those regions. However, digital technology can greatly reduce the impact of spatial distance on trade and promote information flow. So, the past agglomeration economy is decentralized, which is not only beneficial to the development of local enterprises, but also attracts a part of the enterprises to move in, giving the less developed regions more opportunities to integrate into the domestic value chain and international value chain. Moreover, the development of digital economy also greatly weakens the drawbacks caused by local protectionism. Luo (2019)^[16] points out that excessive government competition is one of the important causes of regional economic disparities. The era of digital economy requires that all regions must be integrated into a unified network. This unification of virtual markets based on digital economy can form market integration and promote the free flow of factors and products. In addition, digital technology can be used to analyze big data to plan and adjust the economic structure of less developed regions in a relatively more reasonable way, and fully stimulate the economic growth potential of less developed regions, as illustrated by the recent launch of cloud tourism. Finally, digital economy can also promote the equalization of basic public services, which can be fully reflected by the rapid development of online education and online healthcare during the epidemic. The improvement of public services can enhance the quality of local factors and attract factor inflows^[21], fundamentally improving the economic situation in less developed regions.

As mentioned above, although digital economy has played a vital role in promoting economic growth and regional coordination, there is still a potential risk of widening the regional economic gap, and it is necessary to play an exogenous role of policy in order to prevent the existence of the Matthew effect of the economic gap.

4. Policy Suggestions

4.1. Combing Top-level Design and Supporting Measures to Implement Regional Coordination Strategy

Regional coordination is a major strategy involving the whole country. Against the background of inter-regional competition and local protectionism without the means for effective exchange and cooperation, the state should play an overall regulatory role and plan regional strategies from the national level as a whole, including optimizing the pattern of territorial spatial development and protection, implementing major regional strategies and coordinated regional development strategies. However, in addition to the role of the state in macro policy formulation, the most important thing to achieve the goal of regional coordination is to put the regional coordination development strategy into practice. This requires a combination of specific national and local supporting measures, including strategies to break down local protectionism and promote market integration. The strategy is to reform the household registration system and promote the free flow of talents; to increase the targeted transfer payments to improve the ability of less developed regions to develop their economies; to give policy preferences to less developed regions to attract enterprises to transfer. Only by combining national systematic planning with specific supporting measures can the regional coordination strategy be put into practice, and thus effectively narrow the regional development gap.

4.2. Increasing Infrastructure Development for Less Developed Regions

Sound infrastructure is the basis for regional economic development. Whether it is the infrastructure represented by transportation, post and telecommunications in the past or the new infrastructure represented by cloud, network and terminal with the arrival of the digital era, the gap in infrastructure

between regions is one of the important reasons for the gap in regional economic development. A well-developed infrastructure reduces transaction costs for businesses, which in turn creates agglomeration economies and boosts economic growth. Under the condition that less developed regions lack their own economic capacity, when improving transportation, water and electricity infrastructure, the state should also increase transfer payments to less developed regions and invest more in digital infrastructure, such as cloud computing, artificial intelligence and block chain technology, so as to provide a basis for less developed regions to achieve a bend in the digital economy era.

4.3. Using Digital Technology to Promote Public Service Parity

The future economic development will be talent-based development, and quality public services are the key to retaining and attracting talents. Under the condition that there is no way to achieve parity in education and healthcare in a short time, the country should vigorously develop digital education and digital healthcare, and use digital technology to enable less developed regions to share quality public services with developed regions. On the one hand, it can improve the satisfaction of people in less developed areas, and on the other hand, it can narrow the public service gap, which is conducive to attracting more talents to flow in, and provide a talent base for the economic development of less developed areas. Moreover, the use of digital technology can also make the government to provide public services to a wider range. People can use the e-government platform to easily and quickly understand relevant policy information and complete required services without leaving homes.

4.4. Strengthening the Regulation of Industries Related to Digital Economy and Accelerating the Improvement of Relevant Laws and Regulations

Digital economy is a new economic model that involves all aspects of life and has spawned many new industries. However, the problems facing regulators have also increased. The monopoly of digital platforms, an important vehicle in digital economy, is an urgent issue that regulators need to focus on. The operation of digital platforms is based on a large amount of data, and digital platforms can obtain a large amount of data by providing services based on data analysis. This circular and cumulative effect will make the leading digital platform companies with first-mover advantage form a winner-take-all situation, which will greatly harm the interests of consumers. On February 27, 2021, the Anti-Monopoly Committee of the State Council has formulated and released the Anti-Monopoly Guidelines of the Anti-Monopoly Committee of the State Council on the Platform Economy, emphasizing that the Anti-Monopoly Law and supporting regulations are applicable to all industries. Although relevant platform companies are punished for violating the Anti-Monopoly Law, there is still a great controversy regarding the criteria for digital platforms to reach monopoly. In addition, the infringement of personal privacy when digital platforms collect and use data, and the management of related digital economy industries in terms of tax collection and management are still ambiguous, and the country should accelerate the improvement of related laws and regulations and strengthen supervision.

4.5. Improving the Protection Mechanism for Practitioners of Emerging Industries

Digital economy has given rise to new industries, which have boosted economic growth while solving the employment problems of a large number of workers and generally alleviating the reduction of jobs due to intelligence and other factors. However, since some of the new industries are platform-based, especially those that address low-skilled labor employment, such as rural e-commerce, live streaming and other forms of economy, the security mechanism for employed workers is still very imperfect. The platform only provides a virtual trading platform for anchors or merchants, and the relationship between the two belongs to cooperation rather than employment, then the responsibility attribution of the contracted subjects who encounter problems when working and trading on the platform cannot be clarified, and the rights of the employed persons face the threat of being violated in the face of the monopoly position of the platform. Furthermore, there is no way for the employed people to get the protection of work injury insurance, unemployment insurance and housing provident fund. The reason for this is that the classification of new industries has not been clarified. Now it is only classified as service industry in general, but the different business model in the service industry has caused the service industry-related laws and regulations to be inapplicable to the new industry workers, which leads to the lack of protection mechanism for the workers. Employment in the form of e-commerce and live streaming has solved a large part of the current unemployment problem and will be an important channel to solve unemployment in the future. The country needs to provide a timely protection mechanism for those employed in these industries.

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Information about the author

Yongjing Shi – Ph.D Student, Faculty of Economics, Southern Federal University.

Информация об авторе

Юнцзин Ши – аспирант, экономический факультет, Южный федеральный университет.

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