

# The Mechanism of Internet Promoting Balanced Urban-Rural Development and China's Practice

Yongjian Li, Qiuzheng Li, Donglan Hu\*

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The Internet, the booster of the modern industrial revolution and an important support of the modern lifestyle, has the characteristics of spanning time and space, and it is profoundly affecting the economic and social development of China. There are some disputes on whether in theory or in practice that Internet can narrow the gap between urban and rural development. Based on e-commerce, this paper analyzes the mechanism of using the Internet to narrow the urban-rural gap, and uses the macro and micro data of China's practice to carry out empirical verification. The findings show that the Internet is a positive force to eliminate the urban-rural gap as it has effectively alleviated the imbalance.

**Keywords:** the Internet, industrial development, urban-rural balance, mechanism analysis, China's practice

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## 1. Introduction

The Internet is spreading rapidly. According to the Internet World Stats, by December 2019, the number of Internet users worldwide has exceeded 4.4 billion, accounting for more than 55% of the total population. In China, as of June 2019, the number of Internet users reached 854 million, and the Internet penetration rate reached 61.2% (CNNIC, 2019). In 2019, the national online retail sales reached 10632.4 billion yuan, an increase of 16.5% over the previous year. Among them, the online retail sales of physical goods reached 8523.9 billion yuan, an increase of 19.5%, accounting for 20.7% of the total retail sales of consumer goods.<sup>1</sup> The Internet has played a huge role in people's lives.

The rapid popularization of the Internet has caused a thought-provoking question, that is, whether the Internet can narrow the urban-rural gap formed since the industrialization?

There has been a lot of controversy over whether the Internet can solve the

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<sup>1</sup> National Bureau of Statistics: Total retail sales of consumer goods increased by 8.0% in 2019, [http://www.stats.gov.cn/tjsj/zxfb/202001/t220200117\\_.html](http://www.stats.gov.cn/tjsj/zxfb/202001/t220200117_.html).

imbalance between urban and rural development since its emergence. At first it was believed that, as information online can flow freely, the network can cross the barriers of time and space, and everyone can get information equally, the emergence of the network will form a new human space, which is more equal, more democratic, and can better eliminate the gap between people (Sunstein, 2003). However, the development of the Internet shows that, at the beginning, a large number of Internet start-up companies gathered in the urban areas, even in large urban areas, while the rural areas were devoid of network infrastructure and had no access to the Internet; both the Internet equipment and the cost of access to the Internet were expensive. In the face of this reality, many researchers and practitioners pointed out that the emergence of the Internet had not narrowed the gap between different groups, and a new “digital divide” had emerged. This gap is not only economic, but also social. The data study found that the main early beneficiaries of online media were in urban areas, where the highest-quality online content was produced. This may be one of the reasons why Rosston, Savage and Waldman (2010) found that urban residents paid more for broadband. Researchers further pointed out that as an information technology, the Internet is more likely to spread in areas with large population or economic agglomeration level, leading to the remote areas that should benefit more in the information age not only not to use the Internet more, but also to generate new forms of urban-rural gap. This phenomenon is called the local digital divide. However, with the development of e-commerce, many researchers found that e-commerce could promote the economic development of rural areas (including market towns in rural areas). Barkley, Lamie and Markley (2007) pointed out that the Internet can help reduce the location disadvantage of rural areas and give them more access to research, services and markets. Nath (2015) pointed out that in India, 57% of e-commerce sales came from small towns, and the rest from eight metropolitan areas. Therefore, he proposed that one of the most important benefits of e-commerce was its potential to help developing rural communities “leapfrog” into the knowledge paradigm. Empirical studies in some specific regions show that e-commerce increases the competitiveness of micro and small enterprises (MSE). Mao and Li (2016) constructed a C-D production function model including Internet and human capital variables based on the provincial panel data from 2002 to 2013, and discussed the impact of the two on the agricultural economy in different regions. The empirical results show that the Internet penetration rate and rural human capital have a significant role in promoting the growth of agricultural economy, and there are some differences in the contribution to each region, and the impact on the eastern region is significantly higher than that on the central and western regions in China.

With the advent of the mobile Internet era, the threshold of Internet access has been greatly reduced and the Internet has been rapidly popularized all over the world. According to the data by GSMA, in the major underdeveloped countries, the proportion of the price of “medium”-level traffic packages (600MB to 2GB) in consumer income

decreased from 2%~3% in 2015 to 0.5%~1.0%. In terms of hardware, the price of a mobile phone that can access the Internet is less than \$100, which enables many people to use the mobile Internet to get online. However, there is a problem, that is, what people in different regions do with the Internet. Some researchers have found that young people in many rural areas and backward areas get online mainly for entertainment, while, those in some developed urban areas mainly for information and self-improvement. In this way, although all regions are facing the same network access environment, there are differences in the value identification and utilization of the Internet, which creates a new gap, known as the “second digital divide”.<sup>1</sup> Goldfarb and Tucker (2018) believe that the role of the Internet in the urban-rural gap depends on the agglomeration effect and crossing-time-and-space effect. The agglomeration effect enables e-commerce to develop faster in large cities and developed areas, while low-cost communication can cross time and space, benefiting rural areas. In any given case, the overall outcome depends on the balance between these forces. In general, the less access to technology, the more likely agglomeration is to dominate.

The above analysis shows that there is still controversy in literature on whether the Internet can narrow the urban-rural gap. Based on e-commerce, this paper analyzes the mechanism of using the Internet to narrow the urban-rural gap, and conducts a confirmatory analysis with the macro and micro data of China’s practice. The research results show that the Internet has effectively alleviated the imbalance between urban and rural development, and is a positive force to eliminate the urban-rural gap.

## **2. An analysis of the Mechanism of the Internet Narrowing the Urban-Rural Gap**

In theory, the Internet promotes the flow of information across time and space, enabling rural residents to get the same information, which effectively reduces the information gap between urban and rural areas. E-commerce supplies all people with equal access to information by digitizing tangible goods and publishing the information in the cyberspace, which changes the uneven distribution of commercial facilities caused by the physical conditions. In this sense, e-commerce can effectively narrow the urban-rural gap in business infrastructure, eliminate the inequality caused by distance, and thus alleviate the urban-rural imbalance.

First, the increasing commodity accessibility and diversity reduce the imbalance caused by commodity accessibility. In China, due to the uneven commercial development, a large number of commercial facilities are concentrated in cities, so that many consumers in rural areas have no access to more abundant goods. It is estimated that in 2019, China’s per capita consumption expenditure in rural areas reached 13328

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<sup>1</sup> There is no universally accepted definition of “the second digital divide”. It is generally believed that it is related to the use and identification ability of information.

yuan, and the total consumption expenditure in rural areas reached 7352 billion yuan. The retail sales of consumer goods in rural areas were only 6033.2 billion yuan, which shows that a considerable part of the consumption in rural areas (1318.8 billion yuan) was completed in urban areas. That is to say, the commercial facilities in rural areas can only meet 82.1% of the local demand.<sup>1</sup> A survey shows that rural residents go to cities and towns mainly for shopping, because of the lack of corresponding shopping places in rural areas. The inconvenience of shopping further inhibits the consumption mobility of rural residents, and affects the improvement of their overall consumption capability. In China, the rural transportation infrastructure is backward, the road condition is poor; the rural households live scattered, the communication channels are not smooth, which brings inconvenience to rural residents' consumption and drives high the cost of consumption. On the one hand, the development of e-commerce can break through the limitation of space. Any consumer can get access to the same extensive products and reduce the cost in the process of purchase, which will greatly promote consumption in rural areas. On the other hand, one of the preconditions for the development of e-commerce is the ability of logistics distribution, which requires convenient transportation infrastructure. Under the internal drive of e-commerce economy, rural areas will take the initiative to transform the potential demand for improving transportation infrastructure into practical actions, and accelerate infrastructure construction. In a word, e-commerce not only increases the convenience of rural residents in basic consumption, but also provides favorable conditions for their developmental consumption.

Second, the Internet helps promote consumption upgrading. Underdeveloped commerce is often a hotbed for counterfeiting in rural areas. For example, due to the low level and inconvenience of business services in rural areas, the business ecology has been destroyed, which may make rural areas become the gathering place of fake and shoddy goods, greatly affecting the life of rural residents, and leading to a lot of hidden dangers of product quality and safety. In this way, it is difficult to achieve consumption upgrading in rural areas. E-commerce can promote consumption upgrading in rural areas by providing more abundant high-quality goods and improving the consumption environment in rural areas. On the basis of the provincial panel data from 2003 to 2013, Liu and Zhang (2016) empirically investigated the impact of Internet development on the consumption level and consumption structure of rural residents in various regions in China. The empirical results show that, on the whole, Internet development has a significant positive impact on the consumption of rural residents in China, and the impact intensity from small to large is in the order of Internet development investment environment, Internet penetration rate, mobile subscription, and the potential of driving the transition of rural consumption structure from traditional to developmental and hedonic. The impact of Internet development on the consumption structure of rural residents in the eastern region

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<sup>1</sup> Calculated by the authors on the basis of data from *The 2019 Statistical Bulletin*.

is greater than that in the central and western regions in China.

Third, e-commerce boosts the direct sale of rural products to the world. Due to the weaknesses in business infrastructure and transportation facilities, specialty products in rural areas often do not sell. E-commerce solves this problem by providing a very good channel for the marketing of those products. At the same time, the Internet enables the production process in rural areas to be fully integrated into the social production network, making the production more planned and avoiding the huge loss of farmers caused by price fluctuation.

Rural areas are faced with huge transaction costs to sell their specialty products. Because of the huge physical space barriers and the lack of adequate understanding of rural areas, transaction costs will increase, making it difficult for rural products to be sold directly in the broad market. The development of information and communication technology and the rise of Internet transactions weaken the communication inconvenience caused by geographical distance, which helps rural and township enterprises to participate in the national market. Enterprises located in remote areas are more motivated to use the Internet, especially to use it for sales, which corresponds to “The Death of Distance” in relevant literature, and has also been empirically verified by some researchers. Cairncross (2001) believed that the decrease of information transmission cost would lead to “The Death of Distance”: isolated individuals and companies would be able to integrate into the global economy; rural consumers could get access to the same digital products and services as others; there would be a global spread of knowledge. Sinai and Waldfogel (2004) found through survey data that black people were minorities offline, but they were more closely connected online than non-black people under the same conditions; at the same time, residents who were farther away from bookstores and clothing stores would buy books and clothing through the Internet. These studies show that under the influence of the Internet, the location disadvantage of rural areas is decreasing, and this will promote the development of rural areas, so as to narrow the urban-rural gap.

Fourth, the Internet has lowered the threshold of rural innovation and entrepreneurship. In rural areas, the environment for entrepreneurship and innovation is poor due to the lack of information and educational opportunities, and the geographical gap. The development of e-commerce lowers the threshold of employment and entrepreneurship in rural areas, and brings a lot of opportunities to many rural groups. For example, *World Development Report 2016: Digital Dividends* points out that the wide application of digital technology brings more choices and convenience to many people’s lives. Through inclusiveness, efficiency and innovation, digital technology provides opportunities previously not available to the poor and vulnerable. According to the feedback from the survey of online workers, the biggest advantage of online work is that you can work at home and use the time flexibly. These characteristics of e-commerce lower the threshold of entrepreneurship and employment for vulnerable groups, so that they can partially

solve the development imbalance caused by the imbalance of employment.

Fifth, the Internet promotes the improvement of electronic payment system, accumulates credit capital and reduces the imbalance of financial development (Li and Wang, 2016). One of the important reasons for the backward financial development in rural areas is the lack of sufficient financial data accumulation there and the inability of existing financial institutions to make accurate credit risk assessment for enterprises or individuals related to “agriculture, rural areas and farmers”. E-commerce realizes the unification of information flow, logistics and capital flow through the network. E-payment system has become a prerequisite to support the development of e-commerce. Through the development of e-commerce, the payment of production and life in rural areas can be realized electronically, so that more data can be accumulated to lay a good foundation for financial institutions to provide services. Moreover, the Internet itself will promote financial innovation and can create financial products more suitable for “agriculture, rural areas and farmers”, thus providing more rich and diverse financial services for rural areas.

By accumulating more financially-related data for rural areas or vulnerable groups, the Internet can lay a foundation for them to accumulate credit capital and provide more help for them to obtain financial services. In the age of Internet, credit will be capitalized to lay the foundation for its access to financial services. Furthermore, with the Internet popularized in rural areas, credit capitalization actually contains multiple meanings. First of all, credit evaluation is not only based on the status quo information, but more importantly, credit can determine a person’s future earnings. In other words, credit is the same as a kind of capital. This is because in the Internet age, big data can expose the whole life scene of an individual. Without credit, an individual cannot continue to live in the whole life scene. Secondly, credit determines the process of individual communication. This is because in the era of Web2.0, communication has become a way of life. In this situation, it is difficult to communicate with others without credit. Credit also determines the social life of individuals. Most of the poor areas and vulnerable groups are unable to obtain financial support due to the lack of corresponding credit records. But the Internet, relying on big data, coupled with e-commerce and accumulated data, can help rural people get credit capital. After obtaining credit capital, the rural population can not only obtain financial support, but also lay a foundation for its greater development.

### **3. Internet Plays a Positive Role in Narrowing the Urban-Rural Gap: Based on China’s Practice**

#### *3.1. Macro Data of the Internet Narrowing the Urban-Rural Gap*

The macro data show that the rapidly developing e-commerce has achieved

some results in reducing the urban-rural gap in China. On the whole, China's rural e-commerce has maintained a rapid growth rate. According to the statistics of the Ministry of Commerce, from 2015 to 2018, rural online retail sales (the value of products sold from rural areas through the Internet) in China increased from 353 billion yuan to 1.37 trillion yuan, nearly tripling. From January to November 2019, the national rural online retail sales reached 1522.9 billion yuan, a year-on-year increase of 19%,<sup>1</sup> the growth rate higher than that of the total. The national online retail sales of agricultural products reached 397.5 billion yuan in 2019, an increase of 1.5 times over 2016. In rural areas, more than 15 billion express deliveries have been received and delivered, accounting for more than 20% of the total in China. Up to now, there are more than 13 million rural online businesses across the country, attracting a large number of migrant workers, college students and veterans to return home and start businesses.<sup>2</sup> E-commerce is helping to narrow the urban-rural gap as a whole.

First, the rapid development of rural e-commerce has provided a boost for rural poverty alleviation and reduced the urban-rural gap. E-commerce is an effective means of poverty alleviation. General Secretary Xi Jinping pointed out that we should actively develop rural e-commerce and express business, expand sales channels for agricultural products, and increase farmers' income, while inspecting the effectiveness of local poverty relief efforts at the Dongyue Village of Manshu Township, Guangshan County, Henan Province on September 17, 2019. E-commerce plays an important role in poverty alleviation. By the end of 2019, e-commerce sponsored by the Ministry of Commerce has entered 1231 rural comprehensive demonstration counties, covering all the poor counties in the country. Many new models have emerged in poverty alleviation with e-commerce. One way is to use new marketing means such as short videos. For example, Kuaishou's Lucky Seeds Program, which helps the poor areas of the country to sell their quality products and promote their beautiful scenery, will boost both the sale of specialty goods and the development of related industries. Another way is to help the poor through branding. According to data from JD, branding will be the next step for poverty alleviation through e-commerce. With the brand as the core, we can change the current situation that the poverty alleviation industry lingers in low added value, enhance the product premium with the brand, further enhance the anti-risk ability of the products and industries, help the poverty alleviation industry to truly go to the market, and lead the poor areas to leap out of poverty and get rich. JD has successively promoted hundreds of agricultural products in dozens of poverty-stricken counties, such as Cangxi red heart kiwi fruit, Shicheng lotus seed, Raohe

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<sup>1</sup> Ministry of Commerce: The national rural online retail sales reached 1522.9 billion yuan from January to November 2019, <http://www.ebrun.com/ebrungo/zb/368353.shtml>.

<sup>2</sup> Ministry of Commerce: In 2019, the online retail sales of agricultural products in China reached 397.5 billion yuan, an increase of 1.5 times over 2016, <https://baijiahao.baidu.com/s?id=1662521901308625753&wfr=spider&for=pc>.

honey, Guangling millet, Zhuxi giant salamander, Xigaze glacier water, to develop in the direction of scale, quality and brand. Next is to provide financial support for poor households by combining e-commerce and finance. Financial support is another new trend of e-commerce poverty alleviation. For example, JD agricultural loan provides support for poverty alleviation projects through “Internet + finance + industry”. JD has also launched a poverty alleviation crowdfunding platform, which has completed crowdfunding of more than 300 projects from more than 100 national poverty-stricken counties, such as Fuping persimmon, Guangshan Xinyang Maojian (name of tea), Dangshan peach can, Fuyuan caviar, and drawn follow-up sales funds of more than 1 billion yuan.

Second, e-commerce lowers the threshold and cost of rural entrepreneurship, promotes employment in rural areas, raises the income of farmers, and narrows the urban-rural income gap. According to the *Report on China's Rural E-commerce Development (2017–2018)* (2018), in 2017, there were 9.856 million rural online stores, bringing more than 28 million jobs, and the number has been growing steadily. The development of rural online stores also brings obvious agglomeration effect. According to the *Research Report on Taobao Villages in China (2009–2019)* (2019), by the end of 2018, there were 4310 Taobao villages and 1118 Taobao towns nationwide, covering a population of 250 million. The annual sales of online stores totaled over 700 billion yuan, accounting for nearly 50% of the country's rural online retail sales, and generating more than 6.83 million jobs. The cluster development of rural e-commerce has greatly reduced the entrepreneurial cost in rural areas. E-commerce, especially online retailing, has become an important choice for entrepreneurship and innovation because of its flexible working hours and locations, low access threshold and low investment cost. It has opened up new employment for rural surplus labor force, young entrepreneurs who return to the countryside, veterans and disabled people in urban and rural areas. According to the Ministry of Agriculture, 7 million people have returned or gone to the countryside. More than 80% of the enterprises founded by these people are new industries, new business forms, new models and industrial integration projects, and 54% of them use the Internet and other new-generation information technology. Rural e-commerce has become a “new outlet” for young people to return to their hometown for entrepreneurship and employment.<sup>1</sup> Under the condition of similar family characteristics, compared with the rural families without online business, online business increased the average annual income of rural families by 20500 yuan, and increased their wealth by 213000 yuan. Compared with similar villages, the per capita output value of characteristic industries of e-commerce villages is 11870 yuan, about 25.8 times of that of villages without e-commerce, which is 460 yuan (China International

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<sup>1</sup> The number of entrepreneurs returning to the countryside has reached 7 million, [http://www.xinhuanet.com/fortune/2017-09/17/c\\_1121675445.htm](http://www.xinhuanet.com/fortune/2017-09/17/c_1121675445.htm).



Electronic Commerce Center, 2017).

Third, relying on e-commerce and the Internet, the financial environment in rural areas has improved significantly. Financial gap is both an important manifestation and an important source of the urban-rural gap. Due to the particularity of rural areas, in the pre-Internet era, the financial supply in rural areas was seriously insufficient. Statistics show that, the credit availability of rural finance accounted for 30% in 2015, 20 percentage points lower than that of urban finance. The financial capital gap in “agriculture, rural areas and farmers” reached more than 3 trillion yuan (Li and Wang, 2016). The Internet enables rural residents to use mobile payment and other new ways on a large scale, which promotes the accumulation of financial data. In 2018, 57.0% of rural Internet users used mobile payment for offline consumption, significantly higher than in 2017. With the accumulation of data in rural areas, many financial institutions began to make full use of the new generation of information technology, such as the Internet, mobile Internet, big data, cloud computing, effectively promoting the development of rural finance and narrowing the financial gap between urban and rural areas. For example, e-commerce banks use technologies such as big data to provide farmers with “310” credit services without collateral guarantee (3 minutes for online application, 1 second for funds to be transferred to the account, zero manual intervention in the whole process). As of December 2018, e-commerce bank and its predecessor Alibaba small loan had provided financial support to nearly 6 million rural small and micro enterprises, individual businesses and breeding households.

Fourth, e-commerce has led to the continuous improvement of rural infrastructure and narrowed the urban-rural gap in new infrastructure. The development of e-commerce has promoted the development of infrastructure such as network, transportation in rural areas. By June 2019, the proportion of administrative villages covered by broadband has exceeded 98% in China, and that of poverty-stricken villages exceeded 90%, achieving the 13th Five-Year Plan in advance. In 2018, 57.0% of rural netizens used mobile payment for offline consumption, significantly higher than in 2017. In 2018, the coverage rate of express delivery outlets in towns exceeded 90%. The foundation of agricultural technology has also continued to improve. In terms of agricultural product standardization, under the influence of e-commerce, the certification of “three products and one indication” (pollution-free farm products, green food, organic agricultural products and geographical indications of China’s agricultural products) has been continuously promoted. Under the guidance of the Ministry of Commerce, China E-Commerce Poverty Alleviation Alliance has carried out the promotion of agricultural brands, completed the “three products and one indication” certification training for 464 enterprises in poverty-stricken counties, and 129 are in the process of certification.

Fifth, e-commerce has greatly improved the rural consumption environment, effectively saved the shopping cost, reduced the shopping expenditure, and narrowed

the urban-rural gap caused by the price difference between urban and rural areas. On the basis of big data of e-commerce platforms, it is estimated that, rural people would spend more than 1 trillion yuan on goods and services on these platforms, and the price of products on these platforms would be 6%~8% lower than the average price of offline business in 2018 (McKinsey, 2013). The development of e-commerce will help reduce the living cost in rural areas. Couture, Faber, Gu and Liu (2018) find from the data of China's e-commerce development that e-commerce effectively reduces rural living expenses. Within the scope of their survey, rural e-commerce users reduce the cost of consumption and living by 5% through e-commerce, while the average family cost of all villages reduces by 1%. This shows that e-commerce reduces the living cost in rural areas and narrows the urban-rural gap caused by the difference in commodity prices by reducing commodity prices.

### 3.2. Micro Data of the Internet Narrowing the Urban-Rural Gap

From the overall data, we can see that the Internet has effectively narrowed the urban-rural gap in China, especially by flattening the consumption gap and increasing opportunities for innovation and entrepreneurship. In this section, we further analyze whether the Internet has narrowed the urban-rural gap by analyzing the micro data of nearly 1 billion orders provided by JD big data.

According to the data of per capita consumption in urban and rural areas of JD e-commerce platform from 2015 to 2017 (Table 1), the ratio of urban and rural consumption in three years shows a declining trend, and in 2016 the ratio was lower than that of per capita total social consumption. According to the growth rate data of urban and rural per capita consumption of JD.com from 2015 to 2017 (Table 1), the annual growth rate of rural per capita consumption expenditure is higher than that of the urban.

Table 1. Urban and Rural Per Capita Consumption Index, Growth Rate and Consumption Ratio of JD.com in 2015–2017

Year	Per capita consumption index		Annual growth of per capita consumption (%)		Ratio of urban and rural consumption	Ratio of urban and rural per capita social total consumption expenditure
	town	countryside	town	countryside		
2015	628.09	198.31	—	—	3.17	2.32
2016	812.43	359.64	0.29	0.81	2.26	2.28
2017	1064.70	520.93	0.31	0.45	2.04	—

Note: The per capita consumption index of JD Mall is obtained by dividing the per capita consumption data of the JD.com with the number of urban and rural population in 2017, which is calculated by multiplying the number of population in 2016 with the average population growth rate of 2005–2016, and the data are indexed.

Source: Collected from JD big data.

Due to the short time dimension of data of JD.com, it is impossible to compare the change trend of urban-rural consumption ratio in depth. In order to further analyze the impact of e-commerce on the imbalance of urban and rural consumption, this paper, taking urban and rural areas as the analysis factor, conducts a one-way ANOVA using the data of per capita consumption in 31 provinces, autonomous regions and municipalities directly under the central government in 2015 and 2016 from JD.com and *China Statistical Yearbook*. The results (Table 2 and Table 3) show that, the F value calculated by the data of urban and rural per capita consumption on JD.com is far less than that by the data of total per capita consumption. In 2015, the F value of urban and rural per capita consumption on JD.com was 4.37, while that of total per capita consumption was 104.96; in 2016, the F value of urban and rural per capita consumption on JD.com was 6.1, while that of total per capita consumption was 107.17, indicating that the difference in urban and rural residents' consumption on JD.com is far less than the total consumption difference between urban and rural areas, which shows that JD.com has a significant positive effect on reducing the urban-rural consumption difference.

Table 2. ANOVA of Per Capita Total Consumption and Consumption on JD.com in 2015

Difference source	ANOVA of total consumption per capita in urban and rural areas				ANOVA of per capita consumption on JD.com in urban and rural areas			
	Sum of squares	Freedom	Mean square	F value	Sum of squares	Freedom	Mean square	F value
Between groups	1911551402.25	1	1911551402.25	104.96	2852932.33	1	2852932.33	4.37
In group	1092775874.17	60	18212931.24		39178782.47	60	652979.71	

Source: *China Statistical Yearbook* and JD big data.

Table 3. ANOVA of Per Capita Total Consumption and Consumption on JD.com in 2016

Difference source	ANOVA of total consumption per capita in urban and rural areas				ANOVA of per capita consumption on JD.com in urban and rural areas			
	Sum of squares	Freedom	Mean square	F value	Sum of squares	Freedom	Mean square	F value
Between groups	2177827552.78	1	2177827552.78	107.17	4692058.26	1	4692058.26	6.10
In group	1219218706.32	60	20320311.77		46149228.63	60	769153.81	

Source: *China Statistical Yearbook* and JD big data.

In order to further analyze the impact of e-commerce on urban-rural differences in consumption of different types, this paper divides the consumption of urban and rural residents on JD.com into eight categories: clothing, food, residence, household facilities, articles and services, transportation and communications, education, culture and recreation, health care and medical services, and miscellaneous goods and services according to the classification of the National Bureau of Statistics.

The annual growth rate of per capita consumption expenditure<sup>1</sup> of urban and rural residents of different consumption types on JD.com (Figure 1 and Figure 2) shows that, the growth rate of per capita consumption expenditure of rural residents in 2016 and 2017 was higher than that of urban residents. This paper does not analyze miscellaneous goods and services as they cannot fully reflect the rural consumption due to their mixed classification, and there is the lack of rural data. Except miscellaneous goods and services, in 2016, the biggest urban-rural difference in per capita consumption

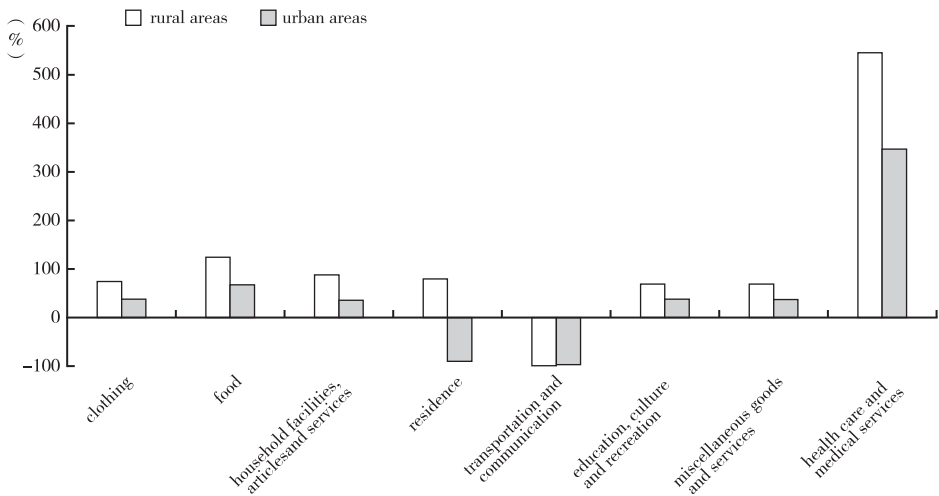


Figure 1. Annual Growth Rate of Per Capita Consumption Expenditure on JD.com in 2016

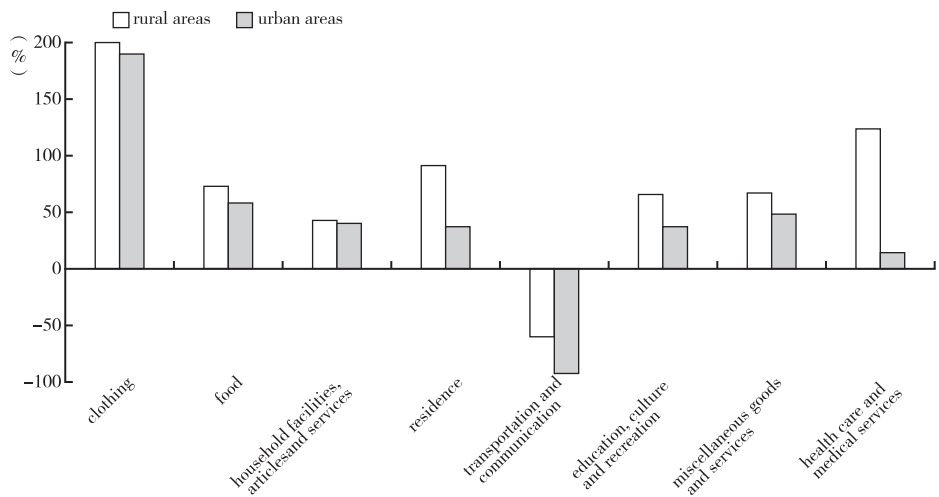


Figure 2. Annual Growth Rate of Per Capita Consumption Expenditure on JD.com in 2017

<sup>1</sup> Per capita consumption expenditure on JD.com = sales volume of JD.com / the number of population

of on JD.com was in household facilities, articles and services, with a growth rate of 79% in rural areas and a negative growth rate of 90% in urban areas. In the consumption of clothing, food, residence, education, culture and recreation, and health care and medical services, the average growth rate of per capita consumption of urban and rural residents is about 30%. In 2017, the biggest urban-rural difference in per capita consumption on JD.com was still in household facilities, articles and services. The rural per capita consumption growth rate was 90%, while the urban one was only 37%. In the consumption of food, education, culture and recreation, and health care and medical services, the urban-rural difference of per capita consumption growth rate is as high as 20%. This shows that e-commerce can stimulate the rural consumption.

In order to further analyze the changes of rural consumption structure, this paper analyzes the growth rate of rural consumption per capita of level-1 categories of household facilities, articles and services, education, culture and recreation,<sup>1</sup> summarizes the pulling effect of e-commerce on different categories of rural consumption.

In terms of household facilities, articles and services (Figure 3), the growth rate of rural per capita consumption in 2016 was higher in the level-1 categories of kitchen appliances, travel and pet life; and in 2017 travel, pet life, kitchen appliances and household appliances. Compared with that of urban per capita consumption (Figure 4), the growth rate of rural per capita consumption of household appliances and kitchen appliances is significantly higher than that of the urban in two years, but the growth rate of computer office consumption is lower than that of the urban, which shows that e-commerce plays a significant role in promoting the consumption of household appliances in rural areas.

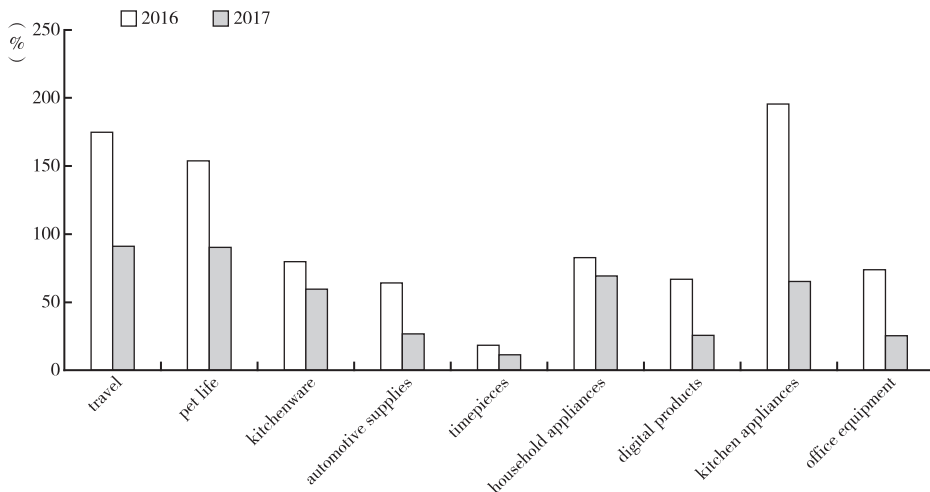


Figure 3. Annual Growth Rate of Rural Per Capita Consumption of Household Facilities, Articles and Services on JD.com in 2016 and 2017

<sup>1</sup> In other types of consumption, data of some level-1 categories are missing and cannot be subdivided, so only these three types are selected.

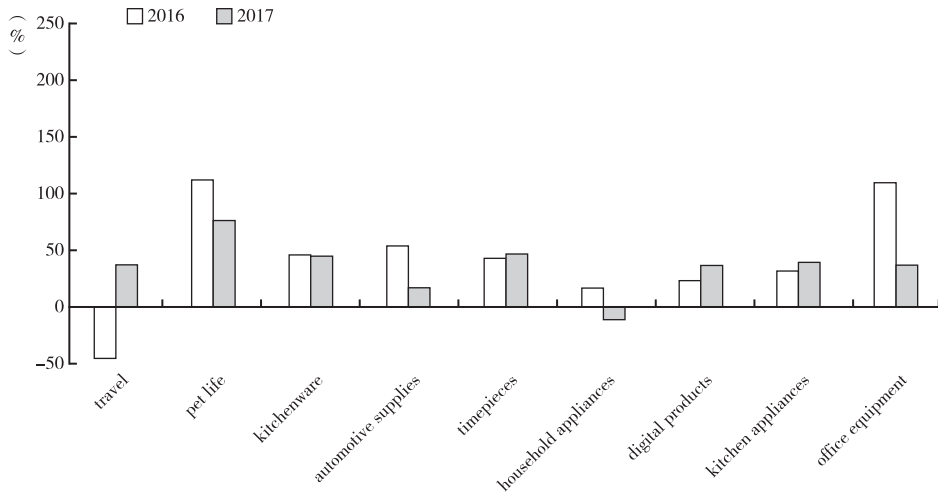


Figure 4. Annual Growth Rate of Urban Per Capita Consumption of Household Facilities, Articles and Services on JD.com in 2016 and 2017

In terms of household facilities, articles and services (Figure 5), the growth rate of rural per capita consumption in 2016 was higher in the level-1 categories of educational audio-visual products and books; online music consumption of rural residents grew rapidly in 2017, with growth rate exceeding that of educational audio-visual products. Compared with the growth rate of urban consumption (Figure 6), the growth rate of online consumption of educational audio-visual products, books, music, and film and television in rural areas is higher than that in urban areas, especially in educational audio-visual products. With the rising per capita income of rural residents, the demand for cultural and educational consumption of rural residents is increasing day by day. The sales of books, audio-visual products are promising in rural areas, which will play an important role in promoting the rural consumption.

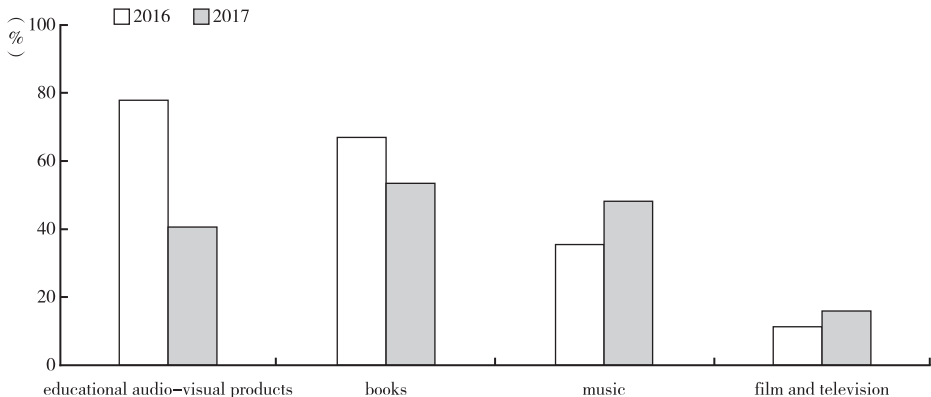


Figure 5. Annual Growth Rate of Rural Per Capita Consumption of Education, Culture and Recreation on JD.com in 2016 and 2017

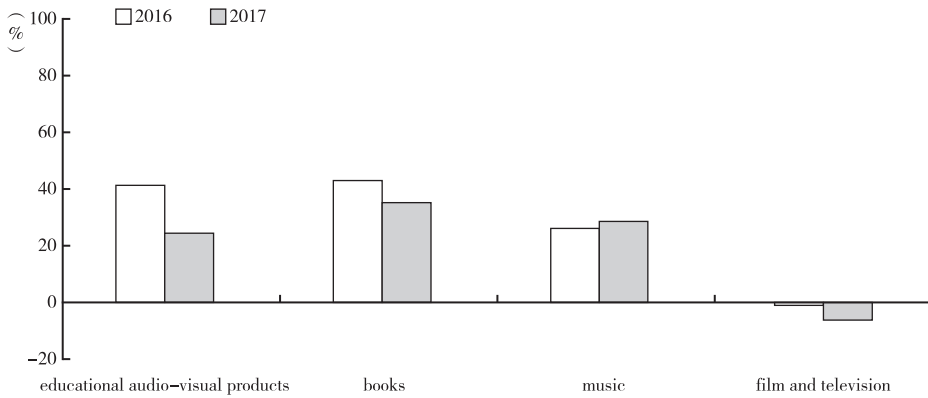


Figure 6. Annual Growth Rate of Urban Per Capita Consumption of Education, Culture and Recreation on JD.com in 2016 and 2017

This paper further compares the ratio of urban and rural per capita consumption expenditure of different consumption types on JD.com with that of per capita total consumption expenditure in 2015 and 2016, reflecting the different effects of JD.com on the difference of urban and rural consumption expenditure in different consumption types. The results show that (Table 4 and Table 5): in 2015 and 2016, the urban-rural ratio of per capita clothing and residence consumption expenditure on JD.com was smaller than that of per capita aggregate consumption expenditure. It can be seen that the JD e-commerce platform has played a role in reducing the differences in clothing and residential consumption between urban and rural areas, while expanding the differences in other consumption types between urban and rural areas.

Table 4. Per Capita Consumption Index of Different Consumption Types by Urban and Rural Residents on JD.com in 2015

Consumption type	Urban residents	Rural residents	Urban-rural ratio	Ratio of urban and rural per capita aggregate consumption expenditure
Clothing	145.22	59.79	2.43	3.09
Food	27.53	8.39	3.28	2.09
Residence	31.24	13.75	2.27	2.45
Household facilities, articles and services	399.28	108.54	3.68	2.39
Transportation and communications	0.12	0.02	6.58	2.49
Education, culture and recreation	6.38	1.34	4.75	2.46
Health care and medical services	16.27	6.09	2.67	1.71
Miscellaneous goods and services	2.06	0.38	5.35	3.32

Source: JD big data.

Table 5. Per Capita Consumption Index of Different Consumption Types by Urban and Rural Residents on JD.com in 2016

Consumption type	Urban residents	Rural residents	Urban-rural ratio	Ratio of urban and rural per capita aggregate consumption expenditure
Clothing	199.73	104.17	1.92	3.03
Food	46.03	18.78	2.45	2.07
Residence	42.37	25.81	1.64	2.38
Household facilities, articles and services	484.04	195.86	2.47	2.40
Transportation and communications	0.00	0.00	49.45	2.33
Education, culture and recreation	8.78	2.27	3.87	2.46
Health care and medical services	22.28	10.26	2.17	1.76
Miscellaneous goods and services	9.19	2.48	3.70	3.20

Source: JD big data.

As e-commerce narrows the urban-rural consumption gap mainly through solving the problem of high consumption cost and poor convenience caused by the underdeveloped commerce in rural areas by making general goods more accessible and providing more convenience, this paper uses units per transaction (UPT) data of different consumption types on JD.com for analysis. Because, compared with the expenditure affected by purchasing power, UPT can better reflect the spending enthusiasm. The results show that (Table 6 and Table 7), in 2015, the urban-rural ratio of per capita clothing UPT on JD.com is smaller than that of per capita aggregate consumption expenditure, and in 2016, the urban-rural ratio of per capita UPT of clothing, residence, and miscellaneous goods and goods on JD.com is smaller than that of per capita aggregate consumption expenditure. This result further strengthens the above conclusion, that is, JD.com has helped reduce the urban-rural differences in clothing and residence consumption.

Table 6. Urban and Rural UPT Index of Different Consumption Types on JD.com in 2015

Consumption type	Urban areas	Rural areas	Urban-rural ratio	Urban-rural ration of per capita aggregate consumption expenditure
Clothing	1.75	0.78	2.23	3.09
Food	0.70	0.22	3.23	2.09
Residence	0.46	0.17	2.64	2.45
Household facilities, articles and services	1.43	0.44	3.24	2.39
Transportation and communications	0.00	0.00	6.78	2.49



Consumption type	Urban areas	Rural areas	Urban-rural ratio	Urban-rural ratio of per capita aggregate consumption expenditure
Education, culture and recreation	0.20	0.04	4.50	2.46
Health care and medical services	0.20	0.08	2.55	1.71
Miscellaneous goods and services	0.01	0.00	2.99	3.32

Source: JD big data.

Table 7. Urban and Rural Online Order Quantity Index of Different Consumption Types on JD.com in 2016

Consumption type	town	countryside	Urban rural ratio	Ratio of urban and rural per capita social total consumption expenditure
Clothing	2.40	1.39	1.72	3.03
Food	1.24	0.57	2.16	2.07
Residence	0.45	0.24	1.87	2.38
Household facilities, articles and services	2.11	0.79	2.68	2.40
Transportation and communications	0.00	0.00	7.15	2.33
Education, culture and recreation	0.27	0.08	3.54	2.46
Health care and medical services	0.27	0.14	1.94	1.76
Miscellaneous goods and services	0.02	0.02	1.19	3.20

Source: JD big data.

In order to analyze the role of e-commerce in stimulating the growth of residence consumption, this paper classifies residence consumption according to level-1 categories, and calculates the per capita consumption and urban-rural ratio on JD.com in 2015 and 2016 (Table 8). Data show that, the three categories with the lowest ratio were furniture, building materials and houseware in 2015, home cleaning, home textiles and furniture in 2016. It can be seen that the consumption of furniture e-commerce keeps a low urban-rural ratio for two consecutive years. However, at present, this low urban-rural ratio is probably due to the low consumption of urban furniture e-commerce. The online consumption of furniture is different from that of clothing and home appliances. First, consumers cannot get enough consumption experience online, so they cannot accurately know the volume and texture of products, which affects their purchase decisions. Second, furniture products are special in that they are large, not easily transported, and liable to damage, so it is troublesome and costly to return and exchange furniture; thus, the furniture industry is still exploring efficient e-commerce model. Therefore, urban residents are still used to buying furniture in offline stores, and e-commerce consumption is low. This leads to a low ratio of urban-rural consumption.

Table 8. Per Capita Consumption Expenditure Index of the Level-1 Categories of Residence Consumption on JD.com in 2015 and 2016

Level-1 categories	2015			2016		
	Urban areas	Rural areas	Urban-rural ratio	Urban areas	Rural areas	Urban rural ratio
Hardware and home decoration	81.81	19.27	4.25	20.68	5.79	3.57
Home furnishing	1182.86	418.35	2.83	1423.95	676.66	2.10
Home decoration materials	868.75	437.16	1.99	1341.10	760.13	1.76
Houseware	12.53	6.10	2.05	7.91	4.71	1.68
Furniture and home decoration	987.59	505.25	1.95	1466.27	1038.48	1.41
Home textiles	6.04	2.81	2.15	3.75	2.76	1.36
Home cleaning	0.24	0.08	3.15	0.09	0.07	1.30

Source: JD big data.

The above analysis of big data shows that at the micro level, e-commerce promotes rural consumption and narrows the urban-rural consumption gap.

#### 4. Conclusions and Policy Recommendations

To sum up, the Internet plays an important role in narrowing the urban-rural gap and promoting the balanced development of urban and rural areas. Therefore, we should further promote the application of Internet in rural areas to further boost the balanced development of urban and rural areas. Decision-makers in China attach great importance to the role of the Internet to promote the balanced development of urban and rural areas, especially the consumption balance. On February 28, 2020, 23 ministries and commissions, including the National Development and Reform Commission, jointly issued the *Implementation Opinions on Promoting Consumption Capacity Expansion and Quality Improvement to Accelerate the Formation of a Strong Domestic Market*, proposing that “China will enrich the supply of goods suitable for rural consumers, improve the supply channels, give full play to the advantages of the existing rural network layout of the postal system, supply and marketing cooperative system, and implement the ‘post in the countryside’, upgrade ‘express delivery to the countryside’. China will carry out the pilot project of standardized construction of rural food stores. China will strengthen the construction of the supply chain system for agricultural products, expand the coverage of e-commerce in rural areas, and promote the two-way flow of industrial products to the countryside and agricultural products to the city.” From this passage, we can see that China has high hopes for using the Internet to narrow the urban-rural gap. In practice, the Internet played a greater role

in promoting the agricultural products to enter the city and promoting the industrial products to the countryside, and taught rural residents to deal with daily problems during the COVID-19 pandemic in 2020. In the post-epidemic era, the Internet can play a better role in improving the balanced development of urban and rural areas through the joint efforts of the state, society and enterprises.

First, China should accelerate the Internet popularization in rural areas. According to *The 44th Statistical Report on Internet Development*, by June 2019, rural Internet users reached 225 million in China, accounting for 26.3% of the total Internet users, and the Internet penetration rate in rural areas was about 40%; urban Internet users 630 million, accounting for 73.7%, and the Internet penetration rate in urban areas was nearly 70%. In terms of the proportion of non-users, non-users reached 541 million, with 37.2% in urban areas and 62.8% in rural areas. The majority of non-users are in rural areas, and there is still a large urban-rural gap in terms of Internet penetration. Therefore, to promote the balanced development of urban and rural areas by using the Internet, it is important to implement more effective policies in rural areas to provide rural residents with greater access to the Internet. The COVID-19 epidemic in 2020 taught rural consumers much in network application and online consumption. From a national perspective, China should seize the opportunity of new infrastructure construction in the post-epidemic era, further promote the network application in rural areas, and build new infrastructure for narrowing the urban-rural gap through the popularization of Internet.

Second, China should further improve the construction of new infrastructure, such as express delivery, in rural areas. Outlets of express delivery have reached the towns in China, but they are still insufficient in villages, which still restricts the development of e-commerce in rural areas. During the epidemic, contactless express service has become the standard. For rural areas, the intelligent express cabinet is an important way to realize such service. Therefore, it is suggested to promote the construction of new infrastructure such as intelligent express cabinets in rural areas in the post-epidemic era to solve the last mile problem of rural express logistics. However, the operation cost of intelligent express cabinets in rural areas is much higher than that in urban areas. Therefore, it is necessary to include the cabinets in infrastructure construction and subsidize their operation by the government to reduce the logistics cost.

Third, China should vigorously support the new areas of agricultural materials e-commerce. In light of the current situation of rural e-commerce, agricultural materials e-commerce is a new field worth exploring. The significance of agricultural materials e-commerce is not only to make use of the advantages of e-commerce, but also to reduce the costs of agricultural production and sales by reducing the intermediate links of agricultural materials procurement, planting services, processing and sales of agricultural products. More importantly, the additional profits generated by reducing the intermediate links can go back to the farmers and cover the farmers' land cost.

Agricultural materials e-commerce also provides the basis for establishing agricultural production traceability system by digitalizing and visualizing the transaction process. At the same time, it can also integrate Internet finance with agricultural science and technology, and provide all-round service for agriculture, rural areas and farmers. Therefore, it is necessary to support the agricultural materials e-commerce in policy.

Fourth, China should promote the development of service e-commerce for local rural residents. As many households turn into empty nests in rural areas, there is a greater demand for localized services such as eldercare, culture, tourism, transport, and catering. These local-based O2O services have great development space in rural areas. However, due to the characteristics of rural areas, the needs for these services can hardly be satisfied. So, how to make use of the Internet to promote the development of service e-commerce in rural areas through business model innovation and policy support, is both a new topic in the future e-commerce development and a focus of policy.

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