THE INTERNET'S IMPACT ON TRADE – AN ANALYSIS APPLYING THE GRAVITY THEORY

DENA BATEH

New York University, New York School of Management & Technology, Excelsior College
E-mail: Drb8@nyu.edu, Drbateh@nysmt.org, Dbateh@excelsior.edu

Abstract - The gravity model of international trade analyzes synergistic trade flows based on the economic size and distance between two parts. The model suggests that trade tends to fall with distance due to geographical distance. This paper analyzes the internet's impact on the geographical distance of the gravity model. Firstly, it briefly describes the gravity model focusing on the importance of geographical proximity. Secondly, it illustrates the introduction of the internet and changes that occurred by it specifically targeting intangible services developed through the introduction of the internet. Thirdly, it analyzes the internet's impact on the distance advantages with historical trade data. Lastly, this paper forecasts how the model will change due to an increasing information technology dominance economy.

Keywords - Gravity Theory, Dominance Economy, Distance Advantages

I. INTRODUCTION

How is the size of the trade amount determined? The answer to this question is the gravity equation. The gravitational equation is an empirically very successful equation in international trade (Feenstra, 2004). The gravity model considers that the number of trade increases between countries with a large economic scale but decreases when the distance between them is large. Many previous studies have been accumulated on such gravity models due to the simplicity of their estimation formulas and the ease of obtaining data. Another notable point of this model is its high explanatory power. The significance of variables in estimation using the gravity model is very high. However, while the gravity model has these advantages, the introduction of the internet has changed its fundamental idea of gravitational advantages as well as the trading system itself.

II. DEVELOPMENTSOF WORLD TRADE

The development of world trade can be classified into three stages. The first stage was the expansion of traditional trade, with reduced transportation costs allowing the goods produced to deliver across national borders to consumption areas. Goods traded at this stage are primarily final products, but consumers have become more accessible to new and lower-cost commodities. The second stage is global value chain trade, and by further reducing transportation costs and various adjustment costs, companies can subdivide the production process of goods across national borders and make each production process superior. The gravity model is highly empirical at this stage since distance is a primary factor in determining trade cost. The third stage is digital trade, which is made possible by the dramatic reduction in the cost of sharing ideas through the transfer of data and information. The expansion of digital trade has dramatically improved global connectivity, contributing to the creation of new business models and the improvement of productivity.

III. THE FOURTH INDUSTRIAL REVOLUTION

With the progress of the Fourth Industrial Revolution, the amount of data traded in the world has increased intensely. The number of Internet users in the world has steadily increased, reaching about 4.6 billion in2021 according to Statista (2021). The average annual growth rate from 2020 to 2021 was7% - 875,000 new users per day, which is a significant increase. The extent of the Internetand mobile phones is now spreading to every corner of the world, including emergingcountries. Cyberspace has come to be recognized as a crucial area, not only in the economybutalso inall aspectsof peoplearound the worldsuch as politics and security.

There is no globally unified definitionofdigital trade, but for example, the OECDstates (2013) stated that digital trade is based on the transfer of data across national borders, and consumers and businesses. According to this statement, digital trade includes buying andselling goods and services over the Internet. Online hotel reservations, ridesharing,andservices offered through online platforms such as music distribution services are the bestexamples. At present, U.S. exports of digital goods and services were 148 billion dollars in 2018according to the Bureau of EconomicAnalysis (2021).

In addition to this information and communication technologies, cross-border dataexchange and communication are steadily increasing, along with sharing ideas andinformation between individuals through Facebook, Twitter, and Instagram (Ciuriak, &Ptashkina, 2018). Even in the business world, communication with overseas offices usinginstant messages is becoming popular (Lund, & Manyika,

2016). IT platform companies around the world are creating a variety of new businesses. For example, in addition to searchengines used in computers and smartphones, various new businesses such as wearableterminals, health data platforms,self-drivingcars, andsmart homeplatforms arebeing utilized.

IV. EFFECTS OF THE INTERNET ON TRADE

The effects of the internet on traditional trade become comprehensive when comparedwith liner companies. The difference between IT platform companies and traditionalbusinesses is that IT platformsplay arole in buildingnetworks fortransactions and facilitating transactions. In contrast to IT platform companies, linear companies sell the goodsand services they produce downstream of the supply chain, and many of the industries thatdominated the 20th century, such as manufacturing, retail, distribution, and service, fall intothis category. Linear companies are building physical assets such as factories and distributioncenters to manufacture their products and deliver them to consumers. For a linear company toexpand its business, it needs a reasonable cost to increase inventories and the personnel whomanagethem.

On the other hand, IT platform companies have made it possible to reduce these coststo the utmost by connecting companies and individuals through the internet, which is one ofthe reasons it's accelerating growth. Also, the value flow of IT platform companies moves inmultiple directions within the network. For example, even in one online marketplace, userswho supply products are everywhere. For a linear enterprise, one more customer means morebuyers of a product or service; but for an IT platform company, one more user meanseverything that already exists in the network. It means building relationships with users andhasdramatically expanded the possibilities of creating new value.

One may argue that the trading system has changed. Concerning personal imports,services that reduce various risks associated with foreign remittances have emerged for onlinepayment, and by using international transportation services, it has become possible to use theprocedureswithalmostnoadditionalcosts.Foreigngoodsandservicesareintroduceddirectly through social media and video sharing services. Unless the foreign seller refuses toship to the importing country and the acquisition or consumption of foreign goods andservices in the country is not illegal, individuals can purchase them using online payment and transportation services.

Comparing the global export trends of digital-related services and non-digital-relatedservices, the growth rate of digital-related services exceeded that of non-digital-relatedservicesin2019.Digital-relatedserviceshavebeenincreasingfasterthannon-digital-relatedservices since 2011, and the ratio of digital-related services to total service exports exceeded10% in 2018 and reached 11.2% in 2019. Besides, the contribution rate of digital-relatedservices was 46.5%, and about half of the increase in service trade in 2019 was due to the expansion of digital-related services,accordingto the Bureau of EconomicAnalysis (2021).

In addition to the progress of digitalization triggered by the COVID-19, the demand for online contact with remote parties in real-time and online shopping is increasing, and thedigital-related products that support these trade-in services are expected to grow. Comparingthe year-on-year growth rates of digital services and overall service trade for the top fivecountries in terms of service imports in 2019, all countries saw growth in digital services inthe second quarter of 2020. The rate exceeds the overall growth in trade in services. Amongthem, China saw a remarkable increase in digital-related service imports, rising 38.7% year-on-yearin the first quarter of 2020 and 25.6% year-on-year inthesecond quarter.

V. IMPACT OF COVID-19 ON INTERNET SERVICES

After the expansion ofCOVID-19, internet services such as online education, livedistribution, and online shopping have expanded in the world, and the digital-related servicesthat support these may have expanded. Trade-in digital services have recently been limited insome areas (Ciuriak& Ptashkina,2018). However, it is expected to expand in thelong run against the backdrop of increasing demand. The WTO (2020) reported that thedemand for digital services is becoming unprecedented and unanticipated as more peopleworkfromhome, distancelearning,and interactremotely. Also,aclearer awarenessofthe importance of access to technology and connectivity to everyone, not just demand, couldhave a positive effect on the tradein ICT services. It is considered that the internationaltransactions will be recorded as the amount of trade in digital-related services sincecommunicationservices are mainly assumed.

With the spread of remote work and online communication accompanying theexpansion of the COVID-19, the demand for providing services via the Internet will increasein the future. Once new lifestyles take root, these demands are not temporary and are likely topersist after the end of the COVID-19. Also, the business model of the Corona Virus Era will beestablished in companies, and investment in digital-related services will recover. Tradeindigital-related services were on an increasing trend until 2019, but new demand and changesin values triggered by the new corona crisis are expected to further boost that growth over themediumto long term.

VI. CONCLUSION

In conclusion, the gravity model has been a great economic measure to explain the international trade phenomena; however, the introduction of the Internet has created newbusiness models, which dramatically reduce transportation costs. Also, the digital trade is one of the largest portions of exports, altering the traditional trading style. As IT platformcompanies have advantages in the digital market, the importance of distance has beendiminishedin internationaltrade. DuetoCOVID-19,many ITplatform companieshavegrown; thus, this paper concludes thatdigital trade will be the major exports in the futureofinternational trade,and thegravitational factorsare not to beconsidered inthe digital trade.

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