

The Labor Market Outcome of Digital Platform

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Abstract: This article analyzes how digital platforms, as the product of the rapid development of the Internet, will affect the employment of human society after they are gradually applied to various industries. This article starts with Google Trends, an Internet job search tool. By summarizing the literature related to Google Trends, we conclude that employment improved somewhat after Google Trends was added to the market. Moreover, Google Trends can also help economists predict the future employment situation from a macro perspective. We then analyzed what happened to a specific industry -- taxis -- after adding digital platforms. Despite the negative comments, we conclude that taxi-hailing platforms can help increase driver employment and will not replace the traditional taxi industry. Finally, the paper puts forward expectations for the future. The government must set more explicit rules to limit platforms and protect workers' rights in the labour market.

Keywords: digital platform, Internet job search, Google Trends, taxi industry, labor market

1. Introduction

With the development of the Internet, digital platforms have played a significant role in the contemporary economy and society. Different software applications in all walks of life shape the industry's development with their unique digital nature. In previous studies, the addition of digital platforms will also impact the employment rate of some industries. In our article, we will summarize and analyze the views put forward in previous articles from two aspects: the impact of Internet job search as a job search tool on the employment rate and the impact of digital platforms on the employment rate of taxi drivers.

2. P1: Internet Job Search

Our topic is the labour market outcome of the digital economy. The digital economy affects the labour market in several ways. In the past few decades, it mainly intervened the employment of different social groups through the development of information communication technology. One tool that was brought by the widespread Internet in the digital era is Internet Job Search.

Internet job search is a concept firstly evaluated by Peter Kuhn and Mikal Skuterud in their study "Job search methods: Internet versus traditional". According to their essay, Internet job search is changing the ways employees look for jobs and employers hire workers [1]: workers contact their employers through the Internet instead of undergoing face-to-face communications. The article then

evaluates "the frequency and incidence of Internet job search among US workers, by race, gender, and other demographic characteristics, the location of jobs (geographic factors), and the relation between Internet and traditional job search methods." After evaluating the particular supplement data generated by the Customer Population Survey (CPS) in December 1998, the two scholars reached several conclusions. Firstly, the Internet job search is more popular among the unemployed than the employed. Secondly, most job seekers conduct Internet job searches at home. Thirdly, a digital divide is presented along racial lines. Specifically, unemployed Hispanic and black workers are mostly taking advantage of IJS. Finally, the development of Internet Job Search causes a decline in public employment agencies, which means the digital economy poses specific threats to traditional job search methods.

Later, professor Autor identifies three labour market characteristics that may have changed due to the increase in Internet usage in his essay "Wiring the labour market". First, the matches between employers and employees are affected by Internet job searches. Second, Internet usage takes the place of specific traditional jobs. Third, the labour demand tends to become less dependent upon the local market [2].

Although Internet Job Search is identified as a realistic option by previous studies, empirical studies show no clear evidence of the effectiveness of IJS in early literature. For example, studies of the effects of the internet on labour market outcomes by Feldman and Klaas, and Fountain barely find any evidence of a friction-reducing effect. For example, Feldman and Klaas state that internet fluency barely affects the extent of job search activity [3]. On the other hand, Fountain evaluates the effect of online searching on the short-term probability of finding employment. The study uses a logit model to determine the probability of becoming employed within three months and finds that individuals who engage in IJS activities only have a slight advantage in finding employment over individuals who do not use the internet [4].

However, studies by Bagues and Labini; Brencic and Norris, Stevenson; and Kuhn and Mansour find that employers and employees who utilize the Internet in searching for employment tend to experience better outcomes in the labour market while comparing to the others. For instance, Bagues and Labini study the impact of the interuniversity consortium AlmaLaurea (electronic labour market) on university graduate labour market outcomes in their essay "Do online market intermediary matter?" They find that it decreases the unemployment probabilities of graduates, improves the matching quality between employers and graduates, and fosters graduates' geographic mobility. [5]. On the other hand, Brencic and Norris examine the effect of online searches on employers' perspectives in their essay "Employers' Online Search: An Empirical Analysis". They find that employers must fill vacancies as soon as possible, specify fewer job criteria, provide complete information about the job application process and withdraw vacancies from job boards faster than employers that do not need to fill vacancies urgently [6].

In Kuhn and Mansour's latest study, "Is Internet Job Search Still Ineffective?", they discover that greater overall Internet penetration might shift the situation. The improvements in technology over the start of the 21st century, including more advanced online job sites, network externalities and greater overall Internet penetration, led to the effectiveness of Internet Job Search [7].

Besides investigating the effectiveness of Internet Job Search and comparing traditional job search methods and IJS, a relatively new research field to evaluate the relationship between Internet job search and unemployment rate in recent years is to use Google Trends, an example of Internet Job Search platform, to predict potential employment growth. In Shintaro, Fumiko and Riku's paper, Google Trends is defined as a service that outputs the time series data of search intensity to show the extent to which a particular keyword is searched for in a specified period and location. Search intensity is standardized to turn the maximum value during the period into 100 based on the number of specific keyword searches relative to the number of all searches in a specified location. The figure

is calculated based on a randomly selected part of the search data to speed up the computation. Consequently, the figure varies based on the time when the search intensity is retrieved [8]. Then, Daniel and Erik pointed out certain advantages Google Trends possessed for macroeconomic forecasting. Unlike household and business surveys with high costs and selection bias, Google Trends reveals present data with no geographical restrictions, and everyone can use Google Trends for free [9]. Thus, Google Trends has a much broader user base, making its data more complex.

By evaluating two terms, "jobs" and "job offer" as search keywords, Shintaro, Fumiko, and Riku found that "the usage of Google Trends does not necessarily contribute to improving the accuracy of forecasts under some preconditions, meaning that there is a limit to the method of adding the search intensity of single keyword to the forecast model." [10]. Therefore, although Google Trends partially reveal the trend of employment growth, its accuracy is limited. However, Daniel and Erik's finding in 2022 is on the contrary. They analyzed sample data from January 2004 through February 2019 with monthly frequency. Later, these two scholars believed Google Trends could be a valuable tool for obtaining accurate and real-time information on future economic growth and labour market conditions. Additionally, the platform might predict employment growth at horizons up to a year ahead [11].

To sum up, the digital economy affected the employment of various social groups through Internet Job Search, which effectiveness increased as the Internet became widespread. Additionally, the continuous development and improvement of large online platforms such as Google Trends enabled macroeconomists to predict employment trends in the future. The digital economy's tools reduced frictional unemployment and employment dilemmas of certain social groups and made future predictions more accurate and convenient.

3. P2: Taxi Industry

This part will start with the taxi industry, analyze and summarize the disputes, benefits and future development direction after the digital platform joins the taxi industry. Emerging digital platforms have been used in many nascent industries and have gained many results through the rapid development of the Internet. Then in the face of the addition of digital platforms, the employment situation of the taxi industry has been affected.

Many employees in the traditional taxi industry have the same worry: whether new taxi apps will replace their jobs. As it turns out, their fears were not unfounded. One study showed that after Uber entered the market, it reduced taxi driver service revenue by 12 per cent in the first year and 18 per cent in the second year. As a result, some taxi companies are closing down or laying off workers. Laid-off taxi drivers have experienced structural unemployment, believing that apps have taken over their jobs. However, many traditional taxi drivers are reluctant to join the digital. The main reason lies in the uncertainty of revenue from each order. First, the platform collects a fee, sometimes as much as 30 per cent in order.

Moreover, the money platforms charge is often not fixed, fluctuating between 20 to 20 per cent. Although the traditional taxi driver also needs to pay the fee of each order to the company, the proportion of the money paid is relatively fixed, which is indicated when the employee signs the contract with the taxi company. Moreover, in the case of Didi in China, the platform sometimes grants benefits to users, such as coupons included in the payment received by drivers, causing them to receive less money. Many full-time drivers would not accept such a pay gap. Secondly, the primary application platforms are more inclined to serve consumers, which shows that consumers can easily give nasty comments to drivers. The bad comments directly affect the income of drivers. However, consumers' feelings are uncontrollable, so it is difficult for drivers to recover their economic losses after receiving a bad review. The third reason is that platforms are not clear about the identity of drivers. The platform claims that these registered drivers are independent contractors, so it does not

need to guarantee a minimum wage or social security. As a result, during the covid-19, many drivers feared they would not be eligible for unemployment benefits provided by the government.

The platform still provides advantages. First, an article published in 2021 surveyed the percentage of American taxi drivers in all industries in the United States. The results show that between 2009 and 2019, the proportion of taxi drivers bottomed out in 2012, which could be explained by the impact of the Great Recession in the United States. Taxi drivers' share peaked at 0.60 per cent in 2019, when the U.S. unemployment rate reached its lowest point. The conclusion is that the traditional taxi industry is greatly affected by the changes in the domestic economy and market conditions in the United States. The second is the employment situation of traditional taxi drivers after the promotion of the Uber platform. Between 2009 and 2019, except in 2015, the proportion of full-time traditional taxi drivers remained stable at around 80 per cent, but the proportion began to decline in 2017, reaching a low of 65 per cent [12]. However, using the Tobit model, which considered different factors as a different coefficients to estimate the marginal effect [13], different factors (ridesharing platform, hourly wage, geographical location, etc.) all have little impact on the actual driving time. The country's social and economic situation affects the taxi industry's employment situation.

Secondly, based on the platform's characteristics, it provides many positive effects on employment in the taxi industry. First, a 2019 report showed that as people's use of social media and digital platforms continues to increase dramatically, more people are choosing to take taxis on their phones, providing higher ridership for taxi drivers. Moreover, ride-sharing software can maximize the utilization rate of capacity within the range of maximum passenger capacity, and the passenger flow will increase accordingly. As a result, increased ridership has opened up more positions and job opportunities. Second, most drivers engaged in ridesharing take this job as a part-time job, reflecting uber's relatively accessible working mode and greater flexibility as an Uber driver. As a result, in the face of unexpected circumstances, such as COVID-19, Uber drivers will have more freedom to choose based on personal aspects. They can leave the taxi driver's job anytime for personal reasons. All they need to do is remove their driver status on the mobile app platform. As for traditional taxi drivers, since they have signed formal employment contracts with taxi companies, they may face contract problems such as breach of contract if they want to terminate the employment relationship.

After the digital platform joined the market, a network effect occurred, forming a two-sided market around customers and service providers. In the newly formed two-sided market, the service provider uses the platform, increasing the platform's value, and the platform's value increases with the network size and user usage [14]. Therefore, we conclude that enabling consumers to have a good user experience can enhance the platform's value. When the platform value is improved, the economic value obtained by the service provider through the creation of the platform will also increase [15]. The network effect is applied to the taxi industry. After the taxi-hailing software joined the taxi industry, taxi drivers provided high-quality services on the platform to maintain their income level and reduce the negative rating rate [16]. When the passengers enjoy satisfactory service, the platform's value will be increased in the customer group to help the drivers create more income with this good network effect.

Finally, digital platforms in the taxi industry have many aspects that need to be improved. First, the existing policies are insufficient to provide platform taxi drivers with enough job security. If workers are restricted by the location and working time required by the company, then workers should be considered employees rather than independent contractors [17]. The company does not recognize drivers as employees, which means that they are not eligible for subsidies and insurance provided by the state, which is also why others do not want to switch to digital platforms. Society must distinguish between employees and independent contractors and thoroughly regulate how platform companies divide drivers' identities. Secondly, the platform needs to issue task instructions in advance, including but not limited to the percentage of service fees paid on each order, to avoid drivers being docked

wages because of unclear job requirements. Moreover, society should set strict rules to review if the platform harms the benefits of drivers when maximizing customers' experience, such as whether it is reasonable to deduct coupons from drivers' wages. Finally, considering the platform software's particularity to meet customers' needs, workers should have the right to raise objections to the bad evaluation given by customers and submit it to the company for re-evaluation.

4. Summary

The effectiveness of Internet job searches to help employment benefits from the rapid development and wide use of the Internet. Besides, Internet job search not only helps to improve employment but also enables economists to have enough data to predict the future employment situation of different industries. Focusing on the taxi industry, traditional taxi drivers do not have to worry too much about being replaced by ride-hailing apps. It turns out that software is not a perfect substitute for traditional taxis. In terms of improving the employment situation, the digital platform has achieved specific results, but there are still some problems due to the incomplete policies and the particularity of the platform operation. In the long run, digital platforms are undoubtedly a new business model combined with the advanced Internet. But how to balance the traditional labour market with the new digital platform is still a problem that needs to be solved. It is hoped that the digital platform with strengthened regulatory constraints can combine with the development of the Internet and provide more job opportunities for society.

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