

Theoretical Analysis and Case Study of Giffen Effect in Commodity and Labor Market

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Abstract. The Giffen effect is a particular economic phenomenon that only occurs in a specific background. Due to its effect on both commodity and labor markets, the Giffen effect became an irreplaceable phenomenon in the development of economy and society. Despite the fact that it is a rare incidence, it still can be found in daily life. Under the circumstance of COVID-19, the mask is a quintessential example of the Giffen goods. At the same time, the mask provides a more tangible explanation of the Giffen effect. This study mainly focuses on explaining the Giffen effect and its influence on the commodity and labor market. Furthermore, the paper also helps to illustrate the real-life example of Giffen goods. The terminal goal of the study is to explore the effects of Giffen goods, and provide others about the idea of the Giffen effect and figure out its main characters. This study also provides a reference for researchers who are interested in this area and willing to spend more time exploring it.

Keywords: Giffen effect, labor market, commodity market, law of demand.

1. Introduction

The traditional theory of demand believes that the price of commodity changes in the opposite direction to the quantity demanded. However, in reality, there are some examples where the demand and the price change in the same direction, but the traditional theory cannot explain this phenomenon. British economist Robert Giffen found that during the Great Irish Famine in the mid-19th century, Irish farmers' demand for potatoes increased due to rising prices. The explanation for this phenomenon is as follows: Irish farmers have low incomes and can only take potatoes as their staple food. Their expenditure accounts for the vast majority of farmers' income. When the price of potatoes rises, the substitution effect prompts farmers to reduce the demand for potatoes. However, although the real income of farmers is significantly reduced, no matter how much the price of potatoes rises, it is still the cheapest food for farmers, so the income effect prompts farmers to increase the demand for potatoes reduces the consumption of other foods. The income effect is greater than the substitution effect. Therefore, the higher the price of potatoes, the greater the farmers' demand for potatoes. Contrary to the traditional law of demand, this economic phenomenon is called auspicious, Giffen effect or Giffen mystery.

2. Literature Review and Related Definition

Current researches on the "Giffen effect" are relatively affluent and provide theoretical reference for this study. The term "Giffen's paradox" is refer to an upward-sloping demand curve when discussing the demand curve [1]. Giffen phenomenon is a commodity characteristic influenced by culture, region, and period. Wang et al. believed that the appearance of Giffen goods is not related to the goods themselves but depends more on the consumption characteristics of consumers, that is, whether there is Giffen behavior [2]. Chen et al. also believe that the characteristics of commodities are not absolute, which is reflected explicitly in the fact that during the period of supply shortage, pork will change from a standard commodity to a Giffen commodity, and the demand will rise with the price [3]. According to the above discussion, Lipsey and Gideon believe that Giffen goods are

essentially a special kind of necessary low-grade goods, and they are irreplaceable [4]. In addition, the definition of Giffen goods and common goods is not strict, and the two can be transformed into each other under a specific time, space, and economic behavior.

Scholars usually adopt the Giffen effect theory to explain some abnormal phenomena in reality, for example, based on the main crops of Hunan Province and Gansu Province as the research object, some researchers found that the sales of rice and wheat in both places existed [5]. Giffen behavior varies to different degrees, and this behavior is mainly dependent on the severity of household poverty [6, 7]. Fang believes that the middle and low-end commercial housing in China's large cities reflects a particular nature of Giffen commodity, and the rise of housing prices will affect people's expectations for future housing prices to move the demand curve upward [8]. Some scholars are committed to distinguishing the specific mechanism of the Giffen effect. For example, Su pointed out that the reason why Giffen goods exist is that the premise of the law of demand, and other unchanged factors have been ignored [9]. Zhang believed that the essence of the Giffen effect lies in the shortage of the supply system, and it is precise because of the insufficient supply of Giffen goods and related substitutes that the price is directly proportional to the demand [10]. In addition, some scholars believe that the Giffen effect is a short-term or partial characteristic of the traditional demand curve. In the long run, the market demand curve is still downward-sloping to the right, and this phenomenon primarily exists in simplified economic theories. It is not easy to find in reality [11].

3. Analytical Framework

3.1. Giffen Effect in Commodity Market

According to the theory of microeconomics, the demand change caused by the price change can be regarded as the superimposed effect of income effect and substitution effect, among which the income effect refers to the change of the actual income level of consumers caused by the change of commodity price, which in turn affects the demand of the commodity, and the substitution effect It means that when the absolute income level remains unchanged, the change in the price of a commodity leads to a change in its relative price with another commodity, which in turn affects the demand for the commodity. Therefore, this study adopts the theory of income and substitution effects to explain the economic principle of the Giffen effect.

Before the formal analysis, this paper assumes that the consumer's budget constraint line is as follows: $p_1x_1 + p_2x_2 = I$. Among them, $i = 1, 2$ represent two kinds of goods; p_i represents the price of good i ; x_i represents the demand for goods i , and I represents the total income of consumers. Therefore, the budget constraint line measures the cost of two goods without exceeding the total income of consumers. Various combinations of possibilities. At the same time, assuming that consumers will produce specific subjective utility in the process of consuming two commodities, the consumption utility function is recorded as: $U_0 = U(x_1, x_2)$. The consumption utility function measures a set of curves representing various combinations of two commodities that can bring U_0 utility to consumers. Under the condition that the consumer's utility is kept constant, as the consumption of an inevitable commodity increase, the consumer's desire for this commodity will decrease. Therefore, the image corresponding to the consumption utility function is a set of convex to the origin curve.

In the product market, commodity 1 is a Giffen commodity, and commodity 2 is an ordinary commodity. The specific income effect and substitution effect analysis can be seen in Figure 1.

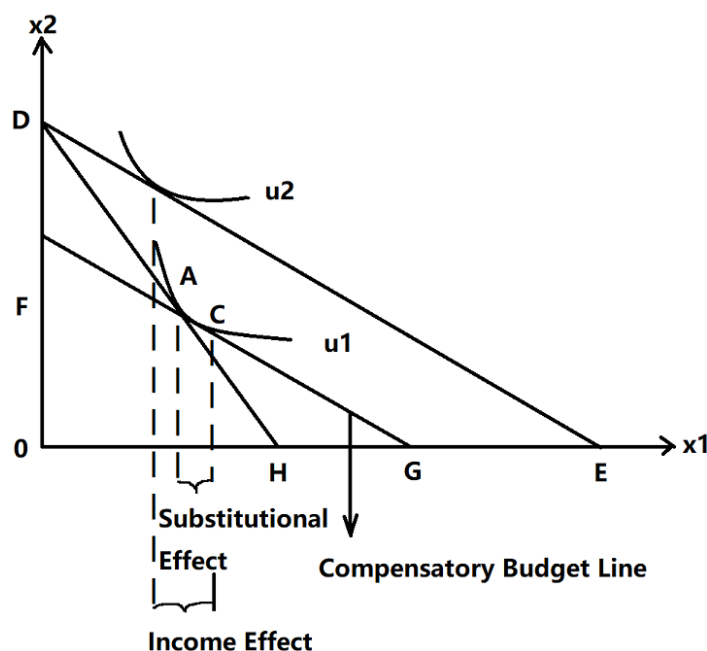


Figure 1. The income and substitution effects of Giffen goods

Assuming that the consumer's initial budget constraint line and utility curve are DH and U1, respectively, the tangent point A of the two is the commodity demand the consumer faces when they obtain the maximum effect at a given income level (x_{11}, x_{21}) . When the price of commodity 1 falls, and the total income and the price of commodity 2 remain unchanged, the budget constraint line DH rotates counterclockwise around point D to DE, and the demand for commodity 1 at this time becomes (x_{12}, x_{22}) , and thus, it can be found that the quantity demand for good 1 decrease and for good 2 rises. Therefore, the demand for commodity 1 is directly proportional to the price, contrary to the traditional view of “the higher the price, the lower the demand”.

However, the change in quantity demand is not caused by only one factor, and the following parts will explain two factors that work together to cause the quantity demand to decrease.

First, consider the substitution effect caused by the price change of commodity 1. Since the premise of the substitution effect is that the actual income level (measured by consumption utility) remains unchanged, and after the price of commodity 1 falls, the actual income level changes from U1 to U2. Therefore, in this paper, the budget constraint line DE is translated to the lower left to FG. At this time, the corresponding commodity demand combination is (x_{13}, x_{23}) , and the difference between x_{11} and x_{13} is the commodity 1 brought about after excluding the influence of the actual income level change caused by the price drop of commodity 1. The part that increases demand is the so-called substitution effect. It can be seen that the substitution effect is negative because as the price of commodity 1 falls, commodity 2 becomes relatively expensive, so rational consumers will increase consumption of commodity one and reduce consumption of commodity 2.

Second, considering the income effect caused by the price change of commodity 1, that is, the change in demand for commodity 1 between commodity demand combination points C and A, it can be found that x_{11} is much smaller than x_{13} , which indicates that the income effect is positive. This is because commodity 1 is a particular low-end commodity. As the actual income level increases, consumers' living standards will increase, and they will switch to other higher-end commodities. Therefore, the demand for commodity 1 will fall.

To sum up, the substitution effect of the price drop of Giffen commodity 1 is negative. In contrast, the income effect is positive, and the latter's effect is greater than that of the former, leading to the decline of its demand as the price falls. Therefore, the corresponding demand curve of Giffen commodity 1 is upward sloping, and its inferiority is the main reason for the abnormal change in demand for Giffen goods.

3.2. Giffen Effect in the Labor Market

The Giffen effect exists not only in the commodity market but also in the labor market. It is specifically manifested in the fact that the labor supply curve slopes backward. That is, the initial labor supply increases with the rise of wages. When wages rise to a certain point, labor becomes a low-grade Giffen commodity, and as wages increase further, labor supply declines. Correspondingly, this paper regards leisure as a particular commodity, as the opposite of labor, and the price of leisure is the opportunity cost of giving up labor, that is, wages. Therefore, the consumption curve of leisure is forward sloping; that is, there is a situation where leisure demand and price change in the same direction, as shown in Figure 2.

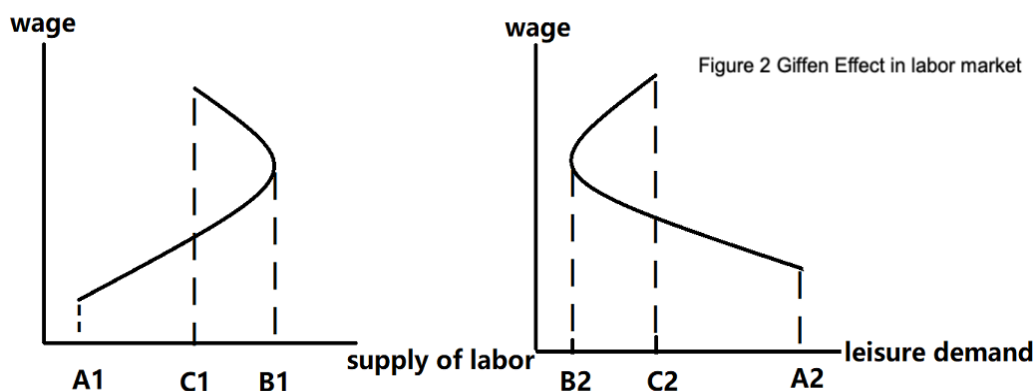


Figure 2. The labor supply curve

In terms of the labor market, the demand for leisure goods is also affected by both the substitution effect and the income effect. For the substitution effect, assuming that the price of leisure, that is, wages, rises, the commodity leisure becomes more expensive relative to other commodities because its opportunity cost rises. Hence, consumers reduce leisure and increase labor supply, so the substitution effect is negatively consistent with a commodity market. For the income effect, an increase in the price of leisure means an increase in the actual income level because more income can be obtained by providing the same labor, which in turn expands the consumption of leisure goods, and the income effect is positive. Thus, as the price of leisure rises, whether the quantity demanded falls or rises depends on the relative magnitudes of the two effects. If the substitution effect is greater than the income effect, the quantity demanded of leisure falls as its price rises. On the contrary, if the income effect is greater than the substitution effect, the demand for "leisure" moves in the same direction as the price.

Generally, when the wage level is low, the increase in wages will not bring about a substantial increase in the actual income level of workers. At this time, the income effect is smaller than the substitution effect. The demand for leisure and the price shows a negative relationship at this time, corresponding to segment A2B2 in Figure 2. Nevertheless, when wages rise to a certain level, a slight increase in wages at this time will bring about a massive increase in the actual income level of workers. At this time, the income effect of price changes is greater than the substitution effect, and the demand for leisure and prices show a relationship of change in the same direction. The demand curve for leisure slopes upward to the right, corresponding to the B2C2 segment in Figure 2.

To sum up, the demand for leisure is inversely proportional to the price first and then directly proportional to the price. That is, a part of the demand curve slopes upward to the right. On the one hand, this shows that leisure can be regarded as a unique Giffen commodity. After wages meet a certain threshold, the demand for leisure is proportional to the price. At this time, the labor supply curve slopes upward to the left. On the other hand, it shows that Giffen's definition of commodities is not absolute, and the Giffen effect can only be reflected after reaching a certain threshold.

The labor factor can also be interpreted as the particular Giffen commodity from the firm's perspective on the demand side. When the price of labor increases, the value created by a single worker for the capitalist will decrease. The capitalist will maintain his total value by increasing the

number of workers hired and the output of goods. Therefore, the demand for labor increases with the price of labor, and the two change in the same direction. However, the proposition should be based on the premise that the capitalist's means of production and the market for products is infinite. This is because the argument that labor is unique Giffen commodity is based on the theory that the capitalist gains surplus value by extracting surplus labor from the workers. If that assumption is not valid, then under the premise of specific production efficiency, capitalists who hire more workers will buy more means of production to produce more goods, which will undoubtedly lead to an expansion of the total quantity of goods. However, the consumer market has been relatively stable for a while. In this way, the supply of goods will exceed the demand, which will eventually lead to the reduction of commodity prices, and then affect capitalists' acquisition of surplus value. At this time, the price and demand of labor will no longer satisfy the change of the same direction.

Labor is the particular Giffen commodity, and if that is true in any case, then employment, which is a headache for governments, will not be a problem. The government only raises workers' wages through economic, administrative, and legal means. This way, workers can get more wages, capitalists hire more workers, and unemployment will disappear. However, this is not the case because real economic life is not satisfied with this assumption condition. In real life, when the price of labor increases, capitalists often improve production efficiency by utilizing technological transformation and labor intensity improvement to alleviate the impact of the increase in labor price on their acquisition of surplus value.

4. Giffen Goods in Real Life

The best example of Giffen goods is the mouth-muffle in the Covid-19 context. Mouth muffles prices under the environment of Covid-19 are relatively higher than the price in daily life. However, its demand keeps rising, which contradicts the law of demand. This is because mouth-muffle is necessary, and it barely has subsidies. Other examples include umbrellas during rainy days, airconditioner during hot summer, etc.

4.1. Example of Mask under the Epidemic

Masks are not Giffen goods in daily life, and their demand and supply also conform to customary laws. However, masks have become Giffen commodities under the background of the epidemic, which means that as the price of masks increases, people's demand will continue to increase. What caused this shift? The answer is simple, that is people's needs. When the epidemic did not come, masks were regarded as cumbersome items hindering breathing. However, when the epidemic came, masks became a necessity to protect life. Therefore, no matter how its price rises, people's demand will only increase, which will cause masks to change from traditional commodities to Giffen commodities.

4.2. Giffen Effect of Mask

Such Giffen phenomenon may have a massive impact on society. Due to the soaring demand for masks, the pressure on society to produce masks will increase. On the bright side, many mask businesses can take this opportunity to achieve economic development and increase company income. As the number of masks has increased, the social and environmental burden will also increase because society needs to deal with more medical waste. Furthermore, the rising price of masks has brought financial burdens to many families and caused many low-income families to be unable to afford masks. More seriously, it will arouse conflicts among people.

Giffen products (masks) will also add much trouble to national governance. Medical resources will become increasingly expensive, thus, increasing national medical expenses. At the same time, large and small fraudulent companies will emerge in society to manufacture substandard masks for sale. Such companies will further lead to social chaos, which is not conducive to preventing and controlling the epidemic.

It can be seen that Giffen commodities have advantages and disadvantages, and they will affect individuals, society, and all aspects of the country. This further reflects the particularity and importance of Giffen commodities.

5. Conclusion

This paper listed its effect on both the commodity and labor markets. For the commodity market, Giffen goods had an income effect and a substitutional effect on quantity demand. These two effects work together to change quantity demand and finally lead to the positive correlation between price and demand, which is against the natural law of demand (when price increase, demand increase simultaneously). For the labor market, Giffen goods also presents that at specific points, when wages are rising, the supply of labor will decrease. At the same time, this phenomenon also indicates that the definition of Giffen goods is flexible. In other words, certain products have to reach specific requirements and become Giffen goods. In a nutshell, Giffen goods are rare, and they are irreplaceable. In turn, all Giffen goods have little subsidies, and some have low utility value. Giffen goods are unique and special, and the study on the advantages and disadvantages of the Giffen effect in this paper is conducive to further understanding the laws of economic and social development. Eventually, it will promote the balanced development of society.

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