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Original Paper

Study on the Tax Burden Sharing between Supply and Demand --Based on a Perspective of Microeconomics

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Abstract
Although a country's tax on market goods increases fiscal revenue to a certain extent, the tax burden is borne by both the supply and demand, which damages the interests of both consumers and suppliers. In the long run, government taxes on goods hurt both producers and consumers and hurt economic growth. This paper analyzes the nature of national taxation, the impact of tax burden on both supply and demand, and the relationship between tax burden allocation and elasticity of supply and demand. At the same time, this paper analyzes that the difference between the supply and demand elasticity is the main reason for the difference between producers and consumers. Finally, this paper puts forward some suggestions and countermeasures to promote economic growth and reduce the tax burden of producers and consumers.

Keywords
Taxation, Tax burden sharing, Elasticity of Supply and Demand, Producer and Consumer

1. Introduction

To levy the tax on products or services by the state is the main source of fiscal revenue and an effective means to regulate economic policies and industrial development. Although the tax is good for the country to increase tax revenue, it will harm the interests of consumers and also harm the interests of producers. For products with low supply elasticity and high demand elasticity, the tax burden (an economic burden caused by national taxation, the same below) is mainly borne by suppliers or producers. For products with small demand elasticity and large supply elasticity, the tax burden is mainly borne by consumers.

The difficulty of tax burden sharing is affected by many factors, but all of them are related to the elasticity of supply and demand of commodities. Under the condition of partial equilibrium of the market, by analyzing the elasticity of supply and demand, we can quantitatively calculate the proportion and quantity of tax burden allocation between the demand side and the supply side, and sum up the quantitative relationship between the elasticity of supply and demand and the tax burden transfer. Based on this, this paper studies the impact of the elasticity of supply and demand on the tax burden of producers and consumers. The results show that the elasticity of supply and demand has a significant positive impact on the tax burden of producers and consumers.

Therefore, in the context of China's economic downward pressure, the government to increase tax reduction is an effective measure to reduce the burden on producers and consumers and enhance economic vitality. After the tax rate is lowered, the burden of enterprises will be reduced, and consumers will not have to increase the additional burden, and the desire of enterprises to invest in production and the demand of consumers will increase.

The following is an in-depth analysis of the tax burden allocation and its influencing factors from the perspective of the elasticity of supply and demand.

2. Research Literature

2.1 Research on the Elasticity of Supply and Demand

Liang (2019) believes that the reaction degree of consumers and producers to prices will not only affect the trend of commodity prices, but also cause some government policies to achieve unexpected multi-faceted results. Liu (2022) believes that the change of commodity price mainly depends on the change of supply and demand, but the change of price in the short term is related to supply and demand and needs to consider other factors. Li (1894) Different factors have different degrees of influence on the supply elasticity of products, and it is difficult to make a comparison between them. Peng (2021) believes that in addition to the impact on prices, supply shocks will also show strong structural characteristics. Economic entities also differ in their ability to cope with supply shocks, leading to structural differentiation within economies.

Xu (1986) argued that the elasticity of supply and demand of agricultural products, light industrial products and heavy industrial products are different, and the characteristics of price fluctuations are also very different. According to their respective changing laws, we can roughly understand the rising and falling points of prices of different kinds of commodities. Xu and Ouyang (2023) conducted a study on the elasticity of import demand, and they believed that in industries with greater elasticity of import demand, the pass-through effect of tariff on import price would be stronger. When tariff reduction occurs, the greater the elasticity of import demand, the lower domestic prices of imported goods brought about by tariff reduction will lead to a larger increase in demand.

2.2 Research on the Tax Burden and Its Impact

He and Chen (2017) proposed in their study of AD valorem tax that when the government raises AD valorem tax, the tax burden of enterprises will increase with the increase of product pricing. When the AD valorem tax base is high, the tax burden faced by enterprises will be large, so the tax burden of AD valorem tax will be more transferred to downstream manufacturers in downstream countries. Hamilton

(1999) found that under the market structure of buyer monopoly, the benefits of an AD valorem tax are always superior to those of an AD valorem tax. Anderson, de Palma and Kreider (2001) found that both AD valorem tax and AD valorem tax can be passed on to consumers in a ratio of more than 100%, thus increasing the profits of enterprises. Peitz and Reisinger (2014) believe that more than 100% of the tax burden can be transferred to the final product consumers regardless of the volumetric tax or AD valorem tax levied on the intermediate product or the final product, and the specific tax burden transfer depends on the elasticity of supply and demand. Shen and Zhang (2018) believe that unilateral imposition or increase of import tariffs can reduce the export competitiveness of exporting countries and thus improve the welfare of importing countries. Kang, Li and Yuan (2017) believe that the reduction of tariffs may also bring about the tilting effect on the product mix of export enterprises, which makes enterprises produce and export more products with competitive advantages. In China's trade cooperation with SCO member states and BRICS countries, tariff reduction can only promote trade development to a certain extent (Zuo, Guo, & Huan, 2018; Li & Qiu, 2017). Raising import tariffs on trading partners will reduce China's exports, and the impact on China's industrial products is particularly significant (Xu, Ao, & Wu, 2018).

3. The Nature and Function of State Taxation

3.1 Nature of Taxation

National taxation (hereinafter referred to as taxation) is the most important form and source of income of the state (government) public finance. The essence of taxation is the special distribution relationship formed by the state to collect material goods or currency from economic units and individuals free of charge according to laws, and its purpose is to meet the public needs of the society and provide public goods to the society. National taxation must produce tax burden, which is borne by both suppliers and consumers. The characteristics of taxation are compulsory, gratuitous and fixed. According to the object of taxation, tax is divided into circulation tax, income tax, property tax, behavior tax, resource tax, etc. According to the standard of tax, it is quantitative tax and AD valorem tax.

3.2 The Role of State Taxation

In ancient times, taxation was the main financial revenue of the state and the main economic means of the feudal dynasty. In modern times, tax can not only increase the national fiscal revenue, but also regulate the national economic policy, industrial policy and social resource allocation. The function of tax is mainly manifested in the following aspects:

3.2.1 Taxation is the Main Source of National Financial Revenue

In ancient times, the tax of the government was the main income of a country and the main financial means for the feudal dynasty to operate. Guan Zhong was a military strategist of the State of Qi in the Spring and Autumn Period, and he was also a famous financial expert. His thoughts on taxation had a great influence on ancient Chinese society. Guan Zhong attaches great importance to the input, output, sales and other links of salt, and also strictly manages these links. He formulated a series of policies to profit from salt, which ensured the stable financial revenue of the Qi government and played a key role in the first hegemon of the state of Qi. Today, we can still get inspiration from Guan Zhong's thoughts on taxation. Among them, Liu and Guan (2006)'s propositions of "the same place and the decline of taxes" and "no time to seize the people" also reflect the principle of tax flexibility.

3.2.2 Adjust the National Economic and Industrial Structure

When a country's economy has developed to a certain stage, it is bound to adjust its industrial structure, income distribution structure, exchange structure (such as price structure, import and export structure, etc.), consumption structure, technology structure, labor force and employment structure according to the needs of national economic development. Tax policy can be used to adjust the economic structure. If you want to inhibit its development, you can increase taxes; Tax breaks are available to encourage their development. For example, after more than 40 years of development, China is now a manufacturing country in the traditional industries of steel, cement, electrolytic aluminum, flat glass and coke. While these industries meet the needs of China's economic development and people's livelihood, there is also a serious overcapacity. Therefore, it is necessary to impose moderately higher taxes on the various factors involved in these industries (such as capital, land (natural resources), labor, management and technological innovation), so as to limit the trend of overinvestment and overcapacity. On the contrary, for those who increase investment in science and technology, promote technological transformation, and actively cultivate emerging industries, tax relief should be reduced, and even industrial preferential subsidies.

3.2.3 Optimize the Allocation of Social Resources

State taxation, on the one hand, reflects the state's intervention in the economy; On the other hand, it also reflects the necessary allocation of resources by the state. By collecting or reducing taxes, enterprises and consumers can be restricted or incentivized. If we want to develop the market economy and enhance economic vitality, we must reduce the burden on enterprises, cut taxes and make them profitable. In addition, taxation also has a certain impact on consumers. Tax relief can stimulate private consumption and investment, which has a positive effect on boosting domestic demand. Let the market play a fundamental role in allocating resources. If the tax is too high, most enterprises will make small profits or even lose money, which will hinder private investment and consumption, weaken the basic role of the market in allocating resources, and affect economic vitality. At the same time, excessive taxation will increase the burden of enterprises, prone to corruption, lead to unfair competition among enterprises, and affect the healthy and orderly development of the socialist market economy.

Therefore, adjusting the amount of tax or the level of interest rate is an important means for the state to allocate social resources (human, material, financial, technology, organization, social relations, etc.), and it plays a crucial role in the adjustment of industrial structure, optimization of resource allocation, and optimization of economic development quality indicators.

4. Adverse Effects of Tax Burden on both Supply and Demand

4.1 Adverse Impact on the Supply Side

After a country imposes taxes on goods, for similar goods, it is bound to lead to an increase in the price of such goods in the domestic market, reducing the competitiveness of such goods, which is very unfavorable to the producer or supplier. If the tax is high (such as more than 10%), it will basically have the effect of excluding similar goods from the market. Because under the conditions of full competition, if the supplier continues to supply such goods, it will be unprofitable, or even lose money, until the order is cancelled. However, the production of other commodities may gain opportunities to develop, gain more orders and market share.

4.2 Adverse Effects on Consumers

After a country imposes a tax on a certain commodity, the price of such commodity in the domestic market will increase, and consumers will bear the higher price, which will reduce the demand for such commodities, and the welfare of consumers will be lost. The impact on consumers also shows that the tax will have "income effect" and "substitution effect" on consumers. The "Income Effect" of tax policy refers to the decrease of disposable income of consumers caused by government taxation, thus reducing the purchase of original commodities and decreasing consumption level. The "substitution effect" of tax policy refers to that when the government imposes taxes on certain commodities, the prices of such commodities will rise relatively, causing consumers to reduce their purchases of such commodities and instead buy other substitutable commodities.

5. Adverse Effects of Tax Burden on both Supply and Demand

The state imposes a tax on a product, the burden of which is shared by the domestic consumer and the producer or supplier; The tax burden borne by both parties depends on the elasticity of supply of the product and the elasticity of consumer demand for the product. Generally speaking, after a tax, if the supply elasticity of a good is small or the consumer demand for the product is elastic, the producer or supplier will bear more tariffs; Conversely, if the supply of goods is elastic and demand is inelastic, consumers bear more of the tax burden.

5.1 Analysis of the Impact of the Tax Burden on both Supply and Demand

From a microeconomic perspective, the impact of the tax burden on suppliers (or producers) and producers is determined by the elasticity of supply and the elasticity of demand. When the government is not taxing, market prices tend toward equilibrium prices due to the interaction of supply and demand forces. At this time, both the buyer and seller prices are PE. When the government taxes T, the buyer's price is P'_E, the buyer's price rises, and the increase is overpayment (P'_E-P_E); The seller's price is P''_E, and the seller reduces by (P_E-P''_E). It can be seen that when the government imposes taxes, both the supply and demand sides have to bear the corresponding tax burden, but due to the different elasticity of supply and demand, their respective tax burdens are different. See Figure 1.

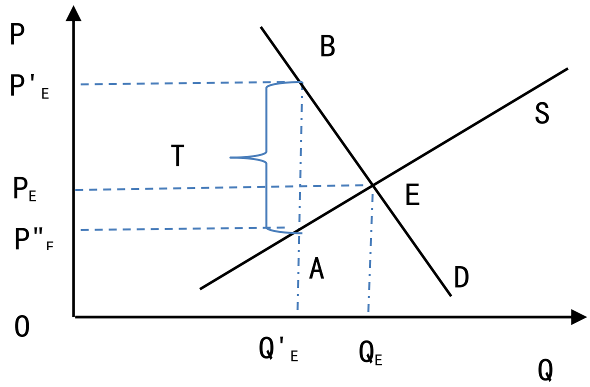

Figure 1. Analysis of the Impact of the Tax Burden

5.2 Elasticity Analysis of between Supply and Demand

5.2.1 Supply Elasticity Analysis

Elasticity of supply refers to the degree to which supply responds to price changes. It represents the degree of sensitivity of a commodity's supply relative change to the relative change of commodity price in a certain period (Western Economics Writing Group, 2019), that is, the ratio of the percentage of supply change to the percentage of price change.

The elasticity coefficient of supply is expressed as follows:

$$\text{Elasticity coefficient of supply} = \frac{\textit{percentage change of supply}}{\text{percentage change of price}} \quad (1)$$

$$\text{expressed by the formula } E_s = \frac{\triangle Q/Q}{\triangle P/P} = \frac{\triangle Q}{\triangle P} * \frac{P}{Q} \quad (2)$$

$$\text{As } \triangle P \text{ approaches zero, } \frac{\triangle Q}{\triangle P} = \frac{dQ}{dP} \quad (3)$$

$$\text{That is } E_s = \frac{dQ}{dS} * \frac{P}{Q} \quad (4)$$

When $E_s>1$, the supply is elastic and the supply curve is relatively flat.

When $E_s<1$, the supply is inelastic and the supply curve is steeper. For example, cars, electric vehicles, etc., are goods with small supply elasticity and large demand elasticity, consumers are more sensitive to the price changes of such goods, and will adjust their demand and desire according to the price in a timely manner, while producers are less sensitive to the price changes of such goods, and generally will not adjust their supply according to market price changes.

From the perspective of supply elasticity, the greater the supply elasticity of products, the flatter the supply curve, the less tax burden the producers bear, and the more tax burden the consumers bear. The supply elasticity is small, the supply curve is steeper, producers bear more tax burden, consumers bear less tax burden.

5.2.2 Burden Sharing Analysis of the Government Taxation

Supply is elastic, demand is inelastic. When E_s>1, the supply is elastic and the supply curve is relatively flat. At the same time, when E_d <1, the demand is inelastic and the demand curve is steep. See Figure 2.

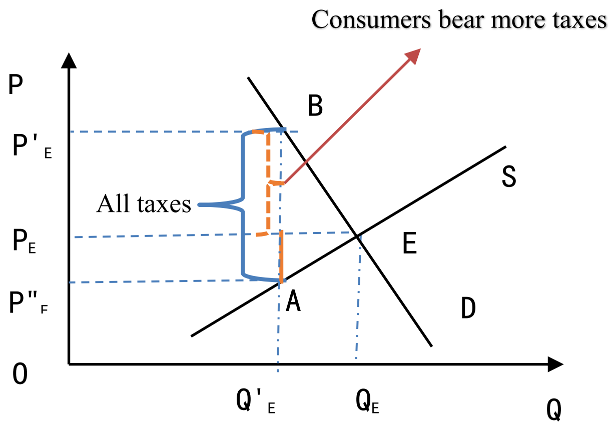

Figure 2. Supply is Elastic

Figure 2 shows that supply is more elastic, while demand is less elastic. In this case, consumers are not very sensitive to prices, while producers are very sensitive. When the tax is levied, producer prices do not fall much, and producers bear only a small part of the tax; But prices paid by consumers have risen sharply, suggesting that consumers are shouldering most of the tax burden.

When E_d >1, the demand is elastic and the demand curve is relatively flat. At the same time, when E_s<1, the supply is inelastic and the supply curve is steeper. See Figure 3.

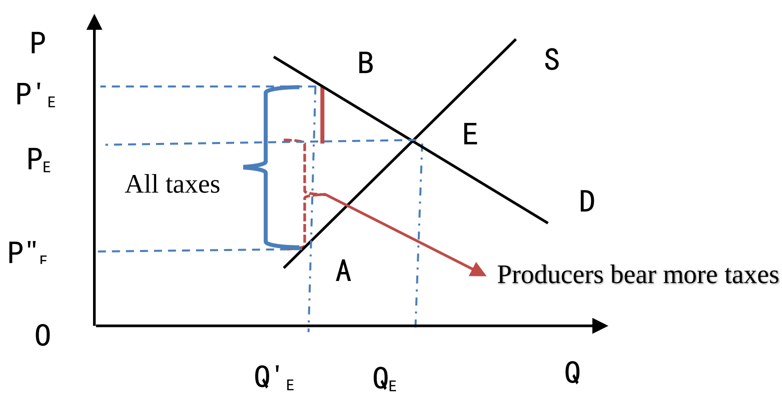

Figure 3. Demand is Elastic

Figure 3 shows that supply is inelastic while demand is elastic. In this case, the producer is not very sensitive to the price, and the price has little influence on the supply quantity. Relatively speaking, consumers are more sensitive to price, and price has a greater impact on consumers. When taxes are imposed, prices paid by consumers rise less, while prices paid by producers fall substantially, bearing more of the tax burden.

6. Suggestions and Countermeasures

In view of the imperfect industrial chain in China, a large part of the products in some industries are oversupplied, the supply is inflexible, and the demand is elastic. In order to avoid the impact of government taxation on both supply and demand, the following countermeasures are proposed:

6.1 Increase Tax Cuts, Reduce the Tax Burden on Producers and Consumers, and Promote Economic Growth

Due to the tax, both producers and consumers have a negative impact, compared with developed countries, China's tax rate is necessary to further reduce. More tax cuts can reduce the cost of enterprises, enhance the vitality of enterprises, and bring about sustained prosperity of the national economy. At the same time, after the tax reduction, the price of market products will decrease accordingly, and the price of consumers will also decrease, which will further stimulate the market vitality.

6.2 Strengthen Technological Innovation and Promote the Popularization and Application of New Processes and Technologies

At the national level, the development plan for high-tech product manufacturing should be formulated, new product research and development should be actively carried out, a perfect technological innovation system should be formed, and product upgrading should be promoted. At the same time, actively promote technological innovation, vigorously promote the promotion and application of new processes and new technologies, improve the technology conversion rate, launch new products as soon as possible, and improve the added value of products.

6.3 Deepen the Adjustment of Industrial Structure and Build a Rational Industrial System

Due to historical and institutional reasons, China's industrial structure is not reasonable, there are repeated construction, serious overcapacity phenomenon. Such as iron and steel, electrolytic aluminum, cement, glass and other industries, there are overinvestment, overcapacity, product oversupply phenomenon, and then cause the adverse situation of product vicious competition. At the same time, these industries are backward in technology, but also belong to high energy consumption, high pollution, and high emission industries, and have increasingly become the source of prominent contradictions and many problems in China's economic operation.

The adjustment of tax and tax rate can promote the structural adjustment of relevant industries, actively build new industries, and change the unreasonable industrial structure

6.4 Align with International Standards, Improve Product Quality and Added Value, and Enhance Competitiveness

The technical standards and quality standards of China's industrial products should actively align with the corresponding standards of industrialized countries, constantly improve production technology and product quality, further increase the added value of industrial products, and promote the sustainable development of China's industry. It is necessary to reduce costs (Dong, 2020) by improving the level of science and technology and scientific management, improve product quality and added value, accelerate the upgrading of relevant industries, and improve international competitiveness.

6.5 Actively Explore the International Market and Make Good Use of Overseas Markets and Resources

In view of the oversupply of domestic steel products, it is necessary to explore the international market and reduce the adverse impact of taxation on the domestic steel industry. For example, on November 15, 2020, China officially signed the Regional Comprehensive Economic Partnership Agreement with 10 ASEAN countries, Japan, South Korea, Australia, New Zealand and other countries. RCEP has laid a good foundation for exploring the international market.

7. Conclusion

When a state taxes a product, it raises the price paid by consumers and lowers the price received by suppliers, and the tax burden is shared between producers and consumers. Different elasticity of supply and demand results in different tax burden sharing.

A reasonable tax policy can ensure the steady and healthy development of the national economy; Unreasonable tax policies will have adverse effects on economic and social development. The government should take into account the characteristics of the industry when carrying out tax reform, formulate scientific and reasonable tax policies, adjust the applicable tax rates, and reduce the tax burden on enterprises. In this regard, enterprises should also actively change the business model, effectively reduce the tax burden of enterprises, and promote the long-term development of enterprises.

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