

Research on Government Subsidy Strategy in Green Supply Chain from the Perspective of Social Welfare

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Abstract

This paper discusses and analyzes the advantages and disadvantages of two government subsidy strategies in green supply chain from the perspective of social welfare. Government subsidies to consumers or to manufacturers can increase sales of green products, but government subsidies to manufacturers can also reduce the use of ordinary products, in terms of sales alone, government subsidies to manufacturers in the supply chain from the supply side can increase the sales of green products, but also on the demand side can open the market. Government subsidies to consumers can effectively increase the profits of manufacturers, and in the supply chain, social welfare benefits will be greater if manufacturers and retailers cooperate, while subsidies to manufacturers can help encourage manufacturers to think green, actively develop green supply chain.

Keywords

Green Supply Chain; Government Subsidy Strategy; Social Welfare; Consumer; Manufacturer.

1. Introduction

building green supply chains has become a key point in promoting green development[1] . If Lenovo Develops and implements the supplier code of conduct in 2015 for green management, assessment and oversight of the supply chain, push suppliers to introduce "all-material declaration" measures to manage and control their suppliers and promote the substitution and emission reduction of harmful substances throughout the industry chain . The government has adopted policy tools to promote green practices and require companies to take more responsibility for the environment [2] . For example, during the pilot demonstration period (2016-2018) of the Dongguan Green supply chain environmental management (GSCM) , the Dongguan government allocated 500,000 yuan annually as a special subsidy to promote GSCM Green supply chain management and green product innovation practices can significantly improve environmental performance [11] Consumers are more willing to pay more for products labeled "Green" and "organic" than for ordinary products, according to a survey by China Daily. In order to gain competitive advantage in the market, manufacturers need to develop green products to meet the needs of consumers and enhance the corporate image. Moreover, environmental regulation is also driving the greening of supply chains . Green Product Innovation and green supply chain development need to be cost-effective[3], for example Due to the lack of funds and the uncertainty of green demand, it is difficult for manufacturers to mobilize funds for R & D and production of Green Products . There are three main driving factors for members of green supply chain to develop, produce and promote green products, the first factor is environmental regulation, which sets out a set of minimum environmental requirements to be met by industrial products in general. By regulating the

environment, the government can promote the production of green products, [12] the second factor is the willingness of supply chain members to develop green products and the technical and financial feasibility of doing so. However, the green technology is not mature, the market prospect of green products is uncertain, and the members of supply chain, as profit-driven organizations[4], have the characteristics of Risk Aversion . In such a development dilemma, effective government subsidies and incentives for green products can reduce the risk of green product development and market promotion[5], and help the government and supply chain members form a long-term cooperative mechanism in the development and promotion of green products. The third factor is consumer preference or demand for green products . The driving factors mainly depend on the level of consumption and green consciousness of consumers In this respect, government subsidies for green products can not only stimulate consumer demand, but also gradually cultivate consumers'awareness of environmental protection and green consumption concepts through the export of green products. Reasonable and effective government subsidy can promote the demand side and the supply side of green supply chain, the expansion of green market demand and the increase of sales of green products can provide financial support for the development, production and promotion of green products and form a positive circulation mechanism for the development of green industry as a whole. With the development of economy, more and more scholars at home and abroad study on Green Supply Chain Management[6].

Green supply chain management is the management of the whole process from the purchase of raw materials to the obsolescence and recovery of products, it is necessary to take full account of the environmental impact of the whole process and the efficiency of the use of resources, in terms of environmental impact and resource operation, to meet the economic benefits of the supply chain and the needs of social environmental protection . In order to achieve the research goal, the game model is solves the green supply chain management question common use method[7]. Jmali et Al. [8]set up a game model based on the green supply chain, and studied the influence of consumers'green preference on the price decision of each member of the supply chain . It is concluded that consumers'green[12] consciousness is beneficial to the members of green supply chain the panel data from European manufacturing companies shows that moving toward green supply chain management is good for corporate reputation In this paper, Wang Z et Al [9] discussed the choice of competition and cooperation in duopoly second-order green supply chain, and found that cooperative R & D Strategy can maximize the profits of manufacturers, and the increasing competition of Cooperative R & D can reduce the profits of manufacturers In this paper, Maichum et Al. [11] used the game model to construct a cost-sharing and benefit-sharing mechanism dominated by suppliers, the research shows that the core enterprise sharing its green information in green supply chain can effectively stimulate the Green R & D investment [13] of non-core Enterprise in green supply chain. Replacing traditional products with green products in green supply chains has become a key way to solve economic development and environmental problems . Now, there is no uniform definition of green product, from the perspective of this study, according to the existing literature, Green Product[16] has the following characteristics: compared with traditional product, green products are characterized by improving the ecological environment[17] and the quality of social life, meeting the requirements of cleaner production in the production process and in supply chain management[18], easy disposal of product waste, more energy-efficient and able to meet the main needs of consumers at higher costs than traditional products[21] in the study of the impact of retailers'information-sharing behavior on green product design in a green supply chain, green products are classified in the same way as appeals. Xie G et Al. [14] introduced the equity preference theory into green supply chain and studied the green product innovation input problem, under the Information asymmetry conditions, the fairness preference intensity of suppliers and the fairness preference intensity of manufacturers

together affect the optimal utility of Green Manufacturers[15] the research of Centobelli p shows that the excessive unit cost Coefficient of green innovation of green manufacturers will lead to the decrease of green investment of supply chain members and the decrease of green degree of green products Lo Et Al.[19] studied the drivers of upstream green supply chain integration and found that cost and customer drivers can mitigate the relationship between supplier development and upstream green supply chains. Zhao Y ET AL [20]think that bullwhip effect leads to the low efficiency of green supply chain optimization in electronic industry.

2. Suggestions on Decision-makers of Green Supply Chain from the Perspective of Social Welfare

2.1. Advice to Manufacturers and Consumers

2.1.1. Consumers Should Enhance Their Awareness of Environmental Protection

The high cost of green supply chain and the imperfection of infrastructure reduce the attention of consumers to green products, and there are obvious differences between consumers' green preference and acceptance. Nowadays, people advocate Green Environmental Protection and pay attention to the improvement of air quality. People's green preference is generally high, but they seldom buy green products because of their economic condition. Most consumers care about the performance, price performance, appearance, price and other traditional factors, and green products cannot meet their consumption needs, because consumers from recognition to the degree of acceptance will take some time to change, but for the green development of social economy, consumers should improve the acceptance of green products and enhance the awareness of environmental protection.

2.1.2. Manufacturers Should Speed up the Construction of Green Supply Chain

Manufacturers play an important role in the production and sale of green products. As rational economic agents, manufacturers will use their own profit maximization to evaluate whether to carry out green innovation or not, the high cost of inputs will affect short-term profits, but in the long run, green supply chains and green products will become the trend in the future. Government subsidies can not only promote the sale of green products in green supply chains, and can also enhance the profit of the manufacturer, is the wise choice for the manufacturer. In order to solve the global environmental and energy problems and achieve the optimal social welfare, manufacturers and their supply chain members should actively accelerate the transformation of green supply chains, make full use of government policies, and with the support of government subsidies, not only will it ease the funding problem, but it will also bring profits to the manufacturers. It can also accelerate the development of green, for manufacturers, should promote the development of green supply chain, and for their own development to create opportunities.

2.2. Recommendations to the Government

Government subsidies to consumers can lead to higher wholesale and retail prices for manufacturers and retailers[23], while higher prices discourage consumers from buying green products and discourage them from buying green products, this leads to an imbalance between supply and demand for green products in the market and impedes the development of green supply chains, which is not conducive to other investors entering the green supply chain, will lead to a large accumulation, and will not be conducive to the sustainable development of the problem of green supply chains, now some manufacturers rely on the government because of high government subsidies, once the government subsidies decline or withdraw from the market, manufacturers and related enterprises simply cannot continue to operate, the impact on the entire industry is so great that the government should set the amount of subsidies strictly and precisely to control the selling prices of green products in the green supply chain in the

market, so that consumers can buy green products, not Fear of green products. On the other hand, the cooperation among the members of the supply chain should be encouraged. The cooperation between enterprises will bring greater social welfare and self-profit, and is closely related to the strength of government subsidy, will make government subsidies more effective, will reap greater social benefits, and the government, as the policy maker and implementer, will have a negative impact on the industry by promoting the development of the supply chain, rather than upsetting the market balance, the control of Subsidy Intensity and subsidy object can lead the healthy and rapid development of green supply chain. The development of green supply chain depends on the encouragement and support of relevant government policies. From the current development situation, the government's financial subsidy is the primary driving factor, if the government implements too little financial subsidy, will have a bad or negative impact on the development of the aluminum supply chain, subsidies have no effect. And if the members of the green supply chain are too dependent on government subsidies, the functioning of the social economy and the core technology of the enterprises are not upgraded, and the green development cannot be achieved, the government attaches great importance to the problems related to subsidies, and began to actively adjust the subsidy policy, continue to optimize the relevant policies for green products, guide the healthy, sustainable and stable development of green supply chain, the development of green supply chain and the government, manufacturers and retailers in the supply chain, consumers are closely related, many members complement each other, only the joint efforts to achieve the healthy development of green supply chain, to achieve social welfare maximization. In green supply chains, government subsidies to consumers and manufacturers can bring profits to each other and help them open markets, in terms of selling prices, government subsidies to consumers can lead to higher selling prices in green supply chains. Subsidies to manufacturers, on the other hand, reduce the selling price of green products, so by comparing the two different forms of subsidies, it is found that it is better for consumers for the government to implement enterprise subsidies, the ability to buy green products at lower prices is acceptable to manufacturers in both ways, but is more likely to be subsidized by the manufacturers themselves because of the direct source of funding. For politics. Then we should use two kinds of subsidy methods reasonably, and choose the optimal subsidy strategy from the angle of consumers and manufacturers, to realize the maximization of social welfare. Government subsidies can promote the production of green products, improve the green degree of products, and maximize the level of social welfare. The social welfare level function can be expressed as consumer surplus plus manufacturer profit plus retailer profit plus [22] environmental improvement cost of government subsidy

$$SW = CS + \pi_m + \pi_r + EI - GS \quad (1)$$

$$CS = \frac{1}{2b} D^2 \text{ [24]}, EI = gD$$

3. Comparative Analysis of Two Subsidy Strategies

Based on the above analysis, it can be seen that different subsidy strategies adopted by the government will have different subsidy effects on products, price and profit comparative analysis:

(1) from the price comparison: Government subsidies to consumers will lead to manufacturers' wholesale price increases, retailers' consumer price increases, enterprises in order to obtain more profits, the transfer of government incentives to the high retail prices of green products, resulting in consumers in the market directly facing high prices of green products, in essence, retailers have absorbed high government subsidies. When the government subsidizes manufacturers, the price of green products and the price of ordinary products will fall, and

consumers will be able to buy green products at lower prices. Stimulate the market and realize the optimization of social welfare.

(2) in terms of sales volume: government subsidies to consumers or to manufacturers can increase sales of green products, but government subsidies to manufacturers can also reduce the use of ordinary products in terms of sales volume alone, government subsidies to manufacturers in the supply chain from the supply side can increase the sales of green products, but also on the demand side can open the market.

(3) profit-to-profit: government subsidies to consumers can effectively increase the profits of manufacturers, and in the supply chain, where manufacturers and retailers cooperate, social welfare benefits will be greater, while subsidies to manufacturers will be greater, it is advantageous to urge the manufacturer to want the green transformation, positively develops the green supply chain.

4. Summary

This paper discusses and analyzes the advantages and disadvantages of two government subsidy strategies in green supply chain from the perspective of social welfare. Government subsidies to consumers can lead to higher wholesale and retail prices for manufacturers and retailers, while higher prices discourage consumers from buying green products and discourage them from buying green products, this leads to an imbalance between supply and demand for green products in the market and impedes the development of green supply chains, which is not conducive to other investors entering the green supply chain, will lead to a large accumulation, and will not be conducive to the sustainable development of the problem of green supply chains, now some manufacturers rely on the government because of high government subsidies, once the government subsidies decline or withdraw from the market, manufacturers and related enterprises simply cannot continue to operate, the impact on the entire industry is so great that the government should set the amount of subsidies strictly and precisely to control the selling prices of green products in the green supply chain in the market, so that consumers can buy green products, not Fear of green products. On the other hand, the cooperation among the members of the supply chain should be encouraged. The cooperation between enterprises will bring greater social welfare and self-profit, and is closely related to the strength of government subsidy, will make government subsidies more effective, will reap greater social benefits, and the government, as the policy maker and implementer, will have a negative impact on the industry by promoting the development of the supply chain, rather than upsetting the market balance, the control of Subsidy Intensity and subsidy object can lead the healthy and rapid development of green supply chain. The development of green supply chain depends on the encouragement and support of relevant government policies. From the current development situation, the government's financial subsidy is the primary driving factor, if the government implements too little financial subsidy, will have a bad or negative impact on the development of the aluminum supply chain, subsidies have no effect. And if the members of the green supply chain are too dependent on government subsidies, the functioning of the social economy and the core technology of the enterprises are not upgraded, and the green development cannot be achieved, the government attaches great importance to the problems related to subsidies, and began to actively adjust the subsidy policy, continue to optimize the relevant policies for green products, guide the green supply chain healthy, sustainable and stable development.

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