

# Crowding-Out Effect of Exports on Domestic Consumption: An Analysis Based on Panel Data of Several Industries in China

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## Abstract

This paper tries to use the data of 1998-2014 about nine departments (department of food, beverage and tobacco, department of fabric and clothing, department of car and motorcar and relative spare and accessory parts, department of medicine and the medical machine, department of culture, sports and relative equipment, minerals, building materials and chemical products division, house appliances division, computer auxiliary equipment division and else departments) to make the regression by Eviews 8.0. We find that department of food, beverage and tobacco and department of car and motorcar and relative spare and accessory parts, department of medicine and the medical machine, department of culture, sports and relative equipment do have crowding-out effect of exports on domestic consumption. Finally, in response to the policy of expanding the demand by analyzing the empirical result, we provide some recommendations from the perspective of export trade.

## Keywords

Export, Domestic Demand, Crowding-Out Effect

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## 1. Introduction

According to the classical trade theory, the export will put up the price of export product and reduce the domestic consumption as well as the consume surplus. While on the other hand, export contributes to improving the export country's national revenue because consumption is increasing. So the export will create two effects: the price effect and revenue effect. The price effect is a negative effect, while the revenue effect is a positive one. Therefore, whether the export has a negative or a positive effect on consumption that is what this paper needs to find. China becomes the world's biggest export country from the year of 2009,

and the trade surpassed the United States in 2014. So whether the large number of exports hinder domestic consumption? Whether the China's domestic demand cannot be effectively exploited because of larger number of export? If this is true, what kind of trade policy should be made? These all need to get known. This paper firstly tries to analyze how exports affect domestic demand, secondly to test how exports affect the domestic demand by econometric models.

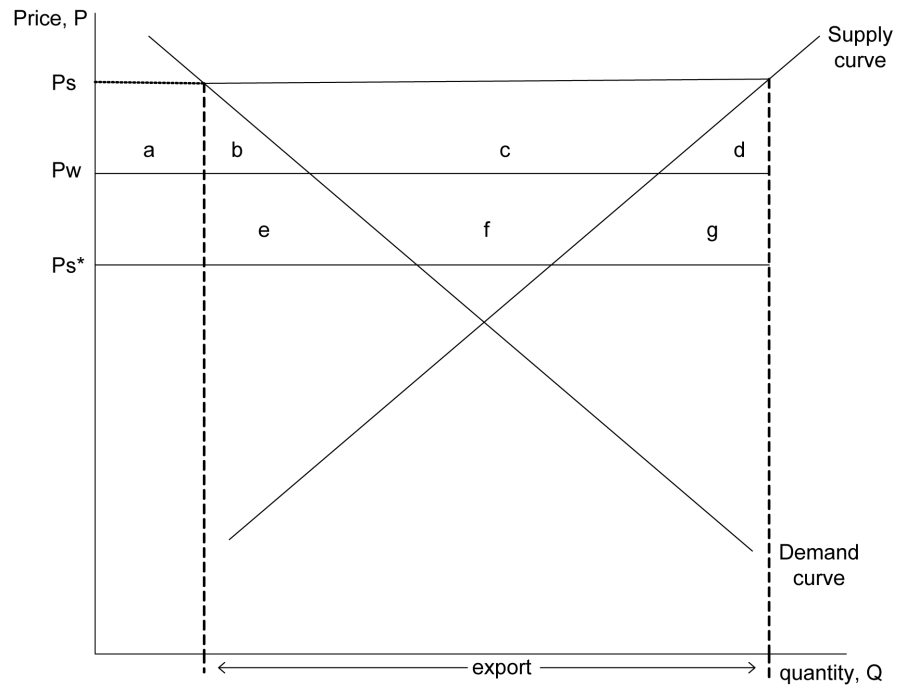
## 2. The Inner Mechanism of How Export Affects Domestic Consume and Relative Literature Review

Export can create two effects, one is revenue effect, which means the more export, the more residents revenue, the more consumption; another one is price effect, due to the resource scarcity, the material can be used by both domestic product and export product, if export grows, which means export consuming more materials. Under the premise that the resource is fixed, there will be less materials for domestic products, then the cost of domestic produce will roar, which will directly lead to higher price of domestic products. If the products are not very necessary for daily life, according to the law of demand, the higher the price, the less consumption. That means if the price effect is bigger than the revenue effect, then the total domestic demand will reduce, that's how the export crowds out the domestic demand. So this paper's basic assumption is as with the increase of the export, if this export product is the necessity, then the above two effects will stimulate the demand, there is no crowding-out effect; if the export product is not the necessity, the revenue effect will stimulate the demand, while the price effect will reduce demand, only if the price effect is bigger than the revenue effect, it exists the crowding-out effect. Otherwise not.

Just as the **Figure 1** firstly shows, since the supplier cannot change his produce scale to quickly adapt to the market in the short time, then the increased export will promote the domestic price from  $P_w$  to  $P_s$ , the loss of consume surplus is  $a + b$ , exporter can get  $a + b + c$ .

Secondly, from the view of investment and saving, according to Mundell Fleming, export will incur the IS curve move to the right, under the condition of the other conditions remain unchanged, it will make the interest rate rise, on the one hand, the investment will reduce, the national revenue decrease, then the domestic demand decrease; on the other hand, the saving will increase, if the disposable income is fixed, the consumption will decrease.

Then, crowding-out effect of export on domestic consumer demand depends on the cost of the export transferring to the domestic demand, when it comes to economic cycle transfer, which means the product should be exported to the outside since there is overcapacity during the recession, but when the economy is booming, whether or not transferring the limited resource to domestic consumer produce relies on the opportunity cost, which is the capital control. If the switching cost is too high, then the investors would not transfer these produce materials to the domestic consume produce, this also develops the export crowd out the domestic demand [1].



**Figure 1.** Supply curve after demand increase.

Xiaolei Cao did the research about the relationship between China domestic demand and external demand in the perspective of international financial crisis, she found that domestic demand and external demand are mutual inhibition and substitution, especially in China’s export-oriented policy, distorting the resource allocation, prompting more resources to export markets. Due to the scarcity, there are not enough materials for the domestic produce. The overcapacity leads to more exports, as the cycle continues [2].

Ansgar Belke thought that when domestic demand is insufficient during the recession, then the domestic capital utilization is low, then it will shift to overseas, the substitution of exports for domestic demand is related to the economy cycle. When the economy is boom, then the domestic capital can be fully used, there is no need to shift the capital to the export industry [1]. Yang did the research about price elasticity and income elasticity of China’s every industries, she found that all kinds of imported products have low substitution, while the manufactured goods have high world income elasticity [3]. To sum up the above, China export goods are very easily affected by international market, especially its main trade partners. Zhang inspected eight emerging market countries in the Asia, Latin America and Europe, he found that as with China’s export development, these countries’ world market shares also go up, there is no crowding-out effect. However, for a simple product, if its export commodity structure is same with or similar with China, then the China’s export would crowd out these countries’ export [4]. The more diversity of these countries’ export commodity structure is, the less affected by the other countries are. So if the export product also has a larger domestic demand, will lead to crowding-out effect of exports on domestic demand [5].

There are already so many researches about the relationship between domestic demand and external demand: Expanding domestic demand has a positive effect on China's foreign trade development [6], Domestic demand can be more conducive to employment and economic growth than foreign trade [7], The dissonance between domestic demand and exports is mainly due to economic supply [8], but there is still insufficient: firstly no one mentioned the theory of the export crowding out domestic demand, someone did the research about the export demand elasticity from the view of price-demand elasticity and income-demand elasticity, but nobody combined them [9]. Not to mention whether there is the crowding-out effect of export on domestic demand and how much the crowding-out effect is. So this paper will find whether the export crowd out the domestic demand or not, whether every department has crowding-out effect or not.

### 3. The Empirical Analysis

#### 3.1. Model Design and Data Processing

This paper mostly based on Zhang's model of whether China's export has crowding-out effect on the emerging countries, which finds the China and emerging countries' export coefficient are in the opposite direction [5]. Besides, Ansgar Belke made the model of the relationship between EURO zone export and their countries' domestic demand. He chose domestic demand, as well as other factors affecting export, such as exchange rate and foreign demand [2]. Also, according to Keynesian theory, the factors affect the consumption, such as income of residents and price index. Therefore, to construct the following model, the writer uses the consumption and exports of various sectors, price index and disposable income of residents as variables, the model is as follows,

$$\text{CONSUME}_{it} = \alpha_i \text{EXPORT}_{it} + \beta_i \text{CPI}_{it} + \gamma_i \text{DPI}_{it} + \varepsilon_i$$

The above data is from the national bureau of statistics, UNCOMTRADE and WTO. CONSUME, which means retails and wholesales of each sector deriving from national bureau, unit is one hundred million dollars; EXPORT means exports of each sector deriving from WTO and UNCOMTRADE, unit is one hundred million dollars; DPI means disposable income of residents calculated by the writer using data from national bureau; CPI means price index, which calculated by the writer using data from national bureau, I means each sector, which including department of food, beverage and tobacco, department of fabric and clothing, department of car and motorcar and relative spare and accessory parts, department of medicine and the medical machine, department of culture, sports and relative equipment, minerals, building materials and chemical products division, house appliances division, computer auxiliary equipment division and else department.

By combining the above variables data from 1998 to 2014 to construct panel data model, the descriptive statistics results of every variable in this model are as follows (Table 1).

**Table 1.** The descriptive statistics results.

	The average	Standard deviation	The maximum	The minimum	Sample number
Consume (hundred million dollars)	2859.46	6264.105	41,101.62	2.21178	139
Export (hundred million dollars)	47,567.21	60,942.91	298,268.8	221	139
DPI (hundred million dollars)	10,234.47	7105.62	24,813.04	2696.578	17
CPI	96.02706	29.57588	199.0409	48.48525	139

For getting different sum of squared residuals by doing the mixed regression and the individual fixed effects regression to do the F inspection, then according to the following formula:

$$F = \frac{[(SSE_r - SSE_u)(T + k - 2)]}{[SSE_u / (NT - T - k)]}$$

Calculate the F value,  $F = 0.7105$ ,  $F_{0.01} = 2.138$ ,  $F_{0.05} = 1.720$ , which means refusing the null hypothesis, indicating that individual fixed effect method is superior to mixed regression.

On the other hand, do Hausman inspection on fixed and random effect for the model to determine whether this model is a fixed or random effect. Seen from **Table 2**, it is easy to find the specific Hausman inspection result showing it turns down the fixed effect and accepts the random effect.

In summary, the regression model should choose random effects.

Do the regression analysis of the panel data for nine sectors, the results are as follows:

Seen from the **Table 3**, we can find that the coefficient of consume and revenue of each sector is different, since this paper mainly does the research about the crowding-out effect of export on domestic demand, so this paper tries to check whether the coefficient  $\alpha$  is a negative value or not, if the  $\alpha$  is a negative, then it means it exists the crowding-out effect, on the contrary does not exist. Besides, according to the theoretical assumptions of the preceding article, not every department has the crowding-out effect, which depends on each department product is the necessity to the residents or not. if the produce of this department is a necessity, according to the assumption, it does not exist the crowding-out effect, the coefficient of  $\alpha$  is a positive; if its product is not the necessity, it exists crowding-out effect, the coefficient of  $\alpha$  is a negative. Therefore, theoretically, we can consider that department of food, beverage and tobacco, department of fabric and clothing, these two sectors have no crowding-out effect. The others have.

In the light of regression result, it is no difficult to find that the following five departments which are department of food, beverage and tobacco, department of fabric and clothing, department of car and motorcar and relative spare and accessory parts, department of medicine and the medical machine, department of culture, sports and relative equipment have obvious crowding-out effect, the coefficient of export is a negative, and the P value is significant at the lever of 5%, which means the result can be accepted, while the other four departments

**Table 2.** Hausman test results.

Chi-Sq. Statistic	Prob.
4.116731	0.2491

**Table 3.** The model regression results of nine departments' panel data.

Department	Export	CPI	DPI
	Coefficient $\alpha$	Coefficient $\beta$	Coefficient $\gamma$
Department of food, beverage and tobacco	-0.072***	5.1375**	0.0413***
Department of fabric and clothing	-0.0104***	-5.8873***	0.3959***
Department of car and motorcar and relative spare and accessory parts	-0.0676***	-18.5136***	0.635***
Department of medicine and the medical machine	-0.0951***	-3.9064***	0.2545***
Department of culture, sports and relative equipment	-0.0544**	-2.0121***	0.0976***
Minerals, building materials and chemical products division	0.0209	-67.3656***	2.0274***
House appliances division	-0.0027	-4.6867***	0.1502***
Computer auxiliary equipment division	0.0007	-1.4429***	0.0457***
Else department	0.0352	-2.9049***	0.0996***
R-squared	0.99573		
DW	2.073		

Remark: \*\*\*, \*\*, \* respectively means significant at the level of 1%, 5% and 10%.

are not. In addition that department of food, beverage and tobacco, department of medicine and the medical machine, these two departments' crowding-out effect is bigger than the other three departments. The coefficient of department of food, beverage and tobacco, department of medicine and the medical machine respectively is -7.2% and -9.5%, department of car and motorcar and relative spare and accessory parts, department of culture, sports and relative equipment are -6.7% and -5.4% respectively. The above percentage means each increase in export of 100 million US dollars, then domestic consumption demand of department of food, beverage and tobacco will reduce 7.2 million dollars, medical expenditure will reduce 9.5 million dollars, department of car and motorcar and relative spare and accessory parts will reduce 6.7 million dollars, department of culture, sports and relative equipment will reduce 5.4 million dollars.

So far in China, the car still is not a necessity to the consumers in China. Especially, we have a large number of farmers. Although in some first-tier cities, the car has already been the synonym to the transportation, but its penetration is still less than home appliances. Additionally, medical and medical equipment,

sports, culture and relatives can be seemed as non-necessities. So these three departments have no crowding-out effect which satisfies the assumption. While clothes and food sectors should not have crowding-out effect according to the hypothesis, but the result is opposite, which can be explained by China's clothing industry is escalating to meet the standards of the import countries, and it is no wonder that the foreign trade clothing is much more popular in the domestic markets. The export price is much lower than domestic price. The domestic consumers spend the same money but buy the worse clothing. There is a significant positive correlation between disposable income and consumption, which is consistent with the theoretical assumption. If the consumers have more disposable income, they would spend more in the consumption.

### 3.2. Robustness Test

The above regression results are in line with the assumption in this paper, to test whether this model is robust or not, will do some adjustments: firstly, since this paper has nine sectors to be analyzed, we can find that consumption of several sectors are very small, including computer auxiliary equipment and other commodity department, while the consumption of department of minerals, building materials and chemical products is very lager, so this paper will remove the above three sectors; secondly, the total disposable income of residents will be replaced by residents final expenditures, then make the new regression, the specific robustness results are as **Table 4**.

Observed **Table 4**, the robustness test shows that the results are consistent with the previous results. Removed the mentioned three departments has litter effect on other departments, the total residents expenditure has positive correlation to the consumption, which also is in line with real life.

**Table 4.** Robustness test results.

Department	Export	CPI	DPI
	Coefficient $\alpha$	Coefficient $\beta$	Coefficient $\gamma$
Department of food, beverage and tobacco	-0.073779***	2.829928	0.28481***
Department of fabric and clothing	-0.0102**	-7.91003***	0.259891***
Department of car and motorcar and relative spare and accessory parts	-0.073801***	-21.82229***	0.425264***
Department of medicine and the medical machine	-0.097269***	-5.195563***	0.170842***
Department of culture, sports and relative equipment	-0.051476**	-2.481122***	0.063547***
House appliances division	-0.002598	-5.551781***	0.098351***
R-squared	0.993588		
Durbin-Watson stat	1.537166		

Remarks: \*\*\*, \*\*, \*respectively means significant at the level of 1%, 5% and 10%.

## 4. Conclusions

The research indicates that department of food, beverage and tobacco, department of fabric and clothing, department of car and motorcar and relative spare and accessory parts, department of medicine and the medical machine, department of culture, sports and relative equipment, these five sectors have obvious crowding-out effect, the else four departments have not. For food, beverages, clothing, those necessities have great domestic demand, should firstly meet domestic consumption, and then export to the world. As with the growth of national income, people's living standard is improving. The requirements are also rising. At the same time, competition for imports of similar products is also growing, which requires domestic manufacturers to continue to develop new technologies, new processes and new methods, and learn from the abroad to improve the product quality, as well as develop the diversities. For those export that has crowding-out effect on domestic demand should reduce the export tax rebate rate to reduce export and encourage importing by reducing import tax.

For the car industry in China, domestic brand car competitiveness is not so strong, those who have strong purchasing power prefer to buying the car made by jointed company and imported cars. As for now, the car market is still huge. China has already become fastest-growing consume country. The car will be just like cellphone for every family in China. So the car industry is an opportunity as well as a challenge for China. To encourage more companies to go abroad and create the world class brands like Huawei, the company should improve the competitions of domestic brand cars, learn the advanced technology from the abroad and welcome the technologically advanced foreign-funded enterprises to enter the domestic market.

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