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Trade Policy Uncertainty and Enterprise Inventory Management Behavior

Weihan Li

School of Economics, Jinan University, Guangzhou 510632, China

Abstract: This paper takes the Permanent Normal Trade Relations (PNTR) granted by the United States after China's accession to the WTO as a quasi-natural experiment, and systematically examines the impact of changes in trade policy uncertainty on the inventory management behavior of enterprises using the method of multiple differences. This paper finds that the decline of trade policy uncertainty has significantly reduced the quantity of enterprise inventory, especially those exporting to the United States. From the perspective of trade policy changes, this paper provides a new explanation for understanding the dynamic changes in the quantity of Chinese enterprise inventory in recent years, and also helps to systematically evaluate the economic effects of trade policy uncertainty changes.

Keywords: Trade policy uncertainty, Inventory management, WTO.

1. Introduction

Nowadays, the wave of "anti globalization" is prevailing, especially under the impact of events such as the US financial crisis, Sino US trade friction, the UK's "Brexit", and the global COVID-19 epidemic, the global political and economic environment is becoming increasingly unstable, thus the uncertainty of trade policies is rising sharply. Since the uncertainty of trade policy can have a significant impact on trade itself and all aspects of macroeconomic operation, it is of positive practical significance to study how the change of trade policy uncertainty affects various economic variables so as to put forward targeted countermeasures for the stable operation of national economy and the stable survival of enterprises.

In recent years, Handley and Limao (2017)[1] the originators of trade policy uncertainty research, have found a measurement method of trade policy uncertainty and gradually carried out quantitative research on trade policy uncertainty. Since then, the research on trade policy uncertainty has gradually become an important frontier research topic in the field of international trade. At present, relevant domestic and foreign researchers mainly study how trade policy uncertainty affects trade and non-trade variables. In general, in addition to Mao Qilin and Xu Jiayun (2018)[2] studying how the uncertainty of trade policy affects the saving behavior of enterprises, there are few literatures in China systematically studying the impact of the external factor of trade policy uncertainty on the specific behavior of Chinese manufacturing enterprises from the micro level. Therefore, this paper focuses on the enterprise inventory management which is a micro-level economic variable. Alessandria et al.(2010)[3] believed that in the export market, enterprises would respond to the impact through inventory management, thus mitigating the adverse impact of the price rise. Novy and Taylor (2014)[4] found that when faced with economic uncertainty, enterprises will reduce losses through inventory management. The important role of holding inventory is that it is not only a key indicator to measure the operating efficiency of enterprises, but also an important measure for enterprises to deal with uncertainties and risks. Therefore, it is of great significance to study the economic effects of trade policy uncertainty from the micro perspective of enterprise inventory management.

Different from the existing literature on the impact of trade policy changes on trade itself and macroeconomic, this paper will focus on the micro level to explore how the changes in trade policy uncertainty affect the inventory management behavior of enterprises. This paper will help to fully reveal the driving factors behind enterprise inventory management, and then enrich and expand the relevant research on the determinants of enterprise inventory management in China to a certain extent, and provide a new explanation for the dynamic changes of enterprise inventory in China in recent years. In addition, this paper enriches the relevant research on the economic effects of trade policy uncertainty and systematically supplements it from the micro level. This will help deepen the understanding of the relationship between the uncertainty of trade policy and the change of enterprise inventory.

2. Literature Review

In terms of research content, the research on issues related to trade policy uncertainty mainly focuses on how trade policy uncertainty affects trade-level economic variables (trade volume, trade price and profit, trade product innovation and quality, domestic added value of enterprise exports) and non-trade level economic variables (economic growth, employment and wages, population migration, enterprise efficiency, enterprise savings). In terms of inventory management, the research mainly focuses on demonstrating that inventory management is an effective means for enterprises to cope with the impact of uncertainty. In terms of research methods, a small part of the literature studies the impact of trade policy uncertainty on trade and other economic variables directly, while most of the literature studies the impact of the reduction of trade policy uncertainty on trade and other economic variables due to the occurrence of a major event, especially the signing of trade agreements. Most of these studies are based on the quasi-natural experiment of Permanent Normal Trade Relations (PNTR) granted by the United States after China's accession to the WTO. The multiplier method is used to investigate the impact of the resulting reduction in trade policy uncertainty on a

certain economic variable.

Through literature review, it is not difficult to find that, in addition to Mao Qilin and Xu Jiayun (2018)[2] studying the impact of trade policy uncertainty on the saving behavior of enterprises at the micro level, there are few literatures in China studying how the external factor of trade policy uncertainty affects the specific behavior of Chinese manufacturing enterprises from the micro perspective. By sorting out the literature on how enterprises respond to the impact of uncertainty and hedge risks through inventory management, and combining the research outlook of Gong Lianmei and Qian Xuefeng (2018)[5], this paper believes that inventory management is one of the important mechanisms that trade policy uncertainty affects enterprise behavior. Therefore, this paper selects the quantity of enterprise inventory as the core explanatory variable, uses the policy event of Permanent Normal Trade Relations (PNTR) granted by the United States after China's accession to the WTO as a quasi-natural experiment, and uses the multiplier method to investigate the impact of changes in trade policy uncertainty on enterprise inventory management behavior.

3. Empirical Models, Variables and Data

3.1. Model Setting

Based on the research methods of Mao Qilin and Xu Jiayun (2018)[2], this paper constructs the following multiplier model:

Model 1 (benchmark model):

$$Inventory_{fit} = \alpha_f + \beta TPU_{i01} \times PostWTO02_t + X'_{fit}\delta + \gamma_t + \xi_{fit}$$

where, subscripts *f*, *i* and *t* represent enterprises, industries and years respectively; The explained variable $Inventory_{fit}$ represents the inventory of enterprise *f* in period *t*, which is logarithmic; The core explanatory variable TPU_{i01} is the trade policy uncertainty index (TPU index) of each 4-digit industry in 2001, which is measured by the difference between the tariff rate of abnormal trade relations and the MFN tariff rate, namely $TPU_h = \tau^{COL2}_h - \tau^{MFN}_h$, where, τ^{COL2}_h and τ^{MFN}_h represents the tariff rate of abnormal trade relations and MFN tariff rate of product *h* in 2001. The TPU index of the above product level can be used to describe the uncertainty of trade policy faced by industry *i* before China's accession to the WTO by simply averaging the TPU index to the 4-digit level of industrial industry classification; $PostWTO02_t$ is a time dummy variable, in which the value of 2002 and the years after 2002 is 1, and the value of the years before 2002 is 0; β measures the average difference of enterprise inventory between the industries with high NTR tariff difference and the industries with low NTR tariff difference before and after China's entry into the WTO, and immediately draws the effect of the decline of trade policy uncertainty on enterprise inventory management behavior; The control variable X_{fit} is other factors that may affect the inventory of the enterprise; α_f is the fixed effect of the enterprise, which is used to control the influence of the factors that do not change with time at the enterprise level on the enterprise inventory; γ_t is a fixed time effect, which is used to control the impact of common time shocks such as macroeconomic fluctuations on enterprise inventory; ε is the random error term.

Model 2 (introducing the US enterprise dummy variable USE_{Dumf}):

$$Inventory_{fit} = \alpha_f + \beta_1 TPU_{i01} \times PostWTO02_t + \beta_2 TPU_{i01} \times PostWTO02_t \times USEDum_f + X'_{fit}\delta + \gamma_t + \xi_{fit}$$

where, $USEDum_f$ is a dummy variable of enterprises exporting to the United States. If enterprise *f* has exported to the United States, $USEDum_f$ is 1, otherwise it is 0; β_1 depicts the average effect of changes in trade policy uncertainty on the inventory of enterprises not exporting to the United States; β_2 depicts the difference between the impact of changes in trade policy uncertainty on the inventory of enterprises exporting to the United States and the impact on the inventory of other enterprises.

3.2. Variable Description

Referring to the research of Mao Qilin and Xu Jiayun (2018)[2] and Duan Wenqi and Jing Guangzheng (2021)[6], this paper selects the following control variables: industrial added value (*add-value*), industrial sales value (*sale-value*), sales revenue of main business products (*sale-rev*), total industrial intermediate investment *(inter-inv*), total assets (*tot-assets*), net fixed assets (*netfix-assets*), total current assets (*cur-asssets*), total profits (*tot-profits*), accumulated depreciation (*acc-dep*), long-term investment (*long-inv*), interest expenditure (*int-exp*), subsidy income (*sub-inc*), export delivery value (*exp-value*), corporate financing constraints (*fin-con*), industry output tariff rate (*output-tar*), state-owned enterprise reform (*SOEshare*), foreign capital deregulation (*FORshare*); Referring to the similar method of Sun Lingyan and Li Ronglin (2011)[7], this paper uses the ratio of interest expenditure to fixed assets to measure the financing constraints of enterprises. The larger the ratio, the smaller the degree of financing constraints faced by enterprises, and vice versa; Referring to the similar method of Amiti and Konings(2007)[8], this paper uses the simple average of the final product tariff rate at the industry level to measure the final product tariff rate of the industry, which is used to control the impact of the deepening of import trade liberalization on enterprise inventory after China's entry into the WTO; Referring to the research of Bai Chongen et al. (2006)[9], this paper uses the ratio of non-state capital to total capital to measure the reform of state-owned enterprises, which is used to control the impact of the major policy change of state-owned enterprise reform on enterprise inventory; Referring to the similar method of Lu and Yu (2015)[10], this paper uses the logarithm of the number of foreign-funded enterprises at the industry level to measure the deregulation of foreign capital, which is used to control the impact of the major policy change of foreign capital deregulation on the inventory of enterprises; In this paper, according to the data characteristics of the above control variables, appropriate logarithms are taken for these control variables if necessary.

3.3. Data Source

This paper mainly uses four sets of data. The first set of data is the database of China's industrial enterprises from 2000 to 2007, which is used to calculate the core explanatory variables of this paper, namely the enterprise inventory and other relevant variables at the enterprise level; The second set of data is the import and export database of China Customs from 2000 to 2007, which provides the trade information of HS8-digit products, including the product tax number code, export product quantity, trade mode, enterprise nature, export destination country and other variables required in this paper; The third set of data is the 1989-2001 U.S. import tariff

database compiled by Feenstra et al (2002)[11]; The fourth set of data is the WITS database from 2000 to 2007, which provides China's import tariff data at the product level to calculate the final product tariff at the industry level.

4. Empirical Results and Analysis

Table 1 reports the benchmark estimate results of the impact of trade policy uncertainty on enterprise inventory. Column (1) only controls the fixed effect of the enterprise and the fixed effect of the year. We find that the estimated coefficient of the cross item is significantly negative, which indicates that the quantity of enterprise inventory in the industry with initial high NTR tariff difference has decreased more than that in the industry with initial low NTR tariff difference after China's accession to the WTO, that is, the uncertainty of trade policy has decreased the quantity of enterprise inventory. Column (2) adds the control variables at the enterprise level on this basis. The results show that after controlling the influence factors at the enterprise level, the estimated coefficient of the cross item is still significantly negative, which again shows that the decline in the uncertainty of trade policy is conducive to reducing the quantity of enterprise inventory. We have noticed that before and after China's accession to the WTO, there are two other important policy reforms taking place at the same time. One is the reform of state-owned enterprises, and the other is the relaxation of the control on the entry of foreign capital. These two policy changes may also have an impact on the corporate savings rate. Therefore, it is necessary to further control the impact of these two policy effects. Column (3) reports the regression results after controlling the reform of state-owned enterprises (*SOEshare*) and the deregulation of foreign capital (*FORshare*). We find that the estimated coefficient of the cross item is still significantly negative, which indicates that the reduction effect of the uncertainty of trade policy on the quantity of enterprise inventory is not affected by other policy changes.

Table 1. Regression Result

Variables	(1) *Inventory*	(2) *Inventory*	(3) *Inventory*	(4) *Inventory*
TPU_{i01}*$PostWTO_{02}$	-.098***	-.039*	-.039*	-.035*
	(.021)	(.02)	(.02)	(.021)
add-value		.033***	.033***	.033***
		(.011)	(.011)	(.011)
sale-value		-.109***	-.109***	-.11***
		(.037)	(.037)	(.037)
sale-rev		-.054*	-.054*	-.054*
		(.032)	(.032)	(.032)
inter-inv		.16***	.16***	.16***
		(.022)	(.022)	(.022)
tot-assets		-.02	-.02	-.02
		(.028)	(.028)	(.028)
netfix-assets		.076***	.076***	.076***
		(.012)	(.012)	(.012)
cur-asssets		.744***	.744***	.744***
		(.021)	(.021)	(.021)
tot-profits		-.027***	-.027***	-.027***
		(.004)	(.004)	(.004)
acc-dep		.132***	.132***	.132***
		(.01)	(.01)	(.01)
long-inv		.002	.002	.002
		(.002)	(.002)	(.002)
int-exp		.017***	.017***	.017***
		(.002)	(.002)	(.002)
sub-inc		.005***	.005***	.005***
		(.002)	(.002)	(.002)
exp-value		.006***	.006***	.006***
		(.002)	(.002)	(.002)
fin-con		.007	.007	.007
		(.005)	(.005)	(.005)
output-tar		0	0	-.001
		(.001)	(.001)	(.001)
SOEshare			-.54	-.525
			(.866)	(.866)
FORshare			-.006	-.006
			(.008)	(.008)
TPU_{i01}*$PostWTO_{02}$*$USEDum$				-.05**
				(.025)
Constant	7.964***	-.604***	-.169	-.182
	(.017)	(.164)	(.637)	(.637)
Observations	184045	184045	184045	184045
R-squared	.041	.141	.141	.142
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Since the United States is the largest target market for Chinese manufacturing exports, changes in trade uncertainty in the United States market will not only have a direct impact on Chinese enterprises exporting to the United States, but also have an impact on the psychological expectations and savings behavior of other manufacturing enterprises. However, logically speaking, those Chinese enterprises that export to the US market will be more directly affected by the uncertainty of trade policy. The regression results in column (4) show that the estimated coefficient of the triple cross item $TPU_{i01} \times PostWTO02 \times USE_{Dum}$ is significantly negative. In addition, we also note that the absolute value of the coefficient of the variable $TPU_{i01} \times PostWTO02 \times USE_{Dum}$ is significantly greater than the absolute value of the coefficient of the variable $TPU_{i01} \times PostWTO02_t$ in column (3). This further shows that although the uncertainty of trade policy has reduced the quantity of enterprise inventory in general, the reduction effect on the quantity of enterprise inventory exporting to the United States is the most obvious.

5. Conclusion

This paper takes the Permanent Normal Trade Relations (PNTR) granted by the United States after China's accession to the WTO as a quasi-natural experiment, and systematically examines the impact of changes in trade policy uncertainty on the inventory management behavior of enterprises using the method of multiple differences. This paper finds that the decline of trade policy uncertainty has significantly reduced the quantity of enterprise inventory, especially those exporting to the United States. From the perspective of trade policy changes, this paper provides a new explanation for understanding the dynamic changes in the quantity of Chinese enterprise inventory in recent years, and also helps to systematically evaluate the economic effects of trade policy uncertainty changes. More importantly, although the tariff rate of most of China's trading partner countries has dropped to a lower level at present, various forms of non-tariff barriers still exist. The Chinese government should strengthen trade policy negotiations with these countries, further accelerate the process of tax reduction and improve the ability to deal with trade frictions; In addition, the Chinese government is also committed to effectively reducing or eliminating the potential uncertainty of trade policies by signing free trade agreements, implementing the "the Belt and Road" initiative, and actively participating in international rule making, so as to further improve the performance and international competitiveness of Chinese manufacturing enterprises. At the same time, enterprises should improve their inventory management level and deal with the negative impact of the uncertainty of trade policy by flexibly adjusting the inventory quantity.

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