

Do Major Government Customers Help U.S. Firms Escape Foreign Competition?

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Motivation (1/4)

Trade openness: benefits and costs

- Trump withdrew from the Trans-Pacific Partnership (TPP) in 2017
- China and US Trade disputes (HUAWEI) in 2018
- COVID-19 and supply chain in 2020
- Foreign competition and firm outcomes:
 - ✓ Lower firms' survival probability and growth (Bernard, Jensen, and Schott, 2006a)
 - ✓ Hurt firm performance and reduce leverage (Xu, 2012)
 - ✓ Increase cost of debt (Valta, 2012)
 - ✓ Affect payout policies (Zhou, Booth, and Chang, 2013)
 - ✓ Hurt domestic employment (Pierce and Schott, 2016)
 - ✓ Hurt domestic innovation (Autor, Dorn, Hanson, Pisano, and Shu, 2020) V.S.,
Increase domestic innovation (Chen, Gao, Wang, 2021)



Motivation (2/4)

Firm's resilient to foreign competition

- Bernard, Jensen, and Schott (2006a): capital-intensive plants are more likely to survive and grow when facing more intense import competition
- Hombert and Matray (2018): R&D-intensive firms can better escape foreign competition through innovation and product differentiation
- Any other firm characteristics help cope with foreign competition?
 - ✓ Government relationship?



Motivation (3/4)

Government purchase

- Global procurement by government agencies is approximately 9.5 trillion U.S. dollars each year (2017 World Bank report).
- The U.S. government is the world's largest purchaser of goods and services; During 1978–2018, U.S. government spend 35% of GDP and about 20% GDP has been spent on private sector contractors.
- For many U.S. public firms, the government is one of their largest customers (disclosed in their regulatory filings).
- U.S. government purchases are very stable over time, with a low correlation between GDP and total government procurement expenditures (Bachmann and Bai, 2013; Goldman, 2020).



Motivation (4/4)

Government purchase and firm behaviors

- Government purchase characteristics: longer-term procurement contracts (stable; lower default risk and switching risk) (Goldman, Rocholl, and So, 2013; Dhaliwal, Judd, Serfling and Shaikh, 2016; Cohen and Li, 2020).
- Government procurements on firm behaviors:
 - ✓ Cohen and Malloy (2016): government-dependent firms become less competitive (invest less and have lower future sales growth).
 - ✓ Goldman (2020): government purchases help insulate government contractors' performance from the 2008–2009 financial crisis.



What we do in this project?

- We explore how the presence of the government as a substantial customer affects firms' performance and policies when import competition intensifies.
- Identification:
 - ✓ We use the United States granting Permanent Normal Trade Relations (PNTR) to China in October 2000 as a quasi-natural experiment.
 - ✓ Instrumental variable approach (two-year and three-year lagged industry average presence of major government customers)
 - ✓ Propensity score matching



Background

Permanent normal trade relations (PNTR)

- U.S. imports from China were subject to relatively high tariff rates imposed by the Smoot-Hawley Tariff Act of 1930 (non-NTR tariff rates).
- From 1980, US granted a waiver to China on an *annually renewable basis* and allowed imports from China to enjoy the relatively low NTR tariff rates.
- The average non-NTR rate (37%) is 9 times than the average NTR rate (4%)
- In October 2000, PNTR was passed by U.S. Congress and went into effect in December 2001 upon China's accession to the WTO.
- PNTR eliminated the uncertainty associated with China's NTR status, leading to a substantial reduction in expected U.S. import tariffs on Chinese goods.
- Industries more exposed to the policy change experience a greater increase in Chinese imports after the passage of PNTR than do other industries.
- Pierce and Schott (2016); Hombert and Matray (2018); Autor, Dorn, Hanson, Pisano, & Shu (2020); Chen, Gao, Wang (2021).



Key Findings

- **Baseline:** Greater import competition leads to lower profitability for average firms, but not for firms with major government customers.
- **Cross-sectional:** The positive effects of major government customers are more pronounced for firms with greater financial constraints or less business diversification.
- **Mechanism:** sustained investments, decreased demand uncertainty, and higher investment efficiency.
- **Robustness:** alternative proxies for government dependence and foreign competition.
- **Additional:** major government customers negatively affect cost of bank loans when foreign competition is fierce.



Contributions

- First, our paper adds to the international business literature on the impact of import competition on firms. Very few studies explore factors that can help firms in developed countries better cope with intensified foreign competition. Our paper complements these studies by showing that firms with major government customers are also better able to insulate trade shocks.
- Second, this paper contributes to the emerging line of studies that investigates the impact of government spending on firm behavior. In this paper, we show that firms with major government customers can better cope with and even benefit from intensified foreign competition.
- Third, our paper adds to the literature that investigates how a firm's customer affects corporate outcomes. Our paper thus advances the understanding of the influence that government customers have on their suppliers.
- Finally, our paper also contributes to the literature that examines how different trade policies affect corporate performance. This study sheds some additional light on the real consequences of PNTR and the resulting increased Chinese imports on U.S. firms.



Research Designs

$$Performance_{i,j,t} = \alpha + \beta_1 NTR\ gap_j + \beta_2 NTR\ gap_j \times Post\ PNTR + \beta_3 Major\ gov_{i,j,t-1} + \beta_4 NTR\ gap_j \times Post\ PNTR \times Major\ gov_{i,j,t-1} + Controls_{i,t-1} + \gamma_{s,t} + \varepsilon_{i,t}$$

- Performance: ROA, Profit margin
- NTR gap is the difference between the non-NTR tariff rates and the NTR tariff rates at the 3-digit SIC industry level in the year before PNTR (i.e. 1999).
- Controls: firm size, firm age, market-to-book ratio, leverage, capital intensity, R&D intensity, tangibility, domestic product market competition (HHI) and political contributions.
- Control industry-by-year fixed effects to control for unobserved, time-varying industry factors that may be correlated with the allocation of government contracts.
- Government customers include U.S. federal government, state government, and local government. Our results are the same if we focus only on federal contractors.



Data and sample (1/2)

- Tariff rates: [Peter Schott's website](#)
- Major customer: Compustat Customer Segment database (SFAS No. 14 and FAS No. 131 require US public firms to report all customers that account for 10% or more of total firm revenues.)
- Financial variables: Compustat.
- Campaign contributions: Federal Election Commission (FEC)
- After merging all the databases and deleting observations with missing values of our main variables, we obtain a sample of 6,724 U.S. manufacturing firms with 50,719 firm-year observations during the sample period of 1990–2007.



Data and sample (2/2)

Descriptive statistics

Variable	Observations	Mean	Q1	Median	Q3	Std
Major gov	50,719	0.056	0.000	0.000	0.000	0.230
NTR gap	50,719	0.318	0.276	0.356	0.410	0.131
ROA	50,719	-0.100	-0.140	0.022	0.084	0.360
Profit margin	46,344	-0.465	-0.036	0.092	0.165	2.013
Major corp	50,719	0.444	0.000	0.000	1.000	0.497
Assets (\$million)	50,719	1,978.300	27.452	123.237	720.608	6,499.390
Age	50,719	13.496	4.000	10.000	20.000	11.485
Market-to-book	50,719	2.702	1.139	1.598	2.671	3.604
Leverage	50,719	0.239	0.024	0.177	0.344	0.292
Capital intensity	50,719	3.641	2.809	3.466	4.243	1.400
R&D intensity	50,719	0.089	0.000	0.024	0.101	0.172
Tangibility	50,719	0.265	0.100	0.208	0.370	0.215
HHI	50,719	0.146	0.061	0.105	0.171	0.127
Political contribution (\$thousand)	50,719	12.020	0.000	0.000	0.000	61.762

For the 5.6% firms with major gov, on average 36.8% of their total sales are generated from the government.



Results (1/13)

Baseline results

	ROA _{t+1}			Profit margin _{t+1}		
	(1)	(2)	(3)	(4)	(5)	(6)
NTR gap	0.134*** (4.786)	-0.009 (-0.133)	-0.011 (-0.157)	0.181 (1.031)	-0.044 (-0.128)	-0.047 (-0.140)
NTR gap×Post	-0.099** (-2.187)	0.004 (0.153)	0.033 (0.470)	-1.321*** (-3.049)	-0.398*** (-2.632)	-0.812* (-1.900)
Major gov	-0.009 (-1.459)	-0.018* (-1.847)	-0.018* (-1.934)	-0.141** (-2.277)	-0.110 (-1.409)	-0.115 (-1.451)
NTR gap×Post×Major gov	0.198*** (6.171)	0.119*** (3.734)	0.126*** (3.981)	1.043*** (3.914)	0.390* (1.953)	0.401* (1.918)
Major corp	0.031*** (9.282)	0.014*** (3.845)	0.015*** (3.860)	0.293*** (10.707)	0.169*** (5.537)	0.162*** (5.492)
NTR gap×Post×Major corp	0.027* (1.700)	-0.017 (-1.266)	-0.018 (-1.254)	0.500*** (3.540)	0.011 (0.107)	0.052 (0.503)
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
NTR gap×Post×controls	No	No	Yes	No	No	Yes
Industry-year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	No	Yes	Yes	No	Yes	Yes
Observations	50,719	50,719	50,719	46,344	46,344	46,344
R-squared	0.490	0.733	0.733	0.336	0.719	0.720

1 std increase in the NTR gap leads to a **1.3%** decline in ROA for firms without major government customers but a **1.29%** increase in ROA for government-dependent firms.

Results (2/13)

Instrumental Variables Estimation

- Omitted variable bias: unobserved characteristics may simultaneously affect the presence of government customer and firm operating performance.
- IV: two-year and three-year lagged industry average Major gov dummy (Dhaliwal, Judd, Serfling and Shaikh, 2016).

	ROA	Profit margin
	(1)	(2)
NTR gap	0.089*** (3.132)	0.017 (0.044)
NTR gap \times Post	-0.100** (-2.269)	-3.599*** (-2.692)
Predicted Major gov	0.026 (1.072)	0.445*** (2.736)
NTR gap \times Post \times Predicted Major gov	0.322*** (3.296)	3.106** (2.448)
Baseline controls	Yes	Yes
Industry-year fixed effects	Yes	Yes
F-statistics	100.40	89.31
Prob>F	0.000	0.000
Observations	49,479	45,964
R-squared	0.357	0.344



Results (3/13)

PSM

To further address the endogeneity issues and balance our sample, we conduct PSM analysis and study the dynamics of firm performance surrounding PNTR.

For each treated firm, we find a matched firm with similar firm characteristics in the same industry but that does not have major government customers.

Balancing property

	Treatment Sample	Control Sample	Difference	t-value
	(1)	(2)	(3)	(4)
NTR gap	0.349	0.349	0.000	0.000
Major corp	0.284	0.330	-0.046	-0.651
Log (Assets)	4.258	4.233	0.025	0.530
Log (1+Age)	2.494	2.441	0.053	0.410
Market-to-book	2.958	2.517	0.441	0.823
Leverage	0.228	0.190	0.038	0.829
Capital intensity	3.226	3.144	0.082	0.481
R&D intensity	0.096	0.089	0.007	0.338
Tangibility	0.207	0.203	0.004	0.141
HHI	0.126	0.126	0.000	0.000
Log(1+PAC contributions)	0.250	0.328	-0.078	-0.468



Results (4/13)

PSM

	ROA		Profit margin	
	(1)	(2)	(3)	(4)
NTR gap	-0.385**	-0.334	-0.427***	-3.525**
	(-2.095)	(-1.425)	(-2.866)	(-2.387)
Major gov	-0.014	-0.013	-0.019	-0.098**
	(-1.422)	(-1.143)	(-1.656)	(-2.043)
NTR gap×Post	-0.128		0.673	
	(-0.538)		(0.472)	
NTR gap×Post×Major gov	0.133***		0.328*	
	(2.763)		(1.701)	
NTR gap×Pre3×Major gov		-0.103		-0.520
		(-1.219)		(-1.267)
NTR gap×Pre2×Major gov		-0.007		0.596
		(-0.114)		(1.585)
NTR gap×Pre1×Major gov		0.085		0.054
		(0.718)		(0.090)
NTR gap×Post0×Major gov		0.176***		0.372
		(3.183)		(0.744)
NTR gap×Post1×Major gov		0.296***		0.998*
		(2.943)		(1.738)
NTR gap×Post2×Major gov		0.276**		0.338**
		(2.563)		(2.291)
NTR gap×Post2Plus×Major gov		-0.001		0.138
		(-0.009)		(0.850)
NTR gap×Year dummy	No	Yes	No	Yes
Industry-year fixed effects * controls	Yes	Yes	Yes	Yes
Observations	2,270	2,270	2,050	2,050
R-squared	0.405	0.409	0.525	0.530



Heterogeneous Effects

	ROA				Profit margin			
	(1) Constrained	(2) Unconstrained	(3) Diversified	(4) Non-diversified	(5) Constrained	(6) Unconstrained	(7) Diversified	(8) Non-diversified
NTR gap	0.177*** (3.425)	0.026* (1.725)	0.127*** (5.585)	0.120*** (3.094)	-0.038 (-0.108)	0.112 (1.467)	0.267*** (3.644)	0.220 (0.939)
NTR gap×Post	-0.227** (-2.553)	-0.012 (-0.468)	-0.057 (-1.373)	-0.120** (-2.016)	-1.999*** (-2.894)	-0.654*** (-2.815)	-0.035 (-0.224)	-1.655*** (-3.207)
Major gov	-0.003 (-0.253)	-0.002 (-0.346)	0.009 (1.129)	-0.009 (-1.065)	-0.233* (-1.857)	0.019 (1.229)	0.049* (1.893)	-0.170** (-1.995)
NTR gap×Post×Major gov	0.371*** (5.476)	-0.022 (-1.034)	0.055 (1.474)	0.259*** (5.834)	2.288*** (3.989)	-0.159 (-1.339)	-0.068 (-0.569)	1.578*** (4.088)
Differences	0.393***		-0.204***		2.447***		-1.646***	
Chi-Square	34.42		12.79		17.75		16.11	
P-value	0.000		0.000		0.000		0.000	
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,814	25,872	10,848	37,791	21,616	24,685	10,482	33,857
R-squared	0.492	0.254	0.322	0.501	0.339	0.189	0.237	0.340

Results (6/13)

Mechanism: Investment

	CAPEX	Total investment	Log (Employment)	Employment growth
	(1)	(2)	(3)	(4)
NTR gap	0.019** (2.149)	0.035** (1.996)	0.436*** (4.283)	0.061* (1.781)
NTR gap×Post	-0.035* (-1.948)	0.031 (0.811)	-0.557*** (-2.688)	0.065 (1.248)
Major gov	-0.007*** (-5.123)	-0.003 (-0.500)	-0.010 (-0.681)	-0.020** (-2.079)
NTR gap×Post×Major gov	0.026*** (3.749)	0.051* (1.933)	0.144** (1.969)	0.122*** (3.064)
Baseline controls	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes
Observations	44,339	39,463	49,792	44,358
R-squared	0.353	0.454	0.939	0.093

Goldman (2020) shows that firms with major government customers have a higher level of investments than other firms during the 2007–2008 financial crisis.

Results (7/13) Mechanism: Demand Uncertainty and Investment Efficiency

	DemandUnc	ROA	Profit margin	CAPEX	CAPEX
	(1)	(2)	(3)	(4)	(5)
NTR gap	-0.688 (-0.787)	0.066** (2.225)	-0.117 (-0.585)	0.013 (1.541)	0.022*** (2.598)
NTR gap×Post	-0.102 (-0.069)	-0.031 (-0.629)	-0.555* (-1.879)	-0.022 (-1.588)	-0.033** (-2.166)
Major gov	0.045 (0.289)				-0.009*** (-6.180)
NTR gap×Post×Major gov	-1.978*** (-2.865)				0.020** (2.407)
<i>Demand_{uncertainty}</i>		-0.076*** (-5.494)	-0.182 (-1.455)	-0.004 (-1.236)	
NTR gap×Post× <i>Demand_{uncertainty}</i>		-0.047*** (-3.727)	-0.549*** (-4.339)	0.000 (-0.145)	
SG				0.006*** (6.026)	0.000 (0.590)
SG×NTR gap×Post× <i>Demand_{uncertainty}</i>				-0.003** (-2.450)	
SG×NTR gap×Post×Major gov					0.021* (1.756)
Observations	48,345	50,719	46,344	42,533	42,533
R-squared	0.028	0.491	0.339	0.367	0.341



Results (8/13)

Robustness: Alternative Measures of Government Customers

	ROA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
NTR gap × Post × Gov	0.163*** (6.075)						
NTR gap × Post × Govsale		0.422*** (5.480)					
NTR gap × Post × GovHHI			0.771*** (4.655)				
NTR gap × Post × Major federal				0.197*** (6.199)			
NTR gap × Post × Major recurrent					0.220*** (6.659)		
NTR gap × Post × Gov contractor						0.089** (2.113)	
NTR gap × Post × Log(1+ContractV)							0.026** (2.274)
Observations	50,719	50,719	50,719	50,719	50,719	15,191	15,191
R-squared	0.490	0.490	0.490	0.490	0.490	0.510	0.510

Results (9/13)

Robustness: Alternative Measures of Government Customers

	Profit margin						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
NTR gap × Post × Gov	0.780*** (3.576)						
NTR gap × Post × Govsale		2.585*** (3.532)					
NTR gap × Post × GovHHI			5.260*** (3.374)				
NTR gap × Post × Major federal				1.024*** (4.082)			
NTR gap × Post × Major recurrent					0.960*** (5.148)		
NTR gap × Post × Gov contractor						1.485*** (4.370)	
NTR gap × Post × Log(1+ContractV)							0.323*** (3.245)
Observations	46,344	46,344	46,344	46,344	46,344	13,697	13,697
R-squared	0.336	0.336	0.336	0.336	0.335	0.373	0.370



Results (10/13)

Robustness: Alternative Measures of Foreign Competition

$$\text{Import penetration} = \frac{\text{Imports}}{\text{Imports} + \text{Domestic production}}$$

Panel A: Import penetration

	ROA		Profit margin	
	(1)	(2)	(3)	(4)
Import penetration	-0.011 (-0.820)	0.076 (1.493)	0.062 (0.933)	0.417 (1.435)
Major gov	-0.015** (-2.095)	-0.018*** (-2.672)	-0.181*** (-2.948)	-0.191*** (-3.181)
Import penetration × Major gov	0.070*** (2.722)	0.082*** (3.321)	0.522*** (3.271)	0.547*** (3.446)
Major corp	0.032*** (7.713)	0.033*** (7.450)	0.205*** (7.980)	0.219*** (7.822)
Import penetration × Major corp	-0.007 (-0.547)	-0.018 (-1.185)	0.131** (2.156)	0.044 (0.594)
Baseline controls	Yes	Yes	Yes	Yes
Import penetration × controls	No	Yes	No	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes
Observations	51,481	51,481	47,530	47,530
R-squared	0.477	0.479	0.355	0.359



Results (11/13)

Robustness: Alternative Measures of Foreign Competition

Panel B: Chinese import penetration

	ROA		Profit margin	
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS
Chinese import penetration	-0.041	0.089	0.155	0.582
	(-0.854)	(1.417)	(0.531)	(1.197)
Major gov	-0.001	-0.001	-0.128*	-0.132*
	(-0.120)	(-0.173)	(-1.870)	(-1.893)
Chinese import penetration \times Major gov	0.459*	0.543**	4.992***	5.289***
	(1.898)	(2.129)	(5.103)	(4.483)
Baseline controls	Yes	Yes	Yes	Yes
Industry-year fixed effect	Yes	Yes	Yes	Yes
F-statistics		122.41		120.83
Prob>F		0.000		0.000
Observations	44,898	44,898	40,824	40,824
R-squared	0.381	0.330	0.338	0.259



Results (12/13)

Robustness: Alternative Measures of Foreign Competition

Panel C: Input-adjusted Chinese import penetration (PNTR may brings intermediate inputs for US manufacturers that mitigate negative impact of import competition in final goods market)

	ROA		Profit margin	
	(1)	(2)	(3)	(4)
Net Chinese import penetration	-0.211*** (-4.210)		-0.334 (-1.634)	
Major gov	0.006 (0.748)	-0.033** (-2.003)	-0.179** (-2.042)	-0.641*** (-2.903)
Net Chinese import penetration \times Major gov	0.285*** (3.565)		1.350** (2.390)	
Input market import penetration		0.139*** (3.010)		0.321 (1.569)
Input market import penetration \times Major gov		-0.179** (-2.237)		0.002 (0.004)
Final market import penetration		-0.570*** (-4.650)		-0.697 (-1.160)
Final market import penetration \times Major gov		1.040*** (3.987)		9.661*** (3.275)
Baseline controls	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes
Observations	31,933	31,933	29,249	29,249
R-squared	0.327	0.328	0.170	0.171



Results (13/13)

Additional: Cost of bank loan

	Log (Spread)		
	(1)	(2)	(3)
Import penetration	0.225*** (3.093)	0.076 (0.991)	-0.564 (-1.620)
Major gov	0.093* (1.728)	0.116** (2.347)	0.116** (2.307)
Import penetration × Major gov	-0.399** (-2.340)	-0.371** (-2.299)	-0.381** (-2.288)
Major corp	0.058** (2.031)	0.041 (1.422)	0.040 (1.454)
Import penetration × Major corp	-0.074 (-0.848)	-0.032 (-0.364)	-0.034 (-0.414)
Loan characteristics & type fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	No	No
Industry-year fixed effects	No	Yes	Yes
Import penetration × firm controls	No	No	Yes
Observations	12,440	12,440	12,440
R-squared	0.540	0.584	0.587

Valta (2012) finds that firms facing greater competition have a higher cost of debt borrowing. Houston et al (2014) show that political connection can reduce a firm's cost of bank loans.



Conclusion

- Government contractors have better operating performance than their peers when their industries are more exposed to the import shock.
- The results are robust to the inclusion of a broad set of controls, instrumental variable analysis, matching analysis, and alternative proxies of government dependence and import competition.
- The beneficial effect is found to be stronger among firms with greater financial constraints or less corporate diversification.
- Further analysis shows that government procurements allow firms to maintain a higher level of investment and investment efficiency and enjoy a lower cost of borrowing when import competition intensifies.
- Overall, this study provides further evidence of the effect of government participation in product market.

