Online Appendix

Appendix A: Tables

Table A1: List of Broadband China Pilot Cities

Year	Pilot City	Count
2014	Beijing, Shanghai, Tianjin, Changsha, Zhuzhou, Xiangtan, Dalian, Shijiazhuang, Benxi, Harbin, Yanbian Korean Autonomous Prefecture, Daqing, Suzhou, Nanjing, Zhenjiang, Jinhua, Kunshan, Anqing, Wuhu, Fuzhou (including Pingtan), Quanzhou, Xiamen, Nanchang, Qingdao, Shangrao, Zibo, Linyi, Weihai, Zhengzhou, Wuhan, Luoyang, Guangzhou, Zhongshan, Shenzhen, Chengdu, Aba Tibetan and Qiang Autonomous Prefecture, Panzhihua, Guiyang, Wuzhong, Yinchuan, Aral	41
2015	Taiyuan, Erdos, Hohhot, Panjin, Anshan, Yangzhou, Baishan, Hefei, Jiaxing, Putian, Tongling, Ganzhou, Xinyu, Jining, Dongying, Meizhou, Dezhou, Yongcheng, Xinxiang, Huangshi, Yichang, Xiangyang, Shiyan, Yueyang, Suizhou, Neijiang, Shantou, Jiangjin, Chongqing, Rongchang, Dongguan, Mianyang, Yibin, Yuxi, Zhongwei , Dazhou , Lanzhou , Guyuan , Kramayi , Zhangye	38
2016	Jinzhong, Yangquan, Wuhai, Tongliao, Baotou, Shenyang, Wuxi, Mudanjiang, Taizhou, Hangzhou, Nantong, Suzhou, Ma'anshan, Huangshan, Ji'an, Zaozhuang, Yantai, Shangqiu, Nanyang, Jiaozuo, Ezhou, Yiyang, Hengyang, Haikou, Yulin, Luzhou, Ya'an, Nanchong, Wenshan Zhuang and Miao Autonomous Prefecture, Zunyi, Linzhi Linzhi, Lhasa, Weinan, Jiuquan, Wuwei, Xining, Tianshui	38

Table A2: The Big Picture for Broadband China

Measurements	Unit	2013	2015	2020
Fixed broadband access subscribers	Million	210	270	400
3G/LTE subscribers	Million	330	450	1,200
Fixed broadband household penetration	%	40	50	70
3G/LTE user penetration rate	%	25	32.5	85
Urban broadband access capacity	Mbps	20	20	50
Rural broadband access capacity	Mbps	4	4	12
Access bandwidth for large enterprises and institutions	Mbps		>100	>1000
Internet international export bandwidth	Gbps	2500	6500	
FTTH coverage for households	Million	130	200	300
Number of 3G/LTE base stations	Thousand	950	1200	
Proportion of administrative villages with broadband	%	90	95	>98
Number of Internet users	Million	700	850	1,100
Internet data volume (total bytes of web pages)	Terabyte	7800	15000	
Value of e-commerce transactions	Trillion Chinese yuan	10	18	

Table A3: Operating Revenue Criteria for Different Firms (in Million Chinese Yuan)

Industry	Large	Medium	Small	Micro
Farming, forestry, animal husbandry and fishery	≥200	[5,200)	[0.5,5)	<0.5
Manufacturing industry	≥400	[20,400)	[3,20)	<3
Construction industry	≥800	[60,800)	[3,60)	<3
Wholesale business	≥400	[50,400)	[10,50)	<10
Retail trade	≥200	[5,200)	[1,5)	<1
Traffic business	≥300	[30,300)	[2,30)	<2
Storage business	≥300	[10,300)	[1,10)	<1
Mail business	≥300	[20,300)	[1,20)	<1
Lodging industry	≥100	[20,100)	[1,20)	<1
Food industry	≥100	[20,100)	[1,20)	<1
Information transfer service industry	≥1000	[10,1000)	[1,10)	<1
Computer service and software industry	≥100	[10,100)	[0.5,10)	<0.5
Real estate activities	≥2000	[10,2000)	[1,10)	<1
Estate management	≥50	[10,50)	[5,10)	<5
Leasehold and business service industry	-	-	-	-
Other industries	-	-	-	-

Table A4: Employee Criteria for Different Firms

Industry	Large	Medium	Small	Micro
Farming, forestry, animal husbandry and fishery	-	-	-	-
Manufacturing industry	≥1000	[300,1000)	[20,300)	<20
Construction industry	-	-	-	-
Wholesale business	≥200	[20,200)	[5,20)	<5
Retail trade	≥300	[50,300)	[10,50)	<10
Traffic business	≥1000	[300,1000)	[20,300)	<20
Storage business	≥200	[100,200)	[20,100)	<20
Mail business	≥1,000	[300,1000)	[20,300)	<20
Lodging industry	≥300	[100,300)	[10,100)	<10
Food industry	≥300	[100,300)	[10,100)	<10
Information transfer service industry	≥2,000	[100,2000)	[10,100)	<10
Computer service and software industry	≥300	[100,300)	[10,100)	<10
Real estate activities	-	-	-	-
Estate management	≥1,000	[300,1000)	[100,300)	<100
Leasehold and business service industry	≥300	[100,300)	[10,100)	<10
Other industries	≥300	[100,300)	[10,100)	<10

Table A5: Total Assets Criteria for Different Firms (in Million Chinese Yuan)

Industry	Large	Medium	Small	Micro
Farming, forestry, animal husbandry and fishery	-	-	-	-
Manufacturing industry	-	-	-	-
Construction industry	≥800	[50,800)	[3,50)	<3
Wholesale business	-	-	-	-
Retail trade	-	-	-	-
Traffic business	-	-	-	-
Storage business	-	-	-	-
Mail business	-	-	-	-
Lodging industry	-	-	-	-
Food industry	-	-	-	-
Information transfer service industry	-	-	-	-
Computer service and software industry	-	-	-	-
Real estate activities	≥100	[50,100)	[20,50)	<20
Estate management	-	-	-	-
Leasehold and business service industry	≥1200	[80,1200)	[1,80)	<1
Other industries	-	-	-	-

Table A6: Share of Pilot Cities in All Cities

	Number of pilot cities	The share of pilot cities to all cities (%)	The share of total GDP (%)		
			2009	2016	2020
The first wave (2014)	41	12.17	35.24	35.68	35.81
The second wave (2015)	38	11.28	12.61	13.06	13.27
The third wave (2016)	38	11.28	11.72	11.24	11.10
Total	117	34.72	59.57	59.97	60.18

Table A7: Other Robustness Checks

	Export-to-Revenue Ratio	
	(1) Excluding post 2018 samples	(2) Controlling for Industry-Year FE
DI	0.061***	0.063***
	(0.012)	(0.013)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes
Firm Obs	2,871	3,934
City-year Obs	883	1,122
R-squared	0.761	0.792

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 uses pre-2018 samples to avoid impacts from the trade war between U.S. and China. Column 2 adds industry-year fixed effects to our baseline regression.

Table A8: Executive Team Characteristics

Variables	Obs.	Mean	S.D.	Min	Max
Executive Team Size	4,005	6.465	2.867	1	28
Average Age	4,005	46.368	4.131	33	60.833
Percent Male	4,005	0.813	0.179	0	1
Percentage Master's or Doctoral Degree	4,005	0.460	0.314	0	1
Percentage Technical Background	4,005	0.288	0.251	0	1
Percentage Financial Background	4,005	0.070	0.160	0	1
Percentage with Overseas Background	4,005	0.054	0.116	0	0.8

Notes: We aggregate individual-level information on executive team members to firm-level.

Table A9: Number of SMEs in Each Year in Final Sample

Year	Firm Observations
2009	111
2010	168
2011	218
2012	251
2013	247
2014	257
2015	294
2016	359
2017	480
2018	511
2019	557
2020	552
Total	4,005

Notes: Number of firms in our final sample in each year.

Table A10: Existing and New Exporters

	Export-to-Revenue Ratio	
	(1)	(2)
	Existing	New
DI	0.065***	0.059***
	(0.014)	(0.019)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	3,057	1,812
City-year Obs	1,027	857
R-squared	0.769	0.779

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 only uses the existing exporters. Column 2 only uses the new exporters.

Table A11: Robustness Check on Productivity

	Export-to-Revenue Ratio	
	(1)	(2)
DI	0.060***	0.063***
	(0.013)	(0.012)
Other controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	4,005	4,005
City-year Obs	1,134	1,134
R-squared	0.742	0.747

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 includes the same control variables and fixed effects as in the baseline analysis but excluding *TFP*. Column 2 further adds *TFP* in the controls.

Appendix B: Empirical – Other Performance

We also look at other firm performance besides export. In Table B1, we look at the impact of Broadband China policy on productivity, revenue, and profits of SMEs.

With the adoption of intelligent production and digital management systems, firms can streamline operations, optimize capital and resource allocation, and improve overall productivity. We follow Olley and Pakes (1996) and Levinsohn and Petrin (2003) to measure Total Factor Productivity (TFP) in column 1 and 2, and both results show that Broadband China policy increases the productivity of SMEs. In column 3 and 4 of Table B1, we look at the revenue and profit of the listed SMEs, and we observe significant and large promotional effect of digital infrastructure development – SMEs in the pilot cities enjoy 5.8% higher growth in revenue and 18.1% higher growth in profit as a result of the Broadband China policy compared to the control group. Results in Table B1 show the crucial role of digital infrastructure development in the growth of SMEs.

Table B1: Other Firm Performance

	(1) *Prod-OP*	(2) *Prod-LP*	(3) *lnRevenue*	(4) *lnProfit*
DI	0.085**	0.077*	0.058*	0.181***
	(0.038)	(0.039)	(0.032)	(0.068)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm Obs	3,921	4,005	4,005	4,005
City-year Obs	1,127	1,134	1,134	1,134
R-squared	0.831	0.828	0.947	0.729

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 and 2 study the productivity of firms, measured using the OP (column 1) and LP (column 2) method, respectively. Column 3 studies firms' revenue and column 4 studies firms' profit.

Appendix C: Method - Estimate Product Quality

Following Hallak and Schott (2011) and Khandelwal et al. (2013), we calculate firm-level export product quality. Specifically, the consumption quantity corresponding to product n is defined as:

$$q_n = p_n^{-\sigma} \lambda_n^{\sigma-1} \frac{E}{P} \tag{C1}$$

where E, P, n, p, λ, and q denote consumer expenditure, price index, product variety, product price, product quality, and product quantity, respectively, with σ>1 representing the elasticity of substitution across product varieties. Given the four-dimensional panel data structure (year-firm-destination-product), the export quantity of product n (by HS6) by firm i to country m in year t can be formalized as:

$$q_{imt} = p_{imt}^{-\sigma} \lambda_{imt}^{\sigma-1} \frac{E_{mt}}{P_{mt}} \tag{C2}$$

Taking the natural logarithm of both sides of Equation (C2) and rearranging terms yields:

$$\ln q_{imt} = \chi_{mt} - \sigma \ln p_{imt} + \varepsilon_{imt} \tag{B3}$$

Here, χ_{mt} denotes an importer-year dummy variable that controls for importer-invariant variables (e.g., geographical distance), time-specific variables (e.g., exchange rate regime reforms), and time-varying importer-specific variables (e.g., GDP of the importing country). $\ln p_{imt}$ is the price of exported products, and $\varepsilon_{imt} = (\sigma - 1)\ln \lambda_{imt}$ captures the residual term containing product quality information. Direct OLS estimation of the above equation may encounter two critical issues: First, the specification omits product variety by exclusively considering price and quality effects on demand. Second, endogeneity arises from bidirectional causality between product quality and price. To address the first issue, following Khandelwal (2010), we control for horizontal product variety by incorporating the GDP of the exporter's province, as product variety is a function of market size. For the second issue, adopting Nevo (2001) approach, we employ the average export price of firm I to non-m markets as an instrumental variable (IV) for its price in market *m*. Incorporating these refinements, the estimated quality parameter is derived as:

$$quality_{imt} = \ln \hat{\lambda}_{imt} = \hat{\varepsilon}_{imt} / (\sigma - 1) = (\ln q_{imt} - \ln \hat{q}_{imt}) / (\sigma - 1) \quad \text{(C4)}$$

We then standardize the quality parameter to derive a normalized quality metric:

$$s - quality_{imt} = (quality_{imt} - \min quality_{imt}) / (\max quality_{imt} - \min quality_{imt}) \quad \text{(C5)}$$

where *min* and *max* denote the minimum and maximum values calculated for a given HS 8-digit product across all years, firms, and country pairs. The firm-level export quality is then defined as:

$$Quality_{it} = (value_{imt} / \sum value_{imt}) \times (s - quality_{imt}) \quad \text{(C6)}$$

where $value_{imt}$ represents the export value of the observation (by firm, destination, product, and year).

Appendix D: Pre-Trend Figures

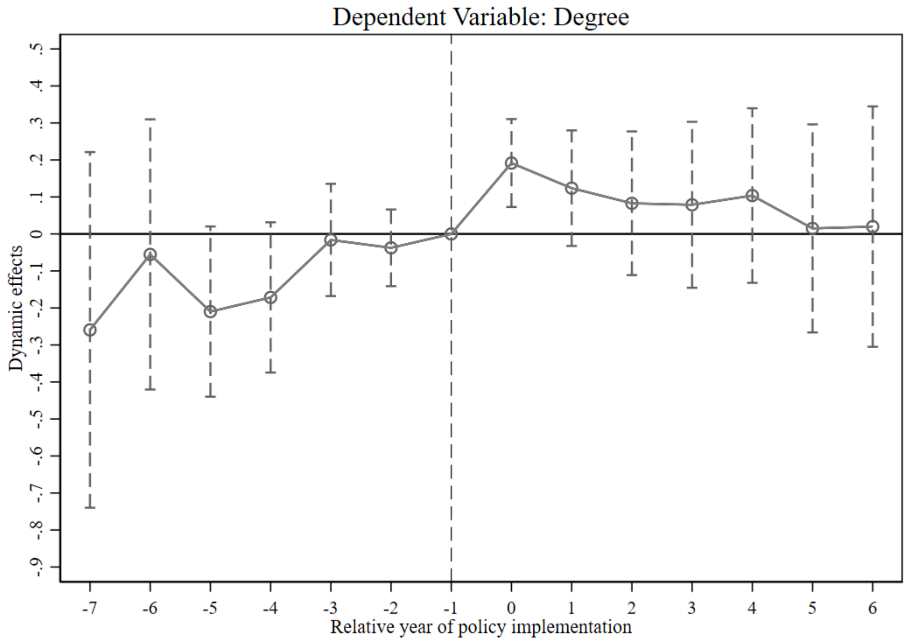

Fig. D1: Pre-Trend Test for Digital Transformation Degree Index

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We follow Wu et al. (2021) to use the digital transformation degree index.

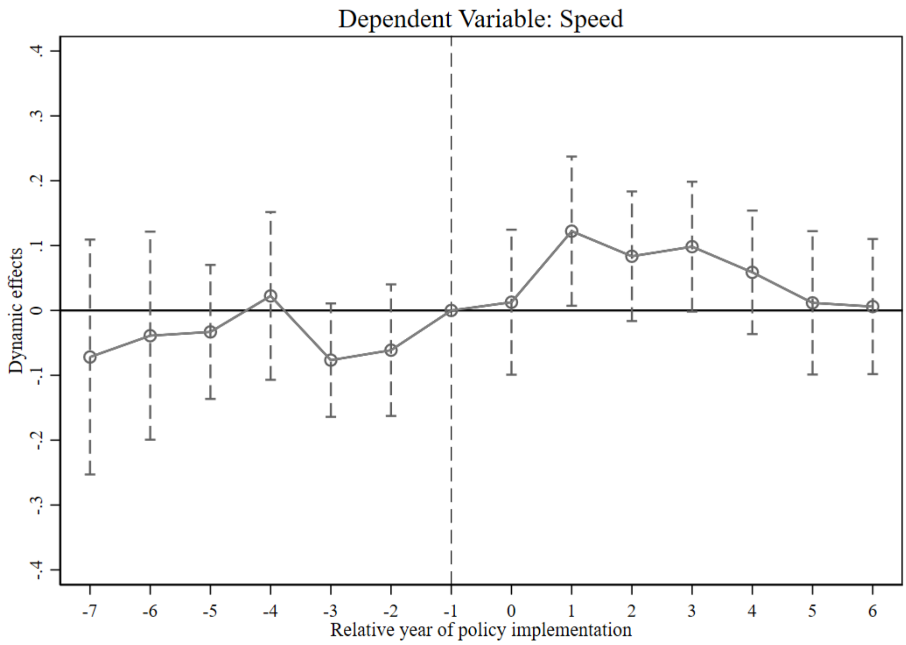

Fig. D2: Pre-Trend Test for Digital Transformation Speed Index

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We follow Du and Ma (2004) to use the digital transformation speed index.

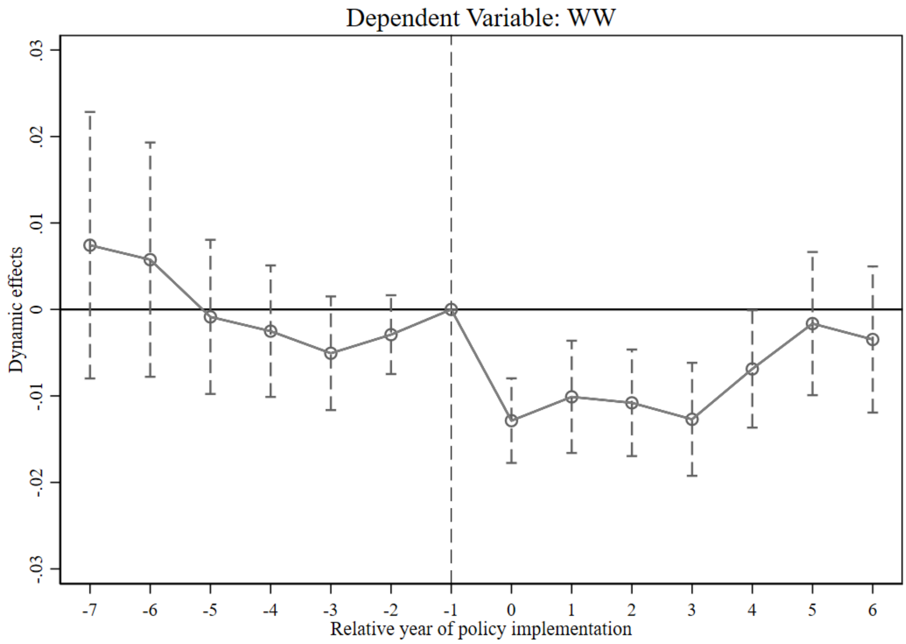

Fig. D3: Pre-Trend Test for WW Index

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period ($\beta_{-1}=0$). We follow Whited and Wu (2006) to construct the WW Index, which indicates the degree of firms' overall financial constraints, and a larger index means greater financial constraints.

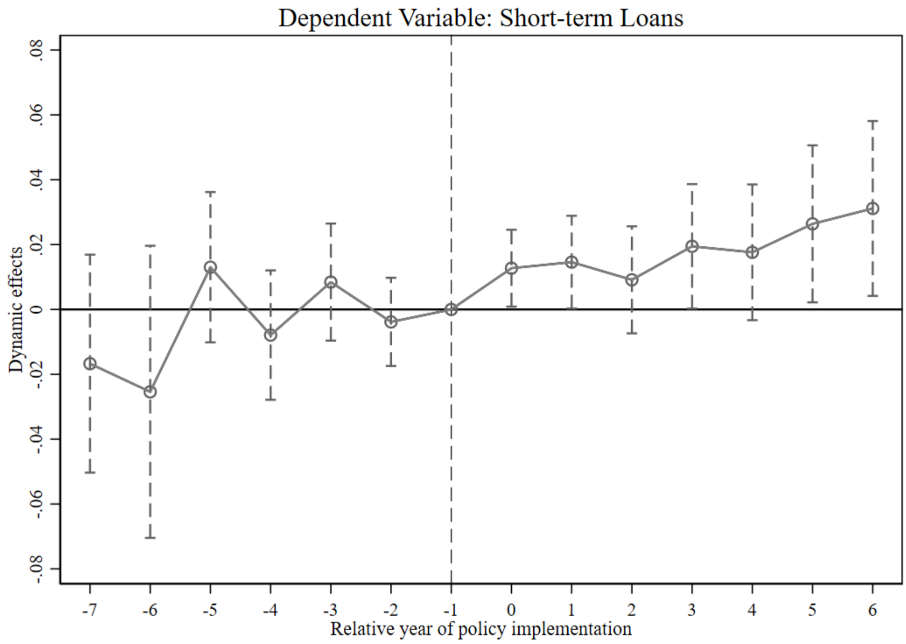

Fig. D4: Pre-Trend Test for Short-Term Loans

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period ($\beta_{-1}=0$). We use the ratio of short-term borrowing to total assets to measure the degree of firms' constraints on financing from bank channels, and a lower ratio means more pronounced bank financing constraints.

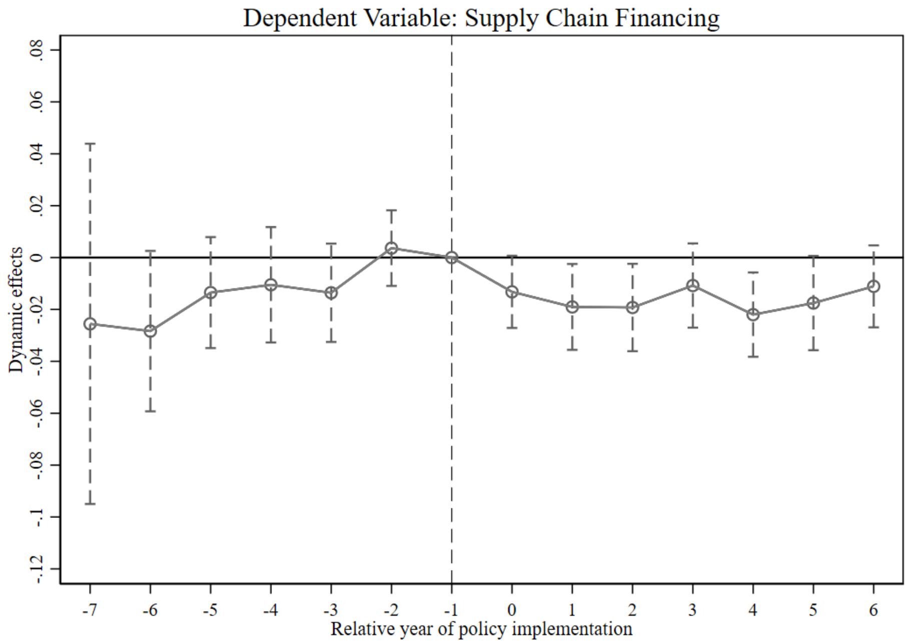

Fig. D5: Pre-Trend Test for Supply Chain Financing

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We follow Petersen and Rajan (1997) and Mateut (2014) to construct an indicator that reflects the degree of firms' constraints on financing from supply chain commercial credit channels, where a larger value means great supply chain financing constraints.

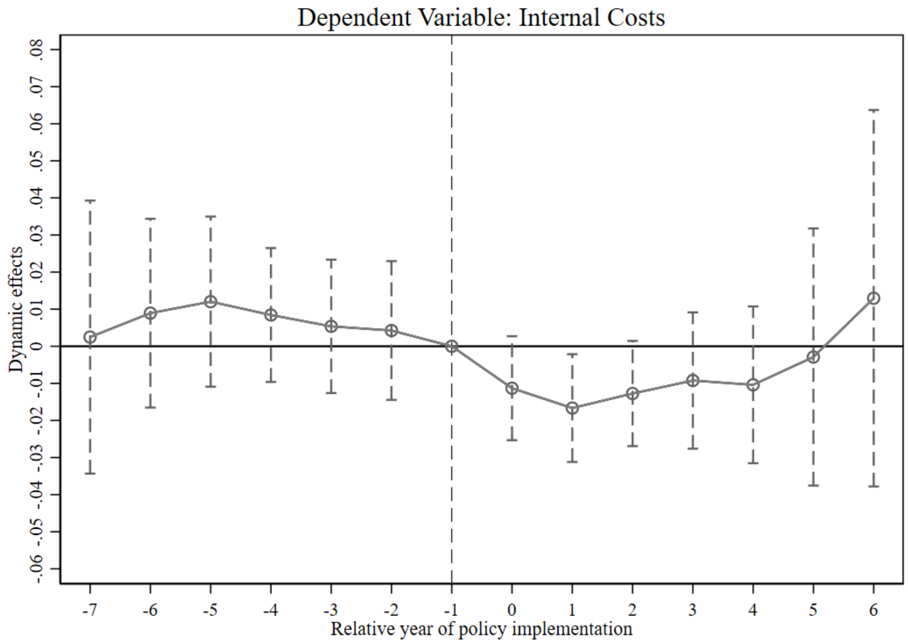

Fig. D6: Pre-Trend Test for Internal Cost

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

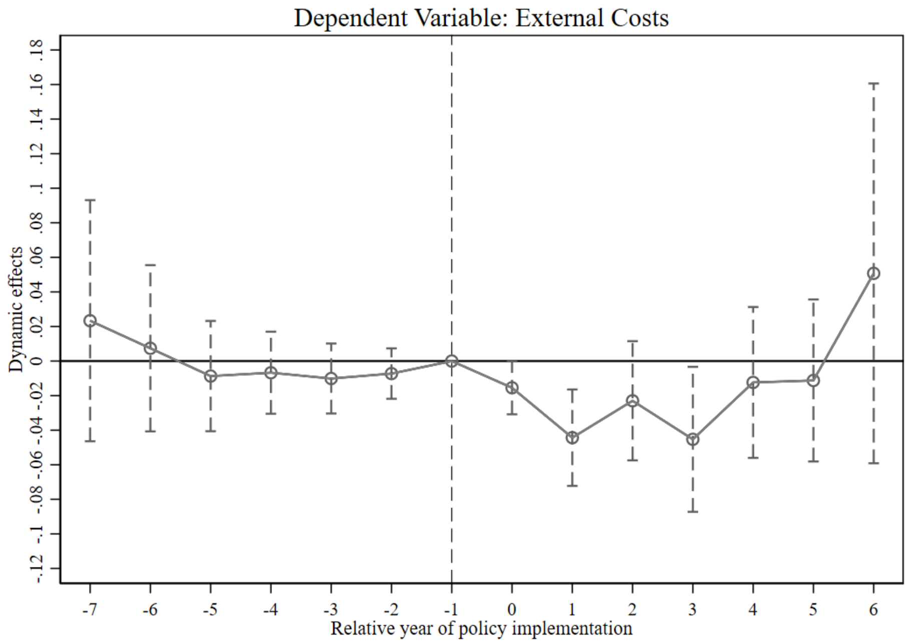

Fig. D7: Pre-Trend Test for External Cost

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

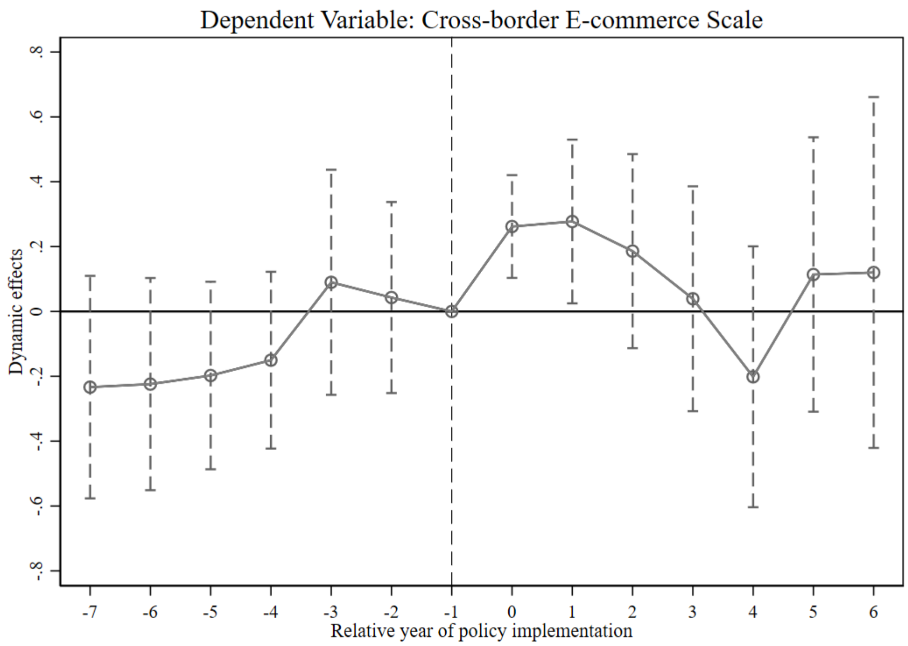

Fig. D8: Pre-Trend Test for Cross-Border E-Commerce Scale

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

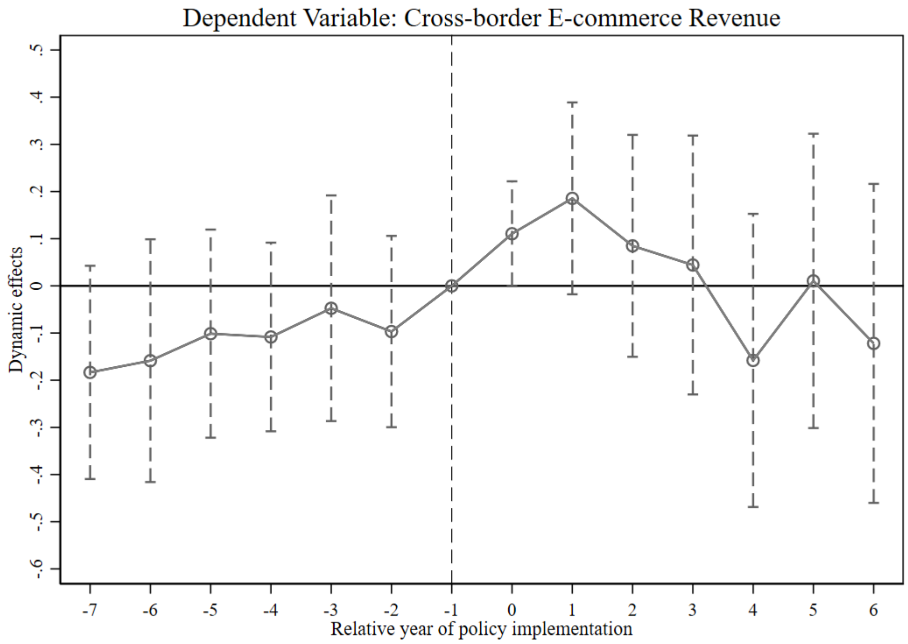

Fig. D9: Pre-Trend Test for Cross-Border E-Commerce Revenue

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

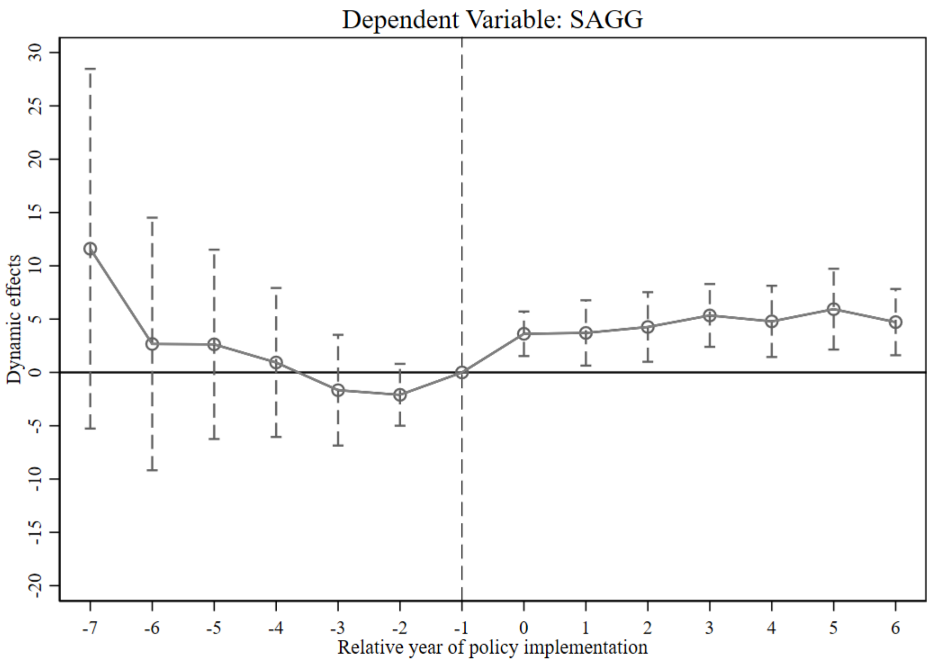

Fig. D10: Pre-Trend Test for Service Agglomeration

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We follow Keeble et al. (1991) to construct the location entropy and use service agglomeration to measure the level of specialized agglomeration in the region.

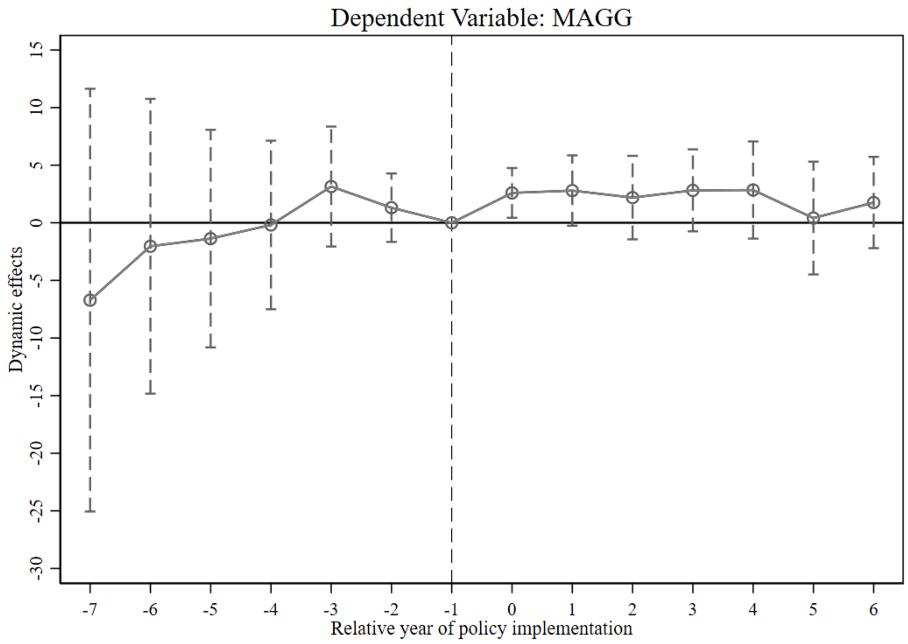

Fig. D11: Pre-Trend Test for Manufacture Agglomeration

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We follow Keeble et al. (1991) to construct the location entropy and use manufacture agglomeration to measure the level of specialized agglomeration in the region.

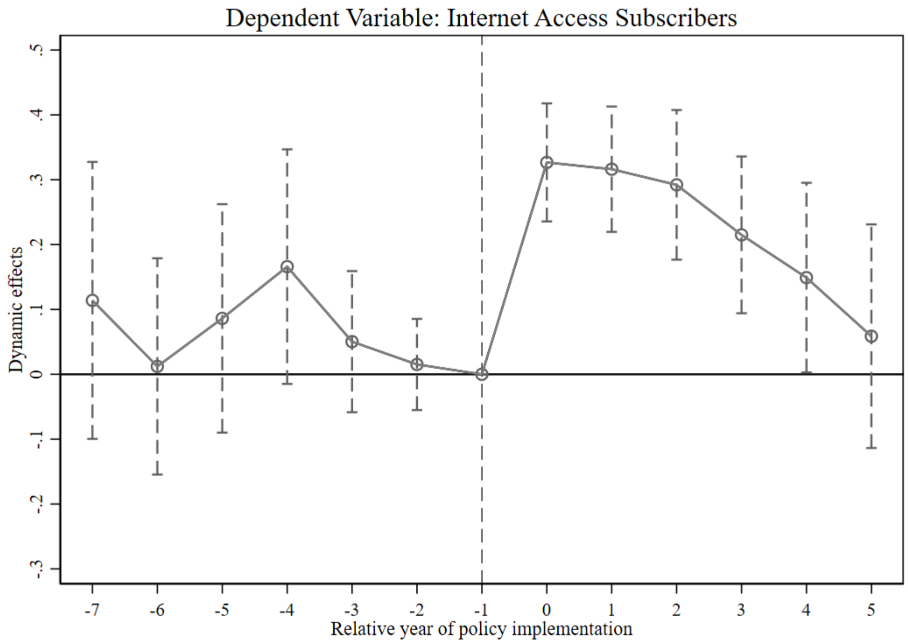

Fig. D12: Pre-Trend Test for Internet Access Subscribers

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We use the number of urban broadband Internet access subscribers to measure urban digital infrastructure development.

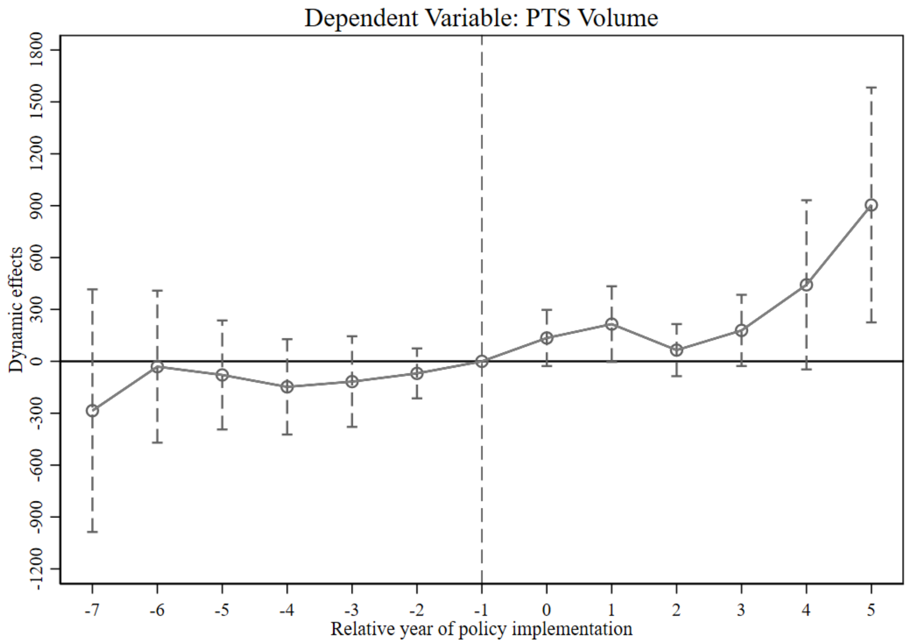

Fig. D13: Pre-Trend Test for PTS Volume

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We use the per capital volume of postal and telecommunications services to measure urban digital infrastructure development.

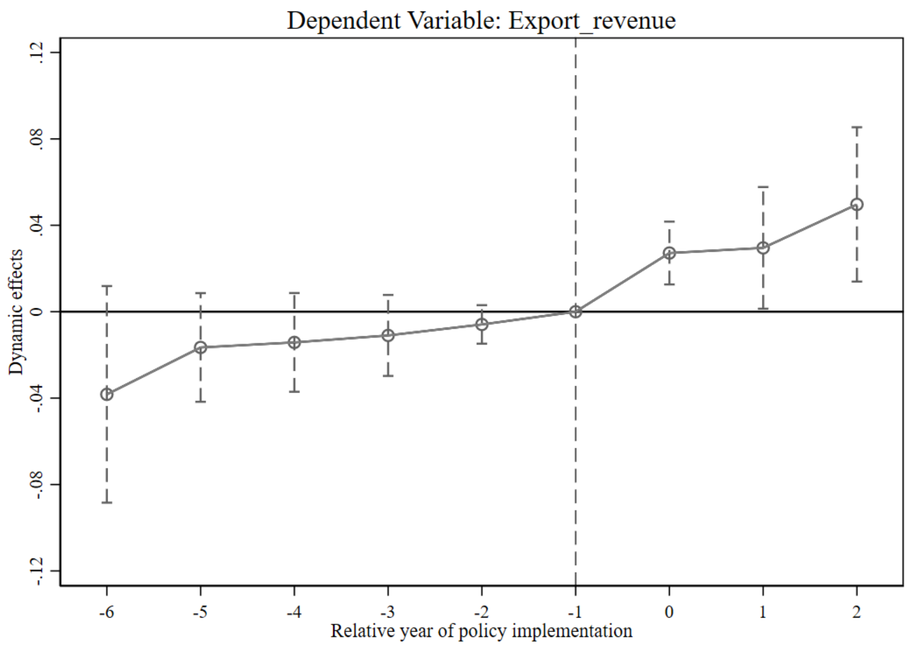

Fig. D14: Pre-Trend Test for Export-to-Revenue Ratio

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

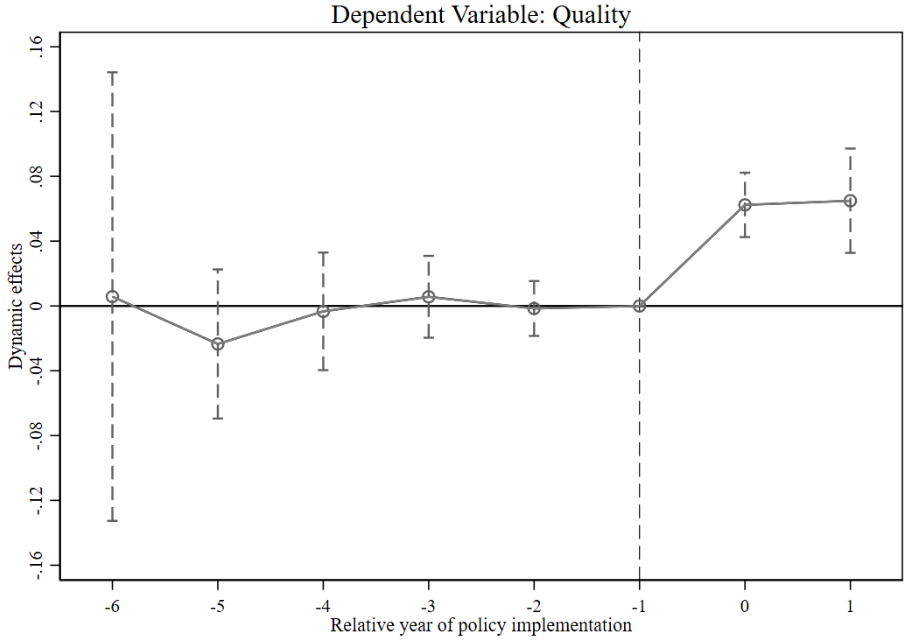

Fig. D15: Pre-Trend Test for Export Quality

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We follow Hallak and Schott (2011) and Khandelwal et al. (2013) to measure the quality of exported products.

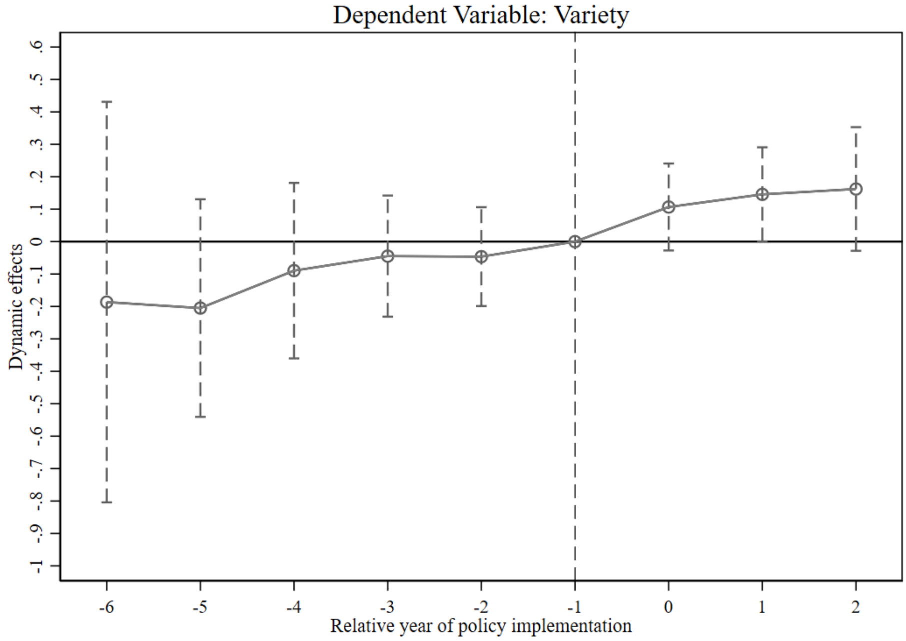

Fig. D16: Pre-Trend Test for Export Variety

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0). We measure variety by counting the number of different products (by HS6) that firms export to.

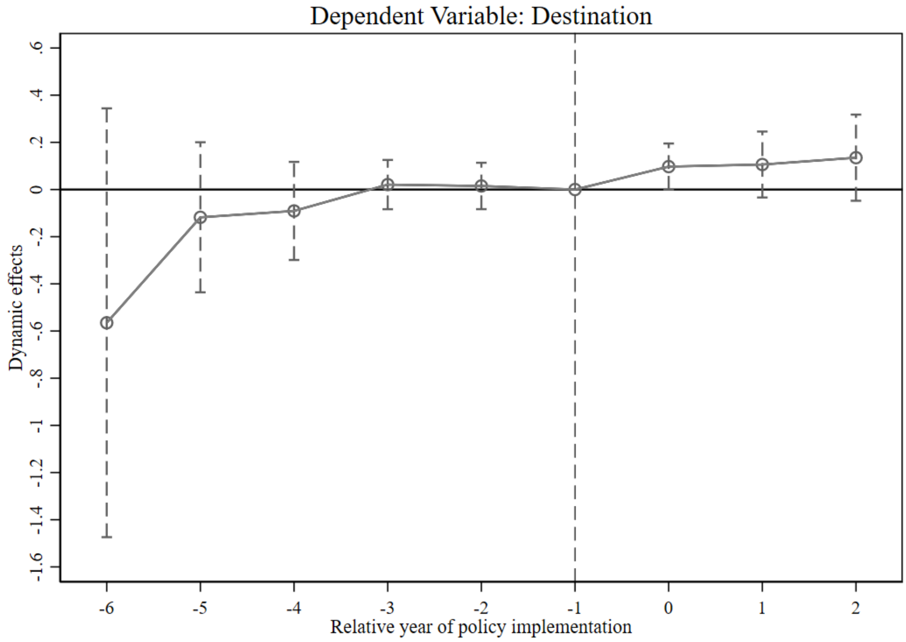

Fig. D17: Pre-Trend Test for Number of Export Destinations

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

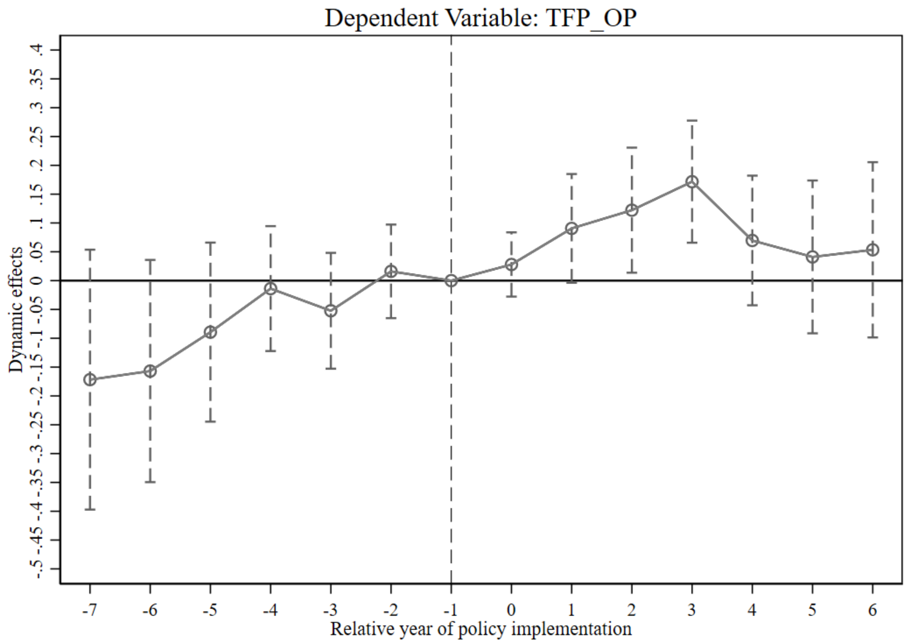

Fig. D18: Pre-Trend Test for TFP (Olley and Pakes, 1996)

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

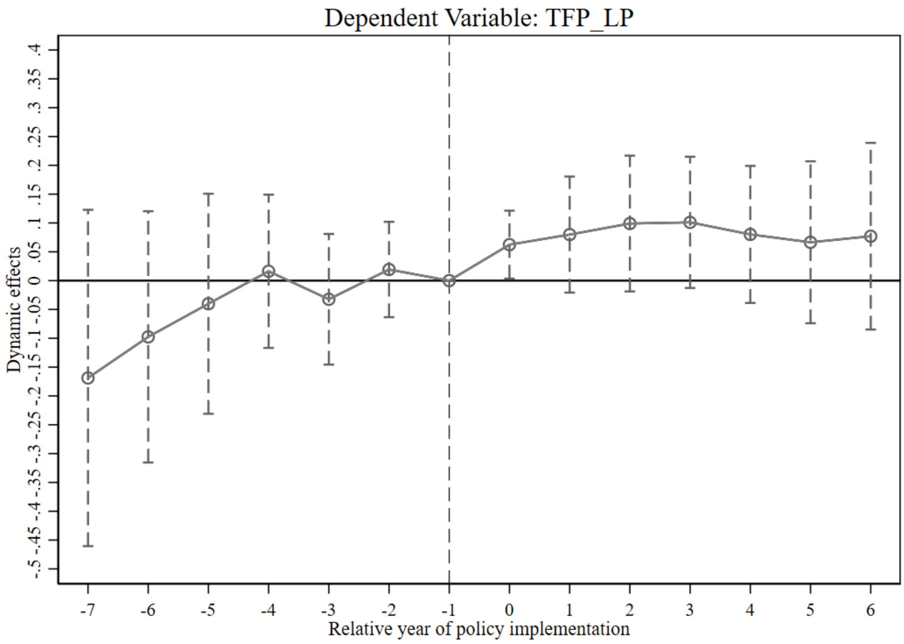

Fig. D19: Pre-Trend Test for TFP (Levinsohn and Petrin, 2003)

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

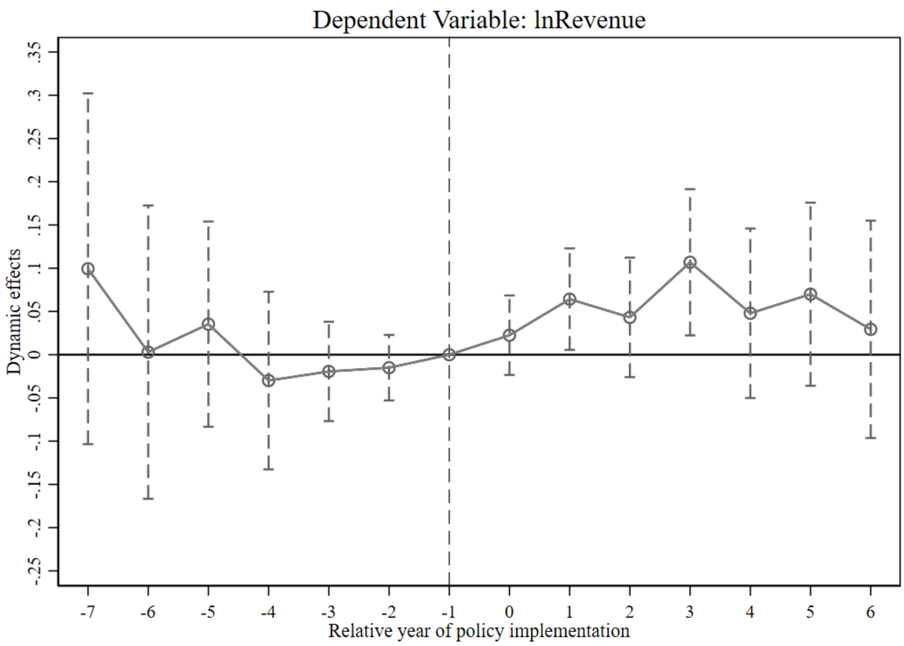

Fig. D20: Pre-Trend Test for Revenue

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

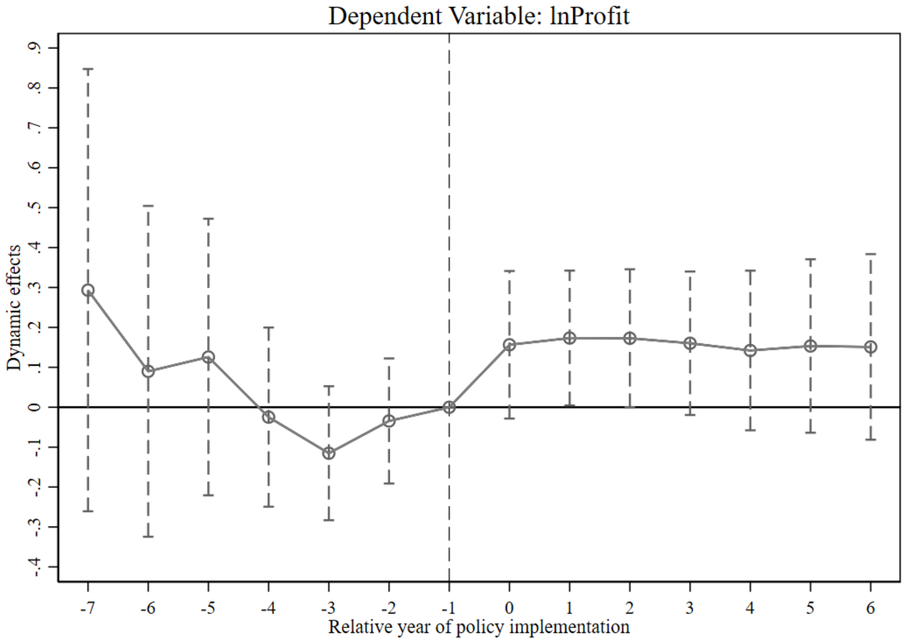

Fig. D21: Pre-Trend Test for Profit

Notes: This figure plots the point estimates and associated 95% confidence intervals for the relative time dummies. We designate the time preceding the enforcement of the policy as the baseline period (β_{-1}=0).

Appendix E: Full Tables

Table E1: New DID Estimator

	Export-to-Revenue Ratio		
	de Chaisemartin and D'Haultfœuille (2020)	Callaway and Sant'Anna (2021)	Borusyak et al. (2024)
DI	0.052***	0.052***	0.058***
	(0.007)	(0.020)	(0.012)
lnSize			0.002
			(0.016)
ROA			0.076
			(0.066)
Lev			-0.008
			(0.031)
Top1			0.002*
			(0.001)
Growth			-0.000
			(0.001)
TobinQ			0.000
			(0.002)
TFP			-0.046***
			(0.012)
lnGDP			0.022
			(0.019)
lnTech			-0.024
			(0.023)
Gov			-0.008
			(0.022)
Fin			0.023
			(0.016)
Import_GDP			0.005
			(0.025)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Firm Obs	1,540	2,739	3,074
City-year Obs	N/A	1,022	1,090

Notes: We apply the new DID estimator proposed by de Chaisemartin and D'Haultfœuille (2020) in column 1, Callaway and Sant'Anna (2021) in column 2, and Borusyak et al. (2024) in column 3. Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

Table E2: PSM-DID Results

	Export-to-Revenue Ratio		
	(1)	(2)	(3)
	Nearest-neighbor	Kernel	Radius
DI	0.066***	0.063***	0.063***
	(0.014)	(0.012)	(0.012)
ln*Size*	-0.014	0.010	0.010
	(0.012)	(0.008)	(0.008)
ROA	0.101*	0.075**	0.075**
	(0.060)	(0.037)	(0.037)
Lev	0.045	-0.025	-0.025
	(0.034)	(0.027)	(0.027)
Top1	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Growth	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
TobinQ	-0.003	0.000	0.000
	(0.003)	(0.002)	(0.002)
TFP	-0.055***	-0.042***	-0.042***
	(0.014)	(0.126)	(0.013)
ln*GDP*	0.036	0.027	0.027
	(0.032)	(0.027)	(0.027)
ln*Tech*	-0.033	-0.025	-0.025
	(0.026)	(0.023)	(0.023)
Gov	-0.016	0.008	0.008
	(0.030)	(0.022)	(0.021)
Fin	0.036**	0.022	0.022
	(0.014)	(0.015)	(0.015)
Import_GDP	0.020	0.001	0.001
	(0.023)	(0.017)	(0.017)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Firm Obs	2,124	3,957	3,964
City-year Obs	925	1,129	1,130
R-squared	0.784	0.753	0.753

Notes: In columns 1-3, we use 1:2 nearest-neighbor matching, kernel matching, and radius matching for PSM analysis, respectively. Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

Table E3: Medium and Small-Micro Firms

	Export-to-Revenue Ratio	
	(1)	(2)
	Medium	Small and Micro
DI	0.036*	0.059***
	(0.021)	(0.015)
ln*Size*	0.013	-0.008
	(0.018)	(0.015)
ROA	0.044	0.091*
	(0.046)	(0.051)
Lev	-0.151**	0.039
	(0.061)	(0.034)
Top1	0.002*	-0.000
	(0.001)	(0.001)
Growth	0.005	0.007
	(0.004)	(0.005)
TobinQ	0.002	-0.001
	(0.003)	(0.002)
TFP	-0.070***	-0.061***
	(0.013)	(0.015)
ln*GDP*	0.073**	0.005
	(0.031)	(0.025)
ln*Tech*	-0.046	0.018
	(0.032)	(0.022)
Gov	0.246*	-0.023
	(0.130)	(0.032)
Fin	0.026	0.017
	(0.023)	(0.012)
Import_GDP	-0.006	-0.005
	(0.043)	(0.021)
Group Difference	0.023*	
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	1,205	2,764
City-year Obs	548	969
R-squared	0.787	0.789

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. In column 1, we further restrict the sample to the medium-sized listed firms. In column 2, we restrict the sample to the small and micro listed firms.

Table E4: Firms in High and Low Digital Technology Industries

	Export-to-Revenue Ratio	
	(1)	(2)
	High-digital Tech	Low-digital Tech
DI	0.089***	0.060***
	(0.029)	(0.016)
ln*Size*	-0.032	0.020**
	(0.027)	(0.009)
ROA	0.096	0.045
	(0.071)	(0.048)
Lev	0.007	-0.062*
	(0.089)	(0.033)
Top1	0.000	0.001
	(0.001)	(0.001)
Growth	0.027	0.005
	(0.020)	(0.004)
TobinQ	-0.000	0.002
	(0.003)	(0.002)
TFP	-0.071***	-0.043***
	(0.021)	(0.013)
ln*GDP*	0.029	0.033
	(0.037)	(0.032)
ln*Tech*	0.032	-0.037
	(0.045)	(0.025)
Gov	-0.031	0.021
	(0.183)	(0.026)
Fin	0.052*	0.008
	(0.026)	(0.018)
Import_GDP	-0.089*	0.009
	(0.046)	(0.024)
Group Difference	0.030*	
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	1,086	2,878
City-year Obs	487	976
R-squared	0.763	0.760

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 and 2 use the firms in the high and low digital technology industries, respectively. We follow the OECD's classification on the digital technology adoption for industries measured by adoption rates of digital technologies and business practices as in Calvino et al. (2018).

Table E5: Executive Team – Age, Gender, Education and Background

	Export-to-Revenue Ratio					
	(1) Age	(2) Male	(3) Master	(4) Financial	(5) Technical	(6) Overseas
DI	0.075***	0.057***	0.051***	0.054***	0.053***	0.051***
	(0.013)	(0.013)	(0.014)	(0.011)	(0.013)	(0.012)
Interaction	-0.022**	0.018*	0.020*	0.039*	0.024**	0.040*
	(0.010)	(0.010)	(0.011)	(0.022)	(0.012)	(0.022)
Group variable	0.017*	-0.017*	-0.010	-0.021	-0.011	-0.042*
	(0.009)	(0.010)	(0.011)	(0.028)	(0.011)	(0.022)
ln*Size*	0.010	0.009	0.012	0.012	0.012	0.008
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
ROA	0.066*	0.064*	0.062*	0.064*	0.064*	0.065*
	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Lev	-0.031	-0.029	-0.033	-0.032	-0.034	-0.033
	(0.028)	(0.028)	(0.029)	(0.029)	(0.028)	(0.028)
Top1	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Growth	0.005	0.005	0.005	0.005	0.005	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
TobinQ	0.002	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
TFP	-0.042***	-0.042***	-0.042***	-0.042***	-0.042***	-0.044***
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.012)
ln*GDP*	0.025	0.027	0.025	0.024	0.026	0.026
	(0.027)	(0.026)	(0.027)	(0.026)	(0.027)	(0.026)
ln*Tech*	-0.028	-0.026	-0.027	-0.027	-0.025	-0.024
	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)	(0.022)
Gov	0.013	0.008	0.006	0.007	0.006	0.001
	(0.022)	(0.022)	(0.023)	(0.022)	(0.022)	(0.020)
Fin	0.020	0.020	0.019	0.018	0.020	0.019
	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)
Import_GDP	0.001	-0.001	0.002	-0.000	0.003	0.011
	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)	(0.017)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Obs	4,005	4,005	4,005	4,005	4,005	4,005
City-year Obs	1,134	1,134	1,134	1,134	1,134	1,134
R-squared	0.747	0.747	0.747	0.748	0.747	0.748

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. In each column, we construct a group dummy based on the demographic composition of executive team members and include the group dummy as well as the interaction term between the group dummy and DI in the regression. In column 1, the group dummy equals 1 if the executive team members' average age is above median. In column 2, the group dummy equals 1 if the share of male executive team members is above median. In column 3, the group dummy equals 1 if the share of executive team members with master/doctorate degree is above median. In columns 4-6, the group dummy equals 1 if the share of executive team members with financial (column 4), technical (column 5), or overseas (column 6) occupation/working/studying experience is above median.

Table E6: Digital Transformation

	(1) *Degree*	(2) *Speed*
DI	0.173**	0.087***
	(0.086)	(0.031)
ln*Size*	0.339***	0.002
	(0.058)	(0.021)
ROA	0.030	0.342***
	(0.233)	(0.101)
Lev	0.082	0.040
	(0.187)	(0.083)
Top1	-0.017***	0.001
	(0.004)	(0.001)
Growth	-0.002	0.002
	(0.004)	(0.004)
TobinQ	0.008	-0.002
	(0.006)	(0.001)
TFP	0.103*	-0.043***
	(0.058)	(0.016)
ln*GDP*	-0.140	0.024
	(0.144)	(0.054)
ln*Tech*	0.133	-0.027
	(0.139)	(0.029)
Gov	0.296**	-0.134
	(0.127)	(0.116)
Fin	-0.045	0.060**
	(0.077)	(0.023)
Import_GDP	-0.161	0.059
	(0.222)	(0.066)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	4,005	4,005
City-year Obs	1,134	1,134
R-squared	0.819	0.174

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 uses the digital transformation degree index in Wu et al. (2021). Column 2 uses the digital transformation speed index in Du and Ma (2024).

Table E7: Promotional Effects on Firm-Level

	(1)	(2)	(3)	(4)	(5)
	WW	*Short-term Loans*	*Supply Chain Financing*	*Internal Costs*	*External Costs*
DI	-0.008***	0.015**	-0.013*	-0.015***	-0.020*
	(0.003)	(0.007)	(0.007)	(0.005)	(0.011)
ln*Size*	-0.043***	-0.025***	0.002	-0.042**	-0.027
	(0.003)	(0.008)	(0.004)	(0.021)	(0.019)
ROA	-0.031***	-0.119***	0.002	-0.151**	-0.041
	(0.009)	(0.036)	(0.020)	(0.073)	(0.059)
Lev	0.040***	0.300***	-0.099***	0.124**	-0.009
	(0.007)	(0.028)	(0.015)	(0.054)	(0.072)
Top1	-0.000**	0.000	0.000	0.001	0.002
	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)
Growth	-0.035***	-0.001	-0.000	0.000	0.002
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
TobinQ	-0.001**	-0.001	0.003*	0.019	0.001**
	(0.001)	(0.004)	(0.001)	(0.019)	(0.001)
TFP	-0.001	0.000	0.010**	0.015	-0.003
	(0.002)	(0.006)	(0.005)	(0.011)	(0.036)
ln*GDP*	-0.002	0.012	0.014	-0.016	0.014
	(0.004)	(0.013)	(0.016)	(0.012)	(0.046)
ln*Tech*	0.000	0.025**	-0.002	-0.001	-0.013
	(0.006)	(0.011)	(0.011)	(0.012)	(0.039)
Gov	0.015***	-0.041**	0.021	-0.021	-0.005
	(0.004)	(0.018)	(0.030)	(0.022)	(0.091)
Fin	0.004	-0.014**	-0.006	-0.013	0.006
	(0.002)	(0.007)	(0.006)	(0.012)	(0.012)
Import GDP	-0.003	0.000	-0.010	0.013	-0.001
	(0.004)	(0.018)	(0.015)	(0.028)	(0.028)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm Obs	4,005	4,005	3,668	4,001	3,992
City-year Obs	1,134	1,134	1,094	1,134	1,131
R-squared	0.944	0.930	0.824	0.494	0.477

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 uses the index in Whited and Wu (2006) which indicates the degree of firms' overall financial constraints, and a larger index means greater financial constraints. Column 2 uses the ratio of short-term borrowings to total assets, which indicates the degree of firms' constraints on financing from bank channels and a lower ratio signifies more pronounced bank financing constraints. Column 3 follows Petersen and Rajan (1997) and Mateut (2014) to construct an indicator that reflects the degree of firms' constraints on financing from supply chain commercial credit channels, where a larger value means greater supply chain financing constraints. Columns 4 studies the internal transactional costs measured by the sum of financial and administrative over total assets. Column 5 studies external transactional costs, and we follow Zhang et al. (2024) to use the sum of "other cash paid for operating activities" and selling expenses over total assets.

Table E8: Promotional Effects on City-Level

	(1)	(2)	(3)	(4)	(5)	(6)
	Cross-border E-commerce Scale	*Cross-border E-commerce Revenue*	*SAGG*	*MAGG*	*Internet Access Subscribers*	*PTS Volume*
DI	0.185*	0.132*	4.531**	1.912	0.237***	262.794**
	(0.108)	(0.072)	(1.813)	(2.144)	(0.056)	(112.347)
ln*GDP*	0.367**	0.403***	-6.919*	4.929	0.177	-427.709
	(0.178)	(0.152)	(3.518)	(4.079)	(0.111)	(292.700)
ln*Tech*	0.141	0.003	-3.712	4.759	0.323**	874.832**
	(0.200)	(0.135)	(3.977)	(4.658)	(0.140)	(377.677)
Gov	0.167	0.706	10.047***	-7.205***	0.141	-249.180
	(1.558)	(1.077)	(2.258)	(2.701)	(0.144)	(228.750)
Fin	0.233	0.149	-3.531	0.275	-0.000	-157.457
	(0.193)	(0.143)	(2.407)	(2.682)	(0.053)	(129.868)
Import_GDP	-0.254	-0.263	0.708	3.227	0.484*	-2,377.401***
	(0.298)	(0.187)	(6.009)	(7.534)	(0.289)	(759.188)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City-year Obs	897	897	1,045	1,045	914	919
R-squared	0.975	0.988	0.935	0.936	0.992	0.757

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 and 2 studies the scale and revenue of cross-border e-commerce, respectively. In column 3 and 4, we follow Keeble et al. (1991) to construct the location entropy to measure the level of regional industrial agglomeration for service and manufacturing, respectively. In column 5 and 6, we study digital infrastructure. Column 5 uses the number of urban broadband Internet access subscribers and column 6 uses per capita volume of postal and telecommunications services.

Table E9: Direct versus Indirect Exporters

	Export-to-Revenue Ratio			
	2009-2020		2009-2016	
	(1) Direct	(2) Indirect	(3) Direct	(4) Indirect
DI	0.070***	0.038	0.065***	0.020
	(0.014)	(0.023)	(0.018)	(0.026)
ln*Size*	0.012	0.011	0.024	0.020
	(0.016)	(0.029)	(0.019)	(0.026)
ROA	0.091**	0.126*	0.227**	0.062
	(0.044)	(0.073)	(0.107)	(0.045)
Lev	0.019	-0.154	0.037	-0.071
	(0.028)	(0.102)	(0.047)	(0.054)
Top1	-0.000	0.002*	-0.002	-0.398**
	(0.001)	(0.001)	(0.002)	(0.153)
Growth	0.007	0.005	0.018	0.003
	(0.006)	(0.004)	(0.016)	(0.002)
TobinQ	-0.001	0.002	-0.003	-0.013
	(0.002)	(0.003)	(0.003)	(0.010)
TFP	-0.044***	-0.073***	-0.099***	-0.001
	(0.014)	(0.020)	(0.013)	(0.000)
ln*GDP*	0.014	0.097**	-0.009	-0.027
	(0.025)	(0.047)	(0.022)	(0.022)
ln*Tech*	-0.010	-0.091**	0.052*	0.111*
	(0.025)	(0.038)	(0.026)	(0.058)
Gov	-0.020	0.471*	0.030	-0.151**
	(0.018)	(0.267)	(0.324)	(0.063)
Fin	0.028*	-0.012	0.022	-0.140
	(0.015)	(0.027)	(0.021)	(0.484)
Import_GDP	0.005	-0.040	-0.056	0.023
	(0.019)	(0.057)	(0.066)	(0.042)
Group Difference	0.032*		0.045*	
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm Obs	3,360	630	1,082	220
City-year Obs	1,066	329	422	148
R-squared	0.769	0.792	0.762	0.862

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 and 3 study direct exporters. Column 2 and 4 study the indirect exporters. In column 1 and 2, we use data in 2009-2020. In column 3 and 4, we use data in 2009-2016.

Table E10: Other Export Performance – Controlling Import

	(1) *Export-to-Revenue*	(2) *Export-to-Revenue*	(3) *Quality*	(4) *Variety*	(5) *Destination*
DI	0.037***	0.038***	0.064***	0.162**	0.111**
	(0.012)	(0.011)	(0.012)	(0.065)	(0.056)
ln*Size*	-0.009	-0.011	0.008	0.192*	0.243***
	(0.016)	(0.016)	(0.013)	(0.106)	(0.080)
ROA	-0.003	-0.009	0.110	0.126	-0.426
	(0.058)	(0.061)	(0.073)	(0.587)	(0.531)
Lev	0.010	0.011	-0.012	0.379*	-0.033
	(0.033)	(0.033)	(0.029)	(0.228)	(0.224)
Top1	-0.001	-0.001	-0.000	0.002	0.005
	(0.001)	(0.001)	(0.001)	(0.006)	(0.004)
Growth	0.005	0.005	-0.003	0.075	0.060
	(0.006)	(0.006)	(0.015)	(0.075)	(0.067)
TobinQ	0.004	0.004	0.000	0.010	0.034*
	(0.003)	(0.003)	(0.002)	(0.019)	(0.018)
TFP	-0.006	-0.007	0.022	-0.046	0.012
	(0.015)	(0.015)	(0.018)	(0.098)	(0.078)
*ln*Total Import		0.007	0.008	-0.012	-0.015
		(0.005)	(0.006)	(0.032)	(0.031)
Import Capital		-0.009*	-0.019	-0.108	-0.106
		(0.005)	(0.013)	(0.092)	(0.065)
Import Intermediate		-0.018	-0.020	-0.038	-0.082
		(0.012)	(0.017)	(0.086)	(0.106)
ln*GDP*	-0.023**	-0.024**	0.014	0.114	0.069
	(0.010)	(0.010)	(0.015)	(0.102)	(0.083)
ln*Tech*	-0.010	-0.011	0.002	0.034	0.082
	(0.013)	(0.014)	(0.013)	(0.069)	(0.056)
Gov	-0.060	-0.065	-0.088	1.007	1.064
	(0.070)	(0.070)	(0.163)	(0.706)	(0.673)
Fin	0.017**	0.018**	-0.005	-0.030	-0.106*
	(0.008)	(0.008)	(0.012)	(0.079)	(0.062)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm Obs	1,990	1,990	1,555	1,990	1,990
City-year Obs	607	607	504	607	607
R-squared	0.770	0.771	0.737	0.856	0.913

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Export data from China Customs data, aggregated at firm-year level. Column 1 and 2 study the export-to-revenue. Column 3 studies the quality of exported products, following Hallak and Schott (2011) and Khandelwal et al. (2013). Column 4 studies product variety represented by the count of different products (by HS6 code) that firms export. Column 5 studies the count of different destination countries a firm exports to. For product quality, the sample size is smaller because we follow Hallak and Schott (2011) and Khandelwal et al. (2013) to estimate export product quality, and we need product quantity and price to estimate quality, but we only have export value data in 2016.

Table E11: Other Robustness Checks

	Export-to-Revenue Ratio	
	(1) Excluding post 2018 samples	(2) Controlling for Industry-Year FE
DI	0.061***	0.063***
	(0.012)	(0.013)
ln*Size*	0.007	0.013
	(0.013)	(0.009)
ROA	0.082*	0.025
	(0.048)	(0.035)
Lev	-0.055	-0.031
	(0.045)	(0.022)
Top1	0.001	0.001*
	(0.001)	(0.001)
Growth	0.017***	0.012***
	(0.002)	(0.002)
TobinQ	-0.001	0.002
	(0.001)	(0.002)
TFP	-0.063***	-0.047***
	(0.011)	(0.013)
ln*GDP*	0.024	0.021
	(0.028)	(0.021)
ln*Tech*	-0.021	-0.031
	(0.026)	(0.021)
Gov	-0.002	0.010
	(0.028)	(0.028)
Fin	0.022	0.025
	(0.019)	(0.016)
Import_GDP	-0.014	0.006
	(0.029)	(0.022)
Firm FE	Yes	Yes
Year FE	Yes	No
Industry-Year FE	No	Yes
Firm Obs	2,871	3,934
City-year Obs	883	1,122
R-squared	0.761	0.792

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 uses pre-2018 samples to avoid impacts from the trade war between U.S. and China. Column 2 adds industry-year fixed effects to our baseline regression.

Table E12: Existing and New Exporters

	Export-to-Revenue Ratio	
	(1)	(2)
	Existing	New
DI	0.065***	0.059***
	(0.014)	(0.019)
ln*Size*	-0.007	0.010
	(0.014)	(0.014)
ROA	0.115**	0.012
	(0.047)	(0.042)
Lev	0.024	-0.081
	(0.031)	(0.058)
Top1	-0.000	0.003***
	(0.001)	(0.001)
Growth	0.001	0.005
	(0.001)	(0.005)
TobinQ	-0.000	0.002
	(0.002)	(0.002)
TFP	-0.040***	-0.027***
	(0.014)	(0.010)
ln*GDP*	0.007	0.052
	(0.025)	(0.035)
ln*Tech*	-0.007	-0.067**
	(0.027)	(0.028)
Gov	-0.032*	0.125
	(0.018)	(0.236)
Fin	0.042***	-0.001
	(0.015)	(0.020)
Import_GDP	-0.018	-0.025
	(0.027)	(0.028)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	3,057	1,812
City-year Obs	1,027	857
R-squared	0.769	0.779

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 only uses the existing exporters. Column 2 only uses the new exporters.

Table E13: Robustness Check on Productivity

	Export-to-Revenue Ratio	
	(1)	(2)
DI	0.060***	0.063***
	(0.013)	(0.012)
ln*Size*	-0.004	0.011
	(0.007)	(0.008)
ROA	0.013	0.063*
	(0.037)	(0.036)
Lev	-0.038	-0.027
	(0.026)	(0.028)
Top1	0.001	0.001
	(0.001)	(0.001)
Growth	0.005	0.005
	(0.004)	(0.004)
TobinQ	0.001	0.002
	(0.002)	(0.002)
TFP		-0.042***
		(0.013)
ln*GDP*	0.023	0.026
	(0.027)	(0.027)
ln*Tech*	-0.031	-0.026
	(0.021)	(0.023)
Gov	0.003	0.010
	(0.022)	(0.022)
Fin	0.019	0.020
	(0.015)	(0.015)
Import_GDP	-0.006	0.000
	(0.017)	(0.018)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Firm Obs	4,005	4,005
City-year Obs	1,134	1,134
R-squared	0.742	0.747

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 includes the same control variables and fixed effects as in the baseline analysis but excluding *TFP*. Column 2 further adds *TFP* in the controls.

Table E14: Other Firm Performance

	(1) *Prod-OP*	(2) *Prod-LP*	(3) *lnRevenue*	(4) *lnProfit*
DI	0.085**	0.077*	0.058*	0.181***
	(0.038)	(0.039)	(0.032)	(0.068)
ln*Size*	0.272***	0.364***	0.476***	0.375***
	(0.079)	(0.087)	(0.032)	(0.079)
ROA	1.283***	1.188***	0.256**	3.543***
	(0.132)	(0.140)	(0.122)	(0.357)
Lev	0.235*	0.255*	0.525***	0.309
	(0.128)	(0.135)	(0.095)	(0.196)
Top1	-0.006*	-0.008**	-0.001	-0.001
	(0.004)	(0.003)	(0.003)	(0.004)
Growth	0.011	0.012	0.011	0.008*
	(0.013)	(0.014)	(0.009)	(0.005)
TobinQ	0.011**	0.010**	-0.005	0.007
	(0.005)	(0.004)	(0.008)	(0.012)
TFP			0.755***	0.246***
			(0.031)	(0.078)
ln*GDP*	0.081	0.073	-0.037	0.220**
	(0.094)	(0.089)	(0.053)	(0.098)
ln*Tech*	0.173**	0.127*	0.068*	0.024
	(0.078)	(0.073)	(0.037)	(0.089)
Gov	0.017	0.166*	0.059	-0.557***
	(0.087)	(0.090)	(0.071)	(0.121)
Fin	0.018	0.003	0.062**	0.106*
	(0.035)	(0.037)	(0.028)	(0.063)
Import_GDP	0.140**	0.143**	-0.100*	0.246**
	(0.063)	(0.062)	(0.057)	(0.109)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm Obs	3,921	4,005	4,005	4,005
City-year Obs	1,127	1,134	1,134	1,134
R-squared	0.831	0.828	0.947	0.729

Notes: Robust standard errors clustered at the city level in parenthesis, ***p<0.01, **p<0.05, *p<0.1. Column 1 and 2 study the productivity of firms, measured using the OP (column 1) and LP (column 2) method, respectively. Column 3 studies firms' revenue and column 4 studies firms' profit.