Outward foreign direct investment and energy efficiency: firm-level evidence from China

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ONLINE APPENDIX

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Appendix A. Descriptive statistics

Table A1 shows the descriptive statistics of the variables. Then, we initially compare the differences in energy efficiency and other characteristics between OFDI, new-OFDI and non-OFDI firms through descriptive statistics. As shown in table A2, there are great differences in various aspects between the three types of firms. First, for three types of fossil energy, OFDI firms have higher energy efficiency and TFEE relative to non-OFDI firms. Note that the energy efficiency advantage of OFDI firms in fuel oil is not obvious. Besides, compared to non-OFDI firms, new-OFDI firms also have higher energy efficiency and TFEE. This implies that firms with higher efficiency self-select to engage in OFDI or OFDI leads to higher efficiency. Second, for production factor inputs, OFDI firms consume more energy (including coal, fuel oil and clean gas), employ more labor and invest more fixed assets relative to non-OFDI firms. OFDI firms also have greater output scale, and the gaps in output scale are greater than those in factor inputs. This may be the reason why OFDI firms have higher efficiency. Third, there are great differences in other characteristics between OFDI and non-OFDI firms. Compared to non-OFDI firms, both OFDI and new-OFDI firms have higher capital intensity and profit rate, less financial constraint as well as more foreign capital.

Appendix B. Sector distribution for OFDI and new-OFDI firms

We provide sector distribution for samples of OFDI and new-OFDI firms, shown in table A3. We find that OFDI and new-OFDI firms are mainly distributed in manufacturing sectors (C13–C43), which suggests that manufacturing sectors are the main sectors engaging in OFDI. We further find that sector C17 (manufacture of textile) has the largest number of OFDI and new-OFDI firms. In addition, sectors C26, C40, C37, C13, C39 and C27 also have a large number of OFDI and

Table A1. Descriptive statistics of the variables

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
EE_{ispt}	139,324	49495.99	4611884	0.0022	8.96E+08
$TFEE\_LP_{ispt}$	139,324	5270.541	16849.73	73.7997	2760265
$TFEE\_OLS_{ispt}$	139,324	375.5045	925.4673	4.7513	115987.8
$TFEE\_OLS2_{ispt}$	139,324	372.7327	802.4708	4.4747	61614.71
$TFEE\_FE_{ispt}$	139,324	6506.437	27608.89	73.6895	5224593
$EE\_Fueloil_{ispt}$	18,754	20924.8	374737	0.1448	2.95E+07
$TFEE\_Fueloil_{ispt}$	18,754	17050.65	60465.75	188.9291	5325312
$EE\_Cleangas_{ispt}$	11,786	72153.23	1721921	0.0033	1.70E+08
$TFEE\_Cleangas_{ispt}$	11,786	15674.89	41269.65	123.6351	1825968
$Coal_{ispt}$	139,324	38236.02	300988.2	0.0010	1.66E+07
$Fueloil_{ispt}$	18,754	2394.691	20764.64	0.1460	1505134
$Cleangas_{ispt}$	11,786	32947.64	530782.5	0.0020	3.25E+07
$OFDI_{ispt}$	158,045	0.0083	0.0906	0	1
$StartOFDI_{ispt}$	158,045	0.0037	0.0607	0	1
$Output_{ispt}$	158,045	486370.1	2980251	4962.779	2.22E+08
$Labor_{ispt}$	158,045	608.6884	2470.917	10	155997
$Capital_{ispt}$	158,045	168264.6	1640564	1	1.92E+08
KL_{ispt}	158,045	339.5811	8468.874	3.72E-05	2077422
$Constraint_{ispt}$	158,045	8.7109	1404.172	1.38E-08	512330.6
$Profit_{ispt}$	158,045	0.0687	0.7396	3.13E-08	281.8234
SOE_{ispt}	158,045	0.0437	0.2043	0	1
$Foreign_{ispt}$	158,045	0.1625	0.3689	0	1

Notes: EE_{ispt}, $TFEE\_LP_{ispt}$, $TFEE\_OLS_{ispt}$, $TFEE\_OLS2_{ispt}$ and $TFEE\_FE_{ispt}$ employ coal as the energy input. $TFEE\_Fueloil_{ispt}$ and $TFEE\_Cleangas_{ispt}$ are measured by the LP method. $Coal_{ispt}$, $Fueloil_{ispt}$ and $Cleangas_{ispt}$ are the levels of coal, fuel oil and clean gas consumption, respectively.

Table A2. Comparisons among different types of firms

	OFDI firms		New-OFDI firms		Non-OFDI firms	
	Observations	Mean	Observations	Mean	Observations	Mean
EE_{ispt}	1,066	356250.8	456	832179.8	138,258	47130.84
$TFEE\_LP_{ispt}$	1,066	19431.81	456	23429.38	138,258	5161.355
$TFEE\_OLS_{ispt}$	1,066	713.8134	456	777.9709	138,258	372.8961
$TFEE\_OLS2_{ispt}$	1,066	725.3553	456	787.4489	138,258	370.0139
$TFEE\_FE_{ispt}$	1,066	26093.87	456	32922.92	138,258	6355.414
$EE\_Fueloil_{ispt}$	237	21480.42	118	22869.72	18,517	20917.69
$TFEE\_Fueloil_{ispt}$	237	69258.17	118	102269	18,517	16382.44
$EE\_Cleangas_{ispt}$	202	341485.8	102	95134.52	11,584	67456.65
$TFEE\_Cleangas_{ispt}$	202	39432.41	102	41234.8	11,584	15260.61
$Coal_{ispt}$	1,066	124055.1	456	138043.1	138,258	37574.34
$Fueloil_{ispt}$	237	5062.566	118	7122.517	18,517	2360.545
$Cleangas_{ispt}$	202	37500.43	102	25533.33	11,584	32868.25
$Output_{ispt}$	1,308	3516026	584	3886552	156,737	461087.1
$Labor_{ispt}$	1,308	2622.198	584	2736.358	156,737	591.8852
$Capital_{ispt}$	1,308	1010747	584	1122551	156,737	161233.9
KL_{ispt}	1,308	2277.07	584	4505.987	156,737	323.4124
$Constraint_{ispt}$	1,308	110.1505	584	246.1028	156,737	7.8644
$Profit_{ispt}$	1,308	0.3440	584	0.6865	156,737	0.0664
SOE_{ispt}	1,308	0.0321	584	0.0428	156,737	0.0437
$Foreign_{ispt}$	1,308	0.2905	584	0.2928	156,737	0.1615

new-OFDI firms.

Appendix C. Robustness check: OLS

In section 5, we find that OFDI firms have higher energy efficiency and TFEE relative to non-OFDI firms in the same sector. To ensure the robustness of our result, we do robustness checks. Tables A4 and A5 report the results of robustness

Table A3. Sector distribution for OFDI and new-OFDI firms

Sector code	Sector name	OFDI firms	New-OFDI firms
B6	Mining and Washing of Coal	1	1
B7	Extraction of Petroleum and Natural Gas	1	1
B8	Mining and Processing of Ferrous Metal Ores	4	3
B9	Mining and Processing of Non-Ferrous Metal Ores	7	4
B10	Mining and Processing of Nonmetal Ores	9	3
C13	Processing of Food from Agricultural Products	155	55
C14	Manufacture of Foods	59	29
C15	Manufacture of Beverages	21	9
C17	Manufacture of Textile	334	128
C18	Manufacture of Textile Wearing Apparel, Footware and Caps	57	21
C19	Manufacture of Leather, Fur, Feather and Related Products	45	15
C20	Processing of Timber, Manufacture of Wood, Bamboo, Rattan, Palm and Straw Products	37	17
C21	Manufacture of Furniture	15	11
C22	Manufacture of Paper and Paper Products	23	12
C23	Printing, Reproduction of Recording Media	5	4
C24	Manufacture of Articles For Culture, Education and Sport Activities	19	9
C25	Processing of Petroleum, Coking, Processing of Nuclear Fuel	19	7
C26	Manufacture of Raw Chemical Materials and Chemical Products	210	100
C27	Manufacture of Medicines	152	61
C28	Manufacture of Chemical Fibers	26	14
C29	Manufacture of Rubber	46	17
C30	Manufacture of Plastics	40	16
C31	Manufacture of Non-metallic Mineral Products	129	47
C32	Smelting and Pressing of Ferrous Metals	119	56
C33	Smelting and Pressing of Non-ferrous Metals	56	37
C34	Manufacture of Metal Products	65	34
C35	Manufacture of General Purpose Machinery	115	54
C36	Manufacture of Special Purpose Machinery	105	54
C37	Manufacture of Transport Equipment	159	74
C39	Manufacture of Electrical Machinery and Equipment	154	83
C40	Manufacture of Communication Equipment, Computers and Other Electronic Equipment	163	78
C41	Manufacture of Measuring Instruments and Machinery for Cultural Activity and Office Work	31	15
C42	Manufacture of Artwork and Other Manufacturing	53	19
C43	Recycling and Disposal of Waste	9	3
Total		2,443	1,091

Notes: The figures in this table are observations.

checks. We employ the LP method (Levinsohn and Petrin, 2003) to measure TFEE. First, firms' entry and exit may affect their efficiency (Melitz, 2003). To this end, we choose the firms that survive at least 6 years (from the previous year to the next five years) for robustness check. Columns (1) and (2) of table A4 report these results. The result shows that our conclusion is robust after alleviating the effect of entry and exit of firms.

Second, firms from manufacturing sectors are more closely related to OFDI. We only employ manufacturing firms, and exclude any firms from other sectors. The results are reported in columns (3) and (4) of table A4, indicating that the energy efficiency and TFEE of OFDI firms are higher in the same sector.

Third, given that the differences between OFDI and non-OFDI firms may change

Table A4. Robustness check: OLS (a)

	Surviving at least 6 years		Only manufacturing industries	
	EE	TFEE (LP)	EE	TFEE (LP)
	(1)	(2)	(3)	(4)
$OFDI_{ispt}$	0.4195	0.6047	0.2910	0.6408
	(0.1434)	(0.0719)	(0.0983)	(0.0459)
Control variables	YES	YES	YES	YES
Sector-province-year FE	YES	YES	YES	YES
Observations	35,565	35,565	129549	129549
Adjusted R^2	0.40	0.41	0.41	0.41

Notes: The figures in parentheses are robust standard errors clustered by sectors and provinces.

over time, we employ samples from different periods to re-estimate the result. Specifically, the global economic crisis in 2008 is an important international event in our research period. We employ samples before and after 2008 for analysis, which are reported in columns (1)–(4) of table A5. For the two periods, both energy efficiency and TFEE of OFDI firms are higher in the same sector.

Fourth, for some Chinese firms, there are OFDI motivations of speculation and tax avoidance. To eliminate the interference of such special firms, we exclude the firms investing in Hong Kong, Macao and "tax havens"[1] and re-estimate the result. These results are reported in columns (5) and (6) of table A5. When we exclude the firms investing in Hong Kong, Macao and "tax havens", the results are still supportive of our conclusion.

Table A5. Robustness check: OLS (b)

	Before 2008		After 2008		Excluding OFDI in Hong Kong, Macao and "tax havens"	
	EE	TFEE (LP)	EE	TFEE (LP)	EE	TFEE (LP)
	(1)	(2)	(3)	(4)	(5)	(6)
$OFDI_{ispt}$	0.3428	0.6426	0.2861	0.6425	0.3938	0.5818
	(0.1329)	(0.0834)	(0.1036)	(0.0445)	(0.1139)	(0.0599)
Control variables	YES	YES	YES	YES	YES	YES
Sector-province-year FE	YES	YES	YES	YES	YES	YES
Observations	54,293	54,293	84,057	84,057	138,060	138,060
Adjusted R^2	0.41	0.36	0.41	0.40	0.42	0.41

Notes: The figures in parentheses are robust standard errors clustered by sectors and provinces.

[1]"Tax havens" include Luxembourg, Panama, Bermuda, the Cayman Islands, the British Virgin Islands, etc.

Appendix D. Why do OFDI firms have higher energy efficiency in the same sector?

The above result indicates that the energy efficiency and TFEE of OFDI firms are higher than those of non-OFDI firms in the same sector. We analyze the reasons why OFDI firms are more energy efficient. There are two possibilities, that is, more efficient firms have larger output scale or input fewer factors. Thus, we compare the differences in output value and factor inputs between OFDI and non-OFDI firms, which is shown in table A6.

First, OFDI firms have higher energy efficiency and TFEE relative to non-OFDI firms, probably because of their larger output scale. According to Helpman *et al.* (2004), OFDI firms have larger output scale so that they can offset the fixed costs of direct investment in foreign countries. Column (1) shows the relationship between OFDI and firms' output value. The estimated coefficient on the OFDI dummy is positive and significant at the 1 per cent level. This result shows that OFDI firms on average have greater output values in the same sector, which is consistent with Helpman *et al.* (2004). In other words, the larger output scale is at least one of the reasons why OFDI firms have higher efficiency. On average, the output value of OFDI firms is 123.98 per cent higher than that of non-OFDI firms in the same sector.

Second, OFDI firms have higher efficiency, probably because of fewer production factor inputs. Columns (2)–(4) show the relationship between OFDI and factor inputs (including energy consumption, labor employment and capital investment). The coefficients on the OFDI dummy are all positive and statistically significant. These results suggest that OFDI firms consume more energy, employ more labor and invest more fixed assets in the same sector. It also suggests that the channels of factor inputs are not the reason why OFDI firms are more efficient. On average, OFDI firms have 94.71 per cent more energy consumption, 103.49 per cent more labor employment and 103.49 per cent more capital investments relative to

non-OFDI firms. By further comparison, we can find that the coefficient for output value is greater than those coefficients for factor inputs. This explains why OFDI firms have higher energy efficiency and TFEE in the same sector. Namely, OFDI firms have large output scale relative to non-OFDI firms, and the gap in output value between OFDI and non-OFDI firms is greater than those gaps in factor inputs.

Table A6. Decomposition of energy efficiency

	Output (1)	Energy (2)	Labor (3)	Capital (4)
$OFDI_{ispt}$	1.2398	0.9471	1.0349	1.0349
	(0.0828)	(0.1235)	(0.0838)	(0.0838)
Control variables	YES	YES	YES	YES
Sector-province-year FE	YES	YES	YES	YES
Observations	138,350	138,350	138,350	138,350
Adjusted R^2	0.40	0.40	0.24	0.72

Notes: In column (1), the dependent variable is firms' output value, while in columns (2)–(4), the dependent variables are energy consumption, labor employment and fixed assets, respectively. The figures in parentheses are robust standard errors clustered by sectors and provinces.

Appendix E. Heterogeneous test: OLS

To analyze the heterogeneous relationships between OFDI and energy efficiency, we construct sub-samples by different energy types as well as OFDI motivations and destinations. Tables A7, A8 and A9 report these results. In this appendix, TFEE is measured by the LP method. First, in tables 1 and 2, we employ coal as the energy. There may be differentiated efficiency for different energy types between OFDI and non-OFDI firms. We employ fuel oil and clean gas to re-estimate the result. Table A7 reports heterogeneous results according to different types of fossil energy. For fuel oil, OFDI firms only have higher TFEE relative to non-OFDI firms in the same sector. The gap in energy efficiency between the two types of firms is not significant. This means that OFDI firms have no advantage in energy efficiency of fuel oil. It shows the particularity of fuel oil on the relationship between OFDI and energy efficiency. Then, for clean gas, both energy efficiency and TFEE of OFDI firms are higher than those of non-OFDI firms in the same sector.

These results are similar to the baseline result employing coal as the energy.

Table A7. Other energy types: fuel oil and clean gas

	Fuel oil		Clean gas	
	EE	TFEE (LP)	EE	TFEE (LP)
	(1)	(2)	(3)	(4)
$OFDI_{ispt}$	0.1356	0.6897	0.3945	0.6340
	(0.1735)	(0.1022)	(0.2279)	(0.1018)
Control variables	YES	YES	YES	YES
Sector-province-year FE	YES	YES	YES	YES
Observations	17,616	17,616	10,686	10,686
Adjusted R^2	0.31	0.49	0.37	0.48

Notes: In columns (1) and (2), we employ fuel oil as the energy, and in columns (3) and (4), we employ clean gas as the energy. The figures in parentheses are robust standard errors clustered by sectors and provinces.

Second, we divide OFDI motivations into business service, local production, resource exploitation and technology R&D, and estimate the results for these subsamples. Table A8 reports heterogeneous results according to different OFDI motivations. For business service OFDI, OFDI firms have higher energy efficiency and TFEE in the same sector, and the magnitudes of coefficients are close to those in tables 2 and 3. This is because the majority of OFDI firms are business-oriented in China. For local production OFDI and technology R&D OFDI, the gap in energy efficiency between OFDI and non-OFDI firms is greater relative to table 2. This implies that these types of OFDI firms are relatively cleaner. However, these OFDI firms have lower TFEE relative to other OFDI firms. For resource exploitation OFDI, OFDI firms only have higher TFEE, but have no advantage in energy efficiency. Note that this OLS estimation can only examine the correlation between OFDI and energy efficiency (or TFEE). In section 6.5.2, we employ the PSM-DID approach to investigate the the causal effect of different OFDI motivations.

Table A8. Different OFDI motivations

	Business service		Local production		Resource exploitation		Technology R&D	
	EE	TFEE (LP)	EE	TFEE (LP)	EE	TFEE (LP)	EE	TFEE (LP)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$OFDI_{ispt}$	0.2193	0.6252	0.3887	0.5213	0.1084	0.7078	0.3776	0.5226
	(0.1235)	(0.0554)	(0.1374)	(0.0682)	(0.2078)	(0.1876)	(0.1949)	(0.1323)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
Sector-province-year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	138,076	138,076	137,579	137,579	137,341	137,341	137344	137344
Adjusted R^2	0.42	0.41	0.42	0.41	0.42	0.40	0.42	0.40

Notes: In columns (1)–(2), (3)–(4), (5)–(6) and (7)–(8), our core variables are business service, local production, resource exploitation and technology R&D OFDI dummies, respectively. The figures in parentheses are robust standard errors clustered by sectors and provinces.

Third, we divide OFDI destinations into high-income and low-income countries,

and investigate the heterogeneous relationship between OFDI and energy efficiency. Table A9 reports the results according to different OFDI destinations. The results indicate that firms investing in both high-income and low-income countries have higher energy efficiency and TFEE relative to non-OFDI firms in the same sector. There is an unexpected result that, for OFDI to low-income countries, OFDI firms' advantages in energy efficiency and TFEE are greater. These results do not support the results of Li *et al.* (2017) and Huang and Zhang (2017), that is, firms investing in high-income countries have higher efficiency. However, OLS estimation only examines the correlation rather than the causal effect. In section 6.5.3, we employ the PSM-DID approach to reveal that OFDI to high-income countries is more conducive to improving energy efficiency and TFEE.

Table A9. Different OFDI destinations

	High-income		Low-income	
	EE	TFEE (LP)	EE	TFEE (LP)
	(1)	(2)	(3)	(4)
$OFDI_{ispt}$	0.2683	0.5419	0.3131	0.6876
	(0.1451)	(0.0801)	(0.1097)	(0.0526)
Control variables	YES	YES	YES	YES
Sector-province-year FE	YES	YES	YES	YES
Observations	137,627	137,627	138,008	138,008
Adjusted R^2	0.42	0.41	0.42	0.41

Notes: In columns (1) and (2), we employ the dummy whether firms invest in high-income countries as core variable, and in columns (3) and (4), the dummy whether firms invest in low-income countries is employed as core variable. The figures in parentheses are robust standard errors clustered by sectors and provinces.

Appendix F. The difference in firm characteristics before and after PSM

After matching in section 6.1, we compare the difference in firm characteristics between treatment and control groups, which is shown in table A10. The standard biases of all covariates decrease significantly, and there is no significant difference between the two groups in terms of ex-ante energy efficiency and TFEE as well as other characteristics. This illustrates that the PSM method can effectively eliminate the differences in characteristics between treatment and control groups,

making the two groups of samples comparable. Under the condition of equal ex-ante energy efficiency and TFEE, we analyze the change rates of outcome variables between treatment and control groups to identify the causal effect of OFDI.

Table A10. Firm characteristics before and after matching

Variable	Matched or not	Mean		Bias (%)	Bias reduction (%)	T-test	
		Treatment	Control			T value	P value
$\ln EE_{isp,-1}$	Unmatched	4.4140	3.5340	47		7.76	0
	Matched	4.4140	4.6427	-12.2	74	-1.46	0.15
$\ln TFEE_{isp,-1}$	Unmatched	8.6558	7.7156	87.1		15.41	0
	Matched	8.6558	8.7247	-6.4	92.7	-0.73	0.47
$\ln KL_{isp,-1}$	Unmatched	5.0063	4.3340	56.9		9.35	0
	Matched	5.0063	5.0221	-1.3	97.6	-0.16	0.87
$\ln lnConstraint_{isp,-1}$	Unmatched	-3.8364	-4.4562	23.9		3.95	0
	Matched	-3.8364	-3.6300	-8	66.7	-1.02	0.31
$\ln lnProfit_{isp,-1}$	Unmatched	-4.0423	-3.5891	-20.6		-4.75	0
	Matched	-4.0423	-3.9720	-3.2	84.5	-0.35	0.72
$\ln SOE_{isp,-1}$	Unmatched	0.0497	0.0388	5.3		0.94	0.35
	Matched	0.0497	0.0497	0	100	0	1
$\ln Foreign_{isp,-1}$	Unmatched	0.2447	0.1339	28.5		5.45	0
	Matched	0.2447	0.2234	5.5	80.8	0.6	0.55

Appendix G. Robustness check: PSM-DID estimation

To ensure the robustness of the PSM-DID results in section 6, we do robustness checks in five aspects. These results are reported in table A11. In this table, TFEE is measured by the LP method. First, in the baseline result, we match the samples of treatment and control groups using 1:1 nearest neighbor matching with replacement. To ensure the robustness of our result, we employ the proportions of 1:2, 1:3 and 1:4 for re-examination, which are reported in panels A–C. The results show that after OFDI, firms improve both energy efficiency and TFEE. In panel A, when we employ energy efficiency as the outcome variable, the coefficients are not significant but still positive. In columns (1) and (2), the absolute values of the coefficients are greater than the standard errors. Thus, we still believe that OFDI improves firms' energy efficiency. Our result is robust when using other proportions (including 1:2, 1:3 and 1:4) for matching.

Second, during our research period, there are a large number of firms entering and exiting the industry in China. Firms' entry and exit may affect their efficiency

(Melitz, 2003). To this end, we employ the firms that survive at least 5 years after starting to engage in OFDI to re-estimate the result. Panel D reports this result, which suggests that OFDI leads to the increases in energy efficiency and TFEE. When we employ surviving firms for analysis, some coefficients are not statistically significant. A possible reason is that the number of observations is too small. More specifically, only 24 observations are from the treatment group. However, these coefficients are all positive and larger relative to the baseline result. We believe that the result is robust after alleviating the impact of entry and exit of firms.

Third, we use Chinese industrial firms for analysis. These firms are from manufacturing sectors, mining sectors as well as energy production and supply sectors. In particular, manufacturing firms are more closely related to OFDI. Firms from energy production and supply sectors do not engage in OFDI, and they use fossil energy to produce electricity and heat. In our dataset, there are no firms from the energy production and supply sectors investing in foreign countries and only 1.1 per cent of firms from mining sectors carrying out OFDI. To this end, we only employ firms from manufacturing industries to estimate the result. Panel E reports this result, suggesting that OFDI improves energy efficiency and TFEE. In columns (2)–(4), the observations and the estimated results are completely consistent with the baseline result. This also implies that OFDI firms are mainly manufacturing firms.

Fourth, for some Chinese firms, there are OFDI motivations of speculation and tax avoidance. For example, a lot of Chinese firms invest in Hong Kong, Macao and "tax havens". After obtaining foreign identity, they return to China to enjoy more preferential policies. To this end, we remove the firms which invest in Hong Kong, Macao and "tax havens". We employ these sub-samples to re-estimate the result, which is reported in panel F. The result shows that after OFDI, firms still improve their energy efficiency and TFEE. After removing firms investing in Hong Kong, Macao and "tax havens", our result is robust.

Fifth, our firm-level data are from 2005 to 2012. The global economic crisis

in 2008 occurred during this period. This is an important international event which affects both the OFDI decision and energy efficiency, so we need to eliminate the interference of the global economic crisis. To this end, we remove any firms which started to engage in OFDI in 2008. Panel G reports this result, and it also shows that OFDI can improve firms' energy efficiency and TFEE. Thus, when we eliminate the interference of the global economic crisis in 2008, our result is still robust.

Table A11: Robustness check: PSM-DID estimation

	1st year (1)	2nd year (2)	3rd year (3)	4th year (4)	5th year (5)
Panel A: 1:2 nearest neighbor matching with replacement					
ATT_k^{EE}	0.0912	0.1200	0.0702	0.1523	0.1893
	(0.0643)	(0.0979)	(0.1245)	(0.1690)	(0.2024)
ATT_k^{TFEE}	0.0830	0.1901	0.1126	0.2436	0.4867
	(0.0434)	(0.0584)	(0.0648)	(0.0914)	(0.1427)
Panel B: 1:3 nearest neighbor matching with replacement					
ATT_k^{EE}	0.1193	0.1083	0.0691	0.1836	0.1569
	(0.0623)	(0.0927)	(0.1175)	(0.1566)	(0.1915)
ATT_k^{TFEE}	0.0893	0.1834	0.0985	0.1815	0.4320
	(0.0411)	(0.0551)	(0.0623)	(0.0861)	(0.1355)
Panel C: 1:4 nearest neighbor matching with replacement					
ATT_k^{EE}	0.1364	0.0699	0.1188	0.1774	0.1027
	(0.0606)	(0.0902)	(0.1146)	(0.1514)	(0.1854)
ATT_k^{TFEE}	0.1005	0.1551	0.1260	0.1622	0.3480
	(0.0401)	(0.0535)	(0.0602)	(0.0816)	(0.1332)
Panel D: Existence for at least 5 years after OFDI					
ATT_k^{EE}	0.6985	0.3599	0.4705	0.6897	0.6834
	(0.2471)	(0.3112)	(0.3807)	(0.4668)	(0.4550)
ATT_k^{TFEE}	0.3542	0.2496	0.2458	0.3243	0.5845
	(0.1735)	(0.1991)	(0.2155)	(0.2394)	(0.2739)
Panel E: Only employing manufacturing industries					
ATT_k^{EE}	0.1491	0.1243	0.0809	0.0391	0.1027
	(0.0747)	(0.1150)	(0.1464)	(0.1974)	(0.2256)
ATT_k^{TFEE}	0.1234	0.1702	0.1289	0.2579	0.3982
	(0.0457)	(0.0677)	(0.0773)	(0.0993)	(0.1592)
Panel F: Excluding OFDI in Hong Kong, Macao, and "tax havens"					
ATT_k^{EE}	0.1789	0.1557	0.2111	0.1511	0.1667
	(0.0850)	(0.1365)	(0.1713)	(0.2026)	(0.2687)
ATT_k^{TFEE}	0.0777	0.2344	0.1044	0.1578	0.4324
	(0.0542)	(0.0879)	(0.0935)	(0.1152)	(0.1693)
Panel G: Eliminating the interference of global economic crisis in 2008					
ATT_k^{EE}	0.1800	0.0307	0.1117	0.0392	1.0780
	(0.0856)	(0.1285)	(0.1951)	(0.1974)	(0.4127)
ATT_k^{TFEE}	0.1706	0.1099	0.1283	0.2580	0.6879
	(0.0583)	(0.0874)	(0.1179)	(0.0994)	(0.2215)

Notes: TFEE is measured by the LP method. The figures in parentheses are standard errors.

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