

Imports results

Intercept	0.5805	0.0001	8033.0194	0.0000	0.5803	0.5806
Q("log_GDPpc_China")	1.6371	0.0000	532698.9448	0.0000	1.6371	1.6371
Q("log_GDPpc_EU")	-0.2811	0.0000	-31593.9628	0.0000	-0.2811	-0.2811
Q("log_Exchange")	-0.0109	0.0000	-931.8908	0.0000	-0.0109	-0.0109
Q("Tariff_AHS")	-0.0107	0.0000	-10959.9070	0.0000	-0.0107	-0.0107
Q("Port_ownership")	-0.2480	0.0000	-87336.5298	0.0000	-0.2480	-0.2480
Q("LPI")	3.0990	0.0000	429012.2843	0.0000	3.0990	3.0990
Q("event_-5")	-0.3365	0.0000	-112426.3616	0.0000	-0.3365	-0.3365
Q("event_-4")	-0.4187	0.0000	-141746.0721	0.0000	-0.4188	-0.4187
Q("event_-3")	-0.3422	0.0000	-116085.2546	0.0000	-0.3422	-0.3422
Q("event_-2")	-0.3940	0.0000	-134907.4246	0.0000	-0.3940	-0.3940
Q("event_0")	0.5799	0.0000	121462.1718	0.0000	0.5799	0.5799
Q("event_1")	0.5470	0.0000	117598.9618	0.0000	0.5470	0.5470
Q("event_2")	0.4095	0.0000	77418.8825	0.0000	0.4095	0.4095
Q("event_3")	0.2468	0.0000	47805.6614	0.0000	0.2468	0.2468
Q("event_4")	0.4036	0.0000	82979.4823	0.0000	0.4036	0.4036
Q("event_5")	0.3764	0.0000	79424.9523	0.0000	0.3764	0.3764
Q("D_Treat_Netherlands")	-2.1282	0.0000	-436922.8731	0.0000	-2.1282	-2.1282
Q("D_Treat_Belgium")	-1.7207	0.0000	-492102.1949	0.0000	-1.7207	-1.7207
Q("D_Treat_Germany")	-0.4873	0.0000	-84372.6252	0.0000	-0.4873	-0.4873
Q("D_Treat_France")	-0.4519	0.0000	-138177.9678	0.0000	-0.4519	-0.4519
Q("D_Treat_Spain")	-1.9835	0.0000	-342186.0625	0.0000	-1.9835	-1.9835
Q("D_Treat_Greece")	-3.3520	0.0000	-298457.0913	0.0000	-3.3520	-3.3520
Q("D_Treat_Malta")	-2.4311	0.0000	-173027.9289	0.0000	-2.4311	-2.4310

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☒ FIXED EFFECTS MODEL (Imports)

PanelOLS Estimation Summary

Dep. Variable:	log_Imports	R-squared:	0.6290
Estimator:	PanelOLS	R-squared (Between):	0.0710
No. Observations:	184	R-squared (Within):	0.0419
Date:	Sun, Jun 22 2025	R-squared (Overall):	0.0710
Time:	21:56:04	Log-likelihood	118.57
Cov. Estimator:	Robust		
	F-statistic:	10.739	
Entities:	8	P-value	0.0000
Avg Obs:	23.000	Distribution:	F(21,133)
Min Obs:	22.000		
Max Obs:	24.000	F-statistic (robust):	16.589
	P-value	0.0000	
Time periods:	23	Distribution:	F(21,133)
Avg Obs:	8.0000		
Min Obs:	8.0000		
Max Obs:	8.0000		

Parameter Estimates

Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
<hr/>					
log_GDPpc_EU	-0.2150	0.1914	-1.1233	0.2633	-0.5935 0.1636
Tariff_AHS	-0.0083	0.0391	-0.2132	0.8315	-0.0857 0.0691
Port_ownership	-0.2227	0.0633	-3.5204	0.0006	-0.3478 -0.0976
LPI	0.8322	0.1201	6.9291	0.0000	0.5947 1.0698

event_-5	-0.0626	0.0486	-1.2877	0.2001	-0.1587	0.0335
event_-4	-0.1336	0.0529	-2.5259	0.0127	-0.2383	-0.0290
event_-3	-0.0728	0.0726	-1.0030	0.3177	-0.2165	0.0708
event_-2	-0.0116	0.0532	-0.2178	0.8279	-0.1167	0.0936
event_0	0.2082	0.0947	2.1988	0.0296	0.0209	0.3955
event_1	0.2816	0.0858	3.2831	0.0013	0.1120	0.4513
event_2	0.2295	0.0713	3.2195	0.0016	0.0885	0.3705
event_3	0.2265	0.0698	3.2453	0.0015	0.0885	0.3646
event_4	0.1644	0.0683	2.4064	0.0175	0.0293	0.2995
event_5	0.0691	0.0882	0.7836	0.4347	-0.1053	0.2435
D_Treat_Netherlands	0.3292	0.1043	3.1571	0.0020	0.1229	0.5354
D_Treat_Belgium	-0.2502	0.0896	-2.7916	0.0060	-0.4274	-0.0729
D_Treat_Germany	-0.1608	0.1464	-1.0981	0.2741	-0.4504	0.1288
D_Treat_France	0.1496	0.0946	1.5812	0.1162	-0.0375	0.3368
D_Treat_Spain	0.0200	0.1062	0.1885	0.8508	-0.1900	0.2300
D_Treat_Greece	0.5986	0.0877	6.8231	0.0000	0.4251	0.7721
D_Treat_Malta	-0.3346	0.1364	-2.4535	0.0154	-0.6044	-0.0649

F-test for Poolability: 238.87

P-value: 0.0000

Distribution: F(29,133)

Included effects: Entity, Time

☒ RANDOM EFFECTS MODEL

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full2.py:83: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange

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fe_results = fe_model.fit(cov_type='robust')
```

RandomEffects Estimation Summary

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Dep. Variable:	log_Imports	R-squared:	0.8295
Estimator:	RandomEffects	R-squared (Between):	0.9076
No. Observations:	184	R-squared (Within):	0.3188
Date:	Sun, Jun 22 2025	R-squared (Overall):	0.8295
Time:	21:56:04	Log-likelihood	-211.84
Cov. Estimator:	Robust		
	F-statistic:	33.852	
Entities:	8	P-value	0.0000
Avg Obs:	23.000	Distribution:	F(23,160)
Min Obs:	22.000		
Max Obs:	24.000	F-statistic (robust):	227.61
	P-value	0.0000	
Time periods:	23	Distribution:	F(23,160)
Avg Obs:	8.0000		
Min Obs:	8.0000		
Max Obs:	8.0000		

Parameter Estimates

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Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI	

const	-18.169	5.6569	-3.2118	0.0016	-29.341	-6.9970
log_GDPpc_China	1.1996	0.2624	4.5721	0.0000	0.6814	1.7178

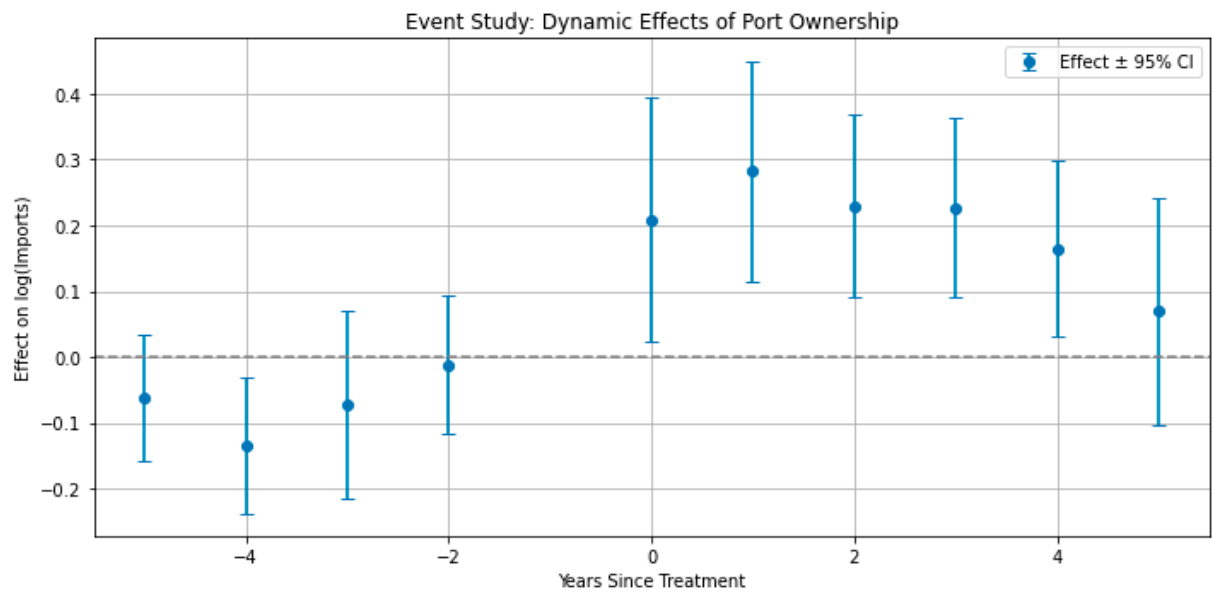
log_GDPpc_EU	2.9114	0.6315	4.6102	0.0000	1.6642	4.1586
log_Exchange	-2.7293	1.1123	-2.4537	0.0152	-4.9260	-0.5326
Tariff_AHS	0.0969	0.0752	1.2882	0.1995	-0.0516	0.2454
Port_ownership	0.1624	0.2146	0.7565	0.4505	-0.2615	0.5862
LPI	1.4810	0.4471	3.3121	0.0011	0.5979	2.3640
event_-5	-0.5274	0.4084	-1.2913	0.1985	-1.3341	0.2792
event_-4	-0.7350	0.4239	-1.7339	0.0849	-1.5723	0.1022
event_-3	-0.8322	0.3733	-2.2293	0.0272	-1.5694	-0.0950
event_-2	-0.8070	0.3927	-2.0552	0.0415	-1.5825	-0.0315
event_0	0.9633	0.2989	3.2230	0.0015	0.3730	1.5536
event_1	0.8901	0.2097	4.2438	0.0000	0.4759	1.3044
event_2	0.7685	0.2116	3.6309	0.0004	0.3505	1.1864
event_3	0.8287	0.2195	3.7752	0.0002	0.3952	1.2622
event_4	0.7675	0.1599	4.7984	0.0000	0.4516	1.0833
event_5	0.4826	0.1583	3.0477	0.0027	0.1699	0.7953
D_Treat_Netherlands	-2.9400	0.2664	-11.037	0.0000	-3.4661	-2.4139
D_Treat_Belgium	-2.0371	0.1842	-11.058	0.0000	-2.4009	-1.6733
D_Treat_Germany	-0.9881	0.3330	-2.9671	0.0035	-1.6458	-0.3304
D_Treat_France	-0.9396	0.2036	-4.6150	0.0000	-1.3417	-0.5375
D_Treat_Spain	-1.4849	0.3096	-4.7958	0.0000	-2.0964	-0.8735
D_Treat_Greece	-2.0364	0.3636	-5.6002	0.0000	-2.7546	-1.3183
D_Treat_Malta	-3.0539	0.2517	-12.134	0.0000	-3.5510	-2.5568

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☒ HAUSMAN TEST

Hausman Test: $\chi^2(21) = 995.638$, p-value = 0.0000



☒ Country \times Year Interactions (FE)

PanelOLS Estimation Summary

Dep. Variable:	log_Imports	R-squared:	0.2374
Estimator:	PanelOLS	R-squared (Between):	-0.7635
No. Observations:	184	R-squared (Within):	-0.0106
Date:	Sun, Jun 22 2025	R-squared (Overall):	-0.7634
Time:	21:56:04	Log-likelihood	52.281
Cov. Estimator:	Robust		
	F-statistic:	11.676	
Entities:	8	P-value	0.0000
Avg Obs:	23.000	Distribution:	F(4,150)
Min Obs:	22.000		
Max Obs:	24.000	F-statistic (robust):	9.7098
	P-value	0.0000	
Time periods:	23	Distribution:	F(4,150)
Avg Obs:	8.0000		

Min Obs: 8.0000
Max Obs: 8.0000

Parameter Estimates

Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
log_GDPpc_EU	-0.8998	0.3268	-2.7534	0.0066	-1.5454 -0.2541
Tariff_AHS	0.0095	0.0409	0.2331	0.8160	-0.0713 0.0903
Port_ownership	0.0516	0.0524	0.9847	0.3263	-0.0519 0.1550
LPI	0.5167	0.1946	2.6551	0.0088	0.1322 0.9012

F-test for Poolability: 193.74

P-value: 0.0000

Distribution: F(29,150)

Included effects: Entity, Time

☒ Pre/Post Treatment Subgroup Effects

Pre-treatment FE model:

PanelOLS Estimation Summary

Dep. Variable:	log_Imports	R-squared:	0.0725
Estimator:	PanelOLS	R-squared (Between):	-0.2664
No. Observations:	110	R-squared (Within):	-0.0661
Date:	Sun, Jun 22 2025	R-squared (Overall):	-0.2612

Time: 21:56:04 Log-likelihood 89.919

Cov. Estimator: Robust

F-statistic: 1.4843

Entities: 8 P-value 0.2153

Avg Obs: 13.750 Distribution: F(4,76)

Min Obs: 3.0000

Max Obs: 23.000 F-statistic (robust): 1.9430

P-value 0.1119

Time periods: 23 Distribution: F(4,76)

Avg Obs: 4.7826

Min Obs: 1.0000

Max Obs: 8.0000

Parameter Estimates

Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
log_GDPpc_EU	-0.2346	0.4294	-0.5464	0.5864	-1.0898 0.6206
Tariff_AHS	-0.0166	0.0431	-0.3855	0.7010	-0.1025 0.0693
Port_ownership	-0.1794	0.0911	-1.9705	0.0524	-0.3608 0.0019
LPI	-0.0706	0.2946	-0.2397	0.8112	-0.6574 0.5162

F-test for Poolability: 293.57

P-value: 0.0000

Distribution: F(29,76)

Included effects: Entity, Time

Post-treatment FE model:

PanelOLS Estimation Summary

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Dep. Variable:      log_Imports  R-squared:          0.5634
Estimator:         PanelOLS  R-squared (Between):    -0.0568
No. Observations:      74  R-squared (Within):      0.4397
Date:              Sun, Jun 22 2025  R-squared (Overall):  -0.0639
Time:              21:56:04  Log-likelihood      50.722
Cov. Estimator:      Robust
                   F-statistic:      19.353
Entities:           7  P-value          0.0000
Avg Obs:           10.571  Distribution:      F(3,45)
Min Obs:           2.0000
Max Obs:           20.000  F-statistic (robust):  32.188
                   P-value          0.0000
Time periods:       20  Distribution:      F(3,45)
Avg Obs:           3.7000
Min Obs:           1.0000
Max Obs:           7.0000
```

Parameter Estimates

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=====
Parameter  Std. Err.   T-stat   P-value   Lower CI   Upper CI
-----
log_GDPpc_EU  -0.4800   0.2747  -1.7474   0.0874  -1.0332   0.0733
Tariff_AHS    -0.0884   0.0779  -1.1357   0.2621  -0.2452   0.0684
LPI           1.2308   0.1402   8.7761   0.0000   0.9483   1.5132
=====
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```

F-test for Poolability: 81.343

P-value: 0.0000

Distribution: F(25,45)

Included effects: Entity, Time

☒ DiD Event Study Model with Country-Year Effects

OLS Regression Results

Dep. Variable:	log_Imports	R-squared:	0.988
Model:	OLS	Adj. R-squared:	0.985
Method:	Least Squares	F-statistic:	297.2
Date:	Sun, 22 Jun 2025	Prob (F-statistic):	1.66e-119
Time:	21:56:04	Log-Likelihood:	30.830
No. Observations:	184	AIC:	18.34
Df Residuals:	144	BIC:	146.9
Df Model:	39		
Covariance Type:	HC3		

	coef	std err	z	P> z	[0.025	0.975]
const	20.9873	0.112	188.128	0.000	20.769	21.206
event_-5	-0.0602	0.118	-0.511	0.609	-0.291	0.171
event_-4	-0.1181	0.118	-1.000	0.317	-0.350	0.113
event_-3	-0.0356	0.136	-0.262	0.794	-0.302	0.231
event_-2	0.0253	0.108	0.235	0.814	-0.185	0.236
event_0	0.0751	0.096	0.778	0.436	-0.114	0.264

event_1	0.1137	0.089	1.282	0.200	-0.060	0.288
event_2	0.0699	0.095	0.735	0.462	-0.116	0.256
event_3	0.0577	0.091	0.632	0.527	-0.121	0.237
event_4	0.0127	0.106	0.120	0.905	-0.195	0.220
event_5	-0.0719	0.144	-0.498	0.618	-0.355	0.211
country_France	1.0840	0.065	16.670	0.000	0.957	1.211
country_Germany	2.3711	0.067	35.491	0.000	2.240	2.502
country_Greece	-3.0586	0.099	-31.032	0.000	-3.252	-2.865
country_Italy	0.8233	0.065	12.577	0.000	0.695	0.952
country_Malta	-2.6945	0.108	-24.987	0.000	-2.906	-2.483
country_Netherlands	0.0968	0.066	1.468	0.142	-0.032	0.226
country_Spain	-0.2270	0.072	-3.132	0.002	-0.369	-0.085
year_2002	0.2014	0.148	1.363	0.173	-0.088	0.491
year_2003	0.5035	0.136	3.709	0.000	0.237	0.769
year_2004	0.7334	0.126	5.839	0.000	0.487	0.980
year_2005	0.7962	0.117	6.795	0.000	0.567	1.026
year_2006	1.0267	0.139	7.393	0.000	0.755	1.299
year_2007	1.2599	0.111	11.396	0.000	1.043	1.477
year_2008	1.4220	0.125	11.410	0.000	1.178	1.666
year_2009	1.3885	0.117	11.914	0.000	1.160	1.617
year_2010	1.6864	0.117	14.472	0.000	1.458	1.915
year_2011	1.9024	0.121	15.687	0.000	1.665	2.140
year_2012	1.9288	0.123	15.696	0.000	1.688	2.170
year_2013	1.9046	0.110	17.322	0.000	1.689	2.120
year_2014	1.8800	0.110	17.083	0.000	1.664	2.096
year_2015	1.6993	0.106	16.012	0.000	1.491	1.907
year_2016	1.6919	0.109	15.549	0.000	1.479	1.905
year_2017	1.8769	0.115	16.293	0.000	1.651	2.103
year_2018	1.9691	0.147	13.398	0.000	1.681	2.257
year_2019	1.9690	0.166	11.884	0.000	1.644	2.294

year_2020	2.0361	0.164	12.386	0.000	1.714	2.358
year_2021	2.3171	0.174	13.319	0.000	1.976	2.658
year_2022	2.1653	0.136	15.890	0.000	1.898	2.432
year_2023	2.1728	0.146	14.853	0.000	1.886	2.460

Omnibus:	2.052	Durbin-Watson:	2.966
Prob(Omnibus):	0.358	Jarque-Bera (JB):	1.795
Skew:	-0.081	Prob(JB):	0.408
Kurtosis:	3.456	Cond. No.	25.8

Notes:

[1] Standard Errors are heteroscedasticity robust (HC3)

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full2.py:129: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange

```
fe_cy_results = fe_cy_model.fit(cov_type='robust')
```

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full2.py:137: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange

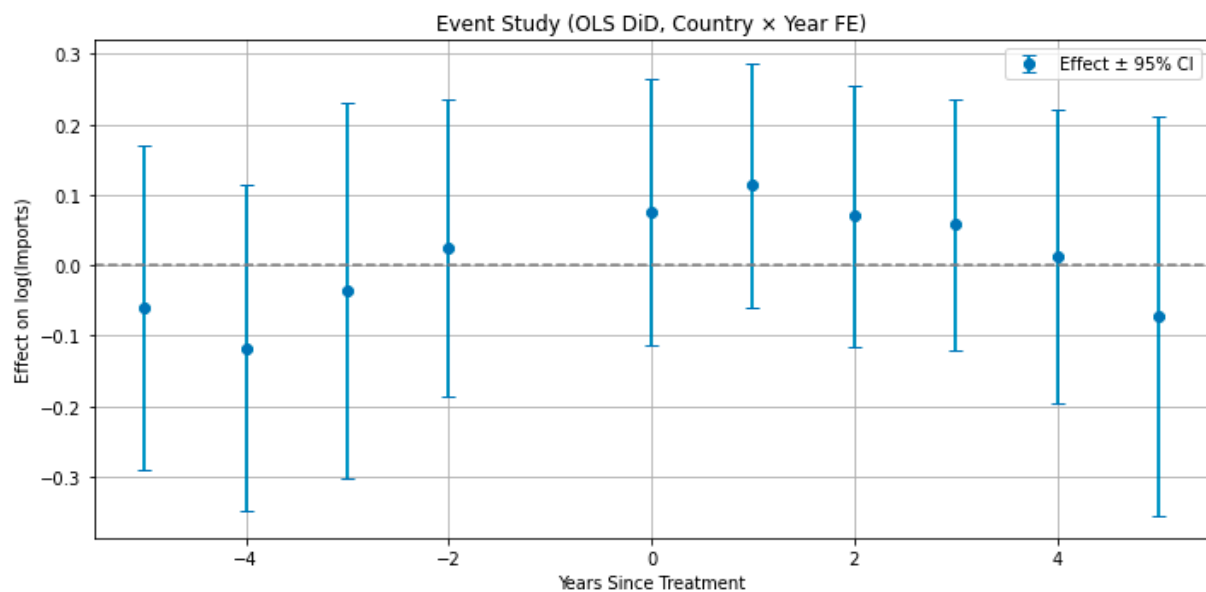
```
fe_pre = PanelOLS(pre['log_Imports'], pre[model_vars], entity_effects=True, time_effects=True, drop_absorbed=True, check_rank=False).fit(cov_type='robust')
```

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full2.py:138: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange, Port_ownership

```
fe_post = PanelOLS(post['log_Imports'], post[model_vars], entity_effects=True, time_effects=True,
drop_absorbed=True, check_rank=False).fit(cov_type='robust')
```



✓ All model results and robustness checks have been exported to Gravity_Regression_Results.xlsx

=== VIF Table ===

	Variable	VIF
0	const	6112.563082
1	log_GDPpc_China	4.459105
2	log_GDPpc_EU	3.528667
3	log_Exchange	3.236727
4	Tariff_AHS	1.313852
5	Port_ownership	2.105770
6	LPI	3.462906

==== PPML Table ====

	Coef.	Std.Err.	...	[0.025	0.975]
Intercept	0.580461	7.225933e-05	...	0.580319	0.580602
Q("log_GDPpc_China")	1.637088	3.073196e-06	...	1.637082	1.637094
Q("log_GDPpc_EU")	-0.281131	8.898248e-06	...	-0.281148	-0.281113
Q("log_Exchange")	-0.010914	1.171164e-05	...	-0.010937	-0.010891
Q("Tariff_AHS")	-0.010697	9.760189e-07	...	-0.010699	-0.010695
Q("Port_ownership")	-0.248027	2.839896e-06	...	-0.248032	-0.248021
Q("LPI")	3.099005	7.223582e-06	...	3.098991	3.099020
Q("event_-5")	-0.336504	2.993106e-06	...	-0.336510	-0.336498
Q("event_-4")	-0.418745	2.954195e-06	...	-0.418751	-0.418740
Q("event_-3")	-0.342192	2.947768e-06	...	-0.342198	-0.342187
Q("event_-2")	-0.393963	2.920245e-06	...	-0.393968	-0.393957
Q("event_0")	0.579892	4.774256e-06	...	0.579882	0.579901
Q("event_1")	0.547007	4.651459e-06	...	0.546998	0.547016
Q("event_2")	0.409528	5.289765e-06	...	0.409517	0.409538
Q("event_3")	0.246838	5.163355e-06	...	0.246827	0.246848
Q("event_4")	0.403624	4.864141e-06	...	0.403614	0.403633
Q("event_5")	0.376361	4.738569e-06	...	0.376351	0.376370
Q("D_Treat_Netherlands")	-2.128197	4.870877e-06	...	-2.128207	-2.128188
Q("D_Treat_Belgium")	-1.720688	3.496607e-06	...	-1.720695	-1.720681
Q("D_Treat_Germany")	-0.487310	5.775692e-06	...	-0.487322	-0.487299
Q("D_Treat_France")	-0.451881	3.270281e-06	...	-0.451887	-0.451874
Q("D_Treat_Spain")	-1.983531	5.796645e-06	...	-1.983543	-1.983520
Q("D_Treat_Greece")	-3.352000	1.123110e-05	...	-3.352022	-3.351978
Q("D_Treat_Malta")	-2.431064	1.405012e-05	...	-2.431092	-2.431036

[24 rows x 6 columns]

==== Fixed Effects Table ====

	coef	std_err	...	lower_ci	upper_ci
log_GDPpc_EU	-0.214969	0.191369	...	-0.590052	0.160114
Tariff_AHS	-0.008342	0.039132	...	-0.085040	0.068356
Port_ownership	-0.222680	0.063254	...	-0.346658	-0.098701
LPI	0.832235	0.120108	...	0.596825	1.067646
event_-5	-0.062585	0.048603	...	-0.157846	0.032677
event_-4	-0.133617	0.052900	...	-0.237300	-0.029934
event_-3	-0.072843	0.072627	...	-0.215191	0.069506
event_-2	-0.011577	0.053152	...	-0.115755	0.092601
event_0	0.208217	0.094697	...	0.022612	0.393822
event_1	0.281632	0.085783	...	0.113497	0.449767
event_2	0.229496	0.071283	...	0.089780	0.369211
event_3	0.226525	0.069800	...	0.089717	0.363333
event_4	0.164403	0.068320	...	0.030497	0.298310
event_5	0.069085	0.088162	...	-0.103711	0.241882
D_Treat_Netherlands	0.329184	0.104267	...	0.124820	0.533548
D_Treat_Belgium	-0.250151	0.089607	...	-0.425781	-0.074520
D_Treat_Germany	-0.160783	0.146416	...	-0.447758	0.126192
D_Treat_France	0.149636	0.094636	...	-0.035850	0.335122
D_Treat_Spain	0.020016	0.106182	...	-0.188100	0.228132
D_Treat_Greece	0.598574	0.087727	...	0.426629	0.770520
D_Treat_Malta	-0.334637	0.136395	...	-0.601971	-0.067304

[21 rows x 6 columns]

=== Random Effects Table ===

	coef	std_err	...	lower_ci	upper_ci
const	-18.168822	5.656910	...	-29.256365	-7.081279
log_GDPpc_China	1.199593	0.262372	...	0.685345	1.713842
log_GDPpc_EU	2.911412	0.631511	...	1.673651	4.149173

log_Exchange	-2.729272	1.112314	...	-4.909408	-0.549137
Tariff_AHS	0.096879	0.075206	...	-0.050526	0.244283
Port_ownership	0.162354	0.214626	...	-0.258313	0.583021
LPI	1.480974	0.447139	...	0.604582	2.357366
event_-5	-0.527427	0.408439	...	-1.327967	0.273114
event_-4	-0.735033	0.423931	...	-1.565937	0.095871
event_-3	-0.832169	0.373285	...	-1.563807	-0.100530
event_-2	-0.806993	0.392663	...	-1.576612	-0.037374
event_0	0.963302	0.298888	...	0.377482	1.549122
event_1	0.890123	0.209748	...	0.479017	1.301229
event_2	0.768469	0.211644	...	0.353646	1.183292
event_3	0.828704	0.219514	...	0.398457	1.258951
event_4	0.767470	0.159943	...	0.453982	1.080958
event_5	0.482593	0.158346	...	0.172234	0.792952
D_Treat_Netherlands	-2.940020	0.266382	...	-3.462130	-2.417911
D_Treat_Belgium	-2.037109	0.184222	...	-2.398184	-1.676034
D_Treat_Germany	-0.988086	0.333014	...	-1.640794	-0.335377
D_Treat_France	-0.939608	0.203599	...	-1.338662	-0.540555
D_Treat_Spain	-1.484949	0.309635	...	-2.091833	-0.878064
D_Treat_Greece	-2.036414	0.363634	...	-2.749136	-1.323692
D_Treat_Malta	-3.053903	0.251687	...	-3.547210	-2.560596

[24 rows x 6 columns]

==== Hausman Test ====

stat pval

HausmanTest 995.637917 0.0

==== Country×Year Fixed Effects ====

coef std_err t pval lower_ci upper_ci

log_GDPpc_EU	-0.899751	0.326779	-2.753395	0.006627	-1.540238	-0.259265
Tariff_AHS	0.009530	0.040891	0.233054	0.816037	-0.070616	0.089675
Port_ownership	0.051557	0.052357	0.984727	0.326344	-0.051062	0.154177
LPI	0.516697	0.194607	2.655073	0.008785	0.135266	0.898127

=== Pre-Treatment FE ===

	coef	std_err	t	pval	lower_ci	upper_ci
log_GDPpc_EU	-0.234616	0.429389	-0.546394	0.586396	-1.076218	0.606987
Tariff_AHS	-0.016620	0.043115	-0.385482	0.700958	-0.101125	0.067885
Port_ownership	-0.179448	0.091066	-1.970529	0.052420	-0.357938	-0.000959
LPI	-0.070632	0.294618	-0.239742	0.811176	-0.648084	0.506819

=== Post-Treatment FE ===

	coef	std_err	t	pval	lower_ci	upper_ci
log_GDPpc_EU	-0.479997	0.274690	-1.747415	8.738703e-02	-1.018388	0.058395
Tariff_AHS	-0.088419	0.077857	-1.135652	2.621146e-01	-0.241018	0.064181
LPI	1.230785	0.140243	8.776059	2.631695e-11	0.955908	1.505662

=== DiD Event Study Table ===

	Coef.	Std.Err.	...	[0.025	0.975]
const	20.987305	0.111559	...	20.768654	21.205956
event_-5	-0.060162	0.117782	...	-0.291010	0.170686
event_-4	-0.118133	0.118163	...	-0.349728	0.113461
event_-3	-0.035595	0.136077	...	-0.302301	0.231110
event_-2	0.025303	0.107535	...	-0.185461	0.236067
event_0	0.075079	0.096459	...	-0.113977	0.264135
event_1	0.113686	0.088692	...	-0.060148	0.287520
event_2	0.069871	0.095050	...	-0.116424	0.256166
event_3	0.057686	0.091291	...	-0.121242	0.236613
event_4	0.012702	0.105965	...	-0.194985	0.220389

event_5	-0.071913	0.144304	...	-0.354743	0.210916
country_France	1.084018	0.065028	...	0.956565	1.211471
country_Germany	2.371102	0.066808	...	2.240161	2.502043
country_Greece	-3.058641	0.098563	...	-3.251822	-2.865460
country_Italy	0.823298	0.065460	...	0.694998	0.951598
country_Malta	-2.694501	0.107838	...	-2.905859	-2.483143
country_Netherlands	0.096793	0.065943	...	-0.032453	0.226039
country_Spain	-0.226955	0.072474	...	-0.369001	-0.084909
year_2002	0.201445	0.147817	...	-0.088271	0.491161
year_2003	0.503451	0.135720	...	0.237445	0.769457
year_2004	0.733364	0.125590	...	0.487213	0.979515
year_2005	0.796227	0.117184	...	0.566551	1.025903
year_2006	1.026729	0.138878	...	0.754533	1.298926
year_2007	1.259886	0.110552	...	1.043208	1.476563
year_2008	1.421974	0.124630	...	1.177703	1.666245
year_2009	1.388502	0.116548	...	1.160071	1.616933
year_2010	1.686415	0.116532	...	1.458016	1.914813
year_2011	1.902414	0.121275	...	1.664720	2.140108
year_2012	1.928790	0.122882	...	1.687946	2.169635
year_2013	1.904636	0.109957	...	1.689125	2.120147
year_2014	1.879960	0.110047	...	1.664273	2.095648
year_2015	1.699324	0.106130	...	1.491312	1.907335
year_2016	1.691913	0.108814	...	1.478641	1.905185
year_2017	1.876892	0.115196	...	1.651111	2.102672
year_2018	1.969055	0.146970	...	1.681000	2.257111
year_2019	1.969020	0.165686	...	1.644281	2.293759
year_2020	2.036081	0.164382	...	1.713898	2.358263
year_2021	2.317081	0.173962	...	1.976122	2.658040
year_2022	2.165324	0.136272	...	1.898236	2.432412
year_2023	2.172826	0.146286	...	1.886110	2.459542

[40 rows x 6 columns]

Exports Results

Intercept	-1.3993	0.0001	-25592.7454	0.0000	-1.3994	-1.3992
Q("log_GDPpc_China")	1.0117	0.0000	416956.3424	0.0000	1.0117	1.0117
Q("log_GDPpc_EU")	1.4627	0.0000	238463.5463	0.0000	1.4626	1.4627
Q("log_Exchange")	-1.1430	0.0000	-121059.5338	0.0000	-1.1430	-1.1430
Q("Tariff_AHS")	-0.0532	0.0000	-71418.4227	0.0000	-0.0532	-0.0532
Q("Port_ownership")	-0.0304	0.0000	-13960.4359	0.0000	-0.0304	-0.0304
Q("LPI")	0.9849	0.0000	198307.7858	0.0000	0.9849	0.9849
Q("event_-5")	-0.1614	0.0000	-62658.5486	0.0000	-0.1614	-0.1614
Q("event_-4")	-0.2311	0.0000	-90012.8691	0.0000	-0.2311	-0.2311
Q("event_-3")	-0.2044	0.0000	-82351.4279	0.0000	-0.2044	-0.2044
Q("event_-2")	-0.1760	0.0000	-72793.9734	0.0000	-0.1760	-0.1760
Q("event_0")	-0.0049	0.0000	-1576.8621	0.0000	-0.0050	-0.0049
Q("event_1")	0.0061	0.0000	2023.9765	0.0000	0.0061	0.0061
Q("event_2")	0.0267	0.0000	8396.3662	0.0000	0.0267	0.0267
Q("event_3")	-0.0074	0.0000	-2398.9866	0.0000	-0.0074	-0.0073
Q("event_4")	0.0513	0.0000	17507.4955	0.0000	0.0513	0.0513
Q("event_5")	0.0473	0.0000	16925.5929	0.0000	0.0473	0.0473
Q("D_Treat_Netherlands")	-0.3014	0.0000	-103924.2960	0.0000	-0.3014	-0.3014
Q("D_Treat_Belgium")	-1.1608	0.0000	-475226.0358	0.0000	-1.1608	-1.1608
Q("D_Treat_Germany")	0.0253	0.0000	5935.3464	0.0000	0.0253	0.0253
Q("D_Treat_France")	-0.4960	0.0000	-190326.5670	0.0000	-0.4960	-0.4960
Q("D_Treat_Spain")	-0.1671	0.0000	-46530.8387	0.0000	-0.1672	-0.1671
Q("D_Treat_Greece")	-0.8535	0.0000	-226930.8428	0.0000	-0.8535	-0.8535
Q("D_Treat_Malta")	-2.2250	0.0000	-302741.6125	0.0000	-2.2250	-2.2250

☒ FIXED EFFECTS MODEL

PanelOLS Estimation Summary

Dep. Variable:	log_Exports	R-squared:	0.4794
Estimator:	PanelOLS	R-squared (Between):	0.0176
No. Observations:	184	R-squared (Within):	0.0999
Date:	Sun, Jun 22 2025	R-squared (Overall):	0.0176
Time:	22:39:45	Log-likelihood	91.708
Cov. Estimator:	Robust		
	F-statistic:	5.8326	
Entities:	8	P-value	0.0000
Avg Obs:	23.000	Distribution:	F(21,133)
Min Obs:	22.000		
Max Obs:	24.000	F-statistic (robust):	4.9079
	P-value	0.0000	
Time periods:	23	Distribution:	F(21,133)
Avg Obs:	8.0000		
Min Obs:	8.0000		
Max Obs:	8.0000		

Parameter Estimates

Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
log_GDPpc_EU	-0.1723	0.2353	-0.7320	0.4654	-0.6377 0.2932

Tariff_AHS	-0.1680	0.0308	-5.4481	0.0000	-0.2290	-0.1070
Port_ownership	-0.1729	0.0599	-2.8877	0.0045	-0.2913	-0.0545
LPI	0.6696	0.1431	4.6808	0.0000	0.3867	0.9526
event_-5	-0.0445	0.0572	-0.7776	0.4382	-0.1577	0.0687
event_-4	0.0625	0.0704	0.8872	0.3766	-0.0768	0.2018
event_-3	0.1358	0.0807	1.6819	0.0949	-0.0239	0.2955
event_-2	0.1421	0.0887	1.6019	0.1115	-0.0334	0.3176
event_0	0.1764	0.0819	2.1539	0.0331	0.0144	0.3383
event_1	0.2170	0.1134	1.9147	0.0577	-0.0072	0.4413
event_2	0.1865	0.0877	2.1260	0.0354	0.0130	0.3600
event_3	0.0996	0.0676	1.4730	0.1431	-0.0341	0.2334
event_4	0.0475	0.1025	0.4633	0.6439	-0.1552	0.2502
event_5	-0.0027	0.0635	-0.0428	0.9659	-0.1284	0.1229
D_Treat_Netherlands	0.2439	0.0773	3.1533	0.0020	0.0909	0.3969
D_Treat_Belgium	0.0970	0.0788	1.2298	0.2210	-0.0590	0.2529
D_Treat_Germany	-0.1435	0.1208	-1.1876	0.2371	-0.3825	0.0955
D_Treat_France	0.0674	0.0828	0.8138	0.4172	-0.0964	0.2312
D_Treat_Spain	0.0516	0.0885	0.5831	0.5608	-0.1234	0.2267
D_Treat_Greece	0.2229	0.0714	3.1225	0.0022	0.0817	0.3640
D_Treat_Malta	0.5016	0.2187	2.2932	0.0234	0.0690	0.9343

F-test for Poolability: 83.345

P-value: 0.0000

Distribution: F(29,133)

Included effects: Entity, Time

☒ RANDOM EFFECTS MODEL

RandomEffects Estimation Summary

```

=====
=====
Dep. Variable:      log_Exports  R-squared:          0.8985
Estimator:          RandomEffects  R-squared (Between):    0.9589
No. Observations:    184  R-squared (Within):      0.7430
Date:                Sun, Jun 22 2025  R-squared (Overall):    0.8985
Time:                22:39:45  Log-likelihood      -121.45
Cov. Estimator:      Robust
                     F-statistic:      61.596
Entities:            8  P-value          0.0000
Avg Obs:             23.000  Distribution:      F(23,160)
Min Obs:             22.000
Max Obs:             24.000  F-statistic (robust):    86.093
                     P-value          0.0000
Time periods:        23  Distribution:      F(23,160)
Avg Obs:             8.0000
Min Obs:             8.0000
Max Obs:             8.0000

```

Parameter Estimates

```

=====
=====
Parameter Std. Err.  T-stat  P-value  Lower CI  Upper CI
-----
const      -13.905   3.7854  -3.6732  0.0003   -21.380   -6.4287
log_GDPpc_China    1.2469   0.1819   6.8534  0.0000    0.8876    1.6062
log_GDPpc_EU       2.4093   0.4103   5.8715  0.0000    1.5989    3.2197
log_Exchange     -1.3434   0.6549  -2.0513  0.0419   -2.6369   -0.0500
Tariff_AHS       -0.1101   0.0691  -1.5941  0.1129   -0.2465    0.0263
Port_ownership     0.1454   0.1577   0.9220  0.3579   -0.1661    0.4569

```

LPI	1.2464	0.2651	4.7019	0.0000	0.7229	1.7699
event_-5	-0.2478	0.1989	-1.2461	0.2145	-0.6406	0.1449
event_-4	-0.2504	0.2055	-1.2185	0.2248	-0.6561	0.1554
event_-3	-0.2642	0.2361	-1.1188	0.2649	-0.7305	0.2022
event_-2	-0.3041	0.2072	-1.4678	0.1441	-0.7133	0.1051
event_0	0.5830	0.1706	3.4180	0.0008	0.2462	0.9199
event_1	0.7313	0.1996	3.6643	0.0003	0.3372	1.1255
event_2	0.6323	0.1706	3.7071	0.0003	0.2954	0.9691
event_3	0.5379	0.1422	3.7824	0.0002	0.2570	0.8187
event_4	0.4424	0.1449	3.0528	0.0027	0.1562	0.7286
event_5	0.3428	0.1194	2.8719	0.0046	0.1071	0.5785
D_Treat_Netherlands	-1.3189	0.1978	-6.6675	0.0000	-1.7096	-0.9283
D_Treat_Belgium	-1.5185	0.1148	-13.227	0.0000	-1.7452	-1.2918
D_Treat_Germany	-1.1571	0.2479	-4.6685	0.0000	-1.6466	-0.6676
D_Treat_France	-1.0298	0.1434	-7.1816	0.0000	-1.3130	-0.7466
D_Treat_Spain	-0.5484	0.2304	-2.3808	0.0185	-1.0034	-0.0935
D_Treat_Greece	-0.3791	0.2788	-1.3600	0.1758	-0.9297	0.1714
D_Treat_Malta	-2.2331	0.2043	-10.929	0.0000	-2.6367	-1.8296

=====

=====

☒ HAUSMAN TEST

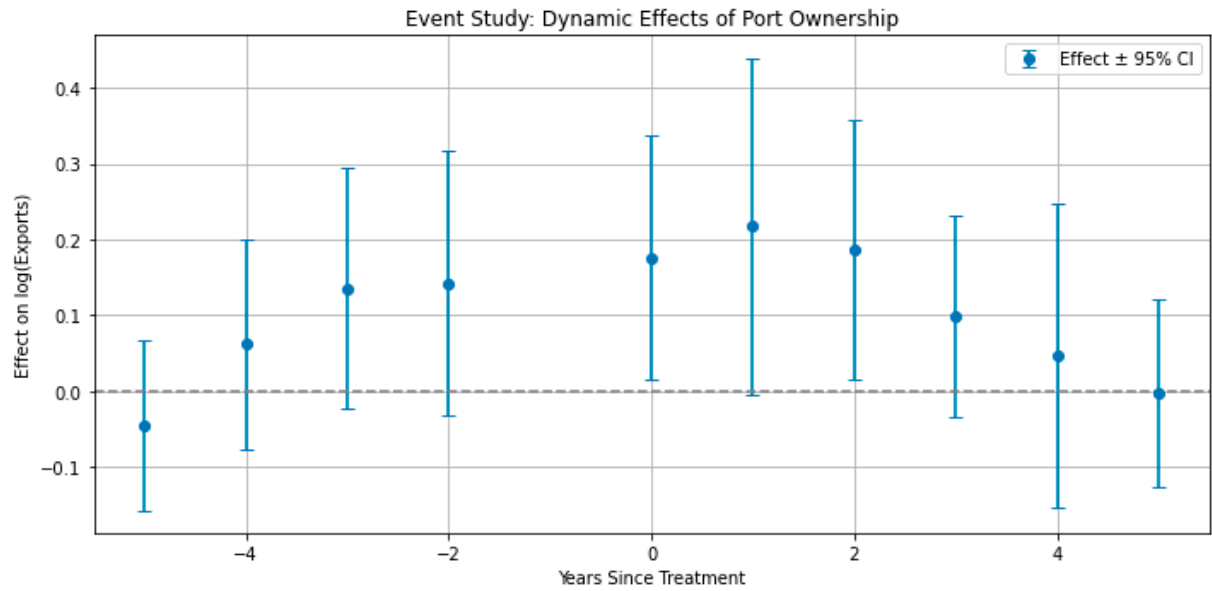
Hausman Test: $\chi^2(21) = 8295.574$, p-value = 0.0000

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full.py:82: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange

```
fe_results = fe_model.fit(cov_type='robust')
```



☒ Country \times Year Interactions (FE)

PanelOLS Estimation Summary

Dep. Variable:	log_Exports	R-squared:	0.3342
Estimator:	PanelOLS	R-squared (Between):	0.3677
No. Observations:	184	R-squared (Within):	0.1357
Date:	Sun, Jun 22 2025	R-squared (Overall):	0.3674
Time:	22:39:45	Log-likelihood	69.079
Cov. Estimator:	Robust		
	F-statistic:	18.827	
Entities:	8	P-value	0.0000
Avg Obs:	23.000	Distribution:	F(4,150)
Min Obs:	22.000		
Max Obs:	24.000	F-statistic (robust):	17.194
	P-value	0.0000	

Time periods: 23 Distribution: F(4,150)
Avg Obs: 8.0000
Min Obs: 8.0000
Max Obs: 8.0000

Parameter Estimates

Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
log_GDPpc_EU	0.3699	0.2269	1.6306	0.1051	-0.0783 0.8182
Tariff_AHS	-0.1768	0.0266	-6.6482	0.0000	-0.2293 -0.1242
Port_ownership	0.0186	0.0463	0.4017	0.6885	-0.0729 0.1101
LPI	0.4000	0.1172	3.4129	0.0008	0.1684 0.6316

F-test for Poolability: 114.28

P-value: 0.0000

Distribution: F(29,150)

Included effects: Entity, Time

☒ Pre/Post Treatment Subgroup Effects

Pre-treatment FE model:

PanelOLS Estimation Summary

Dep. Variable:	log_Exports	R-squared:	0.4230
Estimator:	PanelOLS	R-squared (Between):	0.7450

No. Observations: 110 R-squared (Within): 0.1880
 Date: Sun, Jun 22 2025 R-squared (Overall): 0.7372
 Time: 22:39:45 Log-likelihood 63.796
 Cov. Estimator: Robust
 F-statistic: 13.930
 Entities: 8 P-value 0.0000
 Avg Obs: 13.750 Distribution: F(4,76)
 Min Obs: 3.0000
 Max Obs: 23.000 F-statistic (robust): 8.0232
 P-value 0.0000
 Time periods: 23 Distribution: F(4,76)
 Avg Obs: 4.7826
 Min Obs: 1.0000
 Max Obs: 8.0000

Parameter Estimates

Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
log_GDPpc_EU	1.0642	0.5499	1.9352	0.0567	-0.0311 2.1595
Tariff_AHS	-0.1457	0.0286	-5.0990	0.0000	-0.2025 -0.0888
Port_ownership	-0.0163	0.0755	-0.2160	0.8296	-0.1667 0.1341
LPI	0.2106	0.2842	0.7411	0.4609	-0.3554 0.7766

F-test for Poolability: 85.420

P-value: 0.0000

Distribution: F(29,76)

Included effects: Entity, Time

Post-treatment FE model:

PanelOLS Estimation Summary

```
=====
=====
Dep. Variable:      log_Exports  R-squared:          0.3370
Estimator:         PanelOLS  R-squared (Between):    -0.2518
No. Observations:      74  R-squared (Within):      -0.0913
Date:              Sun, Jun 22 2025  R-squared (Overall):  -0.2607
Time:              22:39:45  Log-likelihood      33.325
Cov. Estimator:      Robust
                   F-statistic:          7.6239
Entities:            7  P-value            0.0003
Avg Obs:            10.571  Distribution:      F(3,45)
Min Obs:            2.0000
Max Obs:            20.000  F-statistic (robust):    9.8218
                   P-value            0.0000
Time periods:        20  Distribution:      F(3,45)
Avg Obs:            3.7000
Min Obs:            1.0000
Max Obs:            7.0000
```

Parameter Estimates

```
=====
=====
Parameter Std. Err.  T-stat  P-value  Lower CI  Upper CI
-----
log_GDPpc_EU -0.4870  0.3988  -1.2210  0.2285  -1.2903  0.3163
Tariff_AHS   -0.3223  0.1061  -3.0367  0.0040  -0.5360  -0.1085
LPI           0.8773  0.1811  4.8454  0.0000  0.5126  1.2419
```

F-test for Poolability: 26.711

P-value: 0.0000

Distribution: F(25,45)

Included effects: Entity, Time

☒ DiD Event Study Model with Country-Year Effects

OLS Regression Results

Dep. Variable: log_Exports R-squared: 0.982
Model: OLS Adj. R-squared: 0.977
Method: Least Squares F-statistic: 273.8
Date: Sun, 22 Jun 2025 Prob (F-statistic): 5.60e-117
Time: 22:39:45 Log-Likelihood: 36.976
No. Observations: 184 AIC: 6.049
Df Residuals: 144 BIC: 134.6
Df Model: 39
Covariance Type: HC3

	coef	std err	z	P> z	[0.025	0.975]
const	21.4370	0.108	199.106	0.000	21.226	21.648
event_-5	-0.0497	0.045	-1.096	0.273	-0.139	0.039
event_-4	0.0808	0.085	0.955	0.340	-0.085	0.247
event_-3	0.1007	0.095	1.056	0.291	-0.086	0.288
event_-2	0.1375	0.098	1.407	0.159	-0.054	0.329

event_0	0.1339	0.132	1.018	0.309	-0.124	0.392
event_1	0.1219	0.159	0.768	0.443	-0.189	0.433
event_2	0.1286	0.155	0.829	0.407	-0.175	0.432
event_3	0.0561	0.117	0.477	0.633	-0.174	0.286
event_4	0.0204	0.136	0.150	0.881	-0.247	0.287
event_5	-0.0436	0.070	-0.619	0.536	-0.182	0.094
country_France	0.4954	0.036	13.674	0.000	0.424	0.566
country_Germany	1.4198	0.043	33.014	0.000	1.336	1.504
country_Greece	-1.2620	0.066	-19.016	0.000	-1.392	-1.132
country_Italy	0.5458	0.036	15.272	0.000	0.476	0.616
country_Malta	-2.6131	0.122	-21.467	0.000	-2.852	-2.375
country_Netherlands	1.2447	0.029	42.813	0.000	1.188	1.302
country_Spain	0.1855	0.034	5.402	0.000	0.118	0.253
year_2002	0.1632	0.132	1.238	0.216	-0.095	0.422
year_2003	0.5481	0.163	3.370	0.001	0.229	0.867
year_2004	0.9126	0.126	7.270	0.000	0.667	1.159
year_2005	1.1711	0.138	8.469	0.000	0.900	1.442
year_2006	1.4192	0.124	11.435	0.000	1.176	1.662
year_2007	1.6482	0.186	8.876	0.000	1.284	2.012
year_2008	1.9880	0.114	17.394	0.000	1.764	2.212
year_2009	1.7651	0.119	14.875	0.000	1.533	1.998
year_2010	2.0489	0.129	15.943	0.000	1.797	2.301
year_2011	2.1766	0.142	15.373	0.000	1.899	2.454
year_2012	2.1044	0.158	13.317	0.000	1.795	2.414
year_2013	2.0541	0.151	13.623	0.000	1.759	2.350
year_2014	2.1909	0.155	14.118	0.000	1.887	2.495
year_2015	2.1076	0.137	15.359	0.000	1.839	2.377
year_2016	2.0473	0.120	17.104	0.000	1.813	2.282
year_2017	2.1737	0.131	16.537	0.000	1.916	2.431
year_2018	2.2363	0.121	18.472	0.000	1.999	2.474

year_2019	2.2601	0.127	17.744	0.000	2.010	2.510
year_2020	2.3274	0.119	19.524	0.000	2.094	2.561
year_2021	2.7126	0.126	21.577	0.000	2.466	2.959
year_2022	2.7523	0.137	20.130	0.000	2.484	3.020
year_2023	2.6525	0.143	18.565	0.000	2.372	2.933

Omnibus:	25.449	Durbin-Watson:	2.405
Prob(Omnibus):	0.000	Jarque-Bera (JB):	141.358
Skew:	-0.143	Prob(JB):	2.02e-31
Kurtosis:	7.284	Cond. No.	25.8

Notes:

[1] Standard Errors are heteroscedasticity robust (HC3)

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full.py:128: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange

```
fe_cy_results = fe_cy_model.fit(cov_type='robust')
```

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full.py:136: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange

```
fe_pre = PanelOLS(pre['log_Exports'], pre[model_vars], entity_effects=True, time_effects=True, drop_absorbed=True, check_rank=False).fit(cov_type='robust')
```

c:\users\agkatsik\onedrive - iti.gr\desktop\gkatsikos\0. professor publication\gravity law paper\ppml_full.py:137: AbsorbingEffectWarning:

Variables have been fully absorbed and have removed from the regression:

log_GDPpc_China, log_Exchange, Port_ownership

```
fe_post = PanelOLS(post['log_Exports'], post[model_vars], entity_effects=True, time_effects=True, drop_absorbed=True, check_rank=False).fit(cov_type='robust')
```

OBJ

☑ All model results and robustness checks have been exported to Gravity_Regression_Results.xlsx

==== VIF Table ====

	Variable	VIF
0	const	6112.563082
1	log_GDPpc_China	4.459105
2	log_GDPpc_EU	3.528667
3	log_Exchange	3.236727
4	Tariff_AHS	1.313852
5	Port_ownership	2.105770
6	LPI	3.462906

==== PPML Table ====

	Coef.	Std.Err.	...	[0.025	0.975]
Intercept	-1.399332	5.467691e-05	...	-1.399439	-1.399225
Q("log_GDPpc_China")	1.011659	2.426296e-06	...	1.011655	1.011664
Q("log_GDPpc_EU")	1.462654	6.133660e-06	...	1.462642	1.462666
Q("log_Exchange")	-1.142979	9.441463e-06	...	-1.142998	-1.142961
Q("Tariff_AHS")	-0.053158	7.443205e-07	...	-0.053160	-0.053157
Q("Port_ownership")	-0.030427	2.179494e-06	...	-0.030431	-0.030422

Q("LPI")	0.984866	4.966352e-06	...	0.984856	0.984876
Q("event_-5")	-0.161444	2.576563e-06	...	-0.161449	-0.161439
Q("event_-4")	-0.231097	2.567381e-06	...	-0.231102	-0.231092
Q("event_-3")	-0.204375	2.481739e-06	...	-0.204380	-0.204370
Q("event_-2")	-0.175994	2.417699e-06	...	-0.175999	-0.175989
Q("event_0")	-0.004948	3.137587e-06	...	-0.004954	-0.004941
Q("event_1")	0.006142	3.034391e-06	...	0.006136	0.006147
Q("event_2")	0.026720	3.182371e-06	...	0.026714	0.026727
Q("event_3")	-0.007351	3.064323e-06	...	-0.007357	-0.007345
Q("event_4")	0.051341	2.932519e-06	...	0.051335	0.051347
Q("event_5")	0.047317	2.795600e-06	...	0.047312	0.047323
Q("D_Treat_Netherlands")	-0.301439	2.900564e-06	...	-0.301445	-0.301433
Q("D_Treat_Belgium")	-1.160831	2.442693e-06	...	-1.160836	-1.160826
Q("D_Treat_Germany")	0.025329	4.267432e-06	...	0.025320	0.025337
Q("D_Treat_France")	-0.496013	2.606116e-06	...	-0.496018	-0.496008
Q("D_Treat_Spain")	-0.167143	3.592093e-06	...	-0.167150	-0.167136
Q("D_Treat_Greece")	-0.853524	3.761163e-06	...	-0.853531	-0.853517
Q("D_Treat_Malta")	-2.225022	7.349573e-06	...	-2.225036	-2.225007

[24 rows x 6 columns]

=== Fixed Effects Table ===

	coef	std_err	...	lower_ci	upper_ci
log_GDPpc_EU	-0.172254	0.235315	...	-0.633471	0.288962
Tariff_AHS	-0.168009	0.030838	...	-0.228451	-0.107567
Port_ownership	-0.172887	0.059870	...	-0.290232	-0.055542
LPI	0.669636	0.143061	...	0.389235	0.950036
event_-5	-0.044489	0.057212	...	-0.156625	0.067647
event_-4	0.062502	0.070446	...	-0.075573	0.200577
event_-3	0.135796	0.080742	...	-0.022457	0.294050

event_-2	0.142140	0.088730	...	-0.031772	0.316052
event_0	0.176362	0.081882	...	0.015873	0.336851
event_1	0.217050	0.113357	...	-0.005131	0.439230
event_2	0.186489	0.087718	...	0.014561	0.358417
event_3	0.099610	0.067625	...	-0.032934	0.232155
event_4	0.047479	0.102473	...	-0.153368	0.248326
event_5	-0.002717	0.063520	...	-0.127217	0.121783
D_Treat_Netherlands	0.243906	0.077350	...	0.092300	0.395511
D_Treat_Belgium	0.096958	0.078842	...	-0.057572	0.251487
D_Treat_Germany	-0.143508	0.120835	...	-0.380346	0.093329
D_Treat_France	0.067399	0.082818	...	-0.094923	0.229722
D_Treat_Spain	0.051607	0.088503	...	-0.121859	0.225073
D_Treat_Greece	0.222857	0.071372	...	0.082968	0.362746
D_Treat_Malta	0.501631	0.218745	...	0.072891	0.930371

[21 rows x 6 columns]

=== Random Effects Table ===

	coef	std_err	...	lower_ci	upper_ci
const	-13.904530	3.785438	...	-21.323988	-6.485071
log_GDPpc_China	1.246858	0.181932	...	0.890272	1.603444
log_GDPpc_EU	2.409309	0.410339	...	1.605045	3.213573
log_Exchange	-1.343446	0.654934	...	-2.627117	-0.059776
Tariff_AHS	-0.110121	0.069081	...	-0.245520	0.025279
Port_ownership	0.145425	0.157721	...	-0.163708	0.454557
LPI	1.246391	0.265082	...	0.726831	1.765952
event_-5	-0.247812	0.198869	...	-0.637595	0.141970
event_-4	-0.250361	0.205470	...	-0.653082	0.152360
event_-3	-0.264192	0.236140	...	-0.727026	0.198643
event_-2	-0.304130	0.207202	...	-0.710246	0.101987

event_0	0.583022	0.170575	...	0.248695	0.917349
event_1	0.731310	0.199575	...	0.340142	1.122478
event_2	0.632279	0.170557	...	0.297988	0.966570
event_3	0.537881	0.142205	...	0.259158	0.816603
event_4	0.442382	0.144908	...	0.158362	0.726402
event_5	0.342769	0.119351	...	0.108841	0.576697
D_Treat_Netherlands	-1.318915	0.197812	...	-1.706627	-0.931203
D_Treat_Belgium	-1.518479	0.114802	...	-1.743490	-1.293467
D_Treat_Germany	-1.157112	0.247856	...	-1.642910	-0.671315
D_Treat_France	-1.029835	0.143398	...	-1.310896	-0.748774
D_Treat_Spain	-0.548442	0.230358	...	-0.999943	-0.096940
D_Treat_Greece	-0.379150	0.278793	...	-0.925585	0.167285
D_Treat_Malta	-2.233132	0.204326	...	-2.633611	-1.832653

[24 rows x 6 columns]

=== Hausman Test ===

stat	pval
------	------

HausmanTest	8295.573616	0.0
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=== Country×Year Fixed Effects ===

	coef	std_err	t	pval	lower_ci	upper_ci
log_GDPpc_EU	0.369920	0.226862	1.630592	1.050744e-01	-0.074730	0.814570
Tariff_AHS	-0.176790	0.026592	-6.648231	5.172485e-10	-0.228910	-0.124670
Port_ownership	0.018604	0.046311	0.401707	6.884711e-01	-0.072166	0.109373
LPI	0.399996	0.117203	3.412851	8.266767e-04	0.170278	0.629714

=== Pre-Treatment FE ===

	coef	std_err	t	pval	lower_ci	upper_ci
log_GDPpc_EU	1.064200	0.549929	1.935161	0.056691	-0.013660	2.142060

Tariff_AHS	-0.145656	0.028566	-5.099023	0.000002	-0.201645	-0.089668
Port_ownership	-0.016305	0.075501	-0.215954	0.829602	-0.164287	0.131677
LPI	0.210597	0.284179	0.741072	0.460933	-0.346393	0.767587

==== Post-Treatment FE ====

	coef	std_err	t	pval	lower_ci	upper_ci
log_GDPpc_EU	-0.486970	0.398842	-1.220962	0.228459	-1.268700	0.294759
Tariff_AHS	-0.322289	0.106132	-3.036691	0.003970	-0.530307	-0.114271
LPI	0.877284	0.181056	4.845366	0.000015	0.522414	1.232154

==== DiD Event Study Table ====

	Coef.	Std.Err.	...	[0.025	0.975]
const	21.437012	0.107666	...	21.225990	21.648034
event_-5	-0.049721	0.045369	...	-0.138643	0.039202
event_-4	0.080808	0.084623	...	-0.085051	0.246666
event_-3	0.100721	0.095386	...	-0.086232	0.287674
event_-2	0.137538	0.097752	...	-0.054052	0.329128
event_0	0.133927	0.131548	...	-0.123902	0.391755
event_1	0.121903	0.158783	...	-0.189307	0.433112
event_2	0.128595	0.155040	...	-0.175278	0.432468
event_3	0.056054	0.117403	...	-0.174052	0.286159
event_4	0.020368	0.136181	...	-0.246542	0.287277
event_5	-0.043565	0.070384	...	-0.181516	0.094385
country_France	0.495360	0.036225	...	0.424359	0.566360
country_Germany	1.419795	0.043006	...	1.335504	1.504086
country_Greece	-1.261993	0.066364	...	-1.392064	-1.131923
country_Italy	0.545843	0.035741	...	0.475792	0.615894
country_Malta	-2.613145	0.121726	...	-2.851724	-2.374566
country_Netherlands	1.244715	0.029073	...	1.187732	1.301697
country_Spain	0.185498	0.034338	...	0.118197	0.252799

year_2002	0.163189	0.131812	...	-0.095157	0.421536
year_2003	0.548114	0.162664	...	0.229299	0.866929
year_2004	0.912617	0.125536	...	0.666571	1.158662
year_2005	1.171076	0.138270	...	0.900072	1.442080
year_2006	1.419185	0.124111	...	1.175931	1.662439
year_2007	1.648233	0.185703	...	1.284262	2.012205
year_2008	1.988037	0.114297	...	1.764020	2.212055
year_2009	1.765082	0.118660	...	1.532513	1.997651
year_2010	2.048950	0.128521	...	1.797054	2.300846
year_2011	2.176591	0.141583	...	1.899094	2.454088
year_2012	2.104385	0.158023	...	1.794666	2.414105
year_2013	2.054095	0.150785	...	1.758561	2.349628
year_2014	2.190877	0.155185	...	1.886719	2.495034
year_2015	2.107586	0.137222	...	1.838637	2.376536
year_2016	2.047305	0.119697	...	1.812704	2.281907
year_2017	2.173734	0.131443	...	1.916110	2.431357
year_2018	2.236336	0.121066	...	1.999052	2.473621
year_2019	2.260063	0.127367	...	2.010428	2.509699
year_2020	2.327357	0.119203	...	2.093723	2.560990
year_2021	2.712614	0.125717	...	2.466213	2.959016
year_2022	2.752309	0.136726	...	2.484331	3.020288
year_2023	2.652518	0.142881	...	2.372477	2.932559

[40 rows x 6 columns]