

Supplementary Materials

Table S1: The effect of agricultural products export and openness of trade on environmental quality in different models

Dep.var	Developed countries			Developing countries		
	FE	EC2SLS	G2SLS	FE	EC2SLS	G2SLS
Total agricultural exports (US \$)	N ₂ O	***	+	***	+	+
Raw agricultural exports	CH ₄	-	***	***	+	+
Openness (US \$)	N ₂ O	***	+	***	+	+
	CH ₄	-	***	***	+	+

*, **, *** denote significant level in 10%, 5% and 1% level.

Table S2: Selection process of suitable model

Reg. models for separate the export endogenous variable and openness variable	Dependent Variable	developed countries			developing countries		
		stage 1		stage 2	stage 1		stage 2
		Hausman	EC2SLS	G2SLS	Hausman	EC2SLS	G2SLS
Reg. equation 1: total agricultural exports	N ₂ O	175.00***	-	-	43.42***	-	-
	CH ₄	-57.37	-	-	18.00**	-	-
Reg. equation 2: raw agricultural exports	N ₂ O	53.31***	-	-	9.89	58.40	58.32
	CH ₄	-51.95	-	-	3.14	0.5057	0.5179
Reg. equation 3: Openness	N ₂ O	92.61***	-	-	17.55**	-	-
	CH ₄	-40.70	-	-	13.92*	-	-

*, **, *** denote significant level in 10%, 5% and 1% level.

Table S3: The total agricultural exports effects on environmental quality- first stage results

Independent variables (exogenous)	Developed countries		Developing countries	
	CH ₄	N ₂ O	CH ₄	N ₂ O
	(fixed effects)	(fixed effects)	(fixed effects)	(fixed effects)
Agricultural land	-1.86*** (0.35)	-1.28*** (0.34)	0.60** (0.27)	0.60** (0.27)
Agricultural machinery	0.02 (0.09)	0.18** (0.08)	0.35*** (0.04)	0.35*** (0.04)
GDP per capita	0.24** (4.07)	-6.19** (2.63)	-2.74*** (0.89)	-2.74*** (0.89)

GDP per capita squared	0.07 (0.20)	0.40** (0.13)	0.28*** (0.05)	0.28*** (0.05)
Agriculture value added	-0.42** (0.10)	0.13 (0.10)	0.68*** (0.12)	0.68*** (0.12)
Agriculture employment	-0.90** (0.10)	-1.05*** (0.09)	0.00 (0.00)	0.00 (0.00)
FDI	-0.01 (0.01)	-0.00 (0.01)	0.03 (0.01)	0.03 (0.02)
education	-0.01 (0.14)	0.03 (0.13)	0.03*** (0.01)	0.03*** (0.01)
constant	31.92 (20.84)	37.51*** (12.49)	-2.78 (4.24)	-2.78 (4.24)
Number of observations	405	405	765	765

Table S4: Raw agricultural exports effects on environmental quality- first stage results

Independent variables (exogenous)	Developed countries		Developing countries	
	CH ₄	N ₂ O	CH ₄	N ₂ O
	(fixed effects)	(fixed effects)	(fixed effects)	(fixed effects)
Agricultural land	-1.40*** (0.35)	-1.40** (0.35)	0.62** (0.26)	0.17*** (0.34)
Agricultural machinery	0.18** (0.09)	0.18** (0.09)	0.36*** (0.04)	0.37*** (0.06)
GDP per capita	-10.31** (4.14)	-10.31** (4.14)	-2.77*** (0.88)	1.61 (1.14)
GDP per capita squared	0.60*** (0.20)	0.60*** (0.20)	0.28*** (0.05)	-0.04 (0.07)
Agriculture value added	0.08 (0.10)	0.09 (0.10)	0.68*** (0.12)	0.05 (0.15)
Agriculture employment	-1.00*** (0.10)	-1.00*** (0.10)	0.00 (0.00)	0.00 (0.00)
FDI	-0.00 (0.01)	-0.00 (0.01)	0.03 (0.02)	0.07*** (0.02)
education	-0.03 (0.14)	-0.03 (0.14)	0.03*** (0.01)	0.02* (0.01)
constant	22.35* (13.09)	22.35* (13.09)	-2.71 (4.13)	8.72 (5.39)
Number of observations	405	405	765	765

Table S5: The total agricultural exports effects on environmental quality with openness of trade- first stage results

Independent variables (exogenous)	Developed countries		Developing countries	
	CH ₄	N ₂ O	CH ₄	N ₂ O
	(fixed effects)	(fixed effects)	(fixed effects)	(fixed effects)
Agricultural land	-1.37*** (0.31)	-1.37*** (0.31)	0.48* (0.26)	0.48* (0.26)
Agricultural machinery	0.18** (0.08)	0.18** (0.08)	0.34*** (0.04)	0.34*** (0.04)
GDP per capita	-10.02*** (3.67)	-10.02*** (3.67)	-2.73*** (0.86)	-2.73*** (0.86)
GDP per capita squared	0.54** (0.18)	0.54** (0.18)	0.28*** (0.05)	0.28*** (0.05)
Openness trade	1.22*** (0.12)	1.22*** (0.12)	0.44*** (0.11)	0.44*** (0.11)
Agriculture value added	0.04 (0.09)	0.04 (0.09)	0.64*** (0.11)	0.64*** (0.11)
Agriculture employment	-0.84*** (0.09)	-0.84*** (0.09)	-0.00 (0.00)	-0.00 (0.00)
FDI	-0.00 (0.01)	-0.00 (0.01)	0.02 (0.02)	0.02 (0.02)
education	0.06 (0.12)	0.06 (0.12)	0.03*** (0.01)	0.03*** (0.01)
constant	28.73** (11.34)	59.81*** (18.78)	-3.15 (4.08)	-3.11 (4.17)
Number of observations	405	405	765	765

Table S6: Collinearity test results

Variable	1/VIF	VIF
Agricultural land	0.295	3.39
Agricultural machinery	0.487	2.05
Agriculture value added	0.225	4.44
Agriculture employment	0.259	3.86
FDI	0.353	2.83
Education level	0.283	3.53
GDP per capita	0.187	5.34
GDP per capita squared	0.502	1.99
Trade openness	0.292	3.43

Mean	3.43
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Table S7: Heteroscedasticity test results

Test type	Test statistic	prob
LR test results for developing countries model	3.26	0.26
LR test results for developed countries model	2.78	0.38