Pesticide Regulatory Heterogeneity and Agricultural Value Chains

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There is nothing “standard” about standards

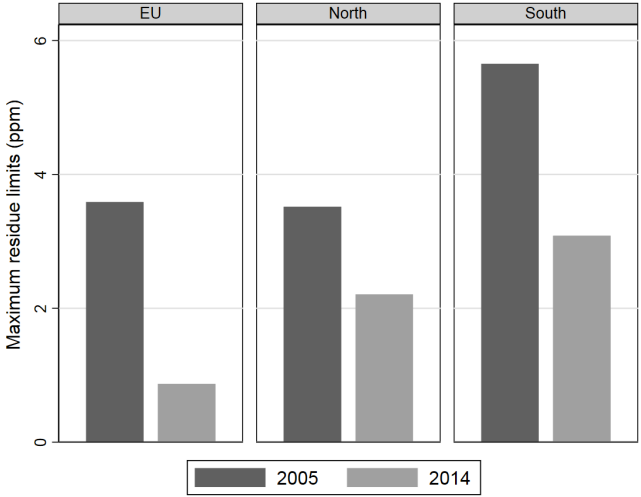
Table 1: Maximum Residue Limits on selected products in 2018 (Source: Homologa)

Active element	Product	CHE	EU	Japan	USA	Canada	China	Codex
Carbaryl	Mandarins	0.01	0.01	7	10	10		15
Captan	Apple	3	10	5	25	5	15	15
Fenbutatin-Oxide	Apple	2	2	5	15	3	5	5
Acetamiprid	Apple	0.8	0.8	2	1	1	0.8	0.8
Azoxystrobin	Tomatoes	3	3	3	0.2	0.2	3	3
Folpet	Avocado	0.02	0.03	30	25	25		

Notes: MRLs are measured in parts-per-million (ppm).

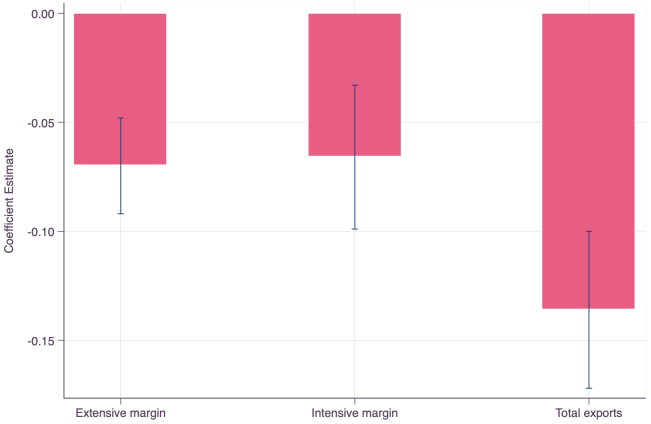
Increasing stringency over time, especially in the EU

Figure 1: Average MRLs by importing country groups in 2005 and 2014



Supply-side trade effects: Country-level analysis (Fiankor et al., 2021)

Figure 2: MRL differences and country-product level exports



- An increase in MRL_{ijkt} by 0.1 units at the mean—which is an increase of about 9%—reduces total exports by about 1.36%

Demand-side trade Effects: Firm-level Analysis (Fiankor et al., 2025)

Table 2: MRL differences and firm-product level imports

	Baseline	GVC Activity	Firm Size
	(1)	(2)	(3)
MRL_{opt}	-0.672^{***}	-0.758^{***}	-0.890^{***}
	(0.249)	(0.250)	(0.264)
GVC_{ft}		-0.133	
		(0.090)	
$MRL_{opt} \times GVC_{ft}$		0.181^{**}	
		(0.083)	
$MRL_{opt} \times$ Medium-size firm			0.242^{***}
			(0.078)
$MRL_{opt} \times$ Large-size firm			0.425^{***}
			(0.085)
Firm, Origin, Product FE	Yes	Yes	Yes

- A one s.d. increase in MRL_{opt} reduces firm-level imports by 18%
- $\equiv$ to tariff rate of 24%

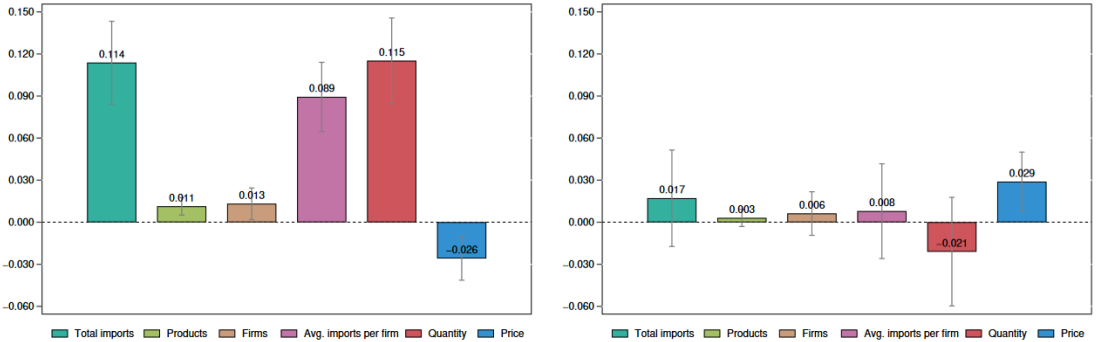
Mechanism: Lower import quantities at higher prices

	Country-level			Firm-level	
Dependent Variable (log)	Prices	Quality	QA Price	Import Prices	Import Quantity
	(1)	(2)	(3)	(4)	(5)
MRL_{opt}	0.027***	0.002	0.026**	0.122***	−0.471*
	(0.008)	(0.013)	(0.012)	(0.027)	(0.246)
log (1 + $Tariff_{opt}$)	0.035***	−0.078***	0.113***	0.312***	−1.043***
	(0.005)	(0.008)	(0.008)	(0.068)	(0.212)
Observations	399,526	399,526	399,526	50,305	50,305

Notes: Columns (1) – (3) include importer-product-time, exporter-product-time, and importer-exporter fixed effects. Columns (4) – (5) include firm-origin-product and origin-year fixed effects.

Homogeneity increases imports and decreases import prices, more so for small firms (Fiankor and Shingal, 2025)

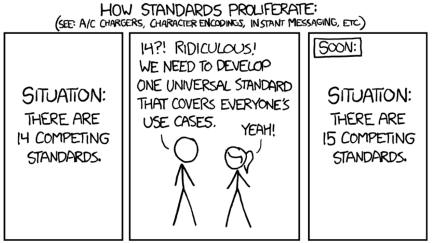
Figure 3: The effect of pesticide regulatory homogeneity on import margins by firm size



(a) Small firms

(b) Large firms

Implications for policy



What is the policy goal?

- Regulatory convergence → efficiency gains
- Open question is whose standard becomes the "standard"?

Thank You!

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