The Effects of Local Content Requirements on Trade: The Case of Indonesia

Yessi Vadila[a,b]   David Christian[b]

[a]Ministry of Trade Republic of Indonesia
[b]ERIA (Economic Research Institute for ASEAN and East Asia)

ERIA Webinar
Thursday, 21 November 2024

Introduction

* Local content requirements (LCRs) have been around as a trade and industrial policy since 1940s, starting in Australia's auto industry.

* LCRs have been and still are ubiquitous policy instruments worldwide, both among developed and developing countries.

* Most prominent motivations for governments to utilize LCRs largely revolve around local employment creation, technological upgrading, and industrial development.

* Traditionally, LCRs involve mandatory stipulation to final goods producers that a certain fraction of their inputs be sourced domestically.

  ▶ LCRs have evolved to cover outcomes such as employment, firm ownership, technology transfer, R&D, eligibility for government contracts or procurements, data storage location, etc.

  ▶ Rules of Origin (RoO) are another example of LCRs at the regional level.

LCRs' worldwide comeback in the past decade

Incidence of LCRs: 2008–2020 (Selected Economies)
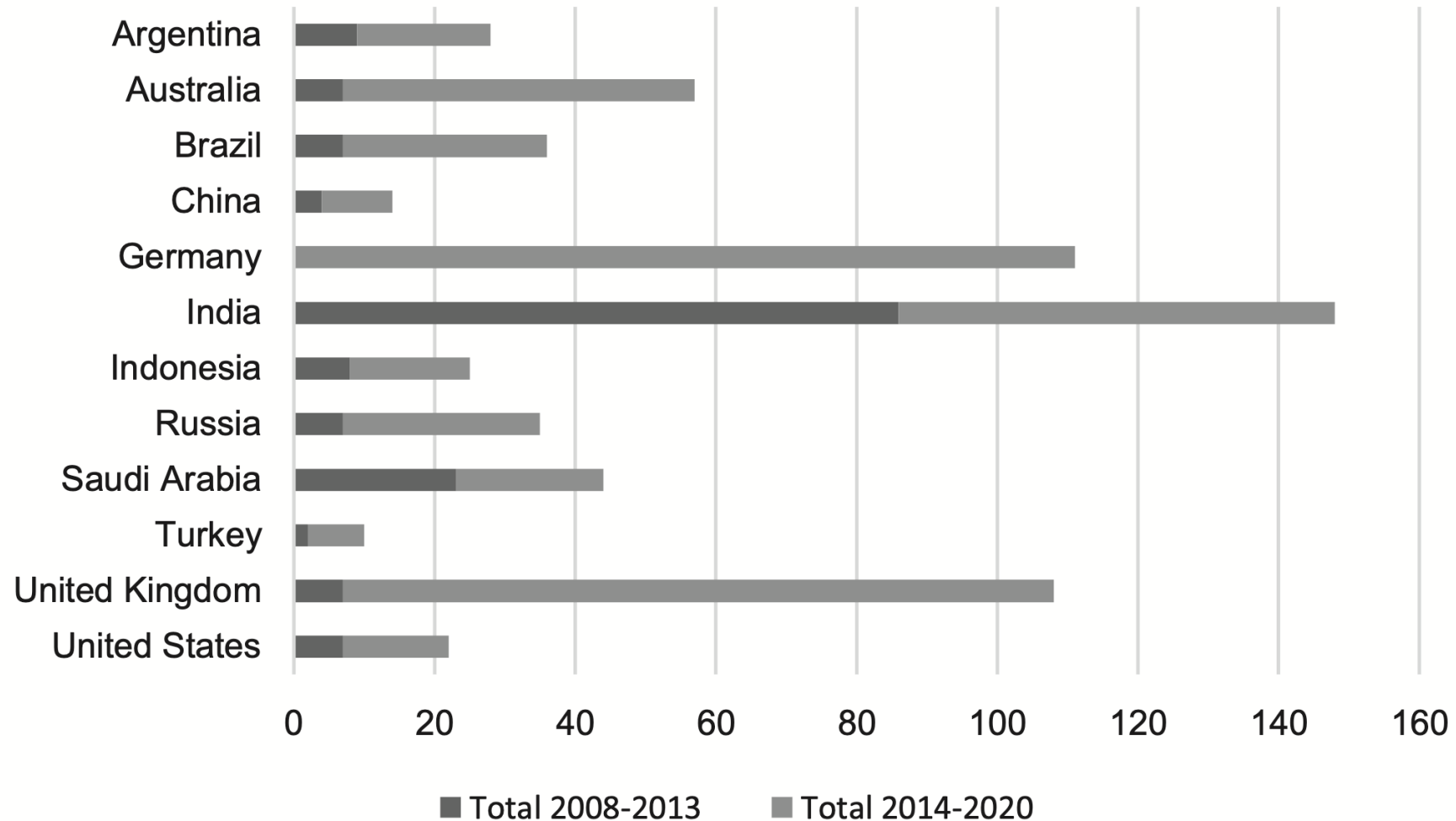
Source: Flaig & Stone (2023)

Indonesia is no stranger to LCRs

✳ Indonesia is among the heaviest employer of LCR policy. Highest among BRICS since 2008.

  ▸ Flaig & Stone (2023), Araujo & Flaig (2017), Hufbauer et al. (2013), Deringer et al. (2018)

✳ LCRs have existed in Indonesia since 1950: Benteng program, Deletion Program (1974-93), National Car program (1996). Rampant pre-AFC, in conjuction with import substitution policy.

✳ In the aftermath of AFC 1997 and associated reforms, LCRs had taken a backseat in Indonesia, largely reserved for government procurement, but not totally abandoned. However, since late 2000s Indonesian government started to revisit localization strategies. (Negara, 2016).

  ▸ Ongoing emphasis on enhancing domestic value added.

✳ Industries exposed to LCRs greatly vary in Indonesia, ranging from manufacturing (automotive, electronics, medical devices, pharmaceutical), utilities and infrastructure (electricity, energy), upstream oil & gas, and services (modern retail).

Literature

✳ Fundamentally, LCRs distort resources allocation in the economy, the impact of which are then materialized via several margins.

  ✓ Output, productivity, trade, employment, input costs, competitiveness, consumer welfare, product quality, and potentially many others.

✳ Seminal paper by Grossman (1981): LCRs increased domestic sourcing costs, which led to higher retail (final goods) prices. LCRs both rise and reduce demand for domestic inputs. Total effects are ambiguous.

✳ Economic literature overwhelmingly points to the negative tendency of LCRs.

  ▶ LCRs increase domestic intermediate input prices → higher input prices for domestic final producers → poorer competitiveness, lower productivity, and less production of final goods → reduced exports competitiveness and volume → lower demand for intermediates → losses in consumer welfare and productivity of downstream firms.

  ▶ Korinek & Ramdoo (2017); Deringer et al. (2018), Hufbauer et al. (2013), Araujo & Flaig (2017), OECD (2016), Hayakawa & Ito (2019), Stone et al. (2014), Scheifele et al. (2022)

✳ LCRs tend to be trade-repressing, especially on export's potential

  ▶ Hufbauer et al. (2013): worldwide proliferation of LCRs reduced global trade by $200–300 bn, of which 80% was trade in intermediate goods.

  ▶ Primarily via the channel of higher domestic input costs at potentially lower quality.

Motivation

1) **LCRs are plentiful in Indonesia, yet their multifaceted effects largely remain understudied**

   ▶ Negara (2016), CSIS (2023), Ing & Grossman (2023)

   ▶ Almost all LCR studies in literature are not on Indonesia, majority on developed world.

2) **Lack of existing studies on LCRs using observational trade data.**

   ▶ Most LCR studies are based on parametric, general equilibrium-based models, or Input-Output-based models (e.g. ICIO, GTAP, OECD Metro).

   ▶ Model predictions or simulations may not be reflected in actual trade flow data.

3) **Potential hidden, unintended consequences of LCRs on trade in the medium to long-run.**

This study

* **Construct a comprehensive LCR dataset of Indonesia from 2004-2020**

  ▶ Identify all Indonesian regulations that include LCRs, both mandatory & non-mandatory in this period (excl. govt. procurement)

  ▶ LCRs that had been or still are in place at any stage within 2004 to 2020

  ▶ For each LCR: map the affected products (8-digit HS) & identify date of implementation and/or repeal

  ▶ 16 regulatory documents that include LCRs, affecting 8% of all products

* **Estimate dynamic effects of being exposed to LCRs on trade flows of affected products**

  ▶ Trade flows: Import value, import volume, export value, export volume

  ▶ Policy effects are estimated up to a maximum of 5 years from the LCRs' implementation date

  ▶ Only LCRs with backward consequences are considered, and LCRs on goods (not services!)

  ▶ DID estimation and event study are employed, following De Chaisemartin & D'Haultfœuille (2022)

Data

✴ **LCR database from authors' compilation**

   ▶ Binary LCR treatment variable

   ▶ Information on whether each product is subject to LCR or not in each year from 2004-2020.

✴ **Trade data from Ministry of Trade, Republic of Indonesia**

   ▶ Import value, import volume, export value, export volume

   ▶ 8-digit HS 2012 from 2004-2020. Total: 9,342 products

   ▶ Top 3 trading partners for each product and each year

✴ **Control variables**

   ▶ Demand proxy from top trading partners of each product-year (i.e., population, GDP, growth, trade value), tariffs, gravity variables, downstream index, backward & forward-linkage, linkage to LCR sectors)

   ▶ Sources: EIU, WITS, CEPII, IMF, World Bank, BPS Indonesia, IO Tables; or authors' calculations from these.

List of LCRs in the dataset

Table 7.A1. List of LCRs in the Dataset

DocID		8-digit HS codes affected	Starting implement-ation date	Broad sectors or industries affected
2	MEMR Reg. 15/2013	102	2013	Upstream oil and gas equipments
5	MoI Reg. 15/2016 Jo. 6/2018, 24/2020	20	2016	Electricity infrastructure, tower, conductor
10	MoI Reg. 34/2017 Jo. 5/2018	250	2017	Automotive: Vehicles with 4 wheels or more
21	MCI Reg. 27/2015 Jo. 13/2021	24	2015	LTE-based telecommunication equipments
27	Government Reg. 76/2014	37	2014	Arms & defence equipments
74	MCI Reg. 26/2013 Jo. 9/2014, 4/2019	4	2013	Internet protocol set top box, TV
78	MCI Reg. 7/2009	24	2009	Telecommunication equipments, wireless broadband
79	MCI Reg. 32/2013	24	2014	Digital TV receivers
82	Presidential Reg. 55/2019	4	2019	Electric vehicles
83	MoI Reg. 61/2009	20	2009	Containers for liquified gas, stove gas accessories, etc.
84	MCI Reg. 30/2009 Jo. 11/2010 Jo. 6/2017	44	2009	Internet protocol set top box, TV
87	MoI Reg. 80/2014 Jo. 34/2015, 22/2016, 70/2016	279	2015	Automotive: Vehicles with 4 wheels or more
88	Presidential Inst. 6/2016 + MoH Reg. 17/2017	157	2016	Pharmaceuticals and medical devices
96	Presidential Reg. 146/2015	80	2015	Upstream oil and gas (esp. refineries)
129	Law 16/2012	37	2012	Arms & defence equipments
131	Law 22/2001 Jo. 11/2020	66	2001	Upstream & downstream oil and gas

Source: Authors' compilation

Abbreviations: Reg. = Regulation; Inst. = Instruction; Jo. = Juncto; MEMR = Ministry of Energy & Mineral Reosurces; MoI = Ministry of Industry; MCI = Ministry of Communication and Informatics; MoH = Ministry of Health

Notes: The term Jo. (juncto) in this table is used loosely to represent some, but not necessarily all, updated versions of the preceding regulation. We only report relevant versions of updated regulations which still contain LCR stipulations. In some cases, we assign a single DocID for multiple regulatory documents if the LCR stipulations in each documents are largely identical and/or cover similar set of products.

Empirical strategy: Event Study

$$Y_{it} = \sum_{e=-E}^{Z} \beta_e 1\{t - F_i = e\} + \theta X_{it} + \alpha_i + \gamma_t + v_{it}$$

▶ $Y_{it} =$ log of $(1 +$ trade outcome variable of product i in year t). Import/Export, Value/Volume

▶ $1\{t - F_i = e\} =$ event study dummies and time indicators, equal to 1 if product i is e years away at year t from its initial LCR treatment.

▶ $F_i =$ the first year the product i was exposed to any LCR within the analysis period

▶ $\beta_e =$ the LCR treatment effects on trade outcomes e years after its initial implementation. **Main interest!**

▶ $X_{it} =$ vector of time-varying control variables for product i in year t

▶ $\alpha_i =$ product fixed-effects

▶ $\gamma_t =$ year fixed effects

▶ $v_{it} =$ idiosyncratic error terms, SE clustered by 2-digit HS

Empirical strategy: Event Study (cont.)

$$Y_{it} = \sum_{e=-E}^{Z} \beta_e 1\{t - F_i = e\} + \theta X_{it} + \alpha_i + \gamma_t + v_{it}$$

✳ The baseline analysis simply estimates the above equation by of Two-Way Fixed Effects OLS (TWFE).

✳ However, recent econometric literature on difference-in-differences (DID) show that OLS TWFE estimators are unbiased only if both the parallel trends and constant effect assumption hold. The latter requires treatment effects to be homogenous across groups of products and over time, which is likely to be violated in the case of LCRs.

  ▶ Sun & Abraham (2021), Callaway & Sant'Anna (2021), De Chaisemartin & D'Haultfœuille (2020, 2022), Goodman-Bacon (2021)

  ▶ Impact of LCRs may vary across industries and with different length of exposure to the policy.

✳ To address these challenges, we also employ a DID estimator by de Chaisemartin & D'Haultfœuille (2022) (hereafter, DCDH) that are more robust to heterogenous treatment effects.

✳ Also, in order observe potential differences in LCR effects across industries, estimations are performed on all products and then separately on different product groups and compare the point estimates.

Four key results

1) In general, LCRs are weakly, positively associated with Indonesia's imports.

2) No evidence that LCRs are effective in promoting export-oriented development strategy in general or boosting Indonesia's export ability in particular.

3) Indication of a loss in long-run export competitiveness arising from LCRs.

4) Sign of domestic reallocation of resources toward satisfying LCRs, and away from engaging in international trade, especially exports.

Four key results

1) **In general, LCRs are weakly, positively associated with Indonesia's imports.**

2) No evidence that LCRs are effective in promoting export-oriented development strategy in general or boosting Indonesia's export ability in particular.

3) Indication of a loss in long-run export competitiveness arising from LCRs.

4) Sign of domestic reallocation of resources toward satisfying LCRs, and away from engaging in international trade, especially exports.

# Result 1a: LCRs are weakly, positively associated with imports

Table 7.2. Dynamic Effects of LCRs on Imports

	All products	Manufacturing
0 Years after	−0.095	−0.089
	(0.129)	(0.137)
1 Year after	0.272	0.148
	(0.314)	(0.138)
2 Years after	0.063	−0.019
	(0.321)	(0.176)
3 Years after	0.623*	0.624**
	(0.371)	(0.304)
4 Years after	0.314*	0.233
	(0.189)	(0.195)
5 Years after	−0.431	−0.157
	(0.384)	(0.183)
Average Effects	0.193	0.156
	(0.208)	(0.123)
Control variables	Yes	Yes
2-digit HS linear trend	Yes	Yes
Manufacturing only	No	Yes
Number of observations	158,814	138,907
Effects jointly significant at 5%	Yes	Yes
Pre-trend significant at 5%	No	No

Source: Authors' calculation. **Note**: This table reports the estimated coefficients β_e from DCDH22 DID regressions. They represent the effects of being exposed to the first LCR up until five years after the LCR's starting implementation date under various specifications. The dependent variable is log of (Indonesia's import volume in kg + 1). Inferring the magnitude of the effects requires taking exponential over the estimated coefficients in this table. Standard errors are estimated using 100 bootstrap replications clustered at the 2-digit HS code level and reported in parentheses. To check for pre-trends at a 5% significance level, the results from joint-significance tests of all placebo estimators up until three years before the LCR implementation are summarized in the last row of the table. Average Effects reports the estimated average total effects of the treatment, i.e., the average of all the instantaneous and dynamic LCR effects across treated products. The results of joint-significance tests, which verify whether the contemporaneous and all dynamic treatment effects are jointly different from zero statistically at a 5% significance level, are provided in the table.

* By and large, no significant and systematic effects of LCRs observed among all products or manufacturing: alternating signs from year to year.

* Effects are jointly significant at 5%, indicating weakly positive association between LCRs implementation and import volume within the next 5 years.

* Some positive spikes in imports, 3-4 years after LCR implementation.

* No evidence that LCRs reduce imports of inputs, similar to findings of Negara (2016).

Result 1a: LCRs are weakly, positively associated with imports

Effects of LCRs on Manufacturing Imports
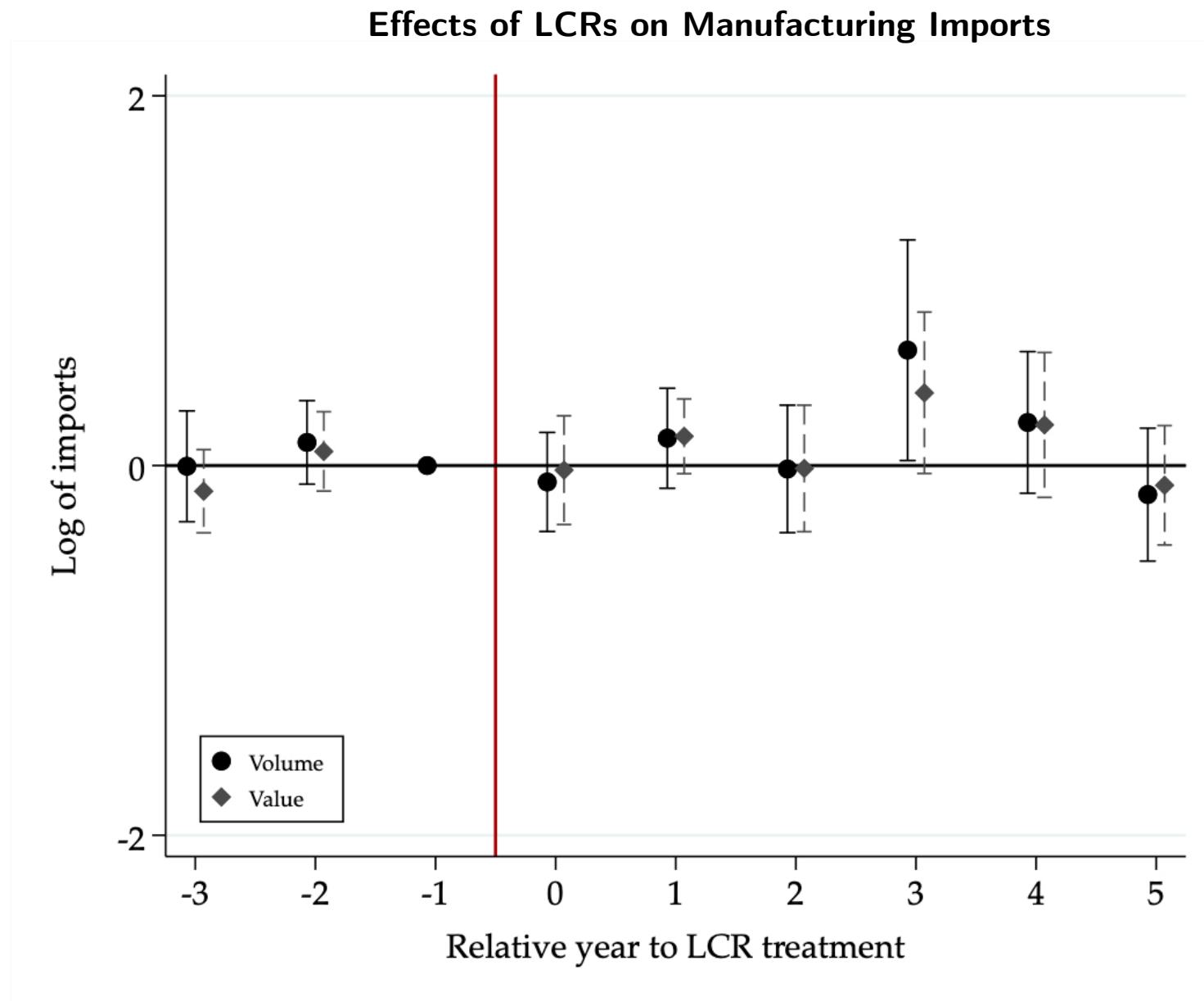
Result 1b: LCRs on high-tech vs medium-tech imports

Table 7.3. Dynamic Effects of LCRs on Imports, by Product Group

	(1)	(2)	(9)	(10)
	All products	Manu-facturing	High-tech products	Medium-tech products
0 Years after	−0.095	−0.089	0.332***	−0.212
	(0.129)	(0.137)	(0.123)	(0.314)
1 Year after	0.272	0.148	0.680*	0.228
	(0.314)	(0.138)	(0.386)	(0.161)
2 Years after	0.063	−0.019	0.466	−0.102
	(0.321)	(0.176)	(0.315)	(0.165)
3 Years after	0.623*	0.624**	1.541***	0.224
	(0.371)	(0.304)	(0.235)	(0.488)
4 Years after	0.314*	0.233	0.630***	0.359
	(0.189)	(0.195)	(0.179)	(0.425)
5 Years after	0.431	−0.157	0.557	−0.276**
	(0.384)	(0.183)	(1.194)	(0.136)
Average Effects	0.193	0.156	0.712***	0.080
	(0.208)	(0.123)	(0.158)	(0.159)
Number of products	9,342	8,171	677	2,118
Products with LCRs (%)	7.9	8.0	6.8	12.1
Number of observations	158,814	138,907	11,509	36,006
Effects jointly significant at 5%	Yes	Yes	Yes	No
Pre-trend significant at 5%	No	No	Yes	No

Source: Authors' calculation. **Note**: This table reports the DCDH22 DID estimators of the effects of being exposed to the first LCR up until five years after the LCR's starting implementation date for separate product groups. Detailed definitions of the product groups are available in Table 7.A3. The dependent variable is log of (Indonesia's import volume in kg + 1). Inferring the magnitude of the effects requires taking exponential over the estimated coefficients in this table. Standard errors are estimated using 100 bootstrap replications clustered at the 2-digit HS code level and reported in parentheses. To check for pre-trends at a 5% significance level, the results from joint-significance tests of all placebo estimators up until three years before the LCR implementation are summarized in the last row of the table. Average Effects reports the estimated average total effects of the treatment, i.e., the average of all the instantaneous and dynamic LCR effects across treated products. The results of joint-significance tests, which verify whether the contemporaneous and all dynamic treatment effects are jointly different from zero statistically at a 5% significance level, are provided in the table.

- Imposition of LCRs on high-tech products (Col. 9) is strongly associated with an increase in their imports, while the effects of LCRs on imports of medium-tech products (Col. 10) are less certain.

- Not surprising, given Indonesia's current comparative advantage lies in low- to medium-tech products.

- Imports of high-tech products/inputs are likely to remain substantial in the future, despite introduction of LCRs.

- It takes time for technological advancement to occur to the extent that it becomes possible and competitive to produce high-tech products locally.

Four key results

1) In general, LCRs are weakly, positively associated with Indonesia's imports.

2) **No evidence that LCRs are effective in promoting export-oriented development strategy in general or boosting Indonesia's export ability in particular.**

3) Indication of a loss in long-run export competitiveness arising from LCRs.

4) Sign of domestic reallocation of resources toward satisfying LCRs, and away from engaging in international trade, especially exports.

Result 2: Lack of favorable effects of LCRs on Indonesia's exports

Effects of LCRs on Manufacturing Exports
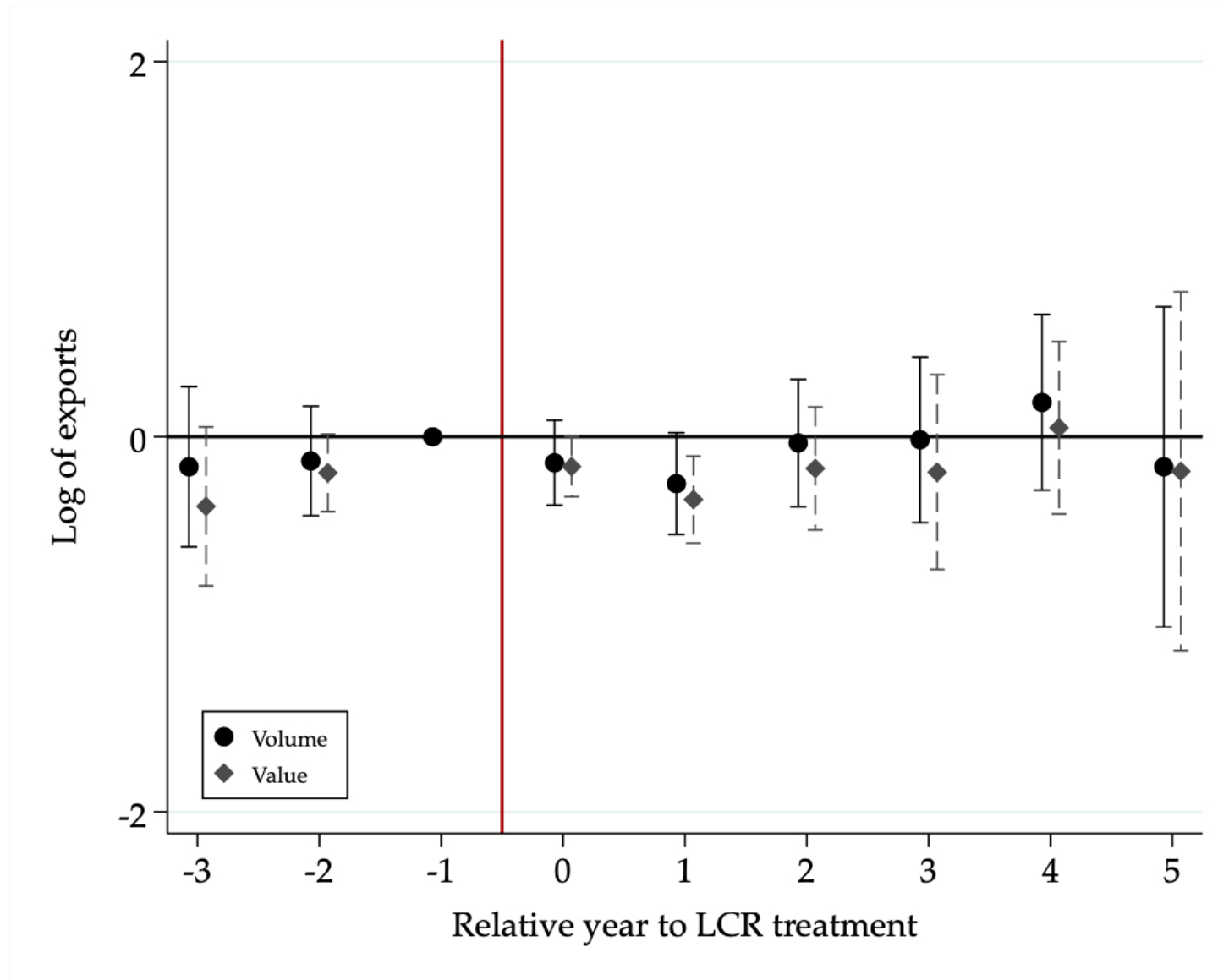
Result 2: Lack of favorable effects of LCRs on Indonesia's exports

Table 7.5. Dynamic Effects of LCRs on Export Volume, by Product Group

	All products	Manu-facturing	Consumer goods	Inter-mediate goods	Down-stream	High-tech products	Medium-tech products
0 Years after	−0.117	−0.139	−0.373	−0.384	0.146	0.264	−0.275
	(0.115)	(0.116)	(0.272)	(0.260)	(0.255)	(0.617)	(0.271)
1 Year after	**−0.235***	**−0.250***	−0.321	−0.428	−0.059	−0.065	−0.268
	(0.133)	(0.138)	(0.340)	(0.322)	(0.637)	(0.905)	(0.219)
2 Years after	−0.016	−0.033	−0.228	−0.103	0.199	0.076	−0.076
	(0.158)	(0.173)	(0.416)	(0.324)	(0.331)	(0.998)	(0.387)
3 Years after	−0.004	−0.016	−0.454	−0.127	0.387*	0.903	−0.185
	(0.206)	(0.225)	(0.527)	(0.354)	(0.221)	(0.895)	(0.507)
4 Years after	0.197	0.183	0.010	0.032	0.459	0.025	0.164
	(0.217)	(0.239)	(0.397)	(0.304)	(0.363)	(0.759)	(0.512)
5 Years after	−0.122	−0.160	−1.296	0.401	0.178	2.402	0.099
	(0.428)	(0.436)	(0.880)	(0.753)	(0.520)	NA	(0.873)
Average Effects	−0.057	−0.077	−0.375	−0.192	0.246	0.301	−0.141
	(0.152)	(0.165)	(0.372)	(0.257)	(0.224)	(0.771)	(0.395)
Number of products	9,342	8,171	2,774	4,213	3,788	677	2,118
Products with LCRs (%)	7.9	8.0	11.4	5.3	10.4	6.8	12.1
Number of observations	158,814	138,907	47,158	71,621	64,396	11,509	36,006
Effects jointly significant at 5%	No	Yes	No	No	No	No	No
Pre-trend significant at 5%	No	No	No	Yes	No	No	Yes

Source: Authors' calculation. **Note**: This table reports the DCDH22 estimators of the effects of being exposed to the first LCR up until five years after the LCR's starting implementation date for separate product groups. Detailed definitions of the product groups are available in Table 7.A3. The dependent variable is log of (Indonesia's export volume in kg + 1). Inferring the magnitude of the effects requires taking exponential over the estimated coefficients in this table. Standard errors are estimated using 100 bootstrap replications clustered at 2-digit HS code level and reported in parentheses. To check for pre-trends at a 5% significance level, the results from joint-significance tests of all placebo estimators up until three years before the LCR implementation are summarized in the last row of the table. Average Effects reports the estimated average total effects of the treatment, i.e., the average of all the instantaneous and dynamic LCR effects across treated products. The results of joint-significance tests, which verify whether the contemporaneous and all dynamic treatment effects are jointly different from zero statistically at a 5% significance level, are provided in the table.

Four key results

1) LCRs generally are weakly and positively associated with Indonesia's imports.

2) No evidence that LCRs are effective in promoting export-oriented development strategy in general or boosting Indonesia's export ability in particular.

3) **Indication of a loss in long-run export competitiveness arising from LCRs.**

4) Sign of domestic reallocation of resources toward satisfying LCRs, and away from engaging in international trade, especially exports.

Result 3: Loss in export competitiveness? Volume-Value divergence

Dynamic Effects of LCRs on Export Volume & Value, Selected Product Groups

	Volume	Value	Volume	Value
	Downstream		**High-tech products**	
0 Years after	0.146	0.007	0.264	0.292
	(0.255)	(0.114)	(0.617)	(0.397)
1 Year after	−0.059	−0.358	−0.065	−0.430
	(0.637)	(0.604)	(0.905)	(0.629)
2 Years after	0.199	−0.135	0.076	0.032
	(0.331)	(0.352)	(0.998)	(0.587)
3 Years after	0.387*	−0.020	0.903	0.325
	(0.221)	(0.457)	(0.895)	(0.528)
4 Years after	0.459	0.320	0.025	−0.554
	(0.363)	(0.405)	(0.759)	(0.494)
5 Years after	0.178	0.053	2.402	0.798
	(0.520)	(0.848)	NA	NA
Average Effects	0.246	−0.045	0.301	−0.017
	(0.224)	(0.337)	(0.771)	(0.428)
Number of products	3,788	3,788	677	677
Products with LCRs (%)	10.4	10.4	6.8	6.8
Number of observations	64,396	64,396	11,509	11,509
Effects jointly significant at 5%	No	No	No	Yes
Pre-trend significant at 5%	No	No	No	No

Source: Authors' calculation. **Note**: This table reports the DCDH22 estimators of the effects of being exposed to the first LCR up until five years after the LCR's starting implementation date for separate product groups. Detailed definitions of the product groups are available in Table 7.A3. The dependent variable is log of (Indonesia's export volume in kg + 1) or (Indonesia's export value in USD + 1). Inferring the magnitude of the effects requires taking exponential over the estimated coefficients in this table. Standard errors are estimated using 100 bootstrap replications clustered at 2-digit HS code level and reported in parentheses. To check for pre-trends at a 5% significance level, the results from joint-significance tests of all placebo estimators up until three years before the LCR implementation are summarized in the last row of the table. Average Effects reports the estimated average total effects of the treatment, i.e., the average of all the instantaneous and dynamic LCR effects across treated products. The results of joint-significance tests, which verify whether the contemporaneous and all dynamic treatment effects are jointly different from zero statistically at a 5% significance level, are provided in the table.

- On average, exposure to LCRs is associated with **higher export volume** but **lower export value** for several product groups, e.g. downstream products and high-tech products.

- This may serve as an early indication a loss of competitiveness in the export market, despite statistical insignificance.

Four key results

1) LCRs generally are weakly and positively associated with Indonesia's imports.

2) No evidence that LCRs are effective in promoting export-oriented development strategy in general or boosting Indonesia's export ability in particular.

3) Indication of a loss in long-run export competitiveness arising from LCRs.

4) **Sign of domestic reallocation of resources toward satisfying LCRs, and away from engaging in international trade, especially exports.**

Result 4: Products with high linked to LCR sectors trade less

Figure 7.A1. Effects of LCRs on Import Volume, by degree of link to other LCR sectors
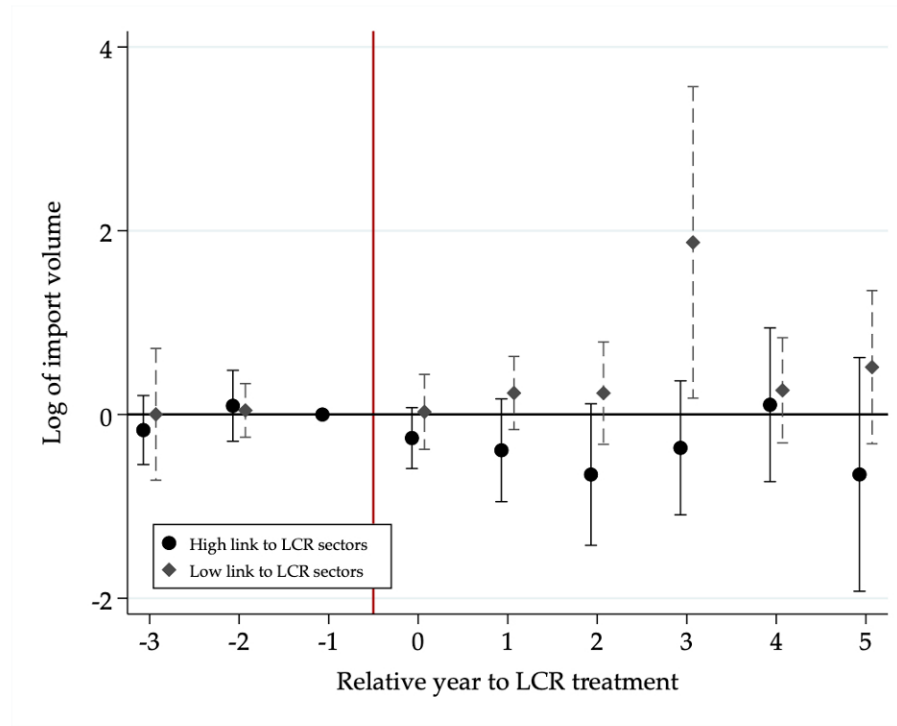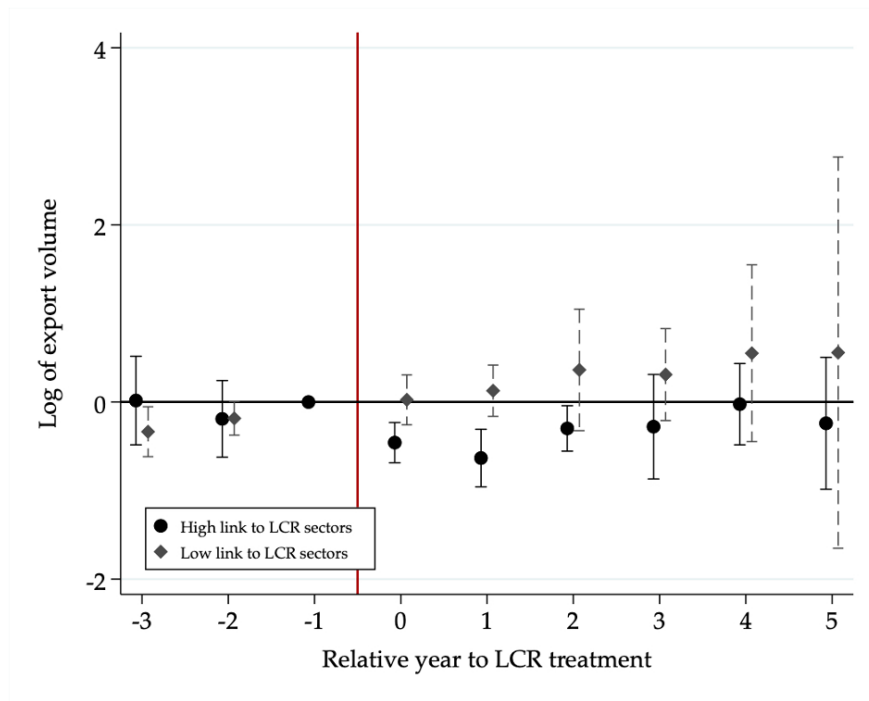

Source: Authors' estimation. Note: This figure presents the dynamic effects of being exposed to an LCR on log of import volume, based on separate DCDH22 estimations on the product group with a high link to LCR sectors (i.e., 2004–20 mean of *LinktoLCRsector* at the 60th percentile or above) and on the product group with a low link to other sectors with LCRs (i.e., 2004–20 mean of *LinktoLCRsector* at the 40th percentile or under). The reported specifications include control variables and 2-digit HS linear trends. Standard errors are estimated using 100 bootstrap replications clustered at 2-digit HS code level. 95% confidence intervals are displayed for each year.

* Using Indonesia's IO tables: information on share of output of each industry flowing as input for other industries with LCRs, we construct for each product's degree of linkage to so-called LCR sectors.

* The variable is called *LinktoLCRSector.* High link if value of this variable is 60th percentile or above; low link: 40th percentile or below.

* Products highly-linked to LCR sectors (i.e. used heavily as inputs for industries with LCRs) have less imports and exports than those with low linkage to LCR sectors.

Result 4: Domestic reallocation of resources toward meeting LCRs

Figure 7.A2. Effects of LCRs on Export Volume, by degree of link to other LCR sectors

Source: Authors' estimation. **Note**: This figure presents the dynamic effects of being exposed to an LCR on log of export volume, based on separate DCDH22 estimations on the product group with a high link to LCR sectors (i.e., 2004–20 mean of *LinktoLCRsectors* at the 60th percentile or above) and on the product group with a low link to other sectors with LCRs (i.e., 2004–20 mean of *LinktoLCRsectors* at the 40th percentile or under). The reported specifications include control variables and 2-digit HS linear trends. Standard errors are estimated using 100 bootstrap replications clustered at 2-digit HS code level. 95% confidence intervals are displayed for each year.

* Divergence in effects between high-link vs low-link products may indicate potential domestic reallocation of resources toward satisfying LCRs, and away from engaging in international trade.

* Resources originally allotted for exports may have been redirected toward supplying other domestic industries that are exposed to LCRs.

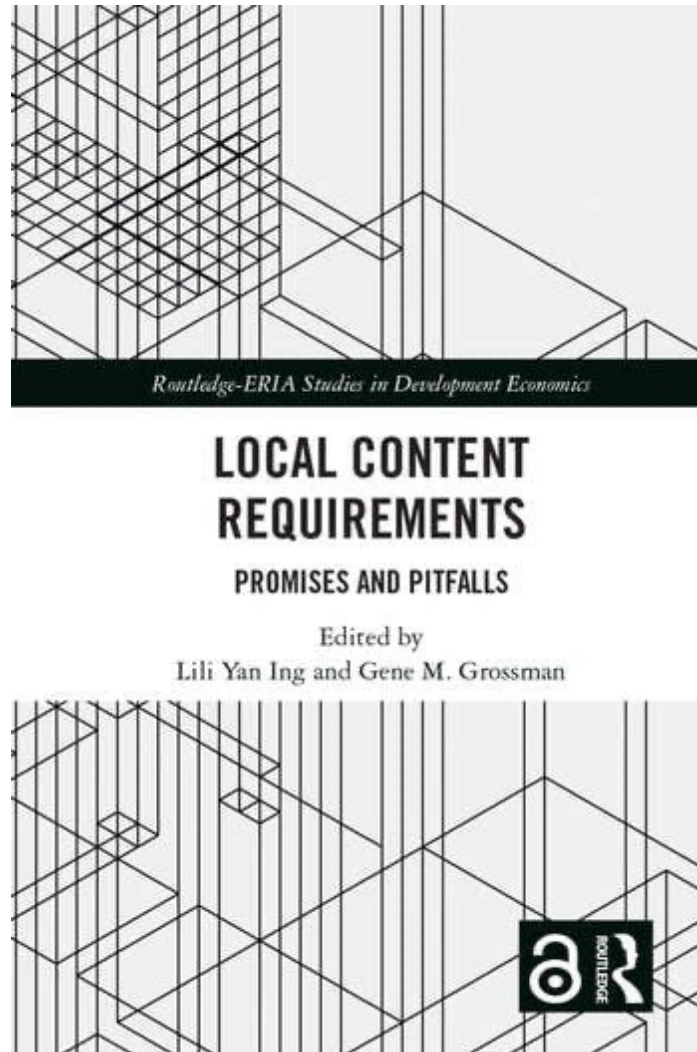* Consistent with lack of favorable effects of LCRs on exports in general.

Summary and implications

* Aggregate effects of LCRs on Indonesia's trade flows are minimal, though no robust evidence that LCRs systematically and significantly boost exports or reduce import reliance in the medium to long-run.
  * Impact on imports are less clear, and on exports tend to be negative.

* Signs of competitiveness loss and domestic reallocation of resources away from international trade due to LCRs.

* Study is silent on and doesn't rule out the possibility that LCRs may bring favorable, non-trade outcomes (e.g. local job creation).
  * But even so, findings inform that this may come at the expense of reduced export growth and potential in the long run. Policymakers need to carefully consider this trade-off.

* Both macro and micro perspectives are necessary in properly assessing the welfare impact of LCRs
  * LCRs create winners and losers in the economy, even indirectly in non-targeted sectors.
  * Avoid overestimation of benefits while underestimating the hidden costs of LCRs.
  * Micro matters: Firm-level decisions in response to LCRs affecting how the policy affects trade at the macro level.

Limitations & future studies

✳ LCRs as binary measures only, does not account for varying degrees of restrictiveness.

    ▶ Need more nuanced measures of LCRs to investigate how their effects vary across stringency levels.

✳ Analysis is limited on products within HS codes system

    ▶ As a result, it is not possible to examine impacts of LCRs on services sector, or local content policies that are executed via government procurement stipulations; both of which potentially have large effects.

✳ Examine the effectiveness of various designs of LCRs

    ▶ Does different design of local content policies (e.g. incentives-based vs mandatory), at various stringency levels, affect trade or economic outcomes differently?

    ▶ Can local content policies be accompanied by other policy instruments to achieve broader development objectives (e.g. green transition)?

    ▶ More detailed examination on how exposure to LCRs affects economic performance in other dimensions (e.g. productivity, labor market outcome, innovation, resources allocation, etc.)

This study is available on open access

Thank You