Online Appendix

Transshipment, Rules of Origin and Enforcement without Commitment

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OA.1 Proofs

Equations, lemmas and propositions without the prefix OA refer to the paper. All closed forms below were checked symbolically; the scripts are part of the replication package.

Preliminaries. With unit costs $c_D = d$, $c_L = l$ and $c_F = c$, the Cournot quantities are $q_i = (a - 4c_i + d + l + c)/4$, which gives equation (1). Let $G_X(c) \equiv \frac{1}{2}Q^2 + q_D^2 + (c - \lambda)q_F$ denote welfare when F's whole cost wedge c is collected as revenue and its goods carry full origin content. Direct computation gives $G_X'(c) = -\frac{21}{16}(c - \hat{\tau})$ with $\hat{\tau}$ as in equation (3). Hence G_X is concave with its maximum at $\hat{\tau}$.

Proof of Lemma 1. F prefers A to its best alternative if and only if $q_F(\gamma r)^2 - K \geq q_F(c_o)^2$. Outputs are positive by Assumption 1(ii), and the condition is equivalent to $(B - 3\gamma r)/4 \geq \sqrt{q_F(c_o)^2 + K}$, that is, $\gamma r \leq \tilde{c}(c_o)$ with $\tilde{c}$ as in equation (4). Between X and M, profit decreases in unit cost, and F chooses the cheaper of τ and $t + e$. Because $\sqrt{q_F(c)^2 + K}$ decreases in c, $\tilde{c}$ is increasing. □

Proof of Lemma 2. Under M with expected payment $x = p\sigma$, welfare gross of audit costs is $G(x) \equiv G_X(t+x) - t\,q_F(t+x)$, since only x of the cost wedge $t+x$ is revenue. Then $G'(x) = G'_X(t+x) + \frac{3}{4}t = -\frac{21}{16}(t+x-\hat{\tau}) + \frac{3}{4}t$, which vanishes at $x = \hat{\tau} - \frac{3t}{7} = \bar{e}$, and $G'' = -\frac{21}{16}$. Customs maximises $G(p\sigma) - \frac{k}{2}p^2$. The first-order condition is $-\frac{21}{16}(p\sigma - \bar{e})\sigma - kp = 0$, which gives $p = 21\bar{e}\sigma/(21\sigma^2 + 16k)$, and the second derivative is $-(21\sigma^2 + 16k)/16 < 0$. Multiplying by σ gives equation (6). The burden increases in σ and tends to $\bar{e}$. The audit probability $p = \bar{e}\sigma/(\sigma^2 + \kappa)$ reaches its maximum $\bar{e}/(2\sqrt{\kappa})$ at $\sigma = \sqrt{\kappa}$ and tends to zero, and Assumption 1(iii) ensures $p \leq 1$. □

Proof of Proposition 1. F prefers X to M if and only if $t + e(\sigma) \geq \tau$. (i) If $\tau \leq t$ this holds for every σ because $e \geq 0$. (iii) Since $e(\sigma) < \bar{e}$ for every finite σ, the condition fails for every s if $\tau \geq t + \bar{e} = \bar{\tau}$. (ii) For $t < \tau < \bar{\tau}$, the condition $\bar{e}\sigma^2/(\sigma^2 + \kappa) \geq \tau - t$ is equivalent to $\sigma^2(\bar{\tau} - \tau) \geq \kappa(\tau - t)$, which gives equation (7). The expression increases in τ and in $\kappa = 16k/21$ and diverges as $\tau \to \bar{\tau}$. Finally, $\bar{\tau} - \hat{\tau} = t - \frac{3t}{7} = \frac{4t}{7}$, and neither $\bar{\tau}$ nor $\hat{\tau}$ depends on s or k. □

Proof of Corollary 1. In a line with fraud cost t, the ceiling burden is $\bar{e}(t) = \hat{\tau} - 3t/7$ and the burden is $\varphi\,\bar{e}(t)$. Fraud is chosen if and only if $t + \varphi(\hat{\tau} - 3t/7) < \tau$. The left-hand side increases in t because $1 - 3\varphi/7 > 0$. Fraud is therefore chosen if and only if $t < t^*$, where $t^*(1 - 3\varphi/7) = \tau - \varphi\hat{\tau}$, which gives equation (8). Differentiating,

$$\frac{\partial t^*}{\partial \varphi} = \frac{-7\hat{\tau}(7 - 3\varphi) + 21(\tau - \varphi\hat{\tau})}{(7 - 3\varphi)^2} = \frac{7(3\tau - 7\hat{\tau})}{(7 - 3\varphi)^2},$$

which is negative whenever $\tau < 7\hat{\tau}/3$. Fraud requires $\tau < \bar{\tau}(t) = \hat{\tau} + 4t/7$ in the marginal line, and Assumption 1(i), imposed in every line, gives $t < \hat{\tau}$ and hence $\bar{\tau}(t) < 11\hat{\tau}/7 < 7\hat{\tau}/3$. The cross-partial is $21/(7 - 3\varphi)^2 > 0$. For $t^* > 0$,

$$-\frac{\partial \ln t^*}{\partial \varphi} = \frac{7\hat{\tau} - 3\tau}{(7 - 3\varphi)(\tau - \varphi\hat{\tau})},$$

whose numerator decreases and whose denominator increases in τ. If Φ is uniform on $[0, \bar{t}]$ and $0 < t^* < \bar{t}$, the fraud share is $t^*/\bar{t}$, which has the same proportional derivative. □

Proof of Corollary 2. With $K = 0$, Lemma 1 gives assembly if and only if $\gamma r \leq c_o = \min\{\tau, t + \varphi\bar{e}(t)\}$. If $t < t^*$, fraud is cheaper than direct export and the line is rerouted through assembly or fraud. If $t \geq t^*$, then $c_o = \tau$, and the line is rerouted if and only if $\gamma r \leq \tau$. By independence the share of lines that export directly is $[1 - G(\tau)][1 - \Phi(t^*)]$, which gives $S(\tau)$. Write $\Phi_\tau \equiv \Phi(t^*(\tau, \varphi))$ and $G_\tau \equiv G(\tau)$.

(i) With Φ uniform on $[0, \bar{t}]$ and t^* interior,

$$-\frac{\partial \ln S}{\partial \varphi} = \frac{(1 - G_\tau)}{\bar{t}\,S(\tau)}\left|\frac{\partial t^*}{\partial \varphi}\right|, \qquad \left|\frac{\partial t^*}{\partial \varphi}\right| = \frac{7(7\hat{\tau} - 3\tau)}{(7 - 3\varphi)^2}.$$

Each factor is weakly smaller at τ_H than at τ_L and the last strictly so. $1 - G_\tau$ is non-increasing in τ. S is non-decreasing in τ, because G_τ and Φ_τ are, since $\partial t^*/\partial \tau = 7/(7 - 3\varphi) > 0$. The last factor decreases in τ and is positive because $\tau < 7\hat{\tau}/3$, as shown in the proof of Corollary 1. The ranking holds for every G.

(ii) A reclassified line that assembles falls back to the cheaper of X and M. It remains rerouted if $t < t^*$ and exports directly if $t \geq t^*$. Among assembling lines, those with $t \geq t^*$ are the lines with $\gamma r \leq \tau$ and $t \geq t^*$, of mass $G_\tau(1 - \Phi_\tau)$. Reclassification with probability π therefore lowers S by

$\pi G_\tau(1-\Phi_\tau)$, that is, in the proportion $\pi\alpha(\tau)$ with $\alpha = G_\tau(1-\Phi_\tau)/S$. Since $S - G_\tau(1-\Phi_\tau) = \Phi_\tau$, $\alpha/(1-\alpha) = G_\tau(1-\Phi_\tau)/\Phi_\tau$. The map $\alpha \mapsto \alpha/(1-\alpha)$ is increasing, and $\alpha(\tau_H) > \alpha(\tau_L)$ if and only if $G_{\tau_H}(1-\Phi_{\tau_H})\Phi_{\tau_L} > G_{\tau_L}(1-\Phi_{\tau_L})\Phi_{\tau_H}$. Because t^* is interior, $0 < \Phi_\tau < 1$, and this is condition (9) when $G_{\tau_L} > 0$. If $G_{\tau_L} = 0 < G_{\tau_H}$, then $\alpha(\tau_L) = 0 < \alpha(\tau_H)$.

(iii) For small changes $d\varphi \geq 0$ and $d\pi \geq 0$ from $\pi = 0$, $d\ln S(\tau) = -f(\tau)\,d\varphi - \alpha(\tau)\,d\pi$ with $f \equiv -\partial \ln S/\partial\varphi > 0$. The difference across tariffs is

$$d\ln S(\tau_L) - d\ln S(\tau_H) = -\big[f(\tau_L) - f(\tau_H)\big]d\varphi + \big[\alpha(\tau_H) - \alpha(\tau_L)\big]d\pi.$$

By (i) the first bracket is positive, and under condition (9) the second is positive. If $d\varphi = 0$, the difference is non-negative. A negative difference therefore requires $d\varphi > 0$. □

Proof of Proposition 2. Under assembly, $Q^2/2 + q_D^2$ is the same as under direct export at the same unit cost, revenue is zero and origin content is $(1-r)q_F$. Hence $W_A(r) = G_X(\gamma r) - \gamma r q_F + \lambda r q_F$, which is equation (10). Its derivative is $\frac{21\gamma}{16}(\hat{\tau} - \gamma r) - \frac{\gamma-\lambda}{4}(B - 6\gamma r)$, which is linear in r with slope $3\gamma(\gamma - 8\lambda)/16 < 0$ under Assumption 1(iv). Setting it to zero gives equation (11).

At equal unit cost for F, the comparisons with the outside modes are as follows. If $\gamma r = \tau$, then $W_A - W_X = r(\lambda - \gamma)\,q_F$, because $W_X = G_X(\tau)$. If $\gamma r = t + e$, then $W_A - W_M = q_F\,(\lambda r - e) + \frac{k}{2}p^2$, because fraud carries full origin content, yields revenue $e\,q_F$ and requires audits.

(i) With $K = 0$, Lemma 1 gives assembly for $r \leq \bar{r} = c_o/\gamma$ and the outside mode for $r > \bar{r}$, whose welfare W_o does not depend on r. At $r = \bar{r}$ the unit cost of assembly equals c_o. If the outside mode is X, $W_A(\bar{r}) - W_X = \bar{r}(\lambda - \gamma)q_F \geq 0$. If it is M, then $\gamma\bar{r} = t + e$ and $W_A(\bar{r}) - W_M \geq q_F(\lambda\bar{r} - e) = q_F\big(\frac{\lambda}{\gamma}(t + e) - e\big) > 0$. The optimum therefore lies in $[0, \bar{r}]$, where concavity of W_A gives $r^* = \min\{\bar{r}, \max\{r_A^*, 0\}\}$.

(ii) The burden $e(\tau + s)$ increases strictly in s. Hence $c_o = \min\{\tau, t + e\}$ increases strictly in s while $t + e < \tau$, that is, for $s < s^*(\tau)$, and equals τ above. Since $\tilde{c}$ is increasing, the same holds for $\bar{r}$.

(iii) As $s \to \infty$, $c_o \to \min\{\tau, t + \bar{e}\} = \min\{\tau, \bar{\tau}\}$, and with $K = 0$, $\tilde{c}(c) = c$. □

Proof of Proposition OA.3. With $x = p\sigma$, the relator maximises $\rho\, x q_F(t + x) - \frac{k_R}{2}(x/\sigma)^2$. The first-order condition is $\rho\sigma^2(B - 3t - 6x) = 4k_R x$, which gives $e_R = \rho\sigma^2(B - 3t)/(4k_R + 6\rho\sigma^2) = L\sigma^2/(\sigma^2 + \kappa_R)$, and the objective is concave in x. Its limit is $L = (B - 3t)/6$, which maximises $x\,q_F(t + x)$.

(i) Direct computation gives $L - \bar{e} = (a + 9d - 7l - 3t - 24\lambda)/42$, which is positive if and only if $\lambda < \lambda_R$. The tariff ceiling for fraud under the relator follows as in Proposition 1 with L in place of $\bar{e}$.

(ii)–(iii) Write $u = \sigma^2 > 0$. Then $e_R \geq e$ if and only if $L(u + \kappa) \geq \bar{e}(u + \kappa_R)$, that is, $(L - \bar{e})u + L\kappa - \bar{e}\kappa_R \geq 0$. This holds for every $u > 0$ if and only if $L \geq \bar{e}$ and $L\kappa \geq \bar{e}\kappa_R$. If $L \geq \bar{e}$ and $\kappa_R \leq \kappa$, then $L\kappa \geq \bar{e}\kappa \geq \bar{e}\kappa_R$. The condition $\kappa_R \leq \kappa$ is $2k_R/(3\rho) \leq 16k/21$, that is, $\rho \geq 7k_R/(8k)$. If $L < \bar{e}$, the inequality holds strictly if and only if $u < (L\kappa - \bar{e}\kappa_R)/(\bar{e} - L) = \sigma_R^2$, which is positive if and only if $\kappa_R < L\kappa/\bar{e}$. □

Proof of Proposition 3. After K is sunk, F stays in assembly if and only if $q_F(\gamma r)^2 \geq q_F(c_o)^2$, that is, $\gamma r \leq c_o$. The government either keeps F in assembly by choosing $r \in [0, c_o/\gamma]$, or pushes it to the outside mode with welfare W_o. By the argument in the proof of Proposition 2(i), $W_A(c_o/\gamma) \geq W_o$ when $\lambda > \gamma$. The government therefore keeps F and, by concavity, chooses $r^d = \min\{\max\{r_A^*, 0\}, c_o/\gamma\}$. The bound $r \leq 1$ does not bind because $c_o < \gamma$.

(i) If $\gamma r_A^* \geq c_o$, then $r^d = c_o/\gamma$ and F's profit from assembly is $q_F(c_o)^2 - K < q_F(c_o)^2$, and F does not enter. Under commitment the government can choose $\bar{r} = \tilde{c}(c_o)/\gamma$, at which F enters, and it does so whenever $W_A(\bar{r}) > W_o$. On that set welfare under discretion, W_o, is strictly lower.

(ii) If $\gamma r_A^* < c_o$, then $r^d = \max\{r_A^*, 0\}$, and F enters if and only if its profit net of K covers its outside profit.

(iii) Under commitment the government can replicate the discretionary outcome. If F assembles under discretion, the government commits to r^d, and F makes the same choice. If F does not assemble, the government commits to $r = 1$. Since $\tilde{c}(c_o) \leq c_o < \gamma$, the rule $r = 1$ exceeds $\bar{r}$ and induces the outside mode. The argument uses $c_o < \gamma$, which is why the statement is restricted to the conditions of the proposition. □

OA.2 Two extensions

Each extension keeps the model of the paper and changes one element. Closed forms were checked symbolically in the replication scripts `ts_v2_ext.py` and `ts_v5_audit.py`.

OA.2.1 A committed audit floor

Suppose that before F chooses its mode the government commits customs to audit at least a share $p_\ell \in (0, 1]$ of declarations of T origin. Customs still chooses $p \geq p_\ell$ after F has moved.

Proposition OA.1 (Audit floor)**.** *Under M, customs sets $p = \max\{p_\ell, p_d(\sigma)\}$, where $p_d(\sigma) = 21\bar{e}\sigma/(21\sigma^2 + 16k)$ is the discretionary rate of Lemma 2, and the burden is $e_\ell(\sigma) = \max\{p_\ell\sigma, e(\sigma)\}$. For every tariff $\tau > t$, fraud is deterred by any liability $\sigma \geq \min\{\sigma^*(\tau), (\tau - t)/p_\ell\}$, with $\sigma^*(\tau) = \infty$ for $\tau \geq \bar{\tau}$. The supremum of the enforceable strictness over all penalties is τ/γ for every tariff.*

Proof. Welfare under M is $G(p\sigma) - kp^2/2$, whose second derivative in p is $-(21\sigma^2 + 16k)/16 < 0$. The unconstrained maximiser is $p_d(\sigma)$, and the constrained maximiser on $[p_\ell, 1]$ is $\max\{p_\ell, p_d\}$, given Assumption 1(iii). The burden follows by multiplying by σ. Both $p_\ell\sigma$ and $e(\sigma)$ increase in σ, and e_ℓ is therefore increasing and unbounded. F prefers X to M if and only if $t + e_\ell(\sigma) \geq \tau$, which holds if $e(\sigma) \geq \tau - t$, that is $\sigma \geq \sigma^*(\tau)$, or if $p_\ell\sigma \geq \tau - t$. With $K = 0$ the enforceable strictness is $\min\{\tau, t + e_\ell(\tau + s)\}/\gamma$, and as $s \to \infty$ it tends to τ/γ. □

The floor turns the audit rate into a partial commitment, and the Becker logic applies again, because for a given floor a heavier penalty always raises the burden. In the baseline a floor of 0.1 deters fraud at $\tau = 3.6$, the ceiling, with a penalty of 29.4 and at $\tau = 3.9$ with a penalty of 32.1. A floor of 0.2 more than halves these penalties, to 12.9 and 14.1. Tariffs above 3.9 are not considered because Assumption 1(ii) requires $\tau < B/3 = 4$. Below the ceiling the floor does not bind at the deterrent liability, and at $\tau = 3$ the minimal penalty stays at 5.28. The floor is costly only when declarations of T origin are genuine. When F assembles legally, customs must still audit at rate p_ℓ, at a cost of $kp_\ell^2/2$, which is 0.025, 0.1 and 0.4 for floors of 0.05, 0.1 and 0.2. Welfare under direct export at the preferred tariff is 27.2 in the baseline, and a floor of 0.1 costs under half a percent of welfare.

OA.2.2 A tariff on the transit country

Suppose all goods of T origin pay a specific tariff $\tau_T \geq 0$, including those of the genuine producer L, whose marginal cost becomes $l+\tau_T$. F's unit cost is τ under X, $\gamma r+\tau_T$ under A and $t+\tau_T+p\sigma$ under M, where σ is the liability on detection. Home collects τ_T on every unit of T origin. Write $B_T \equiv a+d+l+\tau_T$. Then $q_F(c)=(B_T-3c)/4$.

Proposition OA.2 (Transit tariff)**.** *Let* $0 \leq \tau_T < 21\bar{e}/10$.

(i) The ex post preferred tariff on direct exports is $\hat{\tau}_T = \hat{\tau}+11\tau_T/21$.

(ii) Under M, the burden is $e_T(\sigma)=\bar{e}_T\,\sigma^2/(\sigma^2+\kappa)$ *with* $\bar{e}_T \equiv \bar{e}-10\tau_T/21$ *and* $\kappa = 16k/21$ *as before.*

(iii) The fraud ceiling is $\bar{\tau}_T \equiv t+\tau_T+\bar{e}_T = \bar{\tau}+11\tau_T/21$. *For* $t+\tau_T < \tau < \bar{\tau}_T$ *fraud is deterred if and only if* $\sigma \geq \sqrt{\kappa(\tau-t-\tau_T)/(\bar{\tau}_T-\tau)}$.

(iv) With $K=0$ *the enforceable strictness is* $\bar{r}_T = (\min\{\tau, t+\tau_T+e_T\}-\tau_T)/\gamma$, *with supremum* $(\min\{\tau,\bar{\tau}_T\}-\tau_T)/\gamma$ *over penalties. At equal unit cost for F,* $W_A - W_X = (\lambda-\gamma)\,r\,q_F$, *and for* $\lambda > \gamma$ *the optimal rule under commitment is* $\min\{\bar{r}_T, \max\{r^*_{A,T}, 0\}\}$ *with*

$$\gamma r^*_{A,T} = \gamma r^*_A - \frac{2(\gamma+4\lambda)}{3(8\lambda-\gamma)}\,\tau_T.$$

Proof. Let $G^T(c) \equiv \frac{1}{2}Q^2 + q_D^2 + (c-\lambda)q_F + \tau_T q_L$ be welfare when F's cost wedge c is collected, with quantities evaluated at L's cost $l+\tau_T$. It is quadratic in c with second derivative $-21/16$, and solving its first-order condition gives (i). Under M, revenue from F is $(\tau_T+x)q_F$ and its cost is $t+\tau_T+x$. Welfare gross of audit costs is then $G^T(t+\tau_T+x)-t\,q_F$, maximised at $x=\hat{\tau}_T-3t/7-\tau_T=\bar{e}_T$ with the same curvature. The audit problem is then that of Lemma 2 with $\bar{e}_T$ in place of $\bar{e}$, which gives (ii), and (iii) follows as in Proposition 1, with $\bar{\tau}_T-\bar{\tau}=\tau_T+\bar{e}_T-\bar{e}=11\tau_T/21$. For (iv), F assembles if and only if $\gamma r+\tau_T \leq \min\{\tau, t+\tau_T+e_T\}$. Welfare under assembly is $G^T(\gamma r+\tau_T)-(\gamma-\lambda)rq_F$, because the wedge γr is not collected and origin content is $(1-r)q_F$. At $\gamma r+\tau_T=\tau$ this exceeds $W_X=G^T(\tau)$ by $(\lambda-\gamma)rq_F$. The first-order condition in r is linear in r with slope $3\gamma(\gamma-8\lambda)/16<0$, and solving it gives $\gamma r^*_{A,T}$, whose derivative in τ_T is $2(\gamma+4\lambda)/(3(\gamma-8\lambda))<0$. The comparison with fraud and the argument for the optimal rule are as in the proof of Proposition 2. □

The transit tariff affects fraud in two ways. Fraud becomes more expensive by τ_T, but because customs already collects τ_T at the border it wants a smaller audit burden on top, $10\tau_T/21$ less. The net effect raises the ceiling by $11\tau_T/21$. On legal assembly the tariff acts like a lower outside option, and the strictest enforceable rule falls one-for-one with τ_T/γ. In the baseline at $\tau=2$, transit tariffs of 0.2 and 0.5 raise the ceiling from 3.60 to 3.70 and 3.86, lower the minimal deterrent penalty from 2.02 to 1.66 and 1.13, and lower the supremum of the enforceable strictness from 0.71 to 0.64 and 0.54. A tariff of 0.2 makes fraud at $\tau=3.6$, at the old ceiling, deterrable with a penalty of 17.6. The government's ex post preferred assembly cost falls from 3.32 to 3.23 and 3.09.

OA.3 Private enforcement

Under the False Claims Act, a relator who exposes customs fraud keeps a share $\rho \in (0,1)$ of the recovery. Suppose that the relator chooses its detection probability after F has chosen its mode and bears an effort cost $k_R p^2/2$. Let $L \equiv (B-3t)/6$ denote the burden that maximises recoveries $x\,q_F(t+x)$ from a misdeclaring firm.

Proposition OA.3 (Relators)**.** *When the relator alone investigates, the expected burden on a misdeclared unit is $e_R(\sigma) = L\sigma^2/(\sigma^2+\kappa_R)$ with $\kappa_R \equiv 2k_R/(3\rho)$, which converges to L independently of ρ, k_R and λ.*

(i) The relator's ceiling exceeds the customs ceiling, $L > \bar{e}$, if and only if $\lambda < \lambda_R \equiv (a+9d-7l-3t)/24$. Delegation to relators then raises the tariff ceiling for fraud from $\bar{\tau}$ to $t+L$.

(ii) The relator imposes a weakly heavier burden than customs at every liability if and only if $\lambda \le \lambda_R$ and $\kappa_R \le L\kappa/\bar{e}$. Given $\lambda \le \lambda_R$, a sufficient condition is $\rho \ge 7k_R/(8k)$.

(iii) If $\lambda > \lambda_R$, the relator imposes a heavier burden than customs if and only if $\sigma < \sigma_R$, where $\sigma_R^2 = (L\kappa - \bar{e}\kappa_R)/(\bar{e}-L)$. The threshold is positive if and only if $\kappa_R < L\kappa/\bar{e}$.

A relator that is cheap to motivate approaches its ceiling at low liabilities. Its ceiling is set by revenue alone. When the security motive is strong, the government would like a burden above the revenue-maximising level, but the relator stops at L. In the baseline, $\bar{e} = 3.30$ and $L = 1.85$, and customs has the higher ceiling. A relator with effort cost $k_R = 1$ and share $\rho = 0.25$ still imposes a heavier burden than customs for liabilities up to $\sigma_R = 3.66$. The proof is in Section OA.1.

Fraud across product lines. Figure OA.1 illustrates Corollary 1 in the baseline.

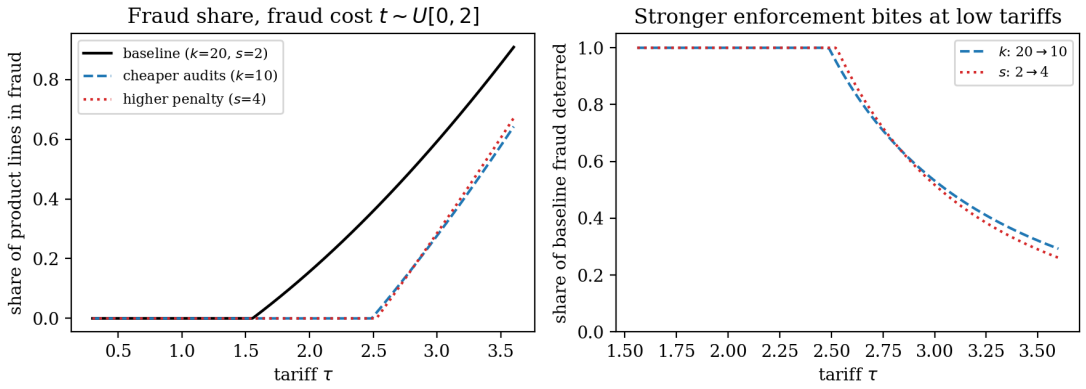


Figure OA.1: Fraud across product lines. Fraud costs are uniform on $[0,2]$; the baseline penalty is $s = 2$ and the baseline audit cost is $k = 20$. Left: share of lines in which F commits fraud. Right: share of baseline fraud lines deterred by cheaper audits or a higher penalty. Source: author's calculations.

OA.4 The optimal rule with a weak security motive

If $\lambda < \gamma$, local content costs the home country more than it is worth, and direct export dominates assembly at equal cost. The government then often prefers a rule strict enough to push F out of assembly altogether. On a grid of 180 parameter values with $\lambda < \gamma$ this happens in 139 cases. In the remaining 41 cases, where

assembly is kept, the optimal rule is $\min\{\max\{r_A^*, 0\}, \bar{r}\}$ in every case, as in Proposition 2(i). Figure OA.2 plots the enforceable strictness against the penalty in the baseline.

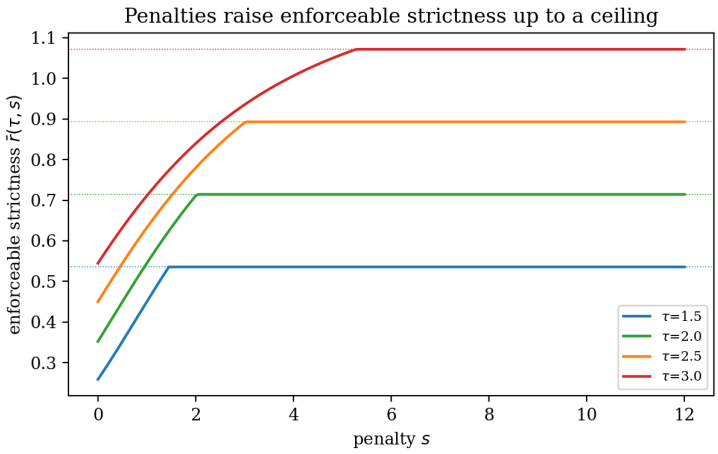


Figure OA.2: Enforceable strictness $\bar{r}(\tau, s)$ against the penalty, $K = 0$, baseline parameters. Dotted lines mark the supremum $\min\{\tau, \bar{\tau}\}/\gamma$.

OA.5 Data construction

Census import records. I downloaded annual year-to-date records for December of 2015–2025 and for August of 2024–2026 from the Census international trade API, endpoint `imports/hs`, at the ten-digit level for China, the fifteen transit countries, Japan, Germany, the United Kingdom and the world total. The variables are general imports, imports for consumption, calculated duty and first quantity. I aggregate to eight-digit lines and keep the 9,056 lines present in every year from 2015 to 2025. After dropping 228 unlisted lines with Section 232/201 duties, 8,828 lines remain: 5,679 on Lists 1–3, 2,161 on List 4A and 988 unlisted, in 4,565 six-digit products. Imports for consumption from China were 398 billion dollars in 2017 and 240 billion in 2025, and from the transit countries 706 and 1,419 billion. The effective duty rate is calculated duty over the customs value of imports for consumption. The comparison group of other suppliers is the world total minus China and the fifteen transit countries, computed line by line and bounded below by zero.

Section 232/201 lines. An unlisted line is dropped if the effective rate on imports from China rose by more than five percentage points between 2017 and 2021. The rule picks up steel and aluminium products under Section 232 and solar cells, modules and washers under Section 201, which also apply to most transit countries. In BACI the 158 HS6 products containing such a line are dropped. 143 of them are unlisted, 12 are in the low tier and 3 are in the high tier. In the HS 2012 panel, an HS 2012 product is dropped if any of its HS 2017 children is.

BACI. Flows are extracted from the HS 2017 and HS 2012 vintages of BACI (Gaulier & Zignago, 2026): China to the United States, China to each transit country, and each transit country to the United States and to all other destinations. Values are in thousands of dollars and enter as inverse hyperbolic

sines, which keeps zeros, and panels are balanced within country–product pairs. Tiers are mapped to HS 2012 through the WITS H5 to H4 concordance.

Effective-rate intensity. For the 2SLS estimates the change in China's effective rate on a six-digit product is its calculated duties over customs value in 2019–2024 minus the same ratio in 2015–2017, both import-weighted over the product's eight-digit lines. The mean change is 20.1 points in the high tier and 5.8 points in the low tier.

Orbis. Through the WRDS interface to Orbis (Bureau van Dijk, 2026) I extracted all first-level subsidiaries of parents with a Chinese identifier in the large and medium company tables, 2.2 million parent–subsidiary links for 564,049 parents. For subsidiaries located in the fifteen transit countries and in eight high-income control countries (United States, Germany, United Kingdom, Australia, Japan, France, Italy, Netherlands), I retrieved the date of incorporation and the primary NACE Rev. 2 code. The analysis sample has 5,416 subsidiaries incorporated in 2012–2025, of which 3,364 are in transit countries and 2,355 in Singapore.

Rulings and enforcement records. Rulings come from CROSS, with full text: 7,448 rulings from 2013 to 2026 that address country of origin, of which 2,998 are China-linked because they mention Chinese inputs, name a transit country and discuss substantial transformation. They are classified by keyword rules described in the replication package, and each ruling is assigned to the four-digit headings it cites. EAPA notices and determinations were collected from CBP and coded by product, transit country and outcome. Circumvention initiations and determinations from 2010 to 2026 come from the Federal Register API.

OA.6 Additional empirical results

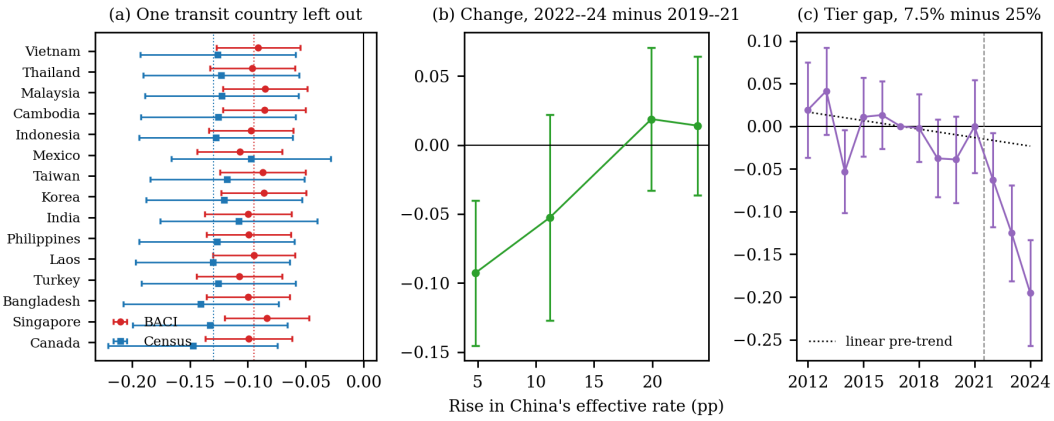


Figure OA.3: (a) Difference in the change with one transit country left out, 95 percent confidence intervals; dotted lines mark the full-sample estimates. (b) Change in the rerouting effect, 2022–2024 minus 2019–2021, by bin of the rise in China's effective rate on the product, BACI HS 2017. (c) Year-by-year gap between the tier coefficients, BACI HS 2012, with the linear pre-trend fitted to 2012–2017. Source: CEPII BACI; US Census Bureau; author's calculations.

Leaving one transit country out. Panel (a) of Figure OA.3 plots the estimates. Table OA.1 reports the difference in the change of Table 4 with each transit country dropped in turn, from the BACI triple difference and from the Census comparison with other suppliers. Dropping Mexico moves the Census estimate the most, to -0.097, and dropping Singapore or Malaysia moves the BACI estimate the most, to -0.083 and -0.085.

Table OA.1: Difference in the change, leaving one transit country out

Country dropped	BACI	Census	Country dropped	BACI	Census
Vietnam	-0.091***	-0.126***	India	-0.100***	-0.108***
	(0.018)	(0.034)		(0.019)	(0.035)
Thailand	-0.096***	-0.123***	Philippines	-0.099***	-0.127***
	(0.019)	(0.034)		(0.019)	(0.034)
Malaysia	-0.085***	-0.122***	Laos	-0.095***	-0.130***
	(0.018)	(0.034)		(0.018)	(0.034)
Cambodia	-0.086***	-0.125***	Turkey	-0.107***	-0.125***
	(0.018)	(0.034)		(0.019)	(0.034)
Indonesia	-0.097***	-0.128***	Bangladesh	-0.100***	-0.141***
	(0.019)	(0.034)		(0.018)	(0.034)
Mexico	-0.107***	-0.097***	Singapore	-0.083***	-0.133***
	(0.019)	(0.035)		(0.019)	(0.034)
Taiwan	-0.087***	-0.118***	Canada	-0.099***	-0.147***
	(0.019)	(0.034)		(0.019)	(0.037)
Korea	-0.086***	-0.120***			
	(0.019)	(0.034)			

Notes: BACI: specification of Table 3, Panel A, first row, without the stated country. Census: Panel B, first row, with the stated country moved out of the transit group and out of the comparison group. Standard errors clustered by HS6 product.

The duty paid and the list. Table OA.2 groups the listed six-digit products by the rise in China's import-weighted effective rate between 2015–2017 and 2019–2024 and estimates the triple difference of equation (13) with a separate early and late coefficient for each group. Panel A shows that rerouting in 2019–2021 was positive in every bin, and that the fade after 2022 is confined to the two bins below 15 points. The first bin is mostly List 4A products but contains 187 products of Lists 1–3 on which product exclusions kept the duty paid low. Panel B separates them. Their fade, -0.070, is close to the low-tier fade of -0.102, while the rest of the high tier shows none. Panel C reports the change per point of the duty change. Across all listed products the fade shrinks by 0.003 log points per point of duty. Within each tier the duty change varies little, with an interdecile range of 11 to 25 points in the high tier and 1 to 7 points in the low tier, and the slope is small.

Enforcement records. Table OA.3 lists the product groups of Enforce and Protect Act investigations, which are dominated by chemicals, steel pipe, aluminium products, furniture and quartz surfaces. The transit countries named most often are India, Thailand, Malaysia and Vietnam. Solar cells followed the same sequence as hardwood plywood, with a circumvention inquiry opened in April 2022 and an affirmative country-wide finding in August 2023 (International Trade Administration, 2022, 2023). Figure OA.4 shows that both series rise after 2018 and that circumvention initiations reached their highest level in 2026, and Figure OA.5 shows the rulings and their event study.

Table OA.2: The fade by the rise in the duty paid, BACI HS 2017

A. Listed HS6 products by the change in China's effective rate, 2015–17 to 2019–24				
Change in effective rate (pp)	below 7.5	7.5–15	15–22.5	above 22.5
Mean change (pp)	4.8	11.2	19.9	23.9
Products in 25% / 7.5% tier	187 / 730	262 / 60	1,049 / 10	1,486 / 5
Rerouting effect, 2019–21	0.100***	0.048	0.125***	0.143***
	(0.036)	(0.056)	(0.036)	(0.034)
Change, 2022–24 minus 2019–21	-0.093***	-0.053	0.019	0.014
	(0.027)	(0.038)	(0.026)	(0.026)
B. Change, 2022–24 minus 2019–21, by group				
25% tier, effective rate up less than 7.5 pp	-0.070 (0.059), 187 products, mean rise 3.1 pp			
25% tier, effective rate up 7.5 pp or more	-0.003 (0.034), 2,792 products			
7.5% tier	-0.102*** (0.036), 1,077 products			
C. Change per point of duty change				
All listed products	0.0033*** (0.0009)			
Within the 25% tier	0.0014 (0.0013)			
Within the 7.5% tier	-0.0052 (0.0057)			

Notes: Triple difference of transit-country exports to the US versus the rest of the world with fixed effects Tkd, Tkt, Tdt and separate 2019–2021 and 2022–2024 coefficients for each group of products. The rise in China's effective rate is calculated duties over customs value of US imports from China, import-weighted over the HTS8 lines of the product, 2019–2024 minus 2015–2017. Panel C: interaction of the late-minus-early contrast with the rise in the effective rate, with separate period effects for listed products. Standard errors clustered by HS6 product.

Direct imports, alternative estimators. Table OA.4 collects alternative estimators for direct imports and for the pooled comparison of transit and control exporters.

High-income exporters as the comparison group. Table OA.5 compares US imports from each transit country with US imports of the same line from Japan, Germany and the United Kingdom. Relative to these exporters, transit countries lost ground in both tiers. The difference in the change between tiers is -0.08 with a standard error of 0.02, as reported in the last row of Panel B of Table 3.

Transit countries versus other suppliers. Table OA.6 and Figure OA.6 report the comparison of Panel B of Table 3 in full. With least squares both tiers lose ground relative to other suppliers, more so in the low tier, while with PPML both gain. The difference in the change is negative in both.

Long pre-period. Table OA.7 reports the event study of the triple difference in the HS 2012 panel, the basis of panel (c) of Figure 3. Without the drop of Section 232/201 products the pre-period coefficients are jointly significant at the five percent level in both tiers. With the drop they are not.

Same-product pass-through. Table OA.8 regresses the long difference, between 2017 and the 2022–2024 average, in exports of transit country T to the United States on the long difference in Chinese exports of the same product to T, separately by tier. Growth in Chinese exports to a transit country predicts growth in its US exports, but it predicts growth in its exports to other destinations almost as well. Same-product pass-through therefore reflects general supply-chain relocation and does not by itself identify transshipment.

Table OA.3: Enforce and Protect Act investigations by product group

Product group	Cases	Share
Chemicals	26	0.19
Other	24	0.17
Steel pipe / tube	16	0.12
Aluminium products	16	0.12
Furniture	13	0.09
Quartz surface products	11	0.08
Cabinets / vanities	10	0.07
Other steel	9	0.06
Steel wire / nails	6	0.04
Plywood / hardwood	3	0.02
Tires	2	0.01
Mattresses	2	0.01
Solar cells	1	0.01
Total	139	1.00

Notes: Cases with a coded product group, 2002–2026. Source: CBP notices of action and determinations.

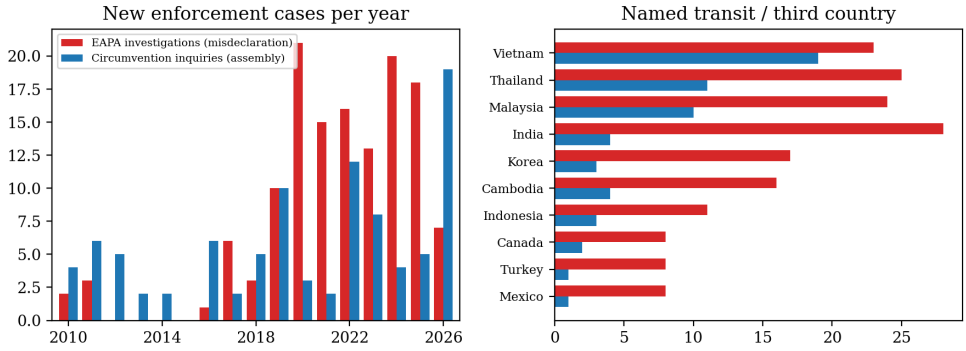


Figure OA.4: New Enforce and Protect Act investigations (misdeclaration) and Commerce circumvention inquiries (assembly) by year of initiation, and the transit or third countries they name.

Chinese-owned subsidiaries. Table OA.9 estimates a PPML difference-in-differences on the number of new Chinese-owned subsidiaries by host country and year of incorporation, comparing transit countries with the eight control countries. New subsidiaries in transit countries rose relative to control countries after 2018, and the increase grew after 2022. The increase is largest in wholesale and warehousing, where the pre-period test does not reject. For manufacturing the pre-period test rejects at five percent. Singapore accounts for 70 percent of the transit-country subsidiaries. Panel B of the table shows that the sectoral composition of new subsidiaries did not change significantly relative to control countries. The ownership data thus show an expansion of Chinese trading and logistics presence in the region. Figure OA.7 shows the counts and the event study.

2025 and 2026. Table OA.10 reports effective duty rates and import levels for January–August of 2024, 2025 and 2026. The tier contrast for 2026 in the paper uses the January–August records of transit countries and other non-China suppliers with group × line, line × year and group × year effects, base year 2024, 52,968 observations.

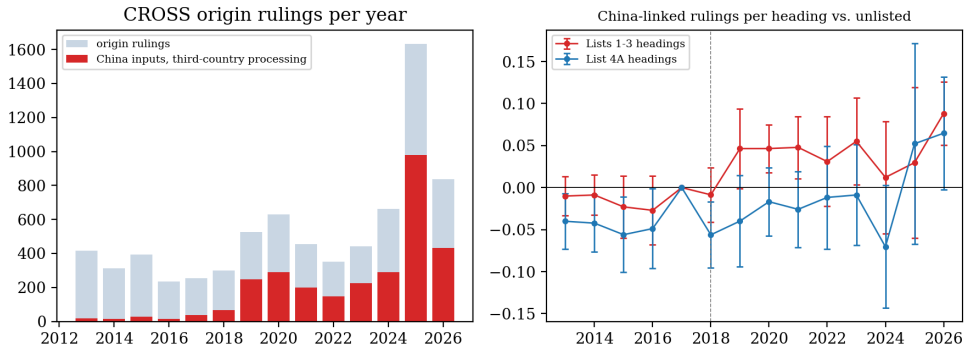


Figure OA.5: Left: origin rulings per year and China-linked rulings. Right: event study of China-linked rulings per heading by Section 301 tier, base year 2017, 95 percent confidence intervals.

Table OA.4: Robustness, Census HTS8

	China direct		*T* vs. *C*, pooled	
	25%	7.5%	25%	7.5%
Baseline OLS, asinh	-0.674***	-0.131**	-0.302***	-0.421***
	(0.063)	(0.065)	(0.085)	(0.091)
PPML, levels	-0.578***	-0.508***	0.152	0.184
	(0.071)	(0.095)	(0.145)	(0.157)
Within HS6	-0.799***	-0.109		
	(0.127)	(0.080)		
Sun–Abraham	-0.700***	-0.181***		
	(0.061)	(0.067)		
Imputation (BJS)	-0.674***	-0.144**		
	(0.062)	(0.072)		
Randomisation p (200 draws)	0.000	0.015	0.000	0.000

Notes: Columns (1)–(2): direct imports from China, specifications of Table 1. Columns (3)–(4): imports from the fifteen transit countries pooled versus Japan, Germany and the United Kingdom pooled, with group × line, line × year and group × year effects. Randomisation p-values from 200 permutations of tier labels across lines. Standard errors clustered by HS6.

OA.7 The 2025 reciprocal tariffs

The reciprocal tariffs of 2025 raised the effective rate on Chinese goods in January–August to 45 percent in the high tier, 31 percent in the low tier and 17 percent on unlisted lines. Product exemptions and the USMCA kept the rates on transit-country goods between 3.7 and 6.7 percent in 2026, far below the statutory 19 and 20 percent on Vietnam, Thailand, Malaysia and Cambodia (DFDL, 2025). In January–August 2026, imports from China were 26 to 38 percent below their 2024 level in every tier, and imports from transit countries were 41 to 52 percent above it. With a large rate gap in every tier, the model predicts rerouting in all lines and no tier contrast. In the Census comparison of transit countries with other suppliers, the 2026 coefficients relative to 2024 and to unlisted lines, which also gained, are −0.139 in the high tier and −0.134 in the low tier. Their difference is 0.005, with a standard error of 0.048. The estimate is consistent with the prediction.

Table OA.5: Comparison with high-income exporters, Census HTS8, 2015–2024

	(1) Duty rate (pp)	(2) China	(3) China within HS6	(4) T	(5) T vs. C	(6) (5) × homog.
Lists 1–3 (25%) × post	20.022***	-0.674***	-0.799***	0.064***	-0.094***	-0.064
	(0.178)	(0.063)	(0.127)	(0.019)	(0.036)	(0.042)
List 4A (7.5%) × post	5.495***	-0.131**	-0.109	-0.003	-0.235***	-0.227***
	(0.178)	(0.065)	(0.080)	(0.020)	(0.040)	(0.045)
Lists 1–3 × post × homog.						-0.068
						(0.087)
List 4A × post × homog.						-0.063
						(0.095)
Pre-period test, p	0.001	0.679			0.001	
Observations	66,653	79,452	79,452	1,191,780	1,430,136	1,430,136
Fixed effects	k, t	k, t	k, HS6×t	ik, it	ik, kt, it	ik, kt, it

Notes: Columns (1)–(3) as in Table 1. Column (4): imports from transit country i. Columns (5)–(6): transit countries versus Japan, Germany and the United Kingdom. Homogeneous goods follow Rauch (1999). Standard errors clustered by HS6.

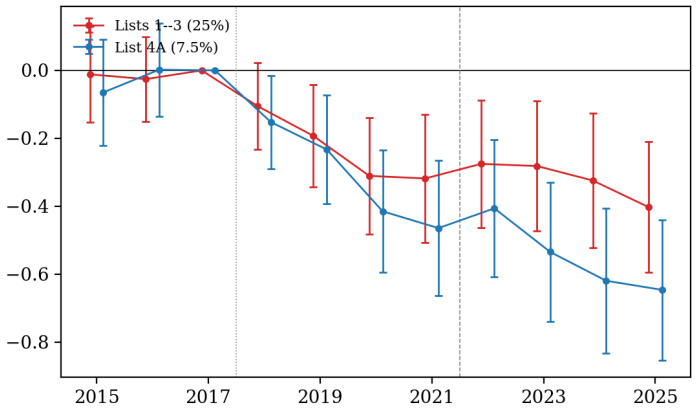


Figure OA.6: Event study of US imports from transit countries versus other non-China suppliers by Section 301 tier, base year 2017, 95 percent confidence intervals.

OA.8 Fraud or relocation: further results

Simulation check of Corollary 2. The script `ts_v6_corollary.py` draws two million lines with fraud cost t uniform on $[0,\bar{t}]$, $\bar{t} \in \{3,4\}$, and assembly cost γr from five distributions G (uniform on $[0,6]$, $[1,8]$ and $[1.5,8]$, and $6 \cdot \text{Beta}(4,2)$ and $6 \cdot \text{Beta}(2,4)$), at the numerical baseline with $\tau_L = 1$, $\tau_H = 2.5$ and $\varphi \in \{0.1, 0.2\}$. In all 20 cases the simulated rerouted share and its derivative in φ match the closed forms, the fraud contrast is negative, and the sign of the response to reclassification with probability $\pi = 0.05$ matches condition (9).

Further splits and outcomes. Table OA.11 complements Table 5. Panels A and B split feasible pairs at the median of R, the share of China in the transit country's supply of the product before 2018, measured as China's exports of the product to T relative to T's exports of the product. The difference in the change is -0.130 below the median and -0.103 above it in HS 2017, and -0.113 and -0.100 in HS 2012. Panel C repeats the feasibility split in the HS 2012 panel with inflows measured over 2015–2017, and Panel D keeps pairs in which T exported at least 100,000 US dollars of the product before 2018. Panel E splits

Table OA.6: US imports from transit countries versus other non-China suppliers, Census HTS8

	(1) Pooled	(2) Split	(3) Split, PPML	(4) Split, excl. 84–85
Lists 1–3 (25%) × post	-0.271***			
	(0.079)			
List 4A (7.5%) × post	-0.424***			
	(0.084)			
Lists 1–3 × 2019–21		-0.261***	0.127	-0.258***
		(0.076)	(0.135)	(0.080)
Lists 1–3 × 2022–24		-0.281***	0.166	-0.255***
		(0.090)	(0.119)	(0.095)
List 4A × 2019–21		-0.350***	0.068	-0.381***
		(0.081)	(0.134)	(0.084)
List 4A × 2022–24		-0.499***	0.002	-0.495***
		(0.096)	(0.120)	(0.100)
Difference in change, 7.5% − 25%		-0.130	-0.105	-0.117
p-value		0.000	0.042	0.001
randomisation p (200 draws)		0.000		
Pre-period test, p	0.306			
Observations	158,904	158,904	157,577	137,700

Notes: Two groups per line and year: the fifteen transit countries and all other suppliers except China. Fixed effects: group × line, line × year, group × year. Post is 2019–2024; 2018 is dropped. Standard errors clustered by HS6.

products by the classification of Rauch (1999). Many homogeneous and reference-priced products, such as chemicals, metal products and building materials, are subject to anti-dumping or countervailing duty orders on Chinese goods with rates far above the Section 301 tiers, and evasion of these orders is policed through the Enforce and Protect Act. Panel F reports three outcomes in a difference-in-differences across tiers and periods, with transit country × product and transit country × year effects and unlisted products as the comparison group: the absolute log gap between T's unit value of exports to the United States and China's unit value of exports of the same product to the United States, an indicator that this gap is below 25 percent, and the inverse hyperbolic sine of China's exports of the product to T. The first two columns report the changes in the tier coefficients and the third the difference in the change with its standard error.

Table OA.7: Triple difference event study, BACI HS 2012, 2012–2024

	25% tier	7.5% tier		25% tier	7.5% tier
2012	0.028	0.047	2019	0.043	0.006
	(0.049)	(0.052)		(0.044)	(0.046)
2013	-0.016	0.025	2020	0.010	-0.029
	(0.046)	(0.049)		(0.050)	(0.052)
2014	0.026	-0.027	2021	-0.065	-0.065
	(0.043)	(0.046)		(0.053)	(0.055)
2015	-0.018	-0.007	2022	-0.003	-0.065
	(0.040)	(0.043)		(0.060)	(0.062)
2016	-0.038	-0.025	2023	-0.055	-0.180***
	(0.037)	(0.039)		(0.060)	(0.063)
2018	0.041	0.039	2024	-0.082	-0.277***
	(0.032)	(0.035)		(0.060)	(0.064)
Joint test 2012–2016 = 0: p = 0.335 (25%), 0.565 (7.5%); mean pre-period tier gap 0.006 (0.020)					
Observations 1,642,342; fixed effects Tkd, Tkt, Tdt; base year 2017					

Notes: Exports of transit countries to the United States versus the rest of the world. Tiers mapped from HS 2017 through the WITS concordance; 158 HS 2012 products containing Section 232/201 lines are dropped. Standard errors clustered by HS6.

Table OA.8: Same-product pass-through, BACI HS 2017

	(1) $\Delta T \to$US	(2) $\Delta T \to$US	(3) $\Delta T \to$RoW
Δ China$\to T \times$ not listed	0.165***	0.146***	0.164***
	(0.031)	(0.029)	(0.025)
Δ China$\to T \times$ List 4A	0.050***	0.047***	0.021
	(0.013)	(0.012)	(0.013)
Δ China$\to T \times$ Lists 1–3	0.025***	0.022***	0.017***
	(0.005)	(0.005)	(0.005)
$\Delta T \to$RoW		0.119***	
		(0.005)	
p: Lists 1–3 = not listed	0.000	0.000	0.000
Observations	75,421	75,421	75,421
Fixed effects		$T\times$tier, $T\times$HS2	

Notes: Long differences in the inverse hyperbolic sine of trade values, 2017 to the 2022–2024 average, by transit country and HS6 product. Standard errors clustered by HS6.

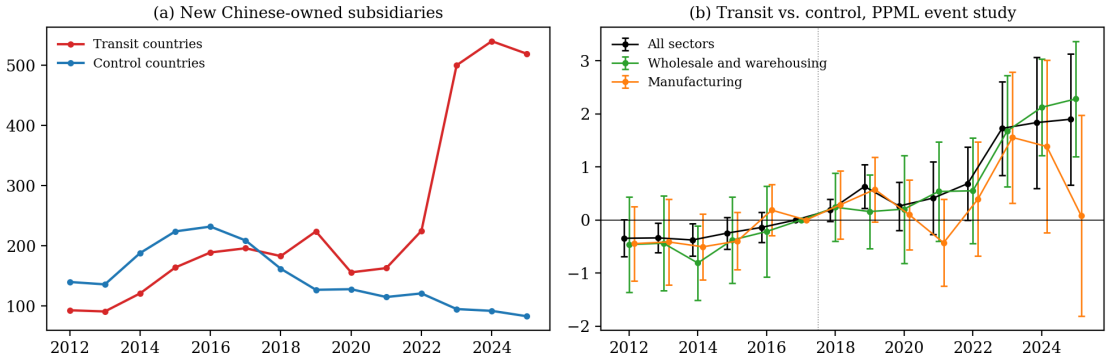


Figure OA.7: (a) New Chinese-owned subsidiaries by year of incorporation. (b) PPML event study, transit versus control countries, base year 2017, 95 percent confidence intervals.

Table OA.9: New Chinese-owned subsidiaries in transit countries, Orbis 2012–2025

	All sectors	Manu-facturing	Wholesale, warehousing	Other services	All, excl. Singapore
Transit × 2019–2025	1.397***	0.868**	1.652***	1.212***	0.233
	(0.462)	(0.409)	(0.366)	(0.465)	(0.282)
Transit × 2019–2021	0.663***	0.388**	0.639**	0.694***	0.346**
	(0.214)	(0.159)	(0.293)	(0.221)	(0.149)
Transit × 2022–2025	1.797***	1.221**	2.093***	1.530***	0.113
	(0.549)	(0.555)	(0.399)	(0.578)	(0.525)
Share of new subsidiaries (LPM), transit × post					
Manufacturing	0.019				0.053
	(0.039)				(0.061)
Wholesale and warehousing	0.018				-0.050
	(0.045)				(0.052)
Pre-period test, p	0.054	0.025	0.351	0.702	0.080
New subsidiaries	5,416	909	1,865	2,642	3,061

Notes: Top panel: PPML, number of new first-level subsidiaries of Chinese parents by host country and year of incorporation, host and year fixed effects, 2018 dropped. Control hosts: United States, Germany, United Kingdom, Australia, Japan, France, Italy, Netherlands. Sectors by primary NACE Rev. 2 code: manufacturing 10–33, wholesale 46 and warehousing 52. Middle panel: linear probability model at the subsidiary level for the sector of a new subsidiary, host and year fixed effects. Standard errors clustered by host country. The pre-period test is the joint test that the 2012–2016 event-study coefficients are zero.

Table OA.10: Duties paid and imports, January–August 2024–2026, Census HTS8

		Lists 1–3	List 4A	Unlisted
Effective duty rate, January–August (percent)				
China	2024	23.1	12.5	3.2
	2025	44.5	30.5	16.6
	2026	39.1	23.8	12.8
Transit countries	2024	0.4	3.1	0.7
	2025	2.7	5.6	3.8
	2026	3.7	5.6	6.7
Imports, January–August, relative to 2024				
China	2025	0.86	0.81	0.76
	2026	0.74	0.62	0.66
Transit countries	2025	1.16	1.13	1.18
	2026	1.51	1.52	1.41

Notes: Calculated duties over customs value of imports for consumption, and imports for consumption relative to January–August 2024. Lines with Section 232/201 duties are kept.

Table OA.11: Fraud or relocation: further splits and outcomes, BACI

	Change, 25% tier	Change, 7.5% tier	Difference in change	HS6 products	Country–product pairs
A. Same-product inflow share R before 2018, HS 2017 (2017)					
$R = 0$	-0.111**	-0.049	0.061	2,620	10,800
	(0.045)	(0.050)	(0.053)		
R below median	-0.000	-0.131***	-0.130***	4,728	25,895
	(0.032)	(0.035)	(0.023)		
R above median	0.039	-0.064*	-0.103***	4,505	25,947
	(0.033)	(0.038)	(0.029)		
B. Same-product inflow share R before 2018, HS 2012 (2015–2017)					
$R = 0$	-0.113**	-0.140**	-0.026	2,002	8,486
	(0.052)	(0.058)	(0.063)		
R below median	-0.019	-0.131***	-0.113***	4,841	29,687
	(0.034)	(0.037)	(0.023)		
R above median	-0.032	-0.132***	-0.100***	4,633	29,488
	(0.035)	(0.040)	(0.028)		
C. Relabelling feasibility, HS 2012: China exported the HS6 product to T in 2015–2017					
Feasible pairs	-0.034	-0.140***	-0.106***	4,941	61,492
	(0.034)	(0.036)	(0.018)		
Infeasible pairs	-0.122**	-0.148**	-0.026	2,002	8,486
	(0.052)	(0.058)	(0.063)		
Difference	0.088**	0.008	-0.079		
	(0.042)	(0.050)	(0.065)		
D. Relabelling feasibility, pairs with pre-2018 exports of at least 100,000 US dollars					
HS 2017, feasible pairs	0.044**	-0.079***	-0.124***	4,738	40,395
	(0.022)	(0.025)	(0.020)		
HS 2017, infeasible pairs	-0.071	-0.029	0.042	2,027	5,781
	(0.047)	(0.054)	(0.066)		
Difference	0.115***	-0.051	-0.166**		
	(0.044)	(0.053)	(0.069)		
HS 2012, feasible pairs	0.083***	-0.035	-0.118***	4,843	49,489
	(0.025)	(0.027)	(0.018)		
HS 2012, infeasible pairs	0.025	0.013	-0.012	1,549	4,808
	(0.051)	(0.062)	(0.073)		
Difference	0.058	-0.048	-0.106		
	(0.046)	(0.059)	(0.075)		
E. Product type (Rauch classification), HS 2017					
Differentiated	0.009	-0.116***	-0.125***	3,411	48,764
	(0.034)	(0.036)	(0.020)		
Homogeneous or reference-priced	-0.044	-0.020	0.024	1,812	23,466
	(0.038)	(0.056)	(0.049)		
Difference			0.149***		
			(0.053)		
F. Other outcomes, HS 2017					
Unit-value gap to China, $\lvert\Delta \ln uv\rvert$	-0.018	-0.045	-0.027*		
			(0.015)		
Unit value within 25% of China's	0.010	0.021	0.011*		
			(0.006)		
China's exports to T, same product	0.157	0.183	0.027		
			(0.018)		

Notes: Specification of Table 5. Panels A and B: groups by the pre-2018 share R of China in the transit country's exports of the product; $R = 0$ are the infeasible pairs of Table 5, Panel C. Panel C: a pair is feasible if China exported the HS6 product to T in 2015–2017. Panel D: pairs with pre-2018 exports of the product by T of at least 100,000 US dollars. Panel E: classification of Rauch (1999), conservative version. Panel F: outcomes and fixed effects as described in the text; 2018 is dropped. Standard errors clustered by HS6 product in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

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