Online Appendix
(Not for publication)

Trade Liberalization and Third-Market Effects

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A Robustness tables

We scrutinize the positive third-market entry results further, as there are confounding factors that may be driving them. Table A.1 presents different additional robustness exercises using the entry dummy as our dependent variable.

Aggregation: In column (1), all countries of destinations are aggregated in a single destination, which is either EUS, ROW or $JANZ$. The estimated coefficients change very little with that aggregation.

Excluding safeguard products: The negotiations leading to the accession of China to the WTO in late 2001 resulted in the US and the EU being granted product-specific safeguard mechanisms that could be used in case of import surges. Indeed, both re-imposed quotas on some Chinese imports in the second half of 2005, which had to be phased out until 2008. Based on overall trade volumes, the restrictions imposed in 2005 do not seem to have been very effective (Harrigan and Barrows, 2009).[13] Nevertheless, producers may have redirected sales to other markets after the imposition of the safeguards, and our results could be picking that up. As a robustness exercise, we exclude from our sample all safeguard-protected products. The estimates of our main independent variable hardly change when we introduce this restriction.

Excluding agent firms: The raw data contains a number of trading agents ("intermediary firms") that mediate trade for other firms but do not directly engage in production. Including these firms could cause problems as their behavior is probably different from that of manufacturing firms. To exclude the possibility that our results are driven by these trading agents, we exclude firms that are identified by certain keywords in their names. Following Ahn et al. (2011), we use a comprehensive list of keywords that are typically used by various kinds of trading agents in China. These trading companies are responsible for about forty percent of our observations. Nevertheless, dropping trading agents does not change our conclusions of a positive entry into EUS, ROW and $JANZ$.

Excluding processing trade: Each product-destination transaction also includes the customs regimes under which products were exported. The most frequent regimes are ordinary trade and processing trade (associated with either assembly or imported materials). Including transactions undertaken using processing trade may be problematic as this customs regime is subject to different tariff levels and potentially to a preferential treatment when exporting. Excluding processing trade export transactions, as in column 4, leads to a decrease in the number of observations of about 12% of the original sample. Our results on entry are again qualitatively similar to our baseline results.

[13] Despite the implementation of a new license system, China restricted neither the number of the licenses nor the volume of exports. In addition, EU retailers used their last chance to import Chinese textile products before the quota re-instatement, yielding a surge in orders. Only two months after the signing of this agreement, import quotas were breached and 80 million T&C items got stuck in European ports. A diplomatic resolution was reached at the beginning of September 2005 putting an end to a situation the British press alluded to as the "Bra Wars." The new agreement included more product categories and relaxed the 2005 quota limits. It was eventually decided that the 2005 quota surplus could be used against the 2006 quotas.

Table A.1: Robustness on Entry

	Aggregate	Drop Safeguard products	Drop Agent firms	Drop Processing trade
	(1)	(2)	(3)	(4)
$MFA_j \times POST_t$	0.083^a	0.075^a	0.082^a	0.080^a
in EUS	(0.008)	(0.009)	(0.010)	(0.009)
$MFA_j \times POST_t$	0.031^a	0.022^a	0.027^a	0.028^a
in ROW	(0.005)	(0.005)	(0.006)	(0.005)
$MFA_j \times POST_t$	0.023^a	0.026^a	0.017^a	0.028^a
in JANZ	(0.006)	(0.007)	(0.007)	(0.007)

Notes: Product-destination and year-destination fixed effects are included in all regressions, where the countries of destination are either part of EUS, ROW, or $JANZ$, except in column (1) where all countries of destinations have been aggregated in a single destination, which is either EUS, ROW, or $JANZ$. When we aggregate the data (column 1), once singletons are excluded, there are 702,791 observations in EUS, 1,353,954 in ROW, 533,627 in $JANZ$. When dropping Safeguard products (column 2), once singletons are excluded, there are 890,834 observations in EUS, 1,475,746 in ROW, and 408,563 in $JANZ$. When dropping Agent firms (column 3), once singletons are excluded, there are 561,058 observations in EUS, 1,065,654 in ROW and 331,283 in $JANZ$. When dropping Processing trade (column 4), once singletons are excluded, there are 1,085,682 observations in EUS, 1,919,617 in ROW and 475,092 in $JANZ$. Standard errors, clustered both at the HS-8 digit product level and at the firm-level, are in parentheses. *a*: significant at the 1 percent; *b*: significant at the 5 percent; *c*: significant at the 10 percent level.

Table A.2: Robustness on the intensive margin - Continuous exporters

	Aggregate	Drop Safeguard products	Drop Agent firms	Drop Processing trade
	(1)	(2)	(3)	(4)
			$\triangle \log(value)$	
$MFA_j \times POST_t$	0.294^a	0.152^a	0.113^b	0.136^a
in EUS	(0.052)	(0.055)	(0.051)	(0.047)
$MFA_j \times POST_t$	0.043	-0.011	0.030	0.018
in ROW	(0.029)	(0.034)	(0.028)	(0.034)
$MFA_j \times POST_t$	0.039	-0.009	0.062^c	0.050
in JANZ	(0.037)	(0.042)	(0.035)	(0.045)
			$\triangle \log(price)$	
$MFA_j \times POST_t$	-0.027^b	-0.034^c	-0.004	-0.042^b
in EUS	(0.012)	(0.018)	(0.028)	(0.018)
$MFA_j \times POST_t$	0.002	0.001	0.005	0.006
in ROW	(0.008)	(0.009)	(0.009)	(0.010)
$MFA_j \times POST_t$	-0.003	-0.009	0.004	0.006
in JANZ	(0.010)	(0.011)	(0.011)	(0.011)

Notes: Where the countries of destination are either part of EUS, ROW, or $JANZ$, except in column (1) where all countries of destinations have been aggregate in a single destination, which is either EUS, ROW, or $JANZ$. When we aggregate the data (column 1), once singletons are excluded, there are 78,862 observations in EUS, 160,800 in ROW, 85,144 in $JANZ$. When dropping Safeguard products (column 2), once singletons are excluded, there are 23,560 observations in EUS, 49,592 in ROW, and 32,512 in $JANZ$. When dropping Agent firms (column 3), once singletons are excluded, there are 13,412 observations in EUS, 48,728 in ROW and 34,084 in $JANZ$. When dropping Processing trade (column 4), once singletons are excluded, there are 29,563 observations in EUS, 56,186 in ROW and 35,657 in $JANZ$. Standard errors, clustered both at the HS-8 digit product level and at the firm-level, are in parentheses. a: significant at the 1 percent; b: significant at the 5 percent; c: significant at the 10 percent level.

B Theoretical Background

B.1 Extensive margin

A firm makes two types of decisions at the extensive margin. First, whether to produce a certain product. Second, whether to sell a product that it produces at different foreign destinations. Our goal here is to understand how the policy shock affected those decisions.

Consider a potential entrepreneur i who is weighing whether to start the production of an MFA product.[14] To do so, she would first need to pay a start-up fixed cost f_e (defined on a per-period basis). Once she pays f_e, she draws a vector of firm-product characteristics, which for simplicity we denote as a scalar measuring firm productivity, φ^i. She also learns her market-specific idiosyncratic characteristics, ϕ_d^i, $d = EUS$, ROW, which denotes different levels of profitability from selling the MFA good in different destinations (for ease of exposition, we ignore profits in the domestic market). Observe that, while φ^i affects firm i's operational profits in all markets, ϕ_d^i affects firm i's operational profit in market d only.

Once the firm has paid f_e and learned its productivity and market-specific characteristics, it decides whether to enter each of the two destinations in our analysis. It chooses to enter market d if its operational profit there, net of trade costs, and evaluated at the optimal quantity and price, $\pi_d(\varphi^i, \phi^i_{ROW})$, is greater than the fixed entry cost in that market, f_d (also defined on a per-period basis).

Thus, *prior to 2005*, the firm chooses to pay f_e to acquire the capability to produce an MFA good if expected aggregate export profits more than compensate for the entry costs. That is, if

$$\max\left\{E\left[\pi_{ROW}(\varphi^i, \phi^i_{ROW}) - f_{ROW}\right], 0\right\} + \max\left\{E\left[\pi_{EUS}(\varphi^i, \phi^i_{EUS}) - (1-\eta^i)\tau_{EUS} q^i_{EUS}(\varphi^i, \phi^i_{EUS}) - f_{EUS}\right], 0\right\} \geq f_e, \quad (3)$$

where q_d^i represents the (optimal) quantity sold by firm i in market $d = EUS$, ROW and E denotes the expectation operator over the productivity draw φ^i and the firm-market specific shocks $\{\phi_d^i\}$, which are ex-ante unknown to the entrepreneur. The key qualitative difference between the net expected profits in the two markets is the presence of the trade cost $\tau_{EUS} > 0$ per unit of sales in the EUS market. τ_{EUS} can be interpreted as the shadow cost of complying with the quota—or, equivalently, the (secondary) market price of the license to sell a unit of a restricted good in the EUS, inclusive of potential lobbying costs. Now, as Khandelwal et al. (2013) make clear, some firms (typically SOEs) managed to escape those restrictions. Such a "political connectedness" is represented here by parameter η^i. For connected firms, $\eta^i = 1$ and the quota restriction does not bind; for all other firms, $\eta^i = 0$ and selling in the EUS requires incurring τ_{EUS}.

In equilibrium, with $\partial \pi_d^i(\varphi^i, \phi_d^i)/\partial \varphi^i > 0$, for given ϕ_d^i there will typically be a marginal firm selling in each market d such that $\pi_d^i(\varphi^*, \phi_d^i) = f_d$, with all firms with $\varphi^i \geq \varphi^*$ serving

[14] Here, we refer indistinguishably to "new firms" and to "existing firms starting to produce a new good."

market d. However, in the EUS before 2005 our context differs from the typical setting in that the productivity cutoff also depends on η^i, with $\varphi^*_{EUS<2005}(\eta^i = 1) < \varphi^*_{EUS<2005}(\eta^i = 0)$: firms did not need to be as productive to enter the EUS if they were politically connected.

Our focus is on the changes in entry behavior due to the elimination of the quota system. In the framework above, this can be represented by setting $\tau_{EUS} = 0$ in the post-2005 period.[15] This reduces (3) to

$$\max\left\{E\left[\pi_{ROW}(\varphi^i, \phi^i_{ROW}) - f_{ROW}\right], 0\right\} + \max\left\{E\left[\pi_{EUS}(\varphi^i, \phi^i_{EUS}) - f_{EUS}\right], 0\right\} \geq f_e. \quad (4)$$

If $\eta^i = 0$, the left-hand side of (4) is unambiguously higher than the left-hand side of (3). Hence, for those firms the policy shock increased net aggregate export profits and made entry more appealing. Thus, we should expect an increase in the number of 'unconnected' firms acquiring the capacity to produce (and export) MFA products after the policy shock.

The change in trade barriers also affects the equilibrium conditions for entry—here, the conditions to start producing MFA products. According to standard models of heterogeneous firms, the higher entry due to the elimination of τ_{EUS} will put pressure on the domestic factors market and raise production costs. This will make foreign market entry in general less appealing for 'connected' ($\eta^i = 1$) firms that do not benefit from the elimination of τ_{EUS} but suffer from tougher market conditions in the industry. Thus, we should expect a decrease in the number of 'connected' firms acquiring the capacity to produce (and export) MFA products after the policy shock. Note, however, that we cannot directly observe η^i. Instead, we rely on the argument that SOEs and firms selling MFA goods to the EUS prior to 2005 are more likely to be 'connected' (according to Khandelwal et al., 2013), and we therefore treat them as having $\eta^i = 1$.

Now, whether a new firm i (or, more precisely, a new firm-product pair) actually enters market d depends on its specific draws, $\{\varphi^i, \phi^i_{ROW}, \phi^i_{EUS}\}$. Consider the problem of a producer of MFA products in China contemplating entry into one of the two export destinations in our analysis prior to 2005. It chooses to enter the EUS if

$$\pi_{EUS}(\varphi^i, \phi^i_{EUS}) - (1 - \eta^i)\tau_{EUS} q^i_{EUS}(\varphi^i, \phi^i_{EUS}) \geq f_{EUS}, \quad (5)$$

whereas it chooses to enter ROW if

$$\pi_{ROW}(\varphi^i, \phi^i_{ROW}) \geq f_{ROW}. \quad (6)$$

After the policy shock, for both $d = EUS$, ROW, the condition is

$$\pi_d(\varphi^i, \phi^i_d) \geq f_d. \quad (7)$$

The trade restriction in the EUS, τ_{EUS}, no longer applies.

[15] For simplicity, we treat the policy shock as if it were simply a reduction of the trade barriers faced by Chinese exporters in the EUS markets. In reality, the elimination of quotas was not only against China, but vis-à-vis a large group of countries that faced quotas. However, as our previous discussion highlights, China was by far the country most constrained by quotas.

Consider first firms that decide to start producing MFA goods as a result of the policy shock. Some of them obtain a high ϕ^i_{EUS} but a low ϕ^i_{ROW}, in which case they only enter the EUS, whereas others get a high ϕ^i_{ROW} but a low ϕ^i_{EUS}, in which case they only enter ROW—even though what motivated them to start producing MFA goods was liberalization in the EUS market. The best ones (high φ^i) enter both markets, as a high enough φ^i compensates for a low ϕ^i_d. Hence, we should expect higher entry rates of firms not exporting MFA products before 2005 in *both* markets. That is, the liberalization in the EUS will induce some firms to enter ROW, even though policy did not change there.

Now, since the industry restructuring raises the productivity cutoff for entry, we should expect lower entry rates in ROW by firms previously serving only the EUS. Since they are more likely to have been connected firms, which sold to the EUS only because they were shielded from competition, they were less productive on average. Hence, in ROW we expect a positive effect on entry rates that is driven mostly by firms that did not previously sell MFA goods in the EUS.

The restructuring of the Chinese economy also tends to affect the exit pattern of incumbent firms. In the EUS, the direct effect of the liberalization is to lower exit rates. On the other hand, general equilibrium forces that make survival in the market harder tend to have the opposite effect. In ROW, the latter are the only effects.

B.2 Intensive Margin

We now turn to the intensive-margin effects. Observe that, to estimate within-firm intensive-margin effects in a market, the analysis considers only firms serving that market both before and after the policy shock. Hence, the estimates do not reflect the behavior of the firms driven out of the market and of those that enter because of the restructuring of the Chinese industry, only that of the (presumably) more productive, surviving firms.

Prior to 2005, the problem of a firm i that exports MFA products from China to the EUS can be described as

$$\max_{q^i_{EUS}(\varphi^i,\phi^i_{EUS})} r^i_{EUS}(q^i_{EUS}(\varphi^i,\phi^i_{EUS})) - c_i\left(q^i_{EUS}(\varphi^i,\phi^i_{EUS}) + q^i_{ROW}(\varphi^i,\phi^i_{ROW})\right) - (1-\eta^i)\tau_{EUS}q^i_{EUS}(\varphi^i,\phi^i_{EUS}),$$

where $r^i_{EUS}(.)$ is firm i's residual revenue function in the EUS selling q^i_{EUS} and $c_i(.)$ is firm i's cost function, whose general formulation varies with total production, thus allowing for variable returns to scale. Analogously, firm i's problem in ROW is

$$\max_{q^i_{ROW}(\varphi^i,\phi^i_{ROW})} r^i_{ROW}(q^i_{ROW}(\varphi^i,\phi^i_{ROW})) - c_i\left(q^i_{EUS}(\varphi^i,\phi^i_{EUS}) + q^i_{ROW}(\varphi^i,\phi^i_{ROW})\right).$$

If the firm chooses to sell strictly positive quantities in both markets before 2005, the associated first-order necessary conditions are

$$\begin{cases} r^{i\prime}_{EUS}(q_{i,EUS}(\varphi,\eta)) = c'_i\left(q^i_{EUS}(\varphi^i,\phi^i_{EUS}) + q^i_{ROW}(\varphi^i,\phi^i_{ROW})\right) + (1-\eta^i)\tau_{EUS} \\ r^{i\prime}_{ROW}(q^i_{ROW}(\varphi^i,\phi^i_{ROW})) = c'_i\left(q^i_{EUS}(\varphi^i,\phi^i_{EUS}) + q^i_{ROW}(\varphi^i,\phi^i_{ROW})\right) \end{cases}.$$

With the policy shock, $\tau_{EUS} = 0$. This has general equilibrium implications in both markets, which in the firm's problem manifests through changes in $r_d^{i\prime}$. Since those changes affect all firms similarly, to identify heterogeneous effects the focus should be on either η^i or c_i'.

In the EUS, the policy shock lowers the exporting costs for all firms with $\eta^i = 0$. Thus, among continuing firms serving the EUS, we expect those to be the ones expanding the most due to the quota lift. Conversely, the policy change brings about no direct benefit for firms with $\eta^i = 1$. On average, then, we should expect an increase in the sales of continuous exporters to the EUS.

For the continuing firms in ROW, the policy shock brings no direct effect but there may be indirect, general equilibrium effects. We again distinguish them depending on their involvement in the EUS, as in the extensive-margin analysis. For firms with no sales to the EUS, either before or after the policy shock, the relevant first-order condition, both before and after 2005, is

$$r_{ROW}^{i\prime}(q_{ROW}^i(\varphi^i, \phi_{ROW}^i)) = c_i' \left(q_{ROW}^i(\varphi^i, \phi_{ROW}^i)\right).$$

Hence, except for possible general equilibrium repercussions of the policy shock in ROW, nothing changed for those firms.

Now, for firms with involvement in the EUS, the intensive-margin effect depends on the curvature of the cost function.[16] Suppose, for example, that there are constraints to the expansion of production. This could be represented with a production technology that displays increasing marginal costs, as in Bown and Crowley (2007). Such decreasing returns may reflect, for example, capacity or financial constraints. For firms entering (or expanding in) the EUS after liberalization, such firm-level constraints would induce a downward intensive-margin adjustment in ROW: $\Delta q_{ROW}^i < 0$. By contrast, there could be factors leading to increasing returns to scale at the firm level. A larger scale, made possible by the opening of the EUS markets, could allow more specialization within firms. Perhaps more importantly, it could induce investment in new machinery, other types of cost-reducing innovation, or better ways of organizing production that are worthwhile only if production is sufficiently large.[17] For firms entering (or expanding in) the EUS after liberalization, such increasing returns at the firm-level would lead to an upward intensive-margin adjustment in ROW: $\Delta q_{ROW}^i > 0$. Overall, then, the impact at the intensive margin for exporters to ROW is theoretically ambiguous.

[16] Observe that, at least among single-product firms, we should not observe heterogeneous effects on the flow of exports of MFA products from China to ROW after the end of the MFA if technology exhibited constant returns to scale. Observe also that any constraint leading to increasing marginal costs in the industry, including pressures from the labor/input markets, would yield a negative effect on the exports from China to ROW. However, since MFA and non-MFA products are similar in their input requirements, both control and treated groups would be similarly affected.

[17] See, for example, the analysis of Lileeva and Trefler (2010) of the adjustment of Canadian firms following the US-Canada free trade agreement.

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