Appendix: How Exporters Grow

Contents

List of Tables

List of Figures

A Models with quality and trade cost heterogeneity

We model a single-product firm, indexed by i, which may participate in multiple distinct export markets, indexed by k. Markets are segmented, so the firm is able to price discriminate. The firm produces a good of quality χ_t^i with marginal cost of production $C_t^i\left(\chi_t^i\right)^\kappa$, where $\kappa > 0$. Both χ_t^i and C_t^i follow exogenous processes.

At the level of an individual export market, the firm faces iid sunk (S_t^{ik}) and fixed (F_t^{ik}) costs of participation, assumed to be iid. Let $X_t^{ik} = \{0,1\}$ be an indicator for participation by firm i in market k at time t. Conditional on participation, demand is given by:

$$Q_t^{ik} = Q_t^k \left(\frac{\tau_t^k \left(P_t^{ik}/\chi_t^i \right)}{P_t^k} \right)^{-\theta} \left(D_t^{ik} \right)^\alpha \exp\left(\nu_t^{ik} \right).$$

Here, Q_t^k is aggregate demand in market k, P_t^k is an index of competitors' prices, and τ_t^k is the combined iceberg trade cost and ad valorem tariff faced when selling into market k. Exogeneity of aggregate demand and competitors' prices relies on assuming monopolistic competition. Demand also depends on the firm's quality χ_t^i and exogenous idiosyncratic demand ν_t^{ik}. The firm chooses its own price P_t^{ik}. In addition, it can take actions which affect D_t^{ik}, i.e. customer base, which shifts demand conditional on price. If $\alpha \in (0,1)$, demand is increasing in customer base, but at a diminishing rate. If $\alpha = 0$, demand does not depend on customer base. Customer base in market k accumulates according to:

$$D_{t+1}^{ik} = \left(1 - X_t^{ik}\right) \underline{D}^k + X_t^{ik} \left((1-\delta) D_t^{ik} + \psi A_t^{ik} + (1-\psi) P_t^{ik} Q_t^{ik} \right)$$

where A_t^{ik} is marketing and advertising effort.

Going forward, we write $Y_t^k = Q_t^k \left(P_t^k/\tau_t^k\right)^\theta$. We refer to Y_t^k as "market size." Then there are four sources of potentially persistent heterogeneity in the model: C_t^i and χ_t^i at the firm-level, Y_t^k at the market level, and ν_t^{ik} at the firm-market level. We do not take a stand on the statistical processes for C_t^i, χ_t^k and Y_t^k, other than to assume they have a persistent component. We assume that idiosyncratic demand is the sum of a permanent component $(\bar{\nu}^{ik})$ and a transitory component $(\tilde{\nu}_t^{ik})$: $\nu_t^{ik} = \bar{\nu}^{ik} + \tilde{\nu}_t^{ik}$. Non-participants receive a new draw of $\bar{\nu}^{ik}$ every period. On entry, the draw is fixed, and the firm retains this draw for as long as it continues to participate in market k. On exit, the firm loses its draw, and again gets a new draw in every subsequent period of non-participation.

At this point, we describe the versions of the model with $\psi = 1$ and with $\psi = 0$ separately.

A.1 Marketing and advertising

Customer base in market k accumulates according to:

$$D_t^{ik} = \left(1 - X_{t-1}^{ik}\right) \underline{D}^k + X_{t-1}^{ik} \left(\left(1-\delta\right) D_{t-1}^{ik} + A_{t-1}^{ik}\right)$$

Firms entering market k start with customer base $\underline{D}^k$. A_{t-1}^{ik} is the increment to customer base at date t due to marketing and advertising at date $t-1$. The depreciation rate of past customer base conditional on continued participation is δ. Customer base fully depreciates on exit.

The cost of marketing and advertising is given by $c\left(D_t^{ik}, A_t^{ik}\right)$, where $c\left(\cdot, 0\right) = 0$, and $c\left(\cdot, \cdot\right)$ is differentiable in both arguments, with $c_A > 0$, $c_{AA} \geq 0$ and $c_D \leq 0$. Since customer base is intangible, it is natural to assume irreversibility (i.e. $A_t^{ik} \geq 0$).

In this model, current participation X_t^{ik} and investment A_t^{ik} affect future as well as current payoffs. Since the choice of price affects only current profits and not future profits, the optimal price is:

$$P_t^{ik} = \frac{\theta}{\theta - 1} C_t^i \left(\chi_t^i\right)^{\kappa}$$

Now define $W_t^i = \left(C_t^i\right)^{1-\theta} \left(\chi_t^i\right)^{\kappa(1-\theta)+\theta}$. Let $Z_t^{ik} = \left\{Y_t^k, W_t^i, S_t^{ik}, F_t^{ik}, \nu_t^{ik}\right\}$. Current net flow profit conditional on participation is:

$$\pi\left(X_{t-1}^{ik}, D_t^{ik}, Z_t^{ik}, A_t^{ik}\right) = \frac{\left(\theta-1\right)^{\theta-1}}{\theta^{\theta}} Y_t^k W_t^i \left(D_t^{ik}\right)^{\alpha} \exp\left(\nu_t^{ik}\right)$$

$$-c\left(D_t^{ik}, A_t^{ik}\right) - F_t^{ik} - \left(1 - X_{t-1}^{ik}\right) S_t^{ik}$$

The Bellman equation for the firm's problem is:

$$V\left(X_{t-1}^{ik}, D_t^{ik}, Z_t^{ik}\right) = \max_{X_t^{ik} \in \{0,1\}, A_t^{ik} > 0} \left\{X_t^{ik} \pi\left(X_{t-1}^{ik}, D_t^{ik}, Z_t^{ik}, A_t^{ik}\right) + \beta \mathbb{E}\left\{V\left(X_t^{ik}, D_{t+1}^{ik}, Z_{t+1}^{ik}\right) | Z_t^{ik}\right\}\right\}$$

subject to the evolution of customer base.

There is effectively only one dimension of persistent market-level heterogeneity in this model, i.e. Y_t^k. This is not true for firm-level heterogeneity. In general, the term that shows up in quantities and the term that shows up in prices will not be the same. Note that in addition to the direct channels of dependence, quantities also depend on how customer base is related to these two dimensions of heterogeneity. This does not matter for independent estimation of quantity and price equations, since no assumptions need to be made about the relationship between the unobserved heterogeneity in the two equations. In addition, since the target moments for our structural estimation hold fixed both firm-level heterogeneity in quanties and firm-level heterogeneity in prices (effectively normalizing both to 1), the fact that they may not be the same is not a problem for us. However if we were to try to use cross-firm variation in quantities and prices to estimate the process for firm-level heterogeneity, we would have to take a stand on this issue.

A.2 Customer markets

Here, customer base in market k accumulates according to:

$$D_t^{ik} = \left(1 - X_{t-1}^{ik}\right) \underline{D}^k + X_{t-1}^{ik} \left(\left(1-\delta\right) D_{t-1}^{ik} + P_{t-1}^{ik} Q_{t-1}^{ik}\right)$$

Firms entering market k start with customer base $\underline{D}^k$. The depreciation rate of customer base conditional on continued participation is δ. Customer base fully depreciates on exit.

In this model, current participation X_t^{ik} and prices P_t^{ik} affect future as well as current payoffs. Now define $Z_t^{ik} = \left\{Y_t^k, C_t^i, \chi_t^i, S_t^{ik}, F_t^{ik}, \nu_t^{ik}\right\}$. Current profit conditional on participation is:

$$\begin{aligned}\pi\left(X_{t-1}^{ik}, D_t^{ik}, Z_t^{ik}, P_t^{ik}\right) = {} & \left(P_t^{ik} - C_t^i \left(\chi_t^i\right)^{\kappa}\right) Y_t^k \left(\chi_t^i\right)^{\theta} \left(P_t^{ik}\right)^{-\theta} \left(D_t^{ik}\right)^{\alpha} \exp\left(\nu_t^{ik}\right) \\ & - F_t^{ik} - \left(1 - X_{t-1}^{ik}\right) S_t^{ik}\end{aligned}$$

The Bellman equation for the firm's problem is:

$$V\left(X_{t-1}^{ik}, D_t^{ik}, Z_t^{ik}\right) = \max_{X_t^{ik} \in \{0,1\}, P_t^{ik} > 0} \left\{X_t^{ik} \pi\left(X_{t-1}^{ik}, D_t^{ik}, Z_t^{ik}, P_t^{ik}\right) + \beta \mathbb{E}\left\{V\left(X_t^{ik}, D_{t+1}^{ik}, Z_{t+1}^{ik}\right) | Z_t^{ik}\right\}\right\}$$

subject to the accumulation of customer base.

There is effectively only one dimension of persistent market-level heterogeneity in this model, i.e. Y_t^k. This is not true for firm-level heterogeneity. In general, the term that shows up in quantities and the term that shows up in prices will not be the same. Note that in addition to the direct channels of dependence, both quantities and prices depend on how markups are related to these two dimensions of heterogeneity, while quantities also depend on how customer base depends on them. This does not matter for independent estimation of quantity and price equations, since no assumptions need to be made about the relationship between the unobserved heterogeneity in the two equations. In addition, since the target moments for our structural estimation hold fixed both firm-level heterogeneity in quanties and firm-level heterogeneity in prices (effectively normalizing both to 1), the fact that they may not be the same is not a problem for us. However if we were to try to use cross-firm variation in quantities and prices to estimate the process for firm-level heterogeneity, we would have to take a stand on this issue.

B When is ψ identified?

We nest the marketing and advertising and customer base models by assuming that firms may accumulate future customer base through a combination of marketing and advertising activity today, and by selling more today. We assume that the weights on marketing and advertising and current sales in the accumulation equation sum to 1. We now use a simplified version of the firm's problem (which ignores stochastic costs of entry and idiosyncratic demand) to argue that this assumption is without loss of generality.

B.1 Firms invest through both channels

Consider Problem 1:

$$V(D) = \max_{A \geq 0, P > 0} \left\{ (P - C) P^{-\theta} D^{\alpha} Z - \left(A + \phi \frac{A^2}{D} \right) - F + \beta V(D') \right\}$$

subject to

$$D' = (1 - \delta) D + \psi_1 A + \psi_2 P^{1-\theta} D^{\alpha} Z$$

where $\psi_1 \geq 0$ and $\psi_2 \geq 0$.[1] Note that if $A > 0$ and $\psi_2 > 0$, combining the first order conditions for A and P gives us:

$$P = C \frac{\theta}{\theta - 1} \left(\frac{1}{1 + \frac{\psi_2}{\psi_1} \left(1 + 2\phi \frac{A}{D} \right)} \right)$$

Now consider Problem 2:

$$\hat{V}\left(\hat{D}\right) = \max_{\hat{A} \geq 0, \hat{P} > 0} \left\{ \left(\hat{P} - C \right) \hat{P}^{-\theta} \hat{D}^{\alpha} \hat{Z} - \left(\hat{A} + \hat{\phi} \frac{\hat{A}^2}{\hat{D}} \right) - \hat{F} + \beta \hat{V}\left(\hat{D}'\right) \right\}$$

subject to

$$\hat{D}' = (1 - \delta) \hat{D} + \frac{\psi_1}{\psi_1 + \psi_2} \hat{A} + \frac{\psi_2}{\psi_1 + \psi_2} \hat{P}^{1-\theta} \hat{D}^{\alpha} \hat{Z}$$

[1] If $\psi_1 < 0$, no firm will ever choose positive A, since it involves a cost today, and it reduces demand and therefore profits tomorrow. If $\psi_2 < 0$, selling more today reduces future demand, inducing cycles in prices, and implying there is no steady state for D.

where the first order conditions for $\hat{A}$ and $\hat{P}$ give:

$$\hat{P} = C\frac{\theta}{\theta - 1}\left(\frac{1}{1 + \frac{\psi_2/(\psi_1+\psi_2)}{\psi_1/(\psi_1+\psi_2)}\left(1 + 2\hat{\phi}\frac{\hat{A}}{\hat{D}}\right)}\right)$$

In Problem 1, take the accumulation equation, divide across by $\psi_1 + \psi_2$, and write $\tilde{D} = D/\left(\psi_1 + \psi_2\right)$, and $\tilde{Z} = Z\left(\psi_1 + \psi_2\right)^{\alpha}$:

$$\frac{D'}{\psi_1 + \psi_2} = (1 - \delta)\frac{D}{\psi_1 + \psi_2} + \frac{\psi_1}{\psi_1 + \psi_2}A + \frac{\psi_2}{\psi_1 + \psi_2}P^{1-\theta}\left(\frac{D}{\psi_1 + \psi_2}\right)^{\alpha} Z\left(\psi_1 + \psi_2\right)^{\alpha}$$

so we have

$$\tilde{D}' = (1 - \delta)\tilde{D} + \frac{\psi_1}{\psi_1 + \psi_2}A + \frac{\psi_2}{\psi_1 + \psi_2}P^{1-\theta}\tilde{D}^{\alpha}\tilde{Z}$$

Note that the pricing equation for Problem 1 can be written:

$$P = C\frac{\theta}{\theta - 1}\left(\frac{1}{1 + \frac{\psi_2/(\psi_1+\psi_2)}{\psi_1/(\psi_1+\psi_2)}\left(1 + 2\frac{\phi}{\psi_1+\psi_2}\frac{A(\psi_1+\psi_2)}{D}\right)}\right)$$

Now write $\tilde{\phi} = \phi/\left(\psi_1 + \psi_2\right)$, so using $\tilde{D} = D/\left(\psi_1 + \psi_2\right)$ we have:

$$P = C\frac{\theta}{\theta - 1}\left(\frac{1}{1 + \frac{\psi_2/(\psi_1+\psi_2)}{\psi_1/(\psi_1+\psi_2)}\left(1 + 2\tilde{\phi}\frac{A}{\tilde{D}}\right)}\right)$$

meanwhile the value function for Problem 1 can also be rewritten:

$$V(D) = \max_{A\geq 0, P>0}\left\{(P - C)P^{-\theta}\left(\frac{D}{\psi_1 + \psi_2}\right)^{\alpha} Z\left(\psi_1 + \psi_2\right)^{\alpha} - \left(A + \frac{\phi}{\psi_1 + \psi_2}\frac{A^2\left(\psi_1 + \psi_2\right)}{D}\right) + \beta V(D')\right\}$$

so we can write

$$\tilde{V}\left(\tilde{D}\right) = \max_{A\geq 0, P>0}\left\{(P - C)P^{-\theta}\tilde{D}^{\alpha}\tilde{Z} - \left(A + \tilde{\phi}\frac{A^2}{\tilde{D}}\right) - F + \beta\tilde{V}\left(\tilde{D}'\right)\right\}$$

Note that this is identical to Problem 2, with $\hat{D} = \tilde{D} = D/\left(\psi_1 + \psi_2\right)$, $\hat{Z} = \tilde{Z} = Z\left(\psi_1 + \psi_2\right)^{\alpha}$, $\hat{\phi} = \tilde{\phi} = \phi/\left(\psi_1 + \psi_2\right)$, $\hat{P} = P$, $\hat{A} = A$, $\hat{F} = F$, $\hat{V} = \tilde{V}$. So the solutions to Problem 2 and the transformed Problem 1 coincide. Note that all of our target moments are expressed as ratios, so the normalizations of D and Z drop out. In addition ϕ is an estimated parameter. This implies that restricting attention to the case where $\psi_1 + \psi_2 = 1$ is without loss of generality.

A corollary of this is that if we did not place some restriction on $\psi_1 + \psi_2$, the model would not be identified.

B.2 Firms invest through A only ($\psi_2 = 0$)

By a similar argument, we can show that when $\psi_2 = 0$, the assumption that $\psi_1 = 1$ is without loss of generality.

B.3 Firms choose $A = 0$

By a similar argument, we can show that when $\psi_1 = 0$, the assumption that $\psi_2 = 1$ is without loss of generality.

However it is also possible that for $\psi_1 > 0$ but sufficiently close to zero, the firm may choose $A = 0$, because the marginal benefit of advertising is less than the marginal cost. To see this, consider the f.o.c. for A:

$$1 + 2\phi\left(\frac{A}{D}\right) = \psi_1 \beta V'\left(D'\right)$$

where the LHS is the marginal cost of A, while the RHS gives the marginal benefit. Note that $V'\left(D'\right) \nrightarrow \infty$ as $A \to 0$ because the firm also accumulates D' through current sales.

If we are in the case where $\psi_1 > 0$ but $A = 0$, by a similar argument to those made above, we can show that the fit of our model is invariant to the value of ψ_2. In this sense, even when we restrict $\psi \in [0, 1]$, the value of ψ is identified only when ψ is such that firms optimally choose to advertise.

C Learning model

C.1 Statement of problem

A single-product firm may participate in multiple distinct export markets. The firm can price discriminate across markets. The only channel through which decisions across different markets are linked is through a common exogenous marginal cost of production, C.

At the level of an individual export market, there are stochastic sunk (S) and fixed (F) costs of participation, assumed to be iid. Let $X = \{0, 1\}$ be an indicator for participation.

Conditional on participation in market k, firm i faces demand given by:

$$Q' = Y\left(P'\right)^{-\theta}\exp\left(\varepsilon\right). \tag{1}$$

Demand depends on one endogenous variable: the firm's own price P', on exogenous aggregate demand and competitors' prices (combined into variable Y which we refer to as market size). Demand also depends on exogenous idiosyncratic demand ε. The firm does not observe ε before making decisions (all other variables are observed). The information set the firm uses to form expectations about current and future ε is denoted I. The information set may evolve over time. It is the evolution of this information set that generates dynamics of quantities and prices. The only action the firm can take to affect its information set is to participate in the market.

Since the evolution of the information set depends only on the decision to participate, the choice of quantities or prices conditional on participation is purely static. Under uncertainty about where current demand lies, it matters whether firms set quantities or prices. We assume they set quantities.[2] The optimal choice of quantity conditional on participation is then:

$$Q' = \left(\frac{\theta-1}{\theta}\right)^{\theta} YC^{-\theta}\left[\mathbb{E}\left\{\exp\left(\frac{1}{\theta}\varepsilon\right)|I\right\}\right]^{\theta}$$

so the market-clearing price is:

$$P' = \frac{\exp\left(\frac{1}{\theta}\varepsilon\right)}{\left[\mathbb{E}\left\{\exp\left(\frac{1}{\theta}\varepsilon\right)|I\right\}\right]}\frac{\theta}{\theta-1}C$$

and profit is given by

$$\tilde{\theta}YC^{1-\theta}\left[\mathbb{E}\left\{\exp\left(\frac{1}{\theta}\varepsilon\right)|I\right\}\right]^{\theta-1}\left(\theta\exp\left(\frac{1}{\theta}\varepsilon\right)-(\theta-1)\,\mathbb{E}\left\{\exp\left(\frac{1}{\theta}\varepsilon\right)|I\right\}\right)$$

so expected profit is

$$\tilde{\theta}YC^{1-\theta}\left[\mathbb{E}\left\{\exp\left(\frac{1}{\theta}\varepsilon\right)|I\right\}\right]^{\theta}$$

The model is closed by an assumption about the process for ε, and an assumption about the updating of information. We assume $\varepsilon_t = \nu + \eta_t$ where ν is distributed $N\left(0,\sigma_{\nu}^{2}\right)$, and η_t is iid, distributed $N\left(0,\sigma_{\eta}^{2}\right)$. On exit from a market, a firm loses its draw of ν. We assume

[2] Because demand is isoelastic in own price, if firms choose instead to set prices, there will be no dynamics of quantities or prices.

Bayesian learning. Define the following variables:

$$T_{t-1} = X_{t-1} + X_{t-1}X_{t-2} + X_{t-1}X_{t-2}X_{t-3} + \ldots$$

$$T_{t-1} = \sum_{s=0}^{\infty} \left(\prod_{\tau=0}^{s} X_{t-1-\tau} \right)$$

This is the firm's tenure in the market on entering period t. Also define:

$$\mu_{t-1} = \frac{1}{T_{t-1}} \sum_{s=0}^{T_{t-1}} \varepsilon_{t-1-s}$$

By the Kalman filter, $\{\mu_{t-1}, T_{t-1}\}$ are sufficient to characterize the firm's information entering into period t. In particular, we have for an incumbent:

$$\left(\mathbb{E} \left\{ \exp\left(\frac{1}{\theta} \varepsilon_t \right) | \mu_{t-1}, T_{t-1} \right\} \right)^{\theta} = \exp\left(\mu_{t-1} \frac{T_{t-1}\sigma_\nu^2}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2} + \frac{1}{2\theta} \left(\sigma_\eta^2 + \frac{\sigma_\nu^2 \sigma_\eta^2}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2} \right) \right)$$

while for an entrant

$$\left(\mathbb{E} \left\{ \exp\left(\frac{1}{\theta} \varepsilon_t \right) \right\} \right)^{\theta} = \exp\left(\frac{1}{2\theta} \left(\sigma_\eta^2 + \sigma_\nu^2 \right) \right)$$

Define $Z = \tilde{\theta} Y C^{1-\theta}$. Expected net profit for an entrant is given by:

$$\pi_{ent}(Z, F, S, X') = X' \left[Z \exp\left(\frac{1}{2\theta} \left(\sigma_\eta^2 + \sigma_\nu^2 \right) \right) - F - S \right]$$

Expected net profit for an incumbent of tenure T for which the mean of observed ε is μ is given by:

$$\pi_{inc}(Z, F, \mu, T, X') = X' \left(Z \exp\left(\mu \frac{T\sigma_\nu^2}{\sigma_\eta^2 + T\sigma_\nu^2} + \frac{1}{2\theta} \left(\sigma_\eta^2 + \frac{\sigma_\nu^2 \sigma_\eta^2}{\sigma_\eta^2 + T\sigma_\nu^2} \right) \right) - F \right)$$

The Bellman equation for an entrant is:

$$V_{ent}(Z, F, S) = \max_{X' \in \{0,1\}} \left\{ \begin{array}{c} \pi_{ent}(Z, F, S, X') + \\ \\ \beta \int_{F'} \left[\begin{array}{c} \int_{\varepsilon'} X' V_{inc}(Z, F', \varepsilon', X') \, h(\varepsilon') \, d\varepsilon' + \\ \\ (1 - X') \int_{S'} V_{ent}(Z, F', S') \, g(S') \, dS' \end{array} \right] f(F') \, dF' \end{array} \right\}$$

while the Bellman equation for an incumbent is

$$V_{inc}(Z,F,\mu,T) = \max_{X'\in\{0,1\}} \left\{ \begin{array}{c} \pi_{inc}(Z,F,\mu,T,X') + \\ \beta \int_{F'} \left[\begin{array}{c} \int_{\varepsilon'} X' V_{inc}\left(Z,F',\frac{T\mu+\varepsilon'}{T+X'},T+X'\right) h(\varepsilon')\, d\varepsilon' + \\ (1-X') \int_{S'} V_{ent}(Z,F',S')\, g(S')\, dS' \end{array} \right] f(F')\, dF' \end{array} \right\}$$

C.2 Selection

Lemma $V_{inc}(Z,F,\mu,T)$ is increasing in μ.

Proof $\pi_{inc}(Z,F,\mu,T,X')$ is weakly increasing in μ (strictly increasing if $X' > 0$). In addition, μ' is increasing in μ. On exit, an incumbent loses its draw of ν and all payoffs following that choice are therefore invariant to μ. The value of the incumbent conditional on a sequences of policies $\{X'\}$ is therefore the sum of terms increasing in μ and terms invariant to μ. In particular, fix the policies at the optimal sequences for an incumbent given $\left\{Z,F,\underline{\mu},T\right\}$, (label this sequence $\{\underline{X'}\}$). The value of an incumbent with $\{Z,F,\bar{\mu},T\}$ who follows $\{\underline{X'}\}$ is weakly greater than that of the optimizing incumbent with $\left\{Z,F,\underline{\mu},T\right\}$ (strictly greater if $X_{inc}\left(Z,F,\underline{\mu},T\right) = 1$). The incumbent with $\{Z,F,\bar{\mu},T\}$ cannot do worse by optimizing. So $V_{inc}(Z,F,\bar{\mu},T) \geq V_{inc}\left(Z,F,\underline{\mu},T\right)$. QED.

Proposition Let $X' = X_{inc}(Z,F,\mu,T)$ be the policy function of an incumbent. If $\bar{\mu} > \underline{\mu}$, and $X_{inc}\left(Z,F,\underline{\mu},T\right) = 1$, then $X_{inc}(Z,F,\bar{\mu},T) = 1$.

Proof This follows directly from the fact that the value of nonparticipation does not depend on μ, while $V_{inc}(Z,F,\mu,T)$ is increasing in μ. This implies that if $X_{inc}\left(Z,F,\underline{\mu},T\right) = 1$, then $X_{inc}(Z,F,\bar{\mu},T) = 1$. QED.

Lemma Conditional on T, μ is increasing in ν.

Proof The definition of μ is as follows:

$$\mu_{t-1} = \frac{1}{T_{t-1}} \sum_{s=0}^{T_{t-1}} \varepsilon_{t-1-s}$$

Making use of the definition of ε:

$$\mu_{t-1} = \frac{1}{T_{t-1}} \sum_{s=0}^{T_{t-1}} (\nu + \eta_{t-1-s})$$

$$\mu_{t-1} = \nu + \frac{1}{T_{t-1}} \sum_{s=0}^{T_{t-1}} (\eta_{t-1-s})$$

Given T, this is an increasing function of ν. QED.

C.3 Properties of prices and quantities

Proposition The price of an entrant is an increasing function of its draw of ν.

Proof The price of an entrant is:

$$P' = \exp\left(\frac{\nu+\eta}{\theta} - \frac{\sigma_\nu^2 + \sigma_\eta^2}{2\theta^2}\right)\frac{\theta}{\theta-1}C$$

$$P' = \exp\left(\left(\frac{\nu}{\theta} - \frac{\sigma_\nu^2}{2\theta^2}\right) + \left(\frac{\eta}{\theta} - \frac{\sigma_\eta^2}{2\theta^2}\right)\right)\frac{\theta}{\theta-1}C$$

This is increasing in ν. QED.

Proposition It is possible to find a $\bar{\nu}$ such that for $\nu \geq \bar{\nu}$, conditional on survival, the price eventually falls below the price on entry.

Proof The price of an incumbent is given by:

$$P' = \exp\left(\frac{\nu+\eta}{\theta} - \frac{\mu}{\theta}\frac{T\sigma_\nu^2}{\sigma_\eta^2 + T\sigma_\nu^2} - \frac{1}{2\theta^2}\left(\sigma_\eta^2 + \frac{\sigma_\nu^2\sigma_\eta^2}{\sigma_\eta^2 + T\sigma_\nu^2}\right)\right)\frac{\theta}{\theta-1}C$$

$$P' = \exp\left(\frac{\nu+\eta}{\theta} - \frac{\nu + \frac{1}{T_{t-1}}\sum_{s=0}^{T_{t-1}}(\eta_{t-1-s})}{\theta}\frac{T_{t-1}\sigma_\nu^2}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2} - \frac{1}{2\theta^2}\left(\sigma_\eta^2 + \frac{\sigma_\nu^2\sigma_\eta^2}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2}\right)\right)\frac{\theta}{\theta-1}C$$

$$P' = \exp\left(\nu\left(1 - \frac{T_{t-1}\sigma_\nu^2}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2}\right) + \eta - \frac{\sigma_\nu^2\sum_{s=0}^{T_{t-1}}(\eta_{t-1-s})}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2} - \frac{1}{2\theta}\left(\sigma_\eta^2 + \frac{\sigma_\nu^2\sigma_\eta^2}{\sigma_\eta^2 + T_{t-1}\sigma_\nu^2}\right)\right)^{\frac{1}{\theta}}\frac{\theta}{\theta-1}C$$

In the limit, as $T \to \infty$,

$$P' \to \exp\left(\frac{\eta}{\theta} - \frac{\sigma_\eta^2}{2\theta^2}\right)\frac{\theta}{\theta-1}C$$

which is independent of ν. If $\nu \geq (\sigma_\nu^2/2\theta)$, then

$$\exp\left(\frac{\eta}{\theta}-\frac{\sigma_\eta^2}{2\theta^2}\right)\frac{\theta}{\theta-1}C < \exp\left(\left(\frac{\nu}{\theta}-\frac{\sigma_\nu^2}{2\theta^2}\right)+\left(\frac{\eta}{\theta}-\frac{\sigma_\eta^2}{2\theta^2}\right)\right)\frac{\theta}{\theta-1}C$$

so conditional on survival, the price eventually falls below the price on entry

Proposition The quantity of an entrant is invariant to its draw of ν.

Proof The quantity of an entrant is:

$$Q' = \left(\frac{\theta-1}{\theta}\right)^{\theta} Z \exp\left(\frac{\sigma_\nu^2+\sigma_\eta^2}{2\theta}\right)$$

This does not depend on ν. QED.

D Proofs of propositions in the paper

Propositions are numbered as in the paper but introduced here in a different order. To prove the propositions we must make some strong assumptions. We verify that the propositions hold under the more general conditions by making use of the model that we structurally estimate in Section 6 of the paper. We describe this exercise after proving the propositions.

D.1 Marketing and advertising ($\psi = 1$)

D.1.1 Statement of problem

A single-product firm may participate in multiple distinct export markets. It can price discriminate across markets. The only channel through which decisions across different markets are linked is through a common exogenous marginal cost of production, C, assumed constant.

At the level of an individual export market, there are iid sunk (S_t) and fixed (F_t) costs of participation. The pdf for S_t is $g(S_t)$ and the pdf for F_t is $f(F_t)$. Let $X_t = \{0, 1\}$ be an indicator for current participation, i.e. positive sales. Conditional on participation, the firm faces demand given by:

$$Q_t = Y(P_t)^{-\theta}(D_t)^{\alpha}\exp(\nu).$$

Demand depends on the firm's current price P_t, and on customer base D_t. Demand depends on exogenous aggregate demand and competitors' prices, which are captured in Y, assumed constant and on exogenous idiosyncratic demand ν.

Before entry into a market, the firm sees its current draw of idiosyncratic demand ν from a distribution with pdf $h(\nu)$. If it enters, it retains this draw as long as it continues to participate. If it does not participate, it loses the current draw, and will receive a new iid draw ν' from the same distribution in each subsequent period of nonparticipation.

Customer base accumulates according to:

$$D_{t+1} = (1 - X_t)\,\underline{D} + X_t\left((1-\delta)\,D_t + A_t\right)$$

The cost of investment is given by $c(D_t, A_t)$, with $c(\cdot, 0) = 0$, $c(\cdot,\cdot)$ differentiable in both arguments, with $c_D < 0$, $c_A > 0$ and $c_{AA} \geq 0$. We assume irreversibility by placing the constraint $A_t \geq 0$ on the available choices.

The current price affects only current period payoffs, so the optimal price for both entrants and incumbents is given by:

$$P_t = \frac{\theta}{\theta - 1} C$$

In this model, the firm faces two choices which affect future as well as current payoffs: participation X_t and investment A_t.

Define $Z = YC^{1-\theta}$ and $\tilde{\theta} = \frac{(\theta-1)^{\theta-1}}{\theta^{\theta}}$. For entrants, current expected net profit conditional on participation is:

$$\pi_{ent}(\nu, Z, F_t, S_t, X_t, A_t) = X_t\left[\tilde{\theta} Z\left(\underline{D}\right)^{\alpha}\exp(\nu) - F_t - S_t\right] - c\left(\underline{D}, A_t\right)$$

For incumbents, current expected net profit conditional on participation is:

$$\pi_{inc}(D_t, \nu, Z, F_t, X_t, A_t) = X_t\left[\tilde{\theta} Z\left(D_t\right)^{\alpha}\exp(\nu) - F_t\right] - c\left(D_t, A_t\right)$$

The Bellman equation for an entrant is:

$$V_{ent}(\nu, Z, F_t, S_t) = \max_{X_t\in\{0,1\}, A_t\geq 0}$$

$$\left\{\begin{array}{c} \pi_{ent}(\nu, Z, F_t, S_t, X_t, A_t) + \\ \\ \beta \int_{F_{t+1}} \left[\begin{array}{c} X_t V_{inc}\left((1-\delta)\,\underline{D} + A_t, \nu, Z, F_{t+1}\right) + \\ \\ (1 - X_t)\int_{S_{t+1}}\int_{\nu'} V_{ent}\left(\nu', Z, F_{t+1}, S_{t+1}\right) h(\nu')\, d\nu' g(S_{t+1})\, dS_{t+1} \end{array}\right] f(F_{t+1})\, dF_{t+1} \end{array}\right\}$$

while the Bellman equation for an incumbent is:

$$V_{inc}\left(D_t,\nu,Z,F_t\right)=\max_{X_t\in\{0,1\},A_t\geq 0}$$

$$\left\{\begin{array}{c}\pi_{inc}\left(D_t,\nu,Z,F_t,X_t,A_t\right)+\\ \beta\int_{F_{t+1}}\left[\begin{array}{c}X_tV_{inc}\left(\left(1-\delta\right)D_t+A_t,\nu,Z,F_{t+1}\right)+\\ \left(1-X_t\right)\int_{S_{t+1}}\int_{\nu'}V_{ent}\left(\nu',Z,F_{t+1},S_{t+1}\right)h\left(\nu'\right)d\nu' g\left(S_{t+1}\right)dS_{t+1}\end{array}\right]f\left(F_{t+1}\right)dF_{t+1}\end{array}\right\}$$

D.1.2 Proof of Proposition 4 (a): selection in the marketing and advertising model

Proposition Let $X_t = X_{inc}\left(D_t,\nu,Z,F_t\right)$ be the policy function of an incumbent. If $\bar{\nu} > \underline{\nu}$, and if $X_{inc}\left(D_t,\underline{\nu},Z,F_t\right)=1$, then $X_{inc}\left(D_t,\bar{\nu},Z,F_t\right)=1$.

Proof Note that the value of nonparticipation does not depend on ν, since the firm gives up its current draw of ν once it chooses not to participate. Let $\{\underline{X}_s,\underline{A}_s\}_{s\geq t} = \{X_s\left(D_t,\underline{\nu},Z,F_t\right),\underline{A}_s\left(D_t,\underline{\nu},Z,F_t\right)\}_{s\geq t}$ denote the optimal plan of incumbent with $\nu = \underline{\nu}$ contingent on all possible future histories $\{F_s,S_s,\nu'\}_{s>t}$. Since this incumbent chooses to participate at t, we know that the value of this optimal plan must be greater than the value of nonparticipation. Note that the value to an incumbent with a different ν of following the plan $\{\underline{X}_s,\underline{A}_s\}_{s\geq t}$ is the sum of terms which are increasing in ν and terms which are invariant to ν. This implies that if $\bar{\nu} > \underline{\nu}$, the value of following the plan $\{\underline{X}_s,\underline{A}_s\}_{s\geq t}$ is greater than the value to the firm with $\underline{\nu}$ of following the plan $\{\underline{X}_s,\underline{A}_s\}_{s\geq t}$, which in turn is greater than the value of nonparticipation. Now the firm with $\bar{\nu} > \underline{\nu}$ cannot do worse by choosing its own optimal plan, $\left\{\overline{X}_s,\overline{A}_s\right\}_{s\geq t}$. The value of this plan must therefore be greater than the value of nonparticipation. This implies that $X_{inc}\left(D_t,\bar{\nu},Z,F_t\right)=1$. QED.

D.1.3 Steady state when there are no fixed / sunk costs

Now assume that F can take on only two values:

$$F=\begin{cases}0 & \text{with probability } \left(1-\omega\right)\\ \infty & \text{with probability } \omega\end{cases}$$

so conditional on entry, there is only exogenous exit. Let

$$c\left(D,A\right)=A+\phi\frac{A^{2}}{D}$$

This is the adjustment cost function we use in our structural estimation.

Let $\tilde{Z}=\frac{(\theta-1)^{\theta-1}}{\theta^{\theta}}YC^{1-\theta}$. Assume that ν and $\tilde{Z}$ are such that it is optimal for the firm to enter. The firm's dynamic problem is then:

$$V\left(D\right)=\max_{A>0}\left\{D^{\alpha}\tilde{Z}\exp\left(\nu\right)-\left(A+\phi\frac{A^{2}}{D}\right)+\beta\omega V\left(D'\right)\right\}$$

subject to

$$D'=\left(1-\delta\right)D+A$$

or rewriting,

$$A=D'-\left(1-\delta\right)D$$

Substituting in, we obtain:

$$V\left(D\right)=\max_{D'>(1-\delta)D}\left\{D^{\alpha}\tilde{Z}\exp\left(\nu\right)-\left(D'-\left(1-\delta\right)D\right)-\phi\frac{\left(D'-\left(1-\delta\right)D\right)^{2}}{D}+\beta\omega V\left(D'\right)\right\}$$

We assume that $V\left(D\right)$ is concave and differentiable.

Take the first order condition with respect to D':

$$0=-1-2\phi\frac{\left(D'-\left(1-\delta\right)D\right)}{D}+\beta\omega V'\left(D'\right)$$

The envelope condition is:

$$V'\left(D\right)=\alpha D^{\alpha-1}\tilde{Z}\exp\left(\nu\right)+\left(1-\delta\right)+2\phi\left(1-\delta\right)\frac{\left(D'-\left(1-\delta\right)D\right)}{D}+\phi\left(\frac{D'-\left(1-\delta\right)D}{D}\right)^{2}$$

Advance one period

$$V'\left(D'\right)=\alpha D'^{\alpha-1}\tilde{Z}\exp\left(\nu\right)+\left(1-\delta\right)+2\phi\left(1-\delta\right)\frac{\left(D''-\left(1-\delta\right)D'\right)}{D'}+\phi\left(\frac{D''-\left(1-\delta\right)D'}{D'}\right)^{2}$$

Substitute into foc to get the Euler equation:

$$\beta\omega\alpha D'^{\alpha-1}\tilde{Z}\exp\left(\nu\right)=\left(1-\beta\omega\left(1-\delta\right)\right)\left(1+2\phi\frac{\left(D'-\left(1-\delta\right)D\right)}{D}\right)-\beta\omega\phi\left(\frac{D''-\left(1-\delta\right)D'}{D'}\right)^{2}$$

Assume that a steady state exists. Then $D = D' = D'' = D_{ss}$. Substituting into the Euler equation, we get:

$$\beta\omega\alpha {D_{ss}}^{\alpha-1}\tilde{Z}\exp(\nu) = (1-\beta\omega(1-\delta))(1+2\phi\delta) - \beta\omega\phi\delta^2$$

and rearranging

$$D_{ss} = \left(\frac{\beta\omega\alpha\tilde{Z}\exp(\nu)}{(1+2\phi\delta)(1-\beta\omega(1-\delta)) - \phi\beta\omega\delta^2}\right)^{\frac{1}{1-\alpha}} = \left(\frac{\beta\omega\alpha\frac{(\theta-1)^{\theta-1}}{\theta^\theta}YC^{1-\theta}\exp(\nu)}{(1+2\phi\delta)(1-\beta\omega(1-\delta)) - \phi\beta\omega\delta^2}\right)^{\frac{1}{1-\alpha}}$$

Note that

$$(1+2\phi\delta)(1-\beta\omega(1-\delta)) - \phi\beta\omega\delta^2 = (1-\beta\omega(1-\delta)) + 2\phi\delta(1-\beta\omega) + \phi\beta\omega\delta^2 > 0$$

This implies that steady state quantity is increasing in idiosyncratic demand, foreign demand and the price index of competitors in the foreign market, and decreasing in own cost.

Note also that the ratio of selling expenses to revenue in steady state is given by:

$$\frac{Sell_{ss}}{R_{ss}} = \frac{A_{ss} + \phi\frac{(A_{ss})^2}{D_{ss}}}{R_{ss}}$$

$$\frac{Sell_{ss}}{R_{ss}} = \frac{1}{\theta}\left[\frac{\alpha\delta(1+\phi)\beta\omega}{(1+2\phi\delta)(1-\beta\omega(1-\delta)) - \phi\delta^2\beta\omega}\right]$$

D.1.4 Propositions on the behavior of prices

Proposition 1. In the marketing and advertising model, the markup is *independent* of C, Y and ν.

Proof This follows directly from the fact that the markup in this model is a constant markup over marginal cost, $P = (\theta/(\theta-1))C$. QED.

D.1.5 Propositions on behavior of quantities

Proposition 5. In the marketing and advertising model, quantity on entry is *decreasing* in C, and *increasing* in Y and ν.

Proof This follows directly from the assumption that customer base on entry is exogenous, and price is a constant markup over marginal cost. Quantity on entry is then given by

$$Q = \left(\frac{\theta}{\theta - 1} C \right)^{1-\theta} Y \left(\underline{D} \right)^{\alpha} \exp\left(\nu \right)$$

QED.

Proposition 6. In the marketing and advertising model, if customer base on entry is below steady state customer base, then (a) quantity converges to steady state quantity from below and (b) growth in quantity on entry depends on $\{Y, C, \nu\}$.

Proof (a) We start by rewriting the problem. Define

$$\kappa = \left(\frac{\beta \omega \alpha}{\left(1 + 2\phi\delta\right)\left(1 - \beta\omega\left(1 - \delta\right)\right) - \phi\beta\omega\delta^2} \right)^{\frac{1}{1-\alpha}}$$

so steady state customer base is given by:

$$D_{ss} = \kappa \left(\tilde{Z} \exp\left(\nu\right) \right)^{\frac{1}{1-\alpha}} = \kappa \left(\frac{\left(\theta - 1\right)^{\theta - 1}}{\theta^{\theta}} Y C^{1-\theta} \exp\left(\nu\right) \right)^{\frac{1}{1-\alpha}}$$

Now define:

$$d = \frac{D}{D_{ss}}$$

Also define

$$v\left(d\right) = \frac{V\left(d \cdot D_{ss}\right)}{D_{ss}}$$

so

$$V\left(D\right) = D_{ss} v \left(\frac{D}{D_{ss}} \right)$$

Then we can rewrite the Bellman equation as follows:

$$v\left(d\right) = \max_{d' > (1-\delta) d} \left\{ \kappa^{\alpha - 1} d^{\alpha} - \left(d' - \left(1 - \delta\right) d\right) - \phi \frac{\left(d' - \left(1 - \delta\right) d\right)^2}{d} + \beta\omega v\left(d'\right) \right\}$$

Take the first order condition:

$$1 + 2\phi\left(d' - \left(1 - \delta\right) d\right) = \beta\omega v'\left(d'\right)$$

Suppose d increases. Then the LHS goes down. So the RHS must go down also. Note that by assumption, the value function is concave. So if d' increases, $v'\left(d'\right)$ goes down.

This implies that d' is increasing in d. Rearrange this as follows

$$1 + 2\phi \left(d' - (1-\delta)\, d\right) - \beta\omega v'\left(d'\right) = h\left(d, d'\right)$$

Note that by concavity of the value function, the function h is increasing in d' and decreasing in d. We know

$$h\left(1,1\right) = 0$$

Consider $d < 1$. Then

$$h(d,1) > 0$$

In addition,

$$h\left(d,d\right) = 1 + 2\phi\delta - \beta\omega v'\left(d\right) < 1 + 2\phi\delta - \beta\omega v'\left(1\right) = 0$$

So $h(d,1) > 0 > h(d,d)$, hence d' such that $h(d,d') = 0$ is such that $1 > d' > d$. QED.

Proof (b) Hold fixed C and Y, and consider $\nu_H > \nu_L$. Since customer base on entry is exogenous, this implies that $\underline{d}\left(\nu_H\right) = \underline{D}/D_{ss}\left(\nu_H\right) < \underline{d}\left(\nu_L\right) = \underline{D}/D_{ss}\left(\nu_L\right)$. Remember that d' is increasing in d, and conditional on d, does not depend on ν. This implies that $d'\left(\underline{d}\left(\nu_H\right)\right) < d'\left(\underline{d}\left(\nu_L\right)\right)$. By concavity of the value function, $v'\left(d'\left(\underline{d}\left(\nu_H\right)\right)\right) > v'\left(d'\left(\underline{d}\left(\nu_L\right)\right)\right)$. Investment on entry is given by

$$A\left(\nu\right) = D_{ss}\left(\nu\right)\left(d'\left(\underline{d}\left(\nu\right)\right) - (1-\delta)\,\underline{d}\left(\nu\right)\right) = D_{ss}\left(\nu\right)\left(\frac{\beta\omega v'\left(d'\left(\underline{d}\left(\nu\right)\right)\right) - 1}{2\phi}\right)$$

Now since $D_{ss}\left(\nu_H\right) > D_{ss}\left(\nu_L\right)$ and $v'\left(d'\left(\underline{d}\left(\nu_H\right)\right)\right) > v'\left(d'\left(\underline{d}\left(\nu_L\right)\right)\right)$, then $A\left(\nu_H\right) > A\left(\nu_L\right)$. Note that growth in quantity on entry is given by:

$$\frac{Q'\left(\nu\right)}{Q\left(\nu\right)} = \left(\frac{(1-\delta)\,\underline{D} + A\left(\nu\right)}{\underline{D}}\right)^{\alpha}$$

Therefore growth in quantities on entry is increasing in ν. By a similar argument, growth in quantities on entry is decreasing in C and increasing in Y. QED

D.2 Customer markets model ($\psi = 0$)

D.2.1 Statement of problem

A single-product firm may participate in multiple distinct export markets. It can price discriminate across markets. The only channel through which decisions across different markets are linked is through a common exogenous marginal cost of production, C, assumed constant.

At the level of an individual export market, there are iid sunk (S_t) and fixed (F_t) costs of participation. The pdf for S_t is $g(S_t)$ and the pdf for F_t is $f(F_t)$. Let $X_t = \{0, 1\}$ be an indicator for current participation, i.e. positive sales. Conditional on participation, the firm faces demand given by:

$$Q_t = Y (P_t)^{-\theta} (D_t)^{\alpha} \exp(\nu).$$

Demand depends on the firm's current price P_t, and on customer base D_t. Demand depends on exogenous aggregate demand and competitors' prices, which are captured in Y, assumed constant and on exogenous idiosyncratic demand ν.

Before entry into a market, the firm sees its current draw of idiosyncratic demand ν from a distribution with pdf $h(\nu)$. If it enters, it retains this draw as long as it continues to participate. If it does not participate, it loses the current draw, and will receive a different iid draw ν' from the same distribution in each subsequent period of nonparticipation.

Customer base accumulates according to:

$$D_{t+1} = (1 - X_t) \underline{D} + X_t ((1 - \delta) D_t + P_t Q_t)$$

The firm faces two choices which affect future as well as current payoffs: participation X_t and prices P_t. For entrants, current expected net profit conditional on participation is:

$$\pi_{ent}(\nu, C, Y, F_t, S_t, X_t, P_t) = X_t \left[(P_t - C) (P_t)^{-\theta} Y (\underline{D})^{\alpha} \exp(\nu) - F_t - S_t \right]$$

Net profit for an incumbent is:

$$\pi_{inc}(D_t, \nu, Y, Z, F_t, X_t, P_t) = X_t \left[(P_t - C) (P_t)^{-\theta} Y (D_t)^{\alpha} \exp(\nu) - F_t \right]$$

The Bellman equation for an entrant is:

$$V_{ent}(\nu, C, Y, F_t, S_t) = \max_{P_t > 0, X_t \in \{0,1\}}$$

$$\left\{\begin{array}{c} \pi_{ent}\left(\nu, C, Y, F_t, S_t, X_t, P_t\right) + \\ \beta \int_{F_{t+1}} \left[\begin{array}{c} X_t V_{inc}\left(\left(1-\delta\right)\underline{D} + \left(P_t\right)^{1-\theta} Y \left(\underline{D}\right)^{\alpha} \exp\left(\nu\right), \nu, C, Y, F_{t+1}\right) + \\ \left(1-X_t\right)\int_{S_{t+1}}\int_{\nu'} V_{ent}\left(\nu', C, Y, F_{t+1}, S_{t+1}\right) h\left(\nu'\right) d\nu' g\left(S_{t+1}\right) dS_{t+1} \end{array}\right] f\left(F_{t+1}\right) dF_{t+1} \end{array}\right\}$$

while the Bellman equation for an incumbent is:

$$V_{inc}\left(D_t, \nu, C, Y, F_t\right) = \max_{P_t > 0, X_t \in \{0,1\}}$$

$$\left\{\begin{array}{c} \pi_{inc}\left(D_t, \nu, C, Y, F_t, X_t, P_t\right) + \\ \beta \int_{F_{t+1}} \left[\begin{array}{c} X_t V_{inc}\left(\left(1-\delta\right) D_t + \left(P_t\right)^{1-\theta} Y \left(D_t\right)^{\alpha} \exp\left(\nu\right), \nu, C, Y, F_{t+1}\right) + \\ \left(1-X_t\right)\int_{S_{t+1}}\int_{\nu'} V_{ent}\left(\nu', C, Y, F_{t+1}, S_{t+1}\right) h\left(\nu'\right) d\nu' g\left(S_{t+1}\right) dS_{t+1} \end{array}\right] f\left(F_{t+1}\right) dF_{t+1} \end{array}\right\}$$

D.2.2 Proof of Proposition 4 (b): selection in the customer markets model

Proposition Let $X' = X_{inc}\left(D, \nu, C, Y, F\right)$ be the policy function of an incumbent. If $\bar{\nu} > \underline{\nu}$, and if $X_{inc}\left(D, \underline{\nu}, C, Y, F\right) = 1$, then $X_{inc}\left(D, \bar{\nu}, C, Y, F\right) = 1$.

Proof Note that the value of nonparticipation depends only on C and Y. Write this $V_{out}\left(C, Y\right)$. Since nonparticipants receive the flow value of nonparticipation (zero) plus the discounted value of the option to enter, we must have $V_{out}\left(C, Y\right) \geq 0$. The only stochastic element in the incumbent's problem is F. For convenience of notation we assume F can take on a finite set of values. Now let $\phi_t = \{F_1, \ldots, F_t\}$ denote a history of realizations of F from 1 to t, let Φ be the set of all possible (infinite) histories, and let $\pi\left(\phi_\infty\right)$ be the probability that history ϕ_∞ is realized. Define:

$$T_t\left(\phi_t\right) = \left(\prod_{s=1}^{t} X_s\left(\phi_s \subseteq \phi_t\right)\right)$$

Consider the sequence version of the firm's problem. The value for an incumbent firm of remaining in the market can be written as follows

$$V_{in}\left(D_0, \nu, C, Y, F_0\right) = \max_{\{X_t(\phi_t), P_t(\phi_t)\}_{t=0}^{\infty}}$$

$$\left\{ \begin{array}{c} Y\exp(\nu_0)\left[\begin{array}{c} (P_0(F_0)-C)(P_0(F_0))^{-\theta}(D_0)^{\alpha}+ \\ \\ \sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t T_t(\phi_t)(P_t(\phi_t)-C)(P_t(\phi_t))^{-\theta}\times\ldots \\ \ldots\times\left(D_t\left(\{P_t(\phi_{t-1}\subseteq\phi_t)\}_0^{t-1},Y,\nu_0\right)\right)^{\alpha} \end{array}\right] \\ \\ -\left(F_0+\sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t T_t(\phi_t)F_t(\phi_t)\right) \\ \\ +V_{out}(C,Y)\sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t T_{t-1}(\phi_{t-1}\subseteq\phi_t)(1-X_t(\phi_t)) \end{array} \right\}$$

where:

$$D_t=(1-\delta)\left(D_{t-1}+P_{t-1}Y(P_{t-1})^{-\theta}(D_{t-1})^{\alpha}\exp(\nu)\right)$$

The firm compares $V_{out}(C,Y)$ with $V_{in}(D_0,\nu,C,Y,F_0)$ and participates iff $V_{in}(D_0,\nu,C,Y,F_0)\geq V_{out}(C,Y)$. Let $\{\underline{X}_t(\phi_t)\}$ and $\{\underline{P}_t(\phi_t)\}$ denote the optimal sequences of participation and prices for the firm with $\nu=\underline{\nu}$, and let $\{\underline{T}_t(\phi_t)\}$ and $\{\underline{D}_t(\phi_t)\}$ denote the induced sequences of T and D. Since the firm with $\nu=\underline{\nu}$ participates, we know that:

$$\begin{array}{c} Y\exp(\underline{\nu})\left[\begin{array}{c} (\underline{P}_0(F_0)-C)(\underline{P}_0(F_0))^{-\theta}(D_0)^{\alpha}+ \\ \\ \sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t\underline{T}_t(\phi_t)(\underline{P}_t(\phi_t)-C)(\underline{P}_t(\phi_t))^{-\theta}(\underline{D}_t(\phi_t))^{\alpha} \end{array}\right] \\ \\ -\left(F_0+\sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t\underline{T}_t(\phi_t)F_t(\phi_t)\right) \\ \\ +V_{out}(C,Y)\sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t\underline{T}_{t-1}(\phi_{t-1}\subseteq\phi_t)(1-\underline{X}_t(\phi_t)) \end{array}\geq V_{out}(C,Y)$$

Notice that

$$\sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t\underline{T}_{t-1}(\phi_{t-1}\subseteq\phi_t)(1-\underline{X}_t(\phi_t))\leq\beta$$

This implies that

$$\begin{array}{c} Y\exp(\underline{\nu})\left[\begin{array}{c} (\underline{P}_0(F_0)-C)(\underline{P}_0(F_0))^{-\theta}(D_0)^{\alpha}+ \\ \\ \sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t\underline{T}_t(\phi_t)(\underline{P}_t(\phi_t)-C)(\underline{P}_t(\phi_t))^{-\theta}(\underline{D}_t(\phi_t))^{\alpha} \end{array}\right]\geq 0 \\ \\ -\left(F_0+\sum_{\phi_\infty\in\Phi}\pi(\phi_\infty)\sum_{t=1}^{\infty}\beta^t\underline{T}_t(\phi_t)F_t(\phi_t)\right)-(1-\beta)V_{out}(C,Y) \end{array}$$

Since the second two terms on the RHS are negative, this implies that the first term must be positive. Therefore:

$$\left[\begin{array}{c} \left(\underline{P}_0\left(F_0\right)-C\right)\left(\underline{P}_0\left(F_0\right)\right)^{-\theta}\left(D_0\right)^{\alpha}+ \\ \\ \sum_{\phi_\infty\in\Phi}\pi\left(\phi_\infty\right)\sum_{t=1}^{\infty}\beta^t\underline{T}_t\left(\phi_t\right)\left(\underline{P}_t\left(\phi_t\right)-C\right)\left(\underline{P}_t\left(\phi_t\right)\right)^{-\theta}\left(\underline{D}_t\left(\phi_t\right)\right)^{\alpha} \end{array}\right]>0$$

Making use of $\bar{\nu}>\underline{\nu}$ this implies that

$$\begin{array}{l} Y\exp\left(\bar{\nu}\right)\left[\begin{array}{c} \left(\underline{P}_0\left(F_0\right)-C\right)\left(\underline{P}_0\left(F_0\right)\right)^{-\theta}\left(D_0\right)^{\alpha}+ \\ \\ \sum_{\phi_\infty\in\Phi}\pi\left(\phi_\infty\right)\sum_{t=1}^{\infty}\beta^t\underline{T}_t\left(\phi_t\right)\left(\underline{P}_t\left(\phi_t\right)-C\right)\times\ldots \\ \ldots\times\left(\underline{P}_t\left(\phi_t\right)\right)^{-\theta}\left(\underline{D}_t\left(\phi_t\right)\right)^{\alpha} \end{array}\right] \\ \qquad -\left(F_0+\sum_{\phi_\infty\in\Phi}\pi\left(\phi_\infty\right)\sum_{t=1}^{\infty}\beta^t\underline{T}_t\left(\phi_t\right)F_t\left(\phi_t\right)\right) \\ +V_{out}\left(C,Y\right)\sum_{\phi_\infty\in\Phi}\pi\left(\phi_\infty\right)\sum_{t=1}^{\infty}\beta^t\underline{T}_{t-1}\left(\phi_{t-1}\subseteq\phi_t\right)\left(1-\underline{X}_t\left(\phi_t\right)\right) \end{array} > V_{in}\left(D_0,\underline{\nu},C,Y,F_0\right)$$

And remember

$$V_{in}\left(D_0,\underline{\nu},C,Y,F_0\right)\geq V_{out}\left(C,Y\right)$$

Now we know that the firm with $\nu=\bar{\nu}$ must do at least as well by optimizing, so

$$V_{in}\left(D_0,\bar{\nu},C,Y,F_0\right)>V_{in}\left(D_0,\underline{\nu},C,Y,F_0\right)\geq V_{out}\left(C,Y\right)$$

QED.

D.2.3 Steady state when there are no fixed / sunk costs

Now assume that F can take on only two values:

$$F=\begin{cases} 0 & \text{with probability } \left(1-\omega\right) \\ \infty & \text{with probability } \omega \end{cases}$$

so conditional on entry, there is only exogenous exit.

Demand is given by

$$Q=\left(P\right)^{-\theta}D^{\alpha}Y\exp\left(\nu\right)$$

Assume that Y, C and ν are such that it is optimal for the firm to enter. The firm's dynamic problem is then:

$$V(D) = \max_P \left\{ (P - C)(P)^{-\theta} D^{\alpha} Y \exp(\nu) + \beta\omega V(D') \right\}$$

subject to

$$D' = (1-\delta) D + PQ$$

or rewriting,

$$V(D) = \max_P \left\{ P^{1-\theta} D^{\alpha} Y \exp(\nu) - C P^{-\theta} D^{\alpha} Y \exp(\nu) + \beta\omega V\left((1-\delta) D + P^{1-\theta} D^{\alpha} Y \exp(\nu)\right)\right\}$$

Assume that $V(D)$ is concave and differentiable.

Take the first order condition with respect to P:

$$(1-\theta) + C\theta P^{-1} + (1-\theta)\beta\omega V'(D') = 0$$

The envelope condition is:

$$V'(D) = \alpha D^{\alpha-1} Y \exp(\nu)\left(P^{1-\theta} - C P^{-\theta}\right) + \left(1 - \delta + \alpha D^{\alpha-1} P^{1-\theta} Y \exp(\nu)\right)\beta\omega V'(D')$$

Iterate forward and substitute into the first order condition:

$$(1-\theta) + C\theta P^{-1} + \beta(1-\theta)\left[\begin{array}{c} \alpha(D')^{\alpha-1} Y \exp(\nu)\left((P')^{1-\theta} - C(P')^{-\theta}\right) + \\ \\ \left(1 - \delta + \alpha(D')^{\alpha-1}(P')^{1-\theta} Y \exp(\nu)\right)\beta\omega V'(D'') \end{array}\right] = 0$$

Now use the first order condition to substitute $V'(D'') = \frac{\theta - 1 - C\theta(P')^{-1}}{\beta(1-\theta)}$ and simplify. We obtain the Euler equation:

$$\frac{C}{P} - \frac{\theta-1}{\theta} = \beta\omega\left[\frac{\alpha Y \exp(\nu)}{\theta}(D')^{\alpha-1}(P')^{1-\theta}\frac{C}{P'} + (1-\delta)\left(\frac{C}{P'} - \frac{\theta-1}{\theta}\right)\right]$$

Assume that a steady state exists. In steady state $P = P' = P_{ss}$ and $D = D' = D_{ss}$. Apply to the constraint to obtain

$$D_{ss} = (1-\delta) D_{ss} + P_{ss}^{1-\theta} D_{ss}^{\alpha} Y \exp(\nu)$$
$$\delta D_{ss} = P_{ss}^{1-\theta} D_{ss}^{\alpha} Y \exp(\nu)$$
$$D_{ss} = \left[\frac{P_{ss}^{1-\theta} Y \exp(\nu)}{\delta}\right]^{\frac{1}{1-\alpha}}$$

Then apply to the Euler equation:

$$P_{ss} = \left[\frac{\theta}{\theta-1} - \frac{\beta\omega\alpha\delta}{(\theta-1)(1-\beta\omega(1-\delta))}\right] C$$

The steady state markup is independent of Z, C and lies below the statically optimal markup, $\theta/(\theta-1)$. In addition, we can verify that the steady state markup is positive:

$$\frac{\theta}{\theta-1} - \frac{\beta\omega\alpha\delta}{(\theta-1)(1-\beta\omega(1-\delta))} > 1$$

iff

$$\theta - \frac{\beta\omega\alpha\delta}{(1-\beta\omega(1-\delta))} > \theta - 1$$

iff

$$\frac{\beta\omega\alpha\delta}{(1-\beta\omega(1-\delta))} < 1$$

iff

$$\beta\omega + \alpha\beta\omega\delta < 1 + \beta\omega\delta$$

which is true because $\beta\omega < 1$ and $\alpha < 1$.

Now substitute in to find D_{ss}:

$$D_{ss} = \left[\frac{P_{ss}^{1-\theta} Y \exp(\nu)}{\delta}\right]^{\frac{1}{1-\alpha}}$$
$$D_{ss} = (Y \exp(\nu))^{\frac{1}{1-\alpha}} C^{\frac{1-\theta}{1-\alpha}} \left(\frac{1}{\delta}\right)^{\frac{1}{1-\alpha}} \left(\frac{\theta}{\theta-1} - \frac{\beta\omega\alpha\delta}{(\theta-1)(1-\beta\omega(1-\delta))}\right)^{\frac{1-\theta}{1-\alpha}}$$

Steady state D is therefore increasing in Y and ν, and decreasing in C.

D.2.4 Propositions on behavior of prices

In this model, we characterize prices before characterizing quantities.

Proposition 2. In the customer markets model, the markup on entry is *increasing* in C and *decreasing* in Y and ν

Proof Define κ:

$$\kappa = \left(\frac{1}{\delta}\right)^{\frac{1}{1-\alpha}} \left(\frac{\theta}{\theta-1} - \frac{\beta\omega\alpha\delta}{(\theta-1)(1-\beta\omega(1-\delta))}\right)^{\frac{1-\theta}{1-\alpha}}$$

so

$$D_{ss} = \kappa (Y \exp(\nu))^{\frac{1}{1-\alpha}} C^{\frac{1-\theta}{1-\alpha}}$$

Now define:

$$d = \frac{D}{D_{ss}}$$

Also define

$$v(d) = \frac{V(d \cdot D_{ss})}{D_{ss}}$$

so

$$V(D) = D_{ss} v\left(\frac{D}{D_{ss}}\right)$$

Notice that

$$P = \hat{\kappa} \left(\frac{d' - (1-\delta) d}{d^{\alpha}}\right)^{\frac{1}{1-\theta}} C$$

where

$$\hat{\kappa} = (\kappa)^{\frac{1-\alpha}{1-\theta}}$$

Then we can rewrite the Bellman equation:

$$v(d) = \max_{d' \geq (1-\delta)d} \left\{ (d' - (1-\delta) d) - \frac{1}{\hat{\kappa}} d^{\frac{\alpha}{1-\theta}} (d' - (1-\delta) d)^{\frac{\theta}{\theta-1}} + \beta\omega v(d') \right\}$$

Take the first order condition:

$$1 - \frac{\theta}{\theta-1} \frac{1}{\hat{\kappa}} \left(\frac{d' - (1-\delta) d}{d^{\alpha}}\right)^{\frac{1}{\theta-1}} + \beta\omega v'(d') = 0$$

and rearrange

$$1 + \beta\omega v'(d') = \frac{\theta}{\theta-1} \frac{1}{\hat{\kappa}} \left(\frac{d' - (1-\delta) d}{d^{\alpha}}\right)^{\frac{1}{\theta-1}}$$

Suppose we increase d. Then the RHS goes down, so the LHS must go down also. By assumption, $v(\cdot)$ is concave, so d' must go up. This implies that d' is increasing in d.

Now, notice that the markup is given by

$$1+\mu\left(d,d'\right)=\hat{\kappa}\left(\frac{d'-\left(1-\delta\right)d}{d^{\alpha}}\right)^{\frac{1}{1-\theta}}=\frac{\theta}{\theta-1}\left(\frac{1}{1+\beta\omega v'\left(d'\left(d\right)\right)}\right)$$

So if d is higher, then d' is higher, $v'\left(d'\right)$ is lower, and hence the markup is higher. So the markup is increasing in d. Now remember that

$$d=\frac{D}{D_{ss}}=D\frac{1}{\kappa\left(Y\exp\left(\nu\right)\right)^{\frac{1}{1-\alpha}}C^{\frac{1-\theta}{1-\alpha}}}=D\frac{C^{\frac{\theta-1}{1-\alpha}}}{\kappa\left(Y\exp\left(\nu\right)\right)^{\frac{1}{1-\alpha}}}$$

This implies that holding fixed D, the markup is increasing in C, and decreasing in Y and ν. QED.

Proposition 3. In the customer markets model, if customer base on entry is below steady state customer base, then (a) the markup converges to the steady state markup from below, and (b) growth in the markup on entry is *decreasing* in C, and *increasing* in Y and ν.

Proof (a) Remember

$$1+\beta\omega v'\left(d'\right)=\frac{\theta}{\theta-1}\frac{1}{\hat{\kappa}}\left(\frac{d'-\left(1-\delta\right)d}{d^{\alpha}}\right)^{\frac{1}{\theta-1}}$$

Rearrange this as follows:

$$\left(\frac{\theta}{\theta-1}\frac{1}{\hat{\kappa}}\left(\frac{d'-\left(1-\delta\right)d}{d^{\alpha}}\right)^{\frac{1}{\theta-1}}-1\right)-\beta\omega v'(d')=h\left(d,d'\right)$$

Note that by concavity of the value function, the function h is increasing in d' and decreasing in d. We know:

$$h(1,1)=0$$

Consider $d<1$. Then

$$h(d,1)>0$$

In addition

$$h(d,d)=\left(\frac{\theta}{\theta-1}\frac{1}{\hat{\kappa}}\left(\delta d^{1-\alpha}\right)^{\frac{1}{\theta-1}}-1\right)-\beta\omega v'(d)<\left(\frac{\theta}{\theta-1}\frac{1}{\hat{\kappa}}\left(\delta\right)^{\frac{1}{\theta-1}}-1\right)-\beta\omega v'(d)$$

and

$$\left(\frac{\theta}{\theta-1}\frac{1}{\hat{\kappa}}(\delta)^{\frac{1}{\theta-1}}-1\right)-\beta\omega v'(d)<\left(\frac{\theta}{\theta-1}\frac{1}{\hat{\kappa}}(\delta)^{\frac{1}{\theta-1}}-1\right)-\beta\omega v'(1)=0$$

So $h(d,1)>0>h(d,d)$, hence d' such that $h(d,d')=0$ is such that $1>d'>d$. So customer base converges to steady state from below. Now remember that

$$1+\mu\left(d,d'\right)=\frac{\theta}{\theta-1}\left(\frac{1}{1+\beta\omega v'\left(d'\left(d\right)\right)}\right)$$

Assuming convergence of d, then $d<d'<d''$. By concavity of v, then $\mu\left(d,d'\right)<\mu\left(d',d''\right)$. QED.

D.2.5 Propositions on behavior of quantities

Proposition 7. In the customer markets model, quantity on entry is *decreasing* in C, and *increasing* in Y and ν

Proof Quantity on entry is given by

$$Q=\frac{\underline{D}^{\alpha}Y\exp\left(\nu\right)}{\left(\left(1+\mu\left(\underline{d}\right)\right)C\right)^{\theta}}$$

where $\underline{d}=\underline{D}/D_{ss}\left(C,Y,\nu\right)$. Since the markup on entry is increasing in C and decreasing in Y and ν, quantity is decreasing in C and increasing in Y and ν. QED.

Proposition 3. In the customer markets model, growth in quantity on entry depends on C, Y and ν.

Proof: Quantity growth on entry can be written:

$$\frac{Q\left(d'\left(\underline{d}\right)\right)}{Q\left(\underline{d}\right)}=\left(\frac{1+\mu\left(\underline{d}\right)}{1+\mu\left(d'\left(\underline{d}\right)\right)}\right)^{\theta}\left(\frac{d'\left(\underline{d}\right)}{\underline{d}}\right)^{\alpha}$$

where

$$\underline{d}=\frac{\underline{D}}{D_{ss}\left(C,Y,\nu\right)}$$

Since $\underline{d}$ depends on C, Y and ν, so does the growth of quantity.

D.3 Numerical validation under more general conditions

In the paper, we conjecture that there is an analogy to Proposition 4 which relates survival to cost and market size, and that Propositions 2, 3 and 6 hold under more general conditions than those assumed here. To provide support to these conjectures, we extend the model we structurally estimate in Section 6 of the paper to allow for heterogeneous cost and market size, and a process for sunk costs that resembles that for fixed costs. We solve numerically for the policy functions in this extended model under a set of parameter values, and verify that the conjectures made in the paper hold for this set of parameter values.

We also verify that our proxies for cost, market size and idiosyncratic demand behave as assumed in Section 4.

D.3.1 Extended model

We assume that cost is lognormally distributed, with parameters $\mu_{cost} = 0$ and σ_{cost}.[3] Cost is constant within a firm over time. We assume that markets have heterogeneous sizes drawn from a nonparametric distribution.[4] Market size is constant over time for a given market. We assume that the sunk cost S_t^{ik} follows the process:

$$S_t^{ik} = \begin{cases} 0 & \text{with probability } \lambda\kappa \\ S & \text{with probability } \lambda(1-\kappa) \\ \infty & \text{with probability } 1-\lambda \end{cases}$$

The cost function for marketing and advertising is:

$$c(D, A) = A + \phi\frac{A^2}{D}$$

with irreversibility ($A \geq 0$).

D.3.2 Parameter choices

To characterize the properties of the marketing and advertising version of the model, we set the vector of parameters $\{\sigma_\nu^2, \sigma_\eta^2, \rho, \lambda, F, \omega, \gamma, \alpha, \delta, \phi, \psi\}$ equal to their values from our baseline estimates of the structural model described in Section 6. We normalize the size of the largest market type to 1, and the cost of the lowest cost firm type to 1. We allow $\underline{D}$ to

[3] We approximate the cost process with 7 states.
[4] We assume there are 5 possible market types.

vary with cost and market type (we assume the ratio of $\underline{D}(c,m)$ to $D_{ss}(c,m)$ is the same for all cost and market types, and is given by $\underline{D}(1,1)/D_{ss}(1,1)$. We then choose σ_{cost}, the size of the 4 smaller markets, S and κ to match as closely as possible: the export participation rate and moments of the empirical distribution of markets per exporter, and of exporters per market. The simulation uses 1000 firms and 150 markets.

To characterize the properties of the customer markets version of the model, we set the vector of parameters $\left\{\sigma_\nu^2, \sigma_\eta^2, \rho, \lambda, F, \omega, \gamma, \alpha, \delta, \phi, \psi\right\}$ equal to their values from our best estimate of the structural model described in Section 6 with $\psi = 0$, and trade elasticity of 3. We normalize the size of the largest market type to 1, and the cost of the lowest cost firm type to 1. We allow $\underline{D}$ to vary with cost and market type (we assume the ratio of $\underline{D}(c,m)$ to $D_{ss}(c,m)$ is the same for all cost and market types, and is given by $\underline{D}(1,1)/D_{ss}(1,1)$. We then choose σ_{cost}, the size of the 4 smaller markets, S and κ to match as closely as possible: the export participation rate and moments of the empirical distribution of markets per exporter, and of exporters per market.

D.3.3 Conjectures we verify

Conjecture 4. We verify that when $\psi = 1$ (given our parameterization), holding fixed $\{S, F, \nu, \eta, D\}$ the probability of survival is decreasing in costs and increasing in market size, as long as customer base is above customer base on entry (the relevant $\underline{D}(c,m)$.).

Conjecture 2. We verify that when $\psi = 0$ (customer markets model), the markup on entry is *increasing* in C^i and *decreasing* in Y^k and ν_t^{ik} even with endogenous exit.

Conjecture 3. We verify that when $\psi = 0$ (customer markets model), if customer base is below steady state customer base, then (a) the markup converges to the steady state markup from below, and (b) growth in the markup on entry (i.e. growth between the first and second periods of participation) is *decreasing* in C^i, and *increasing* in Y^k and ν_t^{ik}, even with endogenous exit.

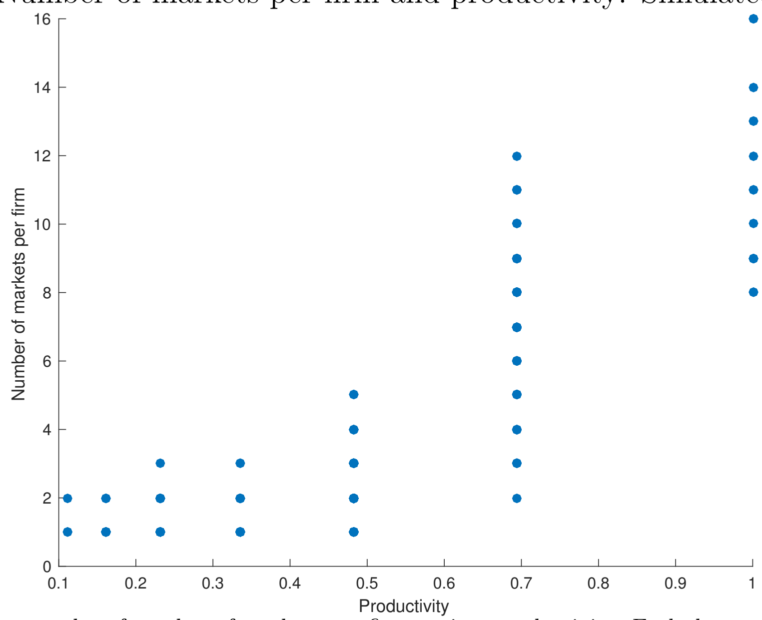
Conjecture 4. We verify that when $\psi = 1$ (marketing and advertising model), if customer base is below steady state customer base, then (a) investment in customer base is decreasing in C^i, and increasing in Y^k and ν^{ik} even with endogenous exit.

D.3.4 Behavior of proxies

We simulate the marketing and advertising model with 1000 firms and 150 markets for 100 periods (50 model-years). We take the last 14 model-years of the simulation. We calculate for each firm the number of markets it participates in over these 14 years. We calculate for each market the number of firms that ever participate in it over these 14 years. Figure 1 illustrates the relationship between number of markets per firm and productivity (the inverse of marginal cost). Figure 2 illustrates the relationship between number of firms per market and market size. The number of markets per firm is negatively correlated with cost, while the number of firms per market is positively correlated with market size.

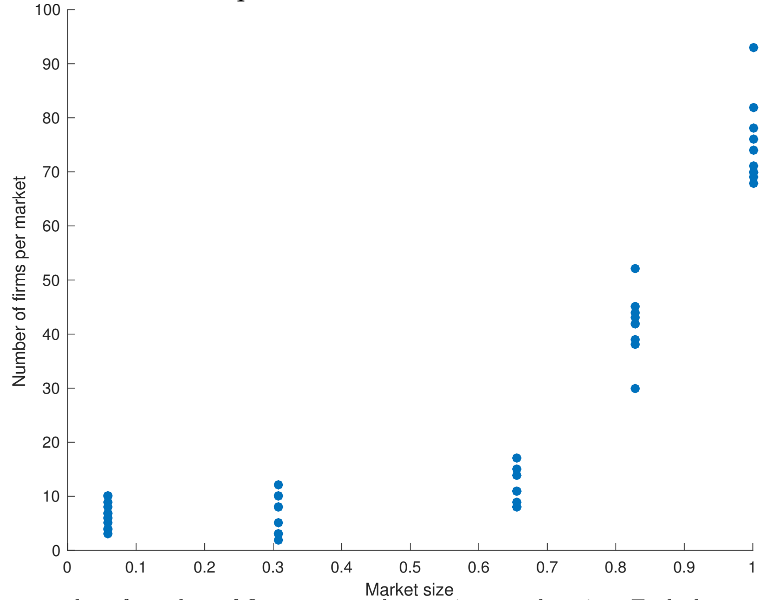
Figure 3 shows that if $\nu' > \nu$, the distribution of duration conditional on ν first order stochastically dominates the distribution of duration conditional on ν'. We also find that the residuals after regressing duration on the number of markets per firm and number of firms per market are positively correlated with ν(the correlation is 0.2).

Figure 1: Number of markets per firm and productivity: Simulated example



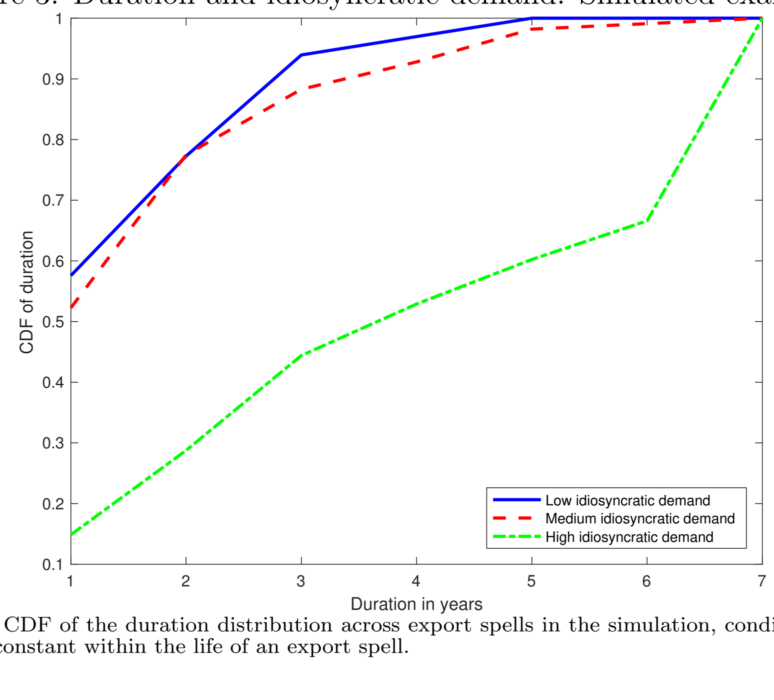
Notes: Figure shows a scatter plot of number of markets per firm against productivity. Each dot represents a combination of productivity and number of markets per firm in the simulation. The size of the dot does not reflect the relative frequency of the {productivity, number of markets} pair.

Figure 2: Number of firms per market and market size: Simulated example



Notes: Figure shows a scatter plot of number of firms per market against market size. Each dot represents a combination of market size and number of firms per market in the simulation. The size of the dot does not reflect the relative frequency of the {market size, number of firms} pair.

Figure 3: Duration and idiosyncratic demand: Simulated example



Notes: Figure plots the CDF of the duration distribution across export spells in the simulation, conditioning on idiosyncratic demand type, which is constant within the life of an export spell.

E Detailed data description

Disclaimer: A portion of this description is taken from the online appendix to Fitzgerald and Haller (2018), and is reproduced here for the convenience of readers.

E.1 Census of Industrial Production

The Irish Census of Industrial Production (CIP) is a census of manufacturing, mining and utilities that takes place annually at both the firm (enterprise) and plant (local unit) level. All firms with 3 or more persons engaged are required to fill in a return. The industries covered are NACE revision 1.1 (the harmonized European industrial classification system) classes 10 to 41 until 2007 and NACE revision 2 classes 05 to 39 from 2008. The data available to us covers the period 1991 to 2009. Survey forms and methodology documents for this data are available on the web at www.cso.ie.
Variables in the CIP data are checked for a number of different measurement issues: industry (NACE) and ownership changes are ignored if they revert in the following year. A similar procedure applies where first or last observations differ from those after or before.

Figures on employment relate to employment in the firm in the second week of September. In some cases this can result in zero employees in combination with a positive wage bill. Where the average wage is clearly out of line with the firm's employment history, the figures are adjusted. For example, if employment is zero but the wage bill is positive, employment figures are obtained by averaging the average wage over the previous and the following year and backing out the employment figure closest to the nearest full number from the wage bill for the current year.

Sales are checked for digit issues based on large changes in sales per employee and deviations from the mean over time. Share of revenue exported is checked for big changes from year to year as well as for once-off zero observations.

The sampling frame for the CIP is the CSO's business register. Firm identifiers on this register occasionally change due to name or legal status changes even if the firm physically stays the same. We identified possible cases of reclassification in the CIP among firms in the top decile according to turnover. The actual cases were then confirmed by CSO statisticians. We assign these firms a new firm identifier that stays the same over their time in the CIP to ensure they are not classified as entrants or exiters. This affects just over 50 firms throughout the sample period.

E.2 Customs data

Irish customs data are collected by the Revenue Commissioners. Starting in 1993, data for intra-European and extra-European trade are collected separately using two different systems called Intrastat and Extrastat. The data available to us covers the period 1996-2014.

All VAT-registered traders make regular VAT returns, which record the total value of goods imported from and exported to other EU countries. In addition, traders whose exports to EU countries in the previous twelve months exceeded 635,000 must make a detailed Intrastat export return each month, which reports the value and volume of intra-EU exports, by destination market and product classification. There is some imputation of data when VAT returns or Intrastat returns are missing. The reporting threshold for extra-European exports to the Extrastat system is 254 Euro per transaction. There is no imputation for Extrastat returns.

Intrastat and Extrastat records are transferred to the CSO, and matched by the CSO to the Business Register using confidential information. We have access to the value (in Euros) and volume of exports by destination market and product classification, aggregated to an annual frequency. We do not have access to a flag for imputed data.

E.2.1 Quality of CIP-customs match

Our measures of firm-level variables and exports come from different sources - the CIP and customs data. There are three issues in using customs data matched to firms as a measure of export participation (and to a lesser extent, exports conditional on participation). The first is the fact that not all customs records can be matched by the CSO to firms on the Business Register. The second is the possibility that some firms export through intermediaries rather than directly, and are hence misclassified as non-exporters. The third is that customs data cover only exports of merchandise, and do not include exports of services. Table 1 reports customs exports matched by the CSO to firms as a share of total published merchandise exports, and customs exports matched to CIP firms (a subset of firms) as a share of total published merchandise exports. As noted in the text of the paper, the share of exports that can be matched to firms on the Business Register is relatively low for the period 1996-1998, and highest for the period 1999-2009.

We do have independent information from the CSO on export participation, as firms are asked what share of total sales is due to export sales. Note that this may include exports of services as well as exports of merchandise. In Table 2 we report the number of firms in each of the following four categories: nonexporters in both CIP and customs; nonexporters in CIP, exporters in customs; exporters in CIP, nonexporters in customs; exporters in both CIP and customs. In Table 3 we report the share of CIP revenue accounted for by each of these four groups. It appears possible from these statistics that there are moderately sized firms who are misclassified as nonexporters due to an inability to match the relevant customs records with the Business Register.

Table 4 reports CIP exports (obtained by multiplying a firm's reported export share by its total sales) as a share of total CIP sales, customs exports matched to CIP firms as a share of total CIP sales, and CIP exports for firms classified as exporters by the customs definition as a share of total CIP sales. The latter two ratios are relatively similar, suggesting that on average, the CIP measure of exports may be of reasonable quality, and that conditional on being matched to a CIP firm, customs records provide a relatively complete picture of exports. However it also suggests that, due to an inability to match customs records to firm identifiers, some exporters are misclassified as nonexporters.

Table 1: Exports matched to firms as a share of published merchandise exports

	All firms	CIP firms
1996	0.57	0.53
1997	0.59	0.52
1998	0.65	0.56
1999	0.76	0.64
2000	0.75	0.61
2001	0.74	0.58
2002	0.74	0.60
2003	0.77	0.62
2004	0.78	0.65
2005	0.76	0.62
2006	0.75	0.61
2007	0.77	0.64
2008	0.74	0.64
2009	0.76	0.65
avg 2000-09	0.76	0.62

Notes: First column reports the ratio of customs exports for which the CSO can find a match to a firm on the Business Register (including firms not in the CIP) to total published merchandise exports. The second column reports the ratio of customs exports for which the CSO can find a match to a CIP firm (satisfying our nonzero turnover and employment criteria) to total published merchandise exports. Source: CSO and authors' calculations.

Table 2: Export status: CIP and Customs classification, number of firms

	CIP Nonex	Customs Nonex	CIP Nonex	Customs Ex	CIP Ex	Customs Nonex	CIP Ex	Customs Ex	Total
1996	2017		94		1277		969		4357
1997	1927		286		864		1417		4494
1998	1922		280		786		1482		4470
1999	1981		273		720		1587		4561
2000	1999		397		699		1731		4826
2001	1930		428		665		1745		4768
2002	2119		452		641		1732		4944
2003	2092		485		632		1693		4902
2004	1929		504		486		1666		4585
2005	1840		436		441		1590		4307
2006	1911		456		509		1600		4476
2007	2436		476		750		1604		5266
2008	2364		478		937		1558		5337
2009	2075		495		841		1495		4906
avg 2000-09	2070		461		660		1641		4832

Notes: First column is the number of CIP firms who report zero exports in the CIP, and who are not matched with any export flows in the customs data. Second column is the number of CIP firms who report zero exports in the CIP and are matched with positive export flows in the customs data. Third column is the number of CIP firms who report positive exports in the CIP and are not matched with any export flows in the customs data. Fourth column is the number of CIP firms who report positive exports in the CIP and are matched with positive export flows in the customs data. Source: CSO and authors' calculations.

Table 3: Export status: CIP and Customs classification, share of CIP revenue

	CIP Nonex	Customs Nonex	CIP Nonex	Customs Ex	CIP Ex	Customs Nonex	CIP Ex	Customs Ex
1996	0.10		0.02		0.33		0.56	
1997	0.09		0.02		0.28		0.62	
1998	0.08		0.01		0.28		0.63	
1999	0.07		0.01		0.24		0.68	
2000	0.07		0.02		0.21		0.70	
2001	0.08		0.02		0.25		0.65	
2002	0.07		0.02		0.24		0.68	
2003	0.05		0.02		0.25		0.68	
2004	0.05		0.02		0.24		0.69	
2005	0.05		0.02		0.25		0.68	
2006	0.05		0.02		0.26		0.67	
2007	0.06		0.01		0.28		0.65	
2008	0.07		0.02		0.22		0.69	
2009	0.06		0.05		0.22		0.68	
avg 2000-09	0.06		0.02		0.24		0.68	

Notes: First column is the share of CIP sales accounted for by CIP firms who report zero exports in the CIP, and who are not matched with any export flows in the customs data. Second column is the share of CIP sales accounted for by CIP firms who report zero exports in the CIP and are matched with positive export flows in the customs data. Third column is the share of CIP sales accounted for by CIP firms who report positive exports in the CIP and are not matched with any export flows in the customs data. Fourth column is the share of CIP sales accounted for by CIP firms who report positive exports in the CIP and are matched with positive export flows in the customs data. Source: CSO and authors' calculations.

Table 4: Different measures of exports: Ratios to total CIP sales

	Total CIP exports	Total matched customs exports	CIP exports of firms with customs exports > 0
1996	0.64	0.42	0.42
1997	0.66	0.41	0.47
1998	0.69	0.49	0.49
1999	0.73	0.55	0.55
2000	0.74	0.55	0.58
2001	0.73	0.55	0.53
2002	0.75	0.54	0.56
2003	0.75	0.47	0.54
2004	0.76	0.50	0.55
2005	0.77	0.47	0.55
2006	0.75	0.44	0.53
2007	0.75	0.44	0.52
2008	0.71	0.49	0.54
2009	0.71	0.53	0.54
avg 2000-09	0.74	0.50	0.54

Notes: First column is the ratio of total exports reported by CIP firms to total sales reported by CIP firms. Second column is the ratio of total customs exports matched to CIP firms to total sales reported by CIP firms. Third column is the ratio of total CIP exports reported by CIP firms who are matched to non-zero export flows in the customs data to total sales reported by CIP firms. Source: CSO and authors' calculations.

E.3 Assignment of NACE 3-digit industries to industry groups

Note: This includes only industries where firms are recorded to be in production in Ireland. This classification follows Vermeulen (2007) as described in Fitzgerald and Haller (2013).

I. Consumer food products 151 Production, processing and preserving of meat and meat products 152 Processing and preserving of fish and fish products 153 Processing and preserving of fruit and vegetables 154 Manufacture of vegetable and animal oils and fats 155 Manufacture of dairy products 158 Manufacture of other food products 159 Manufacture of beverages 160 Manufacture of tobacco products **II. Consumer non-food non-durables** 174 Manufacture of made-up textile articles, except apparel 175 Manufacture of other textiles 177 Manufacture of knitted and crocheted articles 181 Manufacture of leather clothes 182 Manufacture of other wearing apparel and accessories 183 Dressing and dyeing of fur; manufacture of articles of fur 191 Tanning and dressing of leather 192 Manufacture of luggage, handbags and the like, saddlery and harness 193 Manufacture of footwear 221 Publishing 222 Printing and service activities related to printing 223 Reproduction of recorded media 244 Manufacture of pharmaceuticals, medicinal chemicals and botanical products 245 Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations 364 Manufacture of sports goods 365 Manufacture of games and toys 366 Miscellaneous manufacturing n.e.c. **III. Consumer durables** 297 Manufacture of domestic appliances n.e.c. 323 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods 334 Manufacture of optical instruments and photographic equipment 335 Manufacture of watches and clocks 341 Manufacture of motor vehicles 354 Manufacture of motorcycles and bicycles 361 Manufacture of furniture 362 Manufacture of jewelery and related articles 363 Manufacture of musical instruments **IV. Intermediate goods** 132 Mining of non-ferrous metal ores, except uranium and thorium ores 141 Quarrying of stone 142 Quarrying of sand and clay 143 Mining of chemical and fertilizer minerals 145 Other mining and quarrying n.e.c. 156 Manufacture of grain mill products, starches and starch products 157 Manufacture of prepared animal feeds 171 Preparation and spinning of textile fibres 172 Textile weaving 173 Finishing of textiles 176 Manufacture of knitted and crocheted fabrics 201 Sawmilling and planing of wood; impregnation of wood 202 Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards 203 Manufacture of builders' carpentry and joinery 204 Manufacture of wooden containers 205 Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials 211 Manufacture of pulp, paper and paperboard 212 Manufacture of articles of paper and paperboard 241 Manufacture of basic chemicals 242 Manufacture of pesticides and other agro-chemical products 243 Manufacture of paints, varnishes and similar coatings, printing ink and mastics 246 Manufacture of other chemical products 247 Manufacture of man-made fibres 251 Manufacture of rubber products 252 Manufacture of plastic products 261 Manufacture of glass and glass products 262 Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products 263 Manufacture of ceramic tiles and flags 264 Manufacture of bricks, tiles and construction products, in baked clay 265 Manufacture of cement, lime and plaster 266 Manufacture of articles of concrete, plaster and cement 267 Cutting, shaping and finishing of ornamental and building stone 268 Manufacture of other non-metallic mineral products 271 Manufacture of basic iron and steel and of ferro-alloys 272 Manufacture of tubes 273 Other first processing of iron and steel 274 Manufacture of basic precious and non-ferrous metals 275 Casting of metals 284 Forging, pressing, stamping and roll forming of metal; powder metallurgy 285 Treatment and coating of metals; general mechanical engineering 286 Manufacture of cutlery, tools and general hardware 287 Manufacture of other fabricated metal products 312 Manufacture of electricity distribution and control apparatus 313 Manufacture of insulated wire and cable 314 Manufacture of accumulators, primary cells and primary batteries 315 Manufacture of lighting equipment and electric lamps 316 Manufacture of electrical equipment n.e.c. 321 Manufacture of electronic valves and tubes and other electronic components **V. Energy** 101 Mining and agglomeration of hard coal 102 Mining and agglomeration of lignite 103 Extraction and agglomeration of peat 111 Extraction of crude petroleum and natural gas 112 Service activities incidental to oil and gas extraction, excluding surveying 232 Manufacture of refined petroleum products **VI. Capital goods** 281 Manufacture of structural metal 282 Manufacture of tanks, reservoirs and containers of metal; manufacture of central heating radiators and boilers 283 Manufacture of steam generators, except central heating hot water boilers 291 Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines 292 Manufacture of other general purpose machinery 293 Manufacture of agricultural and forestry machinery 294 Manufacture of machine tools 295 Manufacture of other special purpose machinery 300 Manufacture of office machinery and computers

311 Manufacture of electric motors, generators and transformers 322 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy 331 Manufacture of medical and surgical equipment and orthopaedic appliances 332 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control 333 Manufacture of industrial process control equipment 342 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers 343 Manufacture of parts and accessories for motor vehicles and their engines 351 Building and repairing of ships and boats 352 Manufacture of railway and tramway locomotives and rolling stock 353 Manufacture of aircraft and spacecraft 355 Manufacture of other transport equipment n.e.c.

E.4 Sectoral shares: Exporters and exports

Table 5: Distribution of exporting firms across NACE 2-digit sectors (%)

Sector	NACE	1999	2008
Mining	10 to 14	1	2
Food, Bev, Tobacco	15 to 16	14	13
Textiles, Apparel, Leather	17 to 19	9	5
Wood	20	3	4
Paper, Printing	21 to 22	10	8
Chemicals	24	7	7
Rubber, Plastic	25	7	7
Non-metal Mineral	26	4	5
Metal & Metal products	27 to 28	10	13
Machinery	29	10	11
Electrical and optical equipment	30 to 33	14	12
Transport equipment	34 to 35	3	3
Other manufacturing	36 to 37	8	10

Notes: Sample is CIP firms matched to positive exports in customs. Table reports % of these firms in each sector. Source: CSO and authors' calculations.

Table 6: Breakdown of total exports by HS2 category (%) for sample period

HS2 category	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Total food and live animals (0)	14	10	9	8	7	6	6	7	7	7	8	8	8	7
Beverages and tobacco (1)	2	2	1	1	1	1	1	1	1	1	2	2	1	1
Crude mat., inedible, except fuels (2)	2	2	1	1	1	1	1	1	1	1	2	2	1	1
Mineral fuels, lubricants & related mat. (3)	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Animal & veg. oils, fats and waxes (4)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Organic chemicals (51)	10	11	17	17	20	18	18	18	17	20	19	22	20	21
Medicinal and pharmaceutical prod. (54)	6	6	7	7	6	10	17	16	18	17	16	16	19	25
Ess. oils, perf. mat., toilet prep. etc. (55)	3	4	4	4	3	3	3	5	6	6	6	6	6	6
Other chemicals (52,53,56,57,58,59)	3	4	3	4	3	3	3	4	3	3	3	4	5	5
Manuf. goods classified chiefly by mat. (6)	4	4	3	3	2	2	2	2	2	2	2	2	2	1
General ind. mach. and parts, n.e.s. (74)	2	2	1	1	1	1	1	1	1	1	1	2	1	1
Office mach. & data processing equip. (75)	21	23	23	23	23	23	18	18	16	16	16	14	11	8
Telecom. & sound record., repr. equip. (76)	2	3	4	5	4	4	3	2	2	2	2	2	1	1
Electrical mach., appliances etc., n.e.s. (77)	8	8	7	8	9	11	11	6	7	6	6	5	5	4
Oth. mach. & trans. equip. (71,72,73,78,79)	2	2	2	2	2	2	2	2	2	2	2	3	4	4
Professional & scientific apparatus (87)	3	2	2	2	2	2	2	4	4	3	3	2	4	4
Misc. manuf. articles, n.e.s. (89)	10	9	7	8	7	6	5	6	6	6	6	6	5	6
Other misc manuf. art. (81,82,83,84,85,88)	2	2	2	2	1	1	1	1	1	2	2	1	2	2
Commodities and transactions n.e.s. (9)	6	6	5	4	4	4	3	4	4	4	3	3	3	4

Notes: Based on publicly available data on merchandise exports. Expressed as % of total merchandise exports. Source: CSO

E.5 List of countries

The following are the countries in our sample:

Afghanistan, Albania, Algeria, Angola, Antigua & Barbuda, Argentina, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bermuda, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, Brunei, Bulgaria, Burkina Faso, Cambodia, Cameroon, Canada, Chile, China, Colombia, Congo, Congo (Dem Rep), Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Fiji, Finland, France, French Polynesia, Gabon, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Lithuania, Luxembourg, Macao, Macedonia, Malawi, Malaysia, Mali, Malta, Mauritius, Mexico, Moldova, Morocco, Mozambique, Namibia, Netherlands, Netherlands Antilles, New Caledonia, New Zealand, Nicaragua, Nigeria, North Korea, Norway, Oman, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Senegal, Serbia & Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

E.6 Data for comparison of firm and market proxies

Our TFP measure is TFPR at the firm level calculated using a production function estimation approach as in van Biesebroeck (2007). The methodology is described in Haller, S. (2012), "Intra-firm trade, exporting, importing, and firm performance", *Canadian Journal of Economics* 45(4), 1397–1430.

Average share in world GDP is calculated for each of the listed countries based on data on GDP in current US$ from the World Development Indicators for the period 1996-2009. We calculate the share of world GDP for each country each year. Then we average these shares within a country over the sample period. Bilateral distance with Ireland is taken from CEPII.

F Additional tables: Reduced form empirical analysis

Table 7: Percentiles of distribution of # markets per firm and # firms per market

	Firms	Markets	Firm-mkt spells		Firm-prod-mkt spells	
	m^i	f^k	m^i	f^k	m^i	f^k
p10	1	37	5	137	11	236
p25	1	56	18	312	27	487
p50	2	146	39	559	48	714
p75	9	426	62	797	75	1012
p90	30	674	87	1720	101	1720
mean	9.6	283	43	761	52	853

Notes: Statistics are for our cleaned data set of CIP firms. Source: CSO and authors' calculations.

Table 8: Summary statistics on full sample of exporter-years and baseline estimation samples

	(1)	(2)	(3)	(4)	(5)
	Full sample	Product R, Q, P	Market R, #prod	Product exit	Market exit
# employees, mean	84	181	137	181	137
# employees, median	25	72	50	72	50
Firm age, mean	22	22	23	22	23
Firm age, median	18	19	19	19	19
Share foreign owned	0.26	0.55	0.44	0.55	0.44
# export mkts, mean	7	17	12	17	12
# export mkts, median	2	12	6	12	6
Export share, mean	0.32	0.62	0.51	0.62	0.51
Export share, median	0.15	0.69	0.50	0.70	0.50
Coverage of exports	1	0.75	0.99		

Notes: First column reports summary statistics on the full sample of exporter-years. Column 2 reports summary statistics on the firm-years used to estimate columns 1-3 in Table 6 in the paper, i.e. the baseline product-market level analysis of revenue, quantity and price. Column 3 reports summary statistics on the firm-years used to estimate columns 4-5 in Table 6 in the paper, i.e. the baseline market level analysis of revenue and number of products. Column 4 reports summary statistics on the firm-years used to estimate column 1 of Table 7 in the paper, i.e. the baseline product-market level analysis of exit. Column 5 reports summary statistics on the firm-years used to estimate column 2 of Table 7 in the paper, i.e. the baseline market level analysis of exit.

Table 9: Dynamics of revenue, quantity, price, and number of products

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Duration	Spell intercept									
2 years	0.54	(0.04)**	0.57	(0.04)**	-0.02	(0.02)	0.49	(0.06)**	0.10	(0.01)**
3 years	0.86	(0.05)**	0.86	(0.06)**	0.00	(0.03)	0.83	(0.07)**	0.15	(0.02)**
4 years	1.05	(0.07)**	1.04	(0.07)**	0.01	(0.04)	1.03	(0.09)**	0.21	(0.02)**
5 years	1.15	(0.09)**	1.17	(0.10)**	-0.02	(0.05)	1.20	(0.11)**	0.21	(0.02)**
6 years	1.07	(0.12)**	1.07	(0.12)**	0.00	(0.05)	1.33	(0.12)**	0.28	(0.03)**
7+ years	1.37	(0.07)**	1.42	(0.07)**	-0.05	(0.03)	1.55	(0.06)**	0.30	(0.01)**
left-cens	2.70	(0.03)**	2.75	(0.03)**	-0.05	(0.02)**	3.50	(0.03)**	0.72	(0.01)**
right-cens	1.55	(0.04)**	1.54	(0.04)**	0.01	(0.02)	1.82	(0.04)**	0.31	(0.01)**
Tenure	2-year spell									
2 years	-0.01	(0.05)	-0.01	(0.05)	0.00	(0.03)	-0.09	(0.07)	0.00	(0.02)
Tenure	3-year spell									
2 years	0.39	(0.07)**	0.41	(0.07)**	-0.01	(0.04)	0.46	(0.09)**	0.10	(0.02)**
3 years	-0.11	(0.07)	-0.12	(0.07)*	0.02	(0.04)	0.05	(0..09)	0.01	(0.02)
Tenure	4-year spell									
2 years	0.44	(0.10)**	0.50	(0.10)**	-0.06	(0.05)	0.61	(0.12)**	0.12	(0.03)**
3 years	0.50	(0.09)**	0.56	(0.10)**	-0.05	(0.05)	0.56	(0.12)**	0.10	(0.03)**
4 years	0.04	(0.10)	0.04	(0.10)	0.01	(0.05)	0.25	(0.12)**	0.00	(0.03)
Tenure	5-year spell									
2 years	0.61	(0.13)**	0.62	(0.13)**	-0.01	(0.06)	0.64	(0.15)**	0.14	(0.03)**
3 years	0.63	(0.13)**	0.62	(0.13)**	0.01	(0.06)	0.70	(0.15)**	0.15	(0.04)**
4 years	0.50	(0.13)**	0.51	(0.13)**	-0.01	(0.06)	0.52	(0.14)**	0.13	(0.04)**
5 years	-0.04	(0.13)	-0.06	(0.14)	0.03	(0.06)	0.01	(0.15)	0.04	(0.03)
Tenure	6-year spell									
2 years	0.86	(0.15)**	0.90	(0.16)**	-0.03	(0.07)	0.58	(0.15)**	0.17	(0.04)**
3 years	1.00	(0.15)**	1.10	(0.16)**	-0.09	(0.07)	0.78	(0.15)**	0.17	(0.04)**
4 years	0.96	(0.15)**	0.98	(0.16)**	-0.02	(0.07)	0.87	(0.15)**	0.22	(0.04)**
5 years	0.69	(0.15)**	0.67	(0.16)**	0.01	(0.07)	0.62	(0.16)**	0.13	(0.04)**
6 years	0.12	(0.16)	0.10	(0.17)	0.02	(0.08)	-0.05	(0.16)	-0.02	(0.04)
Tenure	7+ year spell									
2 years	0.79	(0.08)**	0.80	(0.09)**	0.00	(0.04)	1.00	(0.07)**	0.20	(0.02)**
3 years	1.08	(0.08)**	1.13	(0.09)**	-0.05	(0.04)	1.30	(0.07)**	0.26	(0.02)**
4 years	1.23	(0.09)**	1.24	(0.09)**	-0.01	(0.04)	1.44	(0.07)**	0.29	(0.02)**
5 years	1.35	(0.08)**	1.35	(0.09)**	-0.01	(0.04)	1.52	(0.07)**	0.30	(0.02)**
6 years	1.24	(0.09)**	1.27	(0.09)**	-0.03	(0.04)	1.44	(0.07)**	0.28	(0.02)**
7+ years	1.21	(0.08)**	1.25	(0.08)**	-0.04	(0.02)**	1.54	(0.06)**	0.31	(0.02)**
Fixed effects	fpy & pmy		fpy & pmy		fpy & pmy		fy & my		fy & my	
N	183,831		183,831		183,831		174,341		174,341	
R^2	0.74		0.81		0.87		0.56		0.47	
R^2-adj	0.59		0.69		0.79		0.51		0.42	

Notes: Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log price at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 10: Baseline dynamics of firm-product-market quantities: full results

			interact. w/ m^i		interact w/ f^k	
Spell duration	Spell intercept					
2 years	0.51	(0.10)**	-0.15	(0.17)	0.52	(0.34)
3 years	0.68	(0.15)**	-0.19	(0.25)	1.18	(0.49)**
4 years	0.94	(0.22)**	-0.86	(0.35)**	1.97	(0.72)**
5 years	0.85	(0.29)**	-0.57	(0.44)	2.51	(0.95)**
6 years	0.63	(0.42)*	0.04	(0.62)	1.96	(1.22)
7+ years	0.46	(0.22)**	0.11	(0.32)	4.28	(0.65)**
Market tenure	2-year spell					
2 years	-0.07	(0.13)	0.04	(0.22)	0.20	(0.43)
Market tenure	3-year spell					
2 years	0.40	(0.20)**	0.06	(0.32)	-0.07	(0.64)
3 years	0.12	(0.21)	-0.04	(0.32)	-1.06	(0.67)
Market tenure	4-year spell					
2 years	0.34	(0.30)	0.36	(0.46)	0.13	(0.95)
3 years	0.30	(0.30)	0.71	(0.46)	-0.06	(0.93)
4 years	-0.15	(0.31)	0.69	(0.48)	-0.31	(0.97)
Market tenure	5-year spell					
2 years	0.72	(0.39)*	-0.09	(0.61)	-0.31	(1.24)
3 years	0.33	(0.39)	0.47	(0.60)	0.53	(1.25)
4 years	0.58	(0.40)	0.24	(0.64)	-0.77	(1.32)
5 years	0.13	(0.39)	0.38	(0.63)	-1.57	(1.26)
Market tenure	6-year spell					
2 years	0.69	(0.56)	-0.24	(0.83)	1.37	(1.57)
3 years	0.99	(0.54)*	-0.47	(0.81)	1.33	(1.54)
4 years	1.01	(0.54)*	-0.01	(0.80)	-0.10	(1.58)
5 years	0.91	(0.56)	-0.14	(0.85)	-0.85	(1.62)
6 years	0.24	(0.59)	0.09	(0.88)	-0.79	(1.63)
Market tenure	7+ year spell					
2 years	0.59	(0.29)**	0.58	(0.40)	-0.06	(0.86)
3 years	0.76	(0.27)**	0.69	(0.39)*	0.49	(0.83)
4 years	1.21	(0.28)**	0.51	(0.39)	-0.77	(0.85)
5 years	1.29	(0.28)**	0.23	(0.40)	-0.09	(0.86)
6 years	1.20	(0.28)**	0.23	(0.40)	-0.11	(0.87)
7+ years	0.55	(0.25)**	1.03	(0.35)**	1.43	(0.74)**
left-cens	1.24	(0.09)**	0.90	(0.14)**	5.46	(0.27)**
right-cens	0.94	(0.11)**	-0.07	(0.17)	2.92	(0.36)**
	Fixed effects					
Firm-prod-yr	Yes					
Mkt-prod-yr	Yes					
N	183,831					
rsq	0.81					
rsq-adj	0.69					

Notes: Dependent variable is log quantity at the firm-product-market-year level. Full set of firm-product-year and market-product-year effects included. Stata command used is reghdfe. Omitted category is spells that last one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 11: Baseline dynamics of firm-product-market prices: full results

			interact. w/ m^i		interact w/ f^k	
Spell duration	Spell intercept					
2 years	0.02	(0.06)	-0.08	(0.09)	-0.10	(0.19)
3 years	0.05	(0.09)	0.00	(0.13)	-0.24	(0.31)
4 years	0.07	(0.11)	-0.09	(0.17)	-0.11	(0.34)
5 years	0.01	(0.16)	0.02	(0.23)	-0.14	(0.53)
6 years	0.41	(0.19)**	-0.45	(0.27)*	-1.12	(0.59)*
7+ years	0.04	(0.10)	-0.03	(0.14)	-0.40	(0.31)
Market tenure	2-year spell					
2 years	-0.01	(0.07)	0.08	(0.11)	-0.09	(0.23)
Market tenure	3-year spell					
2 years	-0.02	(0.11)	0.05	(0.16)	-0.04	(0.37)
3 years	-0.11	(0.11)	0.01	(0.17)	0.57	(0.38)
Market tenure	4-year spell					
2 years	0.01	(0.15)	0.00	(0.23)	-0.28	(0.47)
3 years	-0.25	(0.15)	0.17	(0.23)	0.61	(0.47)
4 years	-0.05	(0.16)	-0.06	(0.24)	0.35	(0.48)
Market tenure	5-year spell					
2 years	-0.04	(0.20)*	-0.04	(0.30)	0.22	(0.67)
3 years	0.07	(0.20)	-0.24	(0.29)	0.16	(0.65)
4 years	0.23	(0.21)	-0.55	(0.31)*	-0.16	(0.69)
5 years	-0.05	(0.21)	-0.05	(0.31)	0.41	(0.68)
Market tenure	6-year spell					
2 years	-0.35	(0.25)	0.27	(0.36)	0.99	(0.76)
3 years	-0.64	(0.26)**	0.81	(0.36)**	1.13	(0.74)
4 years	-0.35	(0.24)	0.11	(0.35)	1.33	(0.75)*
5 years	-0.52	(0.25)**	0.37	(0.36)	1.86	(0.76)**
6 years	-0.47	(0.27)*	0.46	(0.38)	1.49	(0.85)*
Market tenure	7+ year spell					
2 years	0.02	(0.12)	-0.12	(0.16)	0.10	(0.39)
3 years	0.09	(0.12)	-0.30	(0.16)*	-0.12	(0.38)
4 years	-0.13	(0.13)	-0.03	(0.17)	0.62	(0.39)
5 years	-0.20	(0.13)	0.12	(0.17)	0.71	(0.41)*
6 years	-0.27	(0.13)**	0.22	(0.17)	0.77	(0.40)*
7+ years	-0.23	(0.11)**	0.12	(0.15)	0.69	(0.35)**
left-cens	-0.07	(0.05)	0.05	(0.07)	0.02	(0.14)
right-cens	0.01	(0.06)	-0.02	(0.08)	0.03	(0.18)
	Fixed effects					
Firm-prod-yr	Yes					
Mkt-prod-yr	Yes					
N	183,831					
rsq	0.87					
rsq-adj	0.79					

Notes: Dependent variable is log price at the firm-product-market-year level. Full set of firm-product-year and market-product-year effects included. Stata command used is reghdfe. Omitted category is spells that last one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 12: Baseline dynamics of firm-product-market revenue: full results

			interact. w/ m^i		interact w/ f^k	
Spell duration	Spell intercept					
2 years	0.54	(0.10)**	-0.23	(0.16)	0.43	(0.32)
3 years	0.73	(0.15)**	-0.18	(0.23)	0.94	(0.52)*
4 years	1.01	(0.22)**	-0.96	(0.35)**	1.86	(0.71)**
5 years	0.85	(0.27)**	-0.55	(0.42)	2.37	(0.86)**
6 years	1.04	(0.38)**	-0.41	(0.58)	0.84	(1.11)
7+ years	0.50	(0.21)	0.09	(0.30)	3.88	(0.66)**
Market tenure	2-year spell					
2 years	-0.08	(0.13)	0.12	(0.21)	0.10	(0.41)
Market tenure	3-year spell					
2 years	0.37	(0.20)*	0.11	(0.30)	-0.11	(0.66)
3 years	0.01	(0.20)	-0.03	(0.31)	-0.49	(0.69)
Market tenure	4-year spell					
2 years	0.34	(0.30)	0.35	(0.46)	-0.15	(0.95)
3 years	0.05	(0.39)	0.88	(0.46)*	0.55	(0.91)
4 years	-0.20	(0.31)	0.62	(0.48)	0.04	(0.96)
Market tenure	5-year spell					
2 years	0.67	(0.37)*	-0.13	(0.58)	-0.09	(1.16)
3 years	0.40	(0.38)	0.22	(0.58)	0.68	(1.21)
4 years	0.81	(0.37)**	-0.30	(0.59)	-0.93	(1.21)
5 years	0.08	(0.39)	0.33	(0.60)	-1.16	(1.21)
Market tenure	6-year spell					
2 years	0.35	(0.51)	0.03	(0.77)	2.36	(1.47)
3 years	0.35	(0.50)	0.33	(0.77)	2.46	(1.46)*
4 years	0.66	(0.49)	0.10	(0.74)	1.23	(1.46)
5 years	0.39	(0.51)	0.22	(0.79)	1.00	(1.47)
6 years	-0.24	(0.54)	0.55	(0.82)	0.70	(1.54)
Market tenure	7+ year spell					
2 years	0.61	(0.28)**	0.47	(0.38)	0.05	(0.86)
3 years	0.85	(0.27)**	0.40	(0.37)	0.37	(0.81)
4 years	1.08	(0.28)**	0.48	(0.38)	-0.15	(0.85)
5 years	1.08	(0.27)**	0.35	(0.38)	0.62	(0.83)
6 years	0.93	(0.28)**	0.45	(0.38)	0.66	(0.86)
7+ years	0.32	(0.24)	1.15	(0.34)**	2.12	(0.74)**
left-cens	1.17	(0.09)**	0.95	(0.13)**	5.48	(0.27)**
right-cens	0.95	(0.11)**	-0.09	(0.16)	2.95	(0.36)**
	Fixed effects					
Firm-prod-yr	Yes					
Mkt-prod-yr	Yes					
N	183,831					
rsq	0.74					
rsq-adj	0.59					

Notes: Dependent variable is log revenue at the firm-product-market-year level. Full set of firm-product-year and market-product-year effects included. Stata command used is reghdfe. Omitted category is spells that last one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 13: Baseline dynamics of firm-market revenue: full results

			interact. w/ m^i		interact w/ f^k	
Spell duration	Spell intercept					
2 years	0.41	(0.10)**	-0.19	(0.21)	0.71	(0.36)*
3 years	0.69	(0.14)**	-0.06	(0.27)	0.75	(0.50)
4 years	0.68	(0.20)**	0.07	(0.40)	1.51	(0.63)**
5 years	1.36	(0.25)**	-1.05	(0.48)**	1.11	(0.80)
6 years	1.23	(0.30)**	-0.29	(0.54)	1.00	(0.85)
7+ years	0.63	(0.16)**	0.31	(0.28)	3.78	(0.48)**
Market tenure	2-year spell					
2 years	0.05	(0.12)	-0.05	(0.26)	-0.57	(0.43)
Market tenure	3-year spell					
2 years	0.46	(0.18)**	-0.09	(0.37)	0.19	(0.66)
3 years	-0.19	(0.18)	0.43	(0.36)	0.35	(0.65)
Market tenure	4-year spell					
2 years	0.37	(0.27)	0.26	(0.51)	0.66	(0.86)
3 years	0.30	(0.27)	0.40	(0.54)	0.49	(0.83)
4 years	-0.38	(0.27)	0.80	(0.54)	1.52	(0.84)*
Market tenure	5-year spell					
2 years	0.73	(0.33)**	0.10	(0.63)	-0.59	(1.08)
3 years	0.52	(0.34)	0.32	(0.67)	0.28	(1.08)
4 years	0.38	(0.32)	0.37	(0.63)	0.02	(1.03)
5 years	-0.24	(0.32)	0.73	(0.62)	-0.11	(1.03)
Market tenure	6-year spell					
2 years	1.13	(0.40)**	-1.06	(0.73)	-0.73	(1.16)
3 years	1.13	(0.38)**	-0.44	(0.72)	-0.86	(1.15)
4 years	0.99	(0.40)**	-0.16	(0.72)	-0.28	(1.12)
5 years	0.74	(0.42)*	-0.11	(0.76)	-0.38	(1.24)
6 years	0.20	(0.41)	0.08	(0.74)	-1.32	(1.24)
Market tenure	7+ year spell					
2 years	0.58	(0.21)**	0.70	(0.35)**	0.73	(0.63)
3 years	0.91	(0.21)**	0.71	(0.34)**	0.61	(0.62)
4 years	1.04	(0.21)**	0.63	(0.35)*	0.75	(0.61)
5 years	0.99	(0.21)**	0.87	(0.35)**	0.94	(0.61)
6 years	1.08	(0.21)**	0.76	(0.35)**	0.37	(0.64)
7+ years	0.81	(0.19)**	1.27	(0.31)**	1.19	(0.55)**
left-cens	1.22	(0.06)**	2.54	(0.13)**	6.19	(0.22)**
right-cens	0.96	(0.09)**	0.24	(0.18)	3.57	(0.31)**
	Fixed effects					
Firm-yr	Yes					
Mkt-yr	Yes					
N	174,341					
rsq	0.56					
rsq-adj	0.61					

Notes: Dependent variable is log revenue at the firm-market-year level. Full set of firm-year and market-year effects included. Stata command used is reghdfe. Omitted category is spells that last one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 14: Baseline dynamics of firm-market # products: full results

			interact. w/ m^i		interact w/ f^k	
Spell duration	Spell intercept					
2 years	0.12	(0.02)**	-0.09	(0.05)*	0.06	(0.08)
3 years	0.20	(0.03)**	-0.13	(0.07)**	0.00	(0.11)
4 years	0.16	(0.05)**	0.03	(0.09)	0.19	(0.15)
5 years	0.25	(0.06)**	-0.21	(0.12)*	0.20	(0.17)
6 years	0.21	(0.08)**	0.06	(0.14)	0.19	(0.22)
7+ years	0.26	(0.04)**	-0.10	(0.07)	0.34	(0.11)**
Market tenure	2-year spell					
2 years	-0.05	(0.03)*	0.11	(0.06)	0.05	(0.10)
Market tenure	3-year spell					
2 years	0.09	(0.05)**	0.00	(0.09)	0.07	(0.14)
3 years	-0.06	(0.05)	0.11	(0.09)	0.14	(0.14)
Market tenure	4-year spell					
2 years	0.17	(0.07)**	-0.14	(0.13)	0.01	(0.19)
3 years	0.15	(0.07)**	-0.13	(0.13)	-0.01	(0.19)
4 years	-0.02	(0.07)	0.04	(0.13)	0.02	(0.19)
Market tenure	5-year spell					
2 years	0.11	(0.08)	0.13	(0.16)	-0.10	(0.24)
3 years	0.18	(0.08)**	0.00	(0.17)	-0.09	(0.24)
4 years	0.19	(0.08)**	-0.07	(0.16)	-0.13	(0.23)
5 years	-0.04	(0.08)	0.13	(0.16)	0.11	(0.22)
Market tenure	6-year spell					
2 years	0.32	(0.11)**	-0.22	(0.19)	-0.31	(0.31)
3 years	0.28	(0.11)**	-0.17	(0.20)	-0.20	(0.32)
4 years	0.16	(0.12)	0.03	(0.20)	0.23	(0.34)
5 years	0.06	(0.11)	0.08	(0.20)	0.17	(0.33)
6 years	-0.07	(0.11)	0.17	(0.20)	-0.06	(0.33)
Market tenure	7+ year spell					
2 years	0.19	(0.05)**	0.00	(0.09)	0.05	(0.15)
3 years	0.21	(0.05)**	0.10	(0.09)	0.02	(0.15)
4 years	0.28	(0.06)**	0.03	(0.09)	0.02	(0.16)
5 years	0.23	(0.05)**	0.10	(0.10)	0.18	(0.15)
6 years	0.24	(0.06)**	0.10	(0.10)	0.04	(0.16)
7+ years	0.08	(0.05)	0.33	(0.08)**	0.50	(0.13)**
left-cens	0.32	(0.02)**	0.65	(0.03)**	0.73	(0.05)**
right-cens	0.31	(0.02)**	-0.09	(0.04)**	0.17	(0.07)**
	Fixed effects					
Firm-yr	Yes					
Mkt-yr	Yes					
N	174,341					
rsq	0.47					
rsq-adj	0.42					

Notes: Dependent variable is log revenue at the firm-market-year level. Full set of firm-year and market-year effects included. Stata command used is reghdfe. Omitted category is spells that last one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 15: Exit hazard

Obs. level	Firm-prod-mkt		Firm-mkt	
	Tenure			
2 years	-0.13	(0.01)**	-0.16	(0.01)**
3 years	-0.20	(0.01)**	-0.24	(0.01)**
4 years	-0.24	(0.01)**	-0.26	(0.01)**
5 years	-0.24	(0.01)**	-0.29	(0.01)**
6 years	-0.24	(0.01)**	-0.29	(0.01)**
7+ years	-0.27	(0.01)**	-0.32	(0.01)**
cens	-0.27	(0.01)**	-0.34	(0.00)**
Fixed effects	fpy & pmy		fy & my	
N	171,683		162,640	
R^2	0.66		0.41	
R^2-adj	0.46		0.35	

Notes: Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 16: Firm-product-market exit hazard: full results

Market tenure			interact. w/ m^i		interact w/ f^k	
2 years	-0.17	(0.01)**	0.06	(0.02)**	0.10	(0.04)**
3 years	-0.24	(0.02)**	0.09	(0.03)**	0.04	(0.05)
4 years	-0.30	(0.02)**	0.11	(0.03)**	0.08	(0.06)
5 years	-0.27	(0.02)**	0.05	(0.03)	0.06	(0.07)
6 years	-0.30	(0.03)**	0.08	(0.04)**	0.11	(0.08)
7+ years	-0.31	(0.02)**	0.07	(0.03)**	0.10	(0.06)
left-cens	-0.36	(0.01)**	0.18	(0.02)**	0.12	(0.04)**
	Fixed effects					
Firm-prod-yr	Yes					
Mkt-prod-yr	Yes					
N	171,683					
rsq	0.66					
rsq-adj	0.46					

Notes: Dependent variable is an indicator for exit in the next period. Full set of firm-product-year and market-product-year effects included. Stata command used is reghdfe. Omitted category is market tenure equal to one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 17: Firm-market exit hazard: full results

Market tenure			interact. w/ m^i		interact w/ f^k	
2 years	-0.20	(0.01)**	0.04	(0.02)**	0.12	(0.04)**
3 years	-0.30	(0.01)**	0.12	(0.03)**	0.08	(0.04)*
4 years	-0.37	(0.02)**	0.19	(0.03)**	0.20	(0.05)**
5 years	-0.39	(0.02)**	0.16	(0.03)	0.17	(0.05)**
6 years	-0.43	(0.02)**	0.22	(0.03)**	0.30	(0.06)**
7+ years	-0.46	(0.02)**	0.21	(0.03)**	0.28	(0.05)**
left-cens	-0.46	(0.01)**	0.23	(0.02)**	0.14	(0.03)**
	Fixed effects					
Firm-yr	Yes					
Mkt-yr	Yes					
N	162,640					
rsq	0.41					
rsq-adj	0.35					

Notes: Dependent variable is an indicator for exit in the next period. Full set of firm-year and market-year effects included. Stata command used is reghdfe. Omitted category is market tenure equal to one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 18: Entry and 1-year exit

Obs. level	Firm-prod-mkt		Firm-mkt	
	Entry		Entry	
	0.007	(0.000)**	0.065	(0.000)**
N	127,683,042		8,501,296	
R^2	0.005		0.046	
	1-yr Exit		1-yr Exit	
	0.68	(0.00)**	0.44	(0.00)**
N	184,602		37,802	
R^2	0.01		0.04	

Notes: Table reports fitted values based on regression of indicator for future entry or indicator for future exit on m^i and f^k, evaluated at means of m^i and f^k. Sample in firm-product-market entry equation includes all firm-product-markets which do not currently have positive exports, but for which the firm currently exists in the data, and for which the firm exports the relevant product to at least one destination for at least one year in the sample. Sample in firm-market entry equation includes all firm-markets which do not currently have positive exports, but for which the firm currently exists in the data. Sample in one-year exit equations includes all relevant observations where tenure equals one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 19: Firm-product-market entry: full results

			interact. w/ m^i		interact w/ f^k	
const	-0.00	(0.00)**	0.00	(0.00)**	0.03	(0.00)**
N	127,683,042					
rsq	0.00					

Notes: Dependent variable is an indicator for entry in the next year. The sample includes all firm-product-markets which do not currently have positive exports, but for which the firm currently exists in the data, and for which the firm exports the relevant product to at least one destination for at least one year in the sample. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 20: Firm-product-market 1-year exit: full results

			interact. w/ m^i		interact w/ f^k	
const	0.74	(0.00)**	-0.15	(0.00)**	-0.01	(0.01)
N	184,602					
rsq	0.01					

Notes: Dependent variable is an indicator for exit in the next year. Only observations in their first year of participation are included. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 21: Firm-market entry: full results

			interact. w/ m^i		interact w/ f^k	
const	-0.01	(0.00)**	0.13	(0.00)**	0.10	(0.00)**
N	8,501,296					
rsq	0.05					

Notes: Dependent variable is an indicator for entry in the next year. The sample includes all firm-markets which do not currently have positive exports, but for which the firm currently exists in the data. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 22: Firm-market 1-year exit: full results

			interact. w/ m^i		interact w/ f^k	
const	0.69	(0.01)**	-0.36	(0.01)**	-0.54	(0.02)**
N	37,802					
rsq	0.04					

Notes: Dependent variable is an indicator for exit in the next year. Only observations in their first year of participation are included. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 23: Dynamics of revenue, quantity, price, and number of products: no interactions with m^i and f^k

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.47	(0.03)**	0.50	(0.04)**	-0.02	(0.02)	0.39	(0.04)**	0.09	(0.01)**
3 years	0.75	(0.05)**	0.74	(0.05)**	0.01	(0.03)	0.71	(0.05)**	0.15	(0.01)**
4 years	0.83	(0.07)**	0.82	(0.07)**	0.01	(0.04)	0.84	(0.07)**	0.18	(0.02)**
5 years	0.97	(0.09)**	0.98	(0.09)**	-0.01	(0.05)	1.08	(0.09)**	0.19	(0.02)**
6 years	0.93	(0.11)**	0.92	(0.11)**	0.01	(0.05)	1.16	(0.10)**	0.25	(0.03)**
7+ years	1.14	(0.07)**	1.18	(0.07)**	-0.04	(0.03)	1.17	(0.05)**	0.25	(0.01)**
left-cens	2.57	(0.03)**	2.62	(0.03)**	-0.04	(0.02)**	3.12	(0.02)**	0.67	(0.01)**
right-cens	1.33	(0.04)**	1.32	(0.04)**	0.01	(0.02)	1.44	(0.03)**	0.27	(0.01)**
Mkt tenure	2-year spell									
2 years	-0.01	(0.04)	-0.02	(0.05)	0.01	(0.02)	-0.06	(0.05)	-0.01	(0.01)
Mkt tenure	3-year spell									
2 years	0.40	(0.06)**	0.41	(0.07)**	-0.01	(0.04)	0.44	(0.07)**	0.10	(0.02)**
3 years	-0.10	(0.07)	-0.08	(0.07)	-0.01	(0.04)	-0.01	(0..07)	0.00	(0.02)
Mkt tenure	4-year spell									
2 years	0.46	(0.09)**	0.51	(0.09)**	-0.04	(0.05)	0.54	(0.09)**	0.12	(0.02)**
3 years	0.53	(0.09)**	0.59	(0.09)**	-0.07	(0.05)	0.49	(0.09)**	0.10	(0.02)**
4 years	0.08	(0.09)	0.10	(0.09)	-0.02	(0.05)	0.09	(0.09)	-0.01	(0.02)
Mkt tenure	5-year spell									
2 years	0.59	(0.12)**	0.61	(0.12)**	-0.02	(0.06)	0.65	(0.11)**	0.13	(0.03)**
3 years	0.59	(0.12)**	0.60	(0.12)**	-0.01	(0.06)	0.63	(0.12)**	0.15	(0.03)**
4 years	0.49	(0.12)**	0.53	(0.12)**	-0.04	(0.06)	0.46	(0.12)**	0.14	(0.03)**
5 years	0.01	(0.12)	0.00	(0.12)	0.01	(0.06)	-0.05	(0.12)	0.02	(0.03)
Mkt tenure	6-year spell									
2 years	0.75	(0.15)**	0.80	(0.15)**	-0.05	(0.07)	0.59	(0.13)**	0.19	(0.04)**
3 years	0.91	(0.14)**	0.99	(0.15)**	-0.07	(0.07)	0.78	(0.14)**	0.18	(0.04)**
4 years	0.90	(0.14)**	0.97	(0.15)**	-0.06	(0.07)	0.83	(0.13)**	0.20	(0.04)**
5 years	0.63	(0.14)**	0.67	(0.15)**	-0.03	(0.07)	0.58	(0.14)**	0.11	(0.04)**
6 years	0.11	(0.15)	0.12	(0.16)	-0.01	(0.08)	-0.04	(0.14)	-0.02	(0.04)
Mkt tenure	7+ year spell									
2 years	0.84	(0.08)**	0.86	(0.08)**	-0.02	(0.04)	0.98	(0.06)**	0.20	(0.02)**
3 years	1.11	(0.08)**	1.19	(0.08)**	-0.08	(0.04)**	1.28	(0.06)**	0.26	(0.02)**
4 years	1.28	(0.09)**	1.31	(0.08)**	-0.03	(0.04)	1.40	(0.06)**	0.29	(0.02)**
5 years	1.36	(0.08)**	1.38	(0.08)**	-0.02	(0.04)	1.48	(0.06)**	0.29	(0.02)**
6 years	1.26	(0.09)**	1.29	(0.09)**	-0.03	(0.04)	1.42	(0.06)**	0.27	(0.02)**
7+ years	1.27	(0.07)**	1.32	(0.08)**	-0.05	(0.04)	1.49	(0.06)**	0.29	(0.02)**
N	183,831		183,831		183,831		174,341		174,341	
rsq	0.74		0.81		0.87		0.55		0.47	
rsq-adj	0.59		0.69		0.79		0.50		0.41	

Notes: In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variable is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level, and log revenue and log number of products at the firm-market-year level. Full set of firm-product-year and market effects included in firm-product-market-year regressions. Full set of firm-year and market effects included in firm-market-year regressions. Omitted category is spells that last one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.k

Table 24: Exit hazard: no interactions with m^i and f^k

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.13	(0.00)**	-0.17	(0.00)**
3 years	-0.19	(0.01)**	-0.25	(0.01)**
4 years	-0.23	(0.01)**	-0.28	(0.01)**
5 years	-0.24	(0.01)**	-0.31	(0.01)**
6 years	-0.24	(0.01)**	-0.31	(0.01)**
7+ years	-0.27	(0.01)**	-0.34	(0.01)**
left-cens.	-0.26	(0.01)**	-0.35	(0.00)**
	Fixed effects			
Firm-prod-yr	Yes		No	
Mkt-prod-yr	Yes		Yes	
N	171,683		162,640	
rsq	0.66		0.41	
rsq-adj	0.46		0.35	

Notes: Dependent variable is an indicator for exit in the next period. Full set of firm-product-year and market effects included at the firm-product-market-year level. Full set of firm-year and market effects included at the firm-market-year level. Omitted category is market tenure equal to one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 25: Entry and 1-year exit unconditional on m^i and f^k

	Firm-prod-mkt		Firm-mkt	
	Entry		Entry	
	0.002	(0.000)***	0.005	(0.000)***
N	127,683,042		8,501,296	
rsq	0.00		0.00	
	1-yr Exit		1-yr Exit	
	0.68	(0.00)**	0.49	(0.00)**
N	184,602		37,802	
rsq	0.00		0.00	

Notes: Dependent variable is an indicator for entry or exit in the next year. Sample in firm-product-market entry equation includes all firm-product-markets which do not currently have positive exports, but for which the firm currently exists in the data, and for which the firm exports the relevant product to at least one destination for at least one year in the sample. Sample in firm-market entry equation includes all firm-markets which do not currently have positive exports, but for which the firm currently exists in the data. Sample in one-year exit equations includes all relevant observations where tenure equals one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 26: Dynamics of revenue, quantity, price, # of products: interactions with $\ln m^i$ and $\ln f^k$

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.55	(0.04)**	0.57	(0.04)**	-0.02	(0.02)	0.48	(0.05)**	0.11	(0.01)**
3 years	0.86	(0.05)**	0.86	(0.05)**	-0.01	(0.03)	0.88	(0.07)**	0.19	(0.02)**
4 years	1.06	(0.07)**	1.04	(0.07)**	0.02	(0.04)	1.09	(0.09)**	0.25	(0.02)**
5 years	1.15	(0.09)**	1.16	(0.10)**	-0.01	(0.05)	1.31	(0.11)**	0.25	(0.02)**
6 years	1.01	(0.12)**	0.98	(0.13)**	0.03	(0.06)	1.40	(0.11)**	0.31	(0.03)**
7+ years	1.32	(0.07)**	1.36	(0.07)**	-0.04	(0.03)	1.63	(0.06)**	0.35	(0.01)**
left-cens	2.58	(0.03)**	2.63	(0.03)**	-0.04	(0.02)**	3.51	(0.03)**	0.75	(0.01)**
right-cens	1.54	(0.04)**	1.53	(0.04)**	0.01	(0.02)	1.90	(0.04)**	0.37	(0.01)**
Mkt tenure	2-year spell									
2 years	-0.03	(0.05)	-0.03	(0.05)	0.00	(0.03)	-0.13	(0.07)**	-0.01	(0.01)
Mkt tenure	3-year spell									
2 years	0.39	(0.07)**	0.40	(0.07)**	-0.01	(0.04)	0.43	(0.09)**	0.09	(0.02)**
3 years	-0.10	(0.07)	-0.11	(0.07)*	0.01	(0.04)	0.03	(0.09)	0.00	(0.02)
Mkt tenure	4-year spell									
2 years	0.42	(0.09)**	0.48	(0.10)**	-0.05	(0.05)	0.60	(0.11)**	0.13	(0.03)**
3 years	0.44	(0.09)**	0.52	(0.10)**	-0.08	(0.05)*	0.54	(0.11)**	0.10	(0.03)**
4 years	0.00	(0.10)	0.00	(0.10)	0.00	(0.05)	0.12	(0.12)	-0.01	(0.03)
Mkt tenure	5-year spell									
2 years	0.61	(0.12)**	0.63	(0.13)**	-0.02	(0.06)	0.65	(0.14)**	0.13	(0.04)**
3 years	0.60	(0.13)**	0.59	(0.13)**	0.01	(0.06)	0.68	(0.14)**	0.16	(0.04)**
4 years	0.52	(0.13)**	0.51	(0.13)**	0.01	(0.06)	0.49	(0.14)**	0.14	(0.03)**
5 years	-0.05	(0.13)	-0.07	(0.13)	0.01	(0.07)	0.01	(0.15)	0.04	(0.03)
Mkt tenure	6-year spell									
2 years	0.86	(0.16)**	0.92	(0.17)**	-0.06	(0.08)	0.62	(0.15)**	0.18	(0.04)**
3 years	0.98	(0.16)**	1.13	(0.17)**	-0.15	(0.08)*	0.81	(0.15)**	0.19	(0.04)**
4 years	0.99	(0.16)**	1.03	(0.17)**	-0.04	(0.07)	0.91	(0.15)**	0.23	(0.04)**
5 years	0.70	(0.16)**	0.74	(0.17)**	-0.04	(0.08)	0.65	(0.16)**	0.14	(0.04)**
6 years	0.13	(0.17)	0.15	(0.18)	-0.02	(0.08)	-0.01	(0.16)	-0.01	(0.04)
Mkt tenure	7+ year spell									
2 years	0.78	(0.09)**	0.78	(0.09)**	0.00	(0.04)	0.98	(0.07)**	0.20	(0.02)**
3 years	1.03	(0.09)**	1.07	(0.09)**	-0.03	(0.04)	1.31	(0.07)**	0.26	(0.02)**
4 years	1.21	(0.09)**	1.23	(0.09)**	-0.02	(0.04)	1.45	(0.07)**	0.30	(0.02)**
5 years	1.30	(0.09)**	1.32	(0.09)**	-0.02	(0.04)	1.52	(0.07)**	0.30	(0.02)**
6 years	1.19	(0.09)**	1.25	(0.09)**	-0.05	(0.04)	1.45	(0.07)**	0.28	(0.02)**
7+ years	1.13	(0.08)**	1.19	(0.08)**	-0.06	(0.04)	1.54	(0.06)**	0.31	(0.02)**
N	183,831		183,831		183,831		174,341		174,341	
rsq	0.74		0.81		0.87		0.56		0.47	
rsq-adj	0.59		0.69		0.79		0.51		0.42	

Notes: Fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with $\ln m^i$ and $\ln f^k$, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of $\ln m^i$ and $\ln f^k$. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 27: Exit hazard: interactions with $\ln m^i$ and $\ln f^k$

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.13	(0.01)**	-0.16	(0.01)**
3 years	-0.20	(0.01)**	-0.23	(0.01)**
4 years	-0.24	(0.01)**	-0.26	(0.01)**
5 years	-0.25	(0.01)**	-0.29	(0.01)**
6 years	-0.25	(0.01)**	-0.29	(0.01)**
7+ years	-0.28	(0.01)**	-0.32	(0.01)**
left-cens.	-0.28	(0.01)**	-0.34	(0.00)**
	Fixed effects			
Firm-prod-yr	Yes		No	
Mkt-prod-yr	Yes		Yes	
N	171,683		162,640	
rsq	0.66		0.42	
rsq-adj	0.46		0.35	

Notes: Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with $\ln m^i$ and $\ln f^k$ and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of $\ln m^i$ and $\ln f^k$. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 28: Entry and 1-year exit: interactions with $\ln m^i$ and $\ln f^k$

	Firm-prod-mkt		Firm-mkt	
	Entry		Entry	
	0.01	(0.00)**		
N	127,683,042			
rsq	0.00			
	1-yr Exit		1-yr Exit	
	0.68	(0.00)**	0.42	(0.00)**
N	184,602		37,802	
rsq	0.00		0.04	

Notes: Table reports fitted values based on regression of indicator for future entry or indicator for future exit on $\ln m^i$ and $\ln f^k$, evaluated at means of $\ln m^i$ and $\ln f^k$. Sample in firm-product-market entry equation includes all firm-product-markets which do not currently have positive exports, but for which the firm currently exists in the data, and for which the firm exports the relevant product to at least one destination for at least one year in the sample. Sample in firm-market entry equation includes all firm-markets which do not currently have positive exports, but for which the firm currently exists in the data. Sample in one-year exit equations includes all relevant observations where tenure equals one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 29: Dynamics of revenue, quantity, price: interactions with m^{ij} and f^{jk}

Dep. var. (ln)	Revenue		Quantity		Price	
Spell lgth	Spell intercept					
2 years	0.55	(0.04)**	0.58	(0.04)**	-0.03	(0.02)
3 years	0.91	(0.06)**	0.92	(0.06)**	-0.02	(0.03)
4 years	0.98	(0.07)**	0.99	(0.07)**	-0.01	(0.04)
5 years	1.08	(0.09)**	1.09	(0.09)**	-0.01	(0.05)
6 years	1.09	(0.11)**	1.10	(0.11)**	-0.01	(0.05)
7+ years	1.33	(0.07)**	1.37	(0.07)**	-0.04	(0.03)
left-cens	2.69	(0.03)**	2.73	(0.03)**	-0.05	(0.02)**
right-cens	1.56	(0.04)**	1.55	(0.04)**	0.01	(0.02)
Mkt tenure	2-year spell					
2 years	0.01	(0.05)	0.00	(0.06)	0.00	(0.03)
Mkt tenure	3-year spell					
2 years	0.36	(0.07)**	0.35	(0.07)**	0.01	(0.04)
3 years	-0.13	(0.07)	-0.15	(0.08)**	0.02	(0.04)
Mkt tenure	4-year spell					
2 years	0.49	(0.10)**	0.52	(0.10)**	-0.03	(0.05)
3 years	0.55	(0.10)**	0.58	(0.10)**	-0.04	(0.05)
4 years	0.08	(0.10)	0.08	(0.10)	0.00	(0.05)
Mkt tenure	5-year spell					
2 years	0.65	(0.12)**	0.67	(0.12)**	-0.02	(0.06)
3 years	0.67	(0.12)**	0.68	(0.12)**	-0.01	(0.06)
4 years	0.52	(0.12)**	0.58	(0.13)**	-0.05	(0.06)
5 years	0.04	(0.12)	0.03	(0.13)	0.01	(0.06)
Mkt tenure	6-year spell					
2 years	0.79	(0.15)**	0.83	(0.15)**	-0.04	(0.07)
3 years	0.96	(0.14)**	1.02	(0.15)**	-0.06	(0.07)
4 years	0.96	(0.14)**	1.00	(0.15)**	-0.04	(0.07)
5 years	0.68	(0.14)**	0.68	(0.15)**	0.00	(0.07)
6 years	0.18	(0.15)	0.16	(0.16)	0.02	(0.08)
Mkt tenure	7+ year spell					
2 years	0.81	(0.08)**	0.83	(0.08)**	-0.02	(0.04)
3 years	1.11	(0.08)**	1.18	(0.08)**	-0.07	(0.04)**
4 years	1.26	(0.09)**	1.29	(0.09)**	-0.03	(0.04)
5 years	1.35	(0.08)**	1.35	(0.09)**	-0.01	(0.04)
6 years	1.25	(0.08)**	1.28	(0.09)**	-0.03	(0.04)
7+ years	1.22	(0.08)**	1.27	(0.08)**	-0.05	(0.02)
N	183,831		183,831		183,831	
rsq	0.74		0.81		0.87	
rsq-adj	0.59		0.69		0.79	

Notes: Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^{ij} and f^{jk}, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at means of m^{ij} and f^{jk}. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 30: Exit hazard: interactions with m^{ij} and f^{jk}

Market tenure	Firm-prod-mkt	
2 years	-0.12	(0.01)**
3 years	-0.19	(0.01)**
4 years	-0.22	(0.01)**
5 years	-0.23	(0.01)**
6 years	-0.24	(0.01)**
7+ years	-0.26	(0.01)**
left-cens.	-0.26	(0.01)**
	Fixed effects	
Firm-prod-yr	Yes	
Mkt-prod-yr	Yes	
N	171,683	
rsq	0.66	
rsq-adj	0.46	

Notes: Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^{ij} and f^{jk} and firm-product-year and market-product-year fixed effects. Omitted category is market tenure equal to one year. Fitted values evaluated at means of m^{ij} and f^{jk}. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 31: Entry and 1-year exit: interactions with m^{ij} and f^{jk}

	Firm-prod-mkt
	Entry
	0.03 (0.00)**
N	127,683,042
rsq	0.03
	1-yr Exit
	0.64 (0.00)**
N	184,602
rsq	0.06

Notes: Table reports fitted values based on regression of indicator for future entry or indicator for future exit on m^{ij} and f^{jk}, evaluated at means of m^{ij} and f^{jk}. Sample in firm-product-market entry equation includes all firm-product-markets which do not currently have positive exports, but for which the firm currently exists in the data, and for which the firm exports the relevant product to at least one destination for at least one year in the sample. Sample in one-year exit equations includes all relevant observations where tenure equals one year. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 32: Dynamics of revenue, quantity, price, # products: spell fixed effects

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Mkt tenure	2-year spell									
2 years	0.05	(0.05)	0.13	(0.05)**	-0.08	(0.03)**	-0.06	(0.04)	0.02	(0.01)
Mkt tenure	3-year spell									
2 years	0.47	(0.06)**	0.49	(0.06)**	-0.02	(0.04)	0.46	(0.06)**	0.10	(0.01)**
3 years	0.16	(0.07)**	0.15	(0.08)*	0.02	(0.04)	0.20	(0.06)**	0.04	(0.02)**
Mkt tenure	4-year spell									
2 years	0.45	(0.09)**	0.52	(0.09)**	-0.08	(0.05)	0.55	(0.08)**	0.12	(0.02)**
3 years	0.61	(0.10)**	0.69	(0.10)**	-0.08	(0.05)	0.54	(0.08)**	0.12	(0.02)**
4 years	0.22	(0.11)*	0.28	(0.12)**	-0.07	(0.06)	0.23	(0.09)**	0.04	(0.02)*
Mkt tenure	5-year spell									
2 years	0.56	(0.11)**	0.53	(0.11)**	0.03	(0.07)	0.70	(0.11)**	0.16	(0.03)**
3 years	0.77	(0.11)**	0.74	(0.12)**	0.03	(0.07)	0.77	(0.11)**	0.18	(0.03)**
4 years	0.75	(0.12)**	0.74	(0.13)**	0.01	(0.08)	0.59	(0.11)**	0.18	(0.03)**
5 years	0.40	(0.13)**	0.37	(0.14)**	0.02	(0.08)	0.24	(0.12)**	0.11	(0.03)**
Mkt tenure	6-year spell									
2 years	0.73	(0.14)**	0.79	(0.15)**	-0.06	(0.08)	0.52	(0.12)**	0.18	(0.03)**
3 years	0.93	(0.15)**	1.09	(0.16)**	-0.16	(0.08)*	0.81	(0.12)**	0.20	(0.04)**
4 years	0.94	(0.16)**	1.01	(0.17)**	-0.07	(0.09)	0.92	(0.12)**	0.28	(0.04)**
5 years	0.77	(0.17)**	0.84	(0.18)**	-0.07	(0.09)	0.64	(0.12)**	0.19	(0.04)**
6 years	0.38	(0.18)**	0.43	(0.19)**	-0.05	(0.10)	0.09	(0.13)	0.07	(0.04)*
Mkt tenure	7+ year spell									
2 years	0.80	(0.08)**	0.83	(0.08)**	-0.02	(0.04)	0.93	(0.06)**	0.20	(0.02)**
3 years	1.18	(0.08)**	1.24	(0.09)**	-0.06	(0.04)	1.24	(0.06)**	0.27	(0.02)**
4 years	1.36	(0.09)**	1.40	(0.09)**	-0.04	(0.05)	1.36	(0.06)**	0.32	(0.02)**
5 years	1.52	(0.09)**	1.56	(0.10)**	-0.04	(0.05)	1.47	(0.06)**	0.33	(0.02)**
6 years	1.49	(0.09)**	1.56	(0.10)**	-0.08	(0.05)	1.40	(0.06)**	0.31	(0.02)**
7+ years	1.33	(0.10)**	1.38	(0.10)**	-0.06	(0.05)	1.31	(0.06)**	0.30	(0.02)**
N	122,926		122,926		122,926		148,534		148,534	
rsq	0.91		0.93		0.94		0.85		0.78	
rsq-adj	0.79		0.84		0.87		0.80		0.70	

Notes: Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year, market-product-year and spell or firm-year, market-year and spell fixed effects as appropriate. Omitted category is initial year of spell. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 33: Dynamics of revenue, quantity, price, # products: estimation in differences

Obs. level	Firm-product-market						Firm-market			
Dep. var. (Δ ln)	Revenue		Quantity		Price		Revenue		# Products	
Mkt tenure	2-year spell									
1-2 years	0.17	(0.06)**	0.22	(0.06)**	-0.08	(0.04)**	-0.03	(0.05)	0.03	(0.01)**
Mkt tenure	3-year spell									
1-2 years	0.55	(0.07)**	0.57	(0.08)**	-0.03	(0.04)	0.47	(0.07)**	0.11	(0.02)**
2-3 years	-0.19	(0.07)**	-0.24	(0.07)**	0.04	(0.04)	-0.22	(0.06)**	-0.05	(0.02)**
Mkt tenure	4-year spell									
1-2 years	0.50	(0.09)**	0.56	(0.09)**	-0.08	(0.05)	0.57	(0.08)**	0.14	(0.02)**
2-3 years	0.26	(0.08)**	0.27	(0.08)**	-0.03	(0.05)	0.01	(0.07)	0.01	(0.02)
3-4 years	-0.28	(0.08)**	-0.31	(0.09)**	0.03	(0.06)	-0.26	(0.08)**	-0.06	(0.02)*
Mkt tenure	5-year spell									
1-2 years	0.64	(0.11)**	0.61	(0.11)**	0.02	(0.07)	0.70	(0.10)**	0.16	(0.03)**
2-3 years	0.29	(0.10)**	0.28	(0.10)**	-0.02	(0.06)	0.08	(0.08)	0.04	(0.03)
3-4 years	0.04	(0.10)	0.10	(0.10)	-0.06	(0.05)	-0.14	(0.09)	0.00	(0.03)
4-5 years	-0.30	(0.10)**	-0.28	(0.11)**	-0.01	(0.06)	-0.32	(0.08)**	-0.05	(0.03)**
Mkt tenure	6-year spell									
1-2 years	0.88	(0.12)**	0.92	(0.13)**	-0.06	(0.08)	0.48	(0.11)**	0.17	(0.03)**
2-3 years	0.28	(0.12)**	0.40	(0.12)**	-0.11	(0.07)	0.27	(0.09)**	0.02	(0.03)
3-4 years	0.10	(0.11)	0.02	(0.12)	0.07	(0.07)	0.14	(0.11)	0.09	(0.03)**
4-5 years	-0.10	(0.11)	-0.10	(0.12)	-0.01	(0.06)	-0.26	(0.09)	-0.07	(0.03)**
5-6 years	-0.13	(0.14)	-0.27	(0.13)**	0.03	(0.07)	-0.50	(0.09)**	-0.11	(0.03)**
Mkt tenure	7+ year spell									
1-2 years	0.85	(0.07)**	0.88	(0.08)**	-0.03	(0.04)	0.91	(0.06)**	0.21	(0.02)**
2-3 years	0.41	(0.07)**	0.45	(0.07)**	-0.03	(0.04)	0.30	(0.05)**	0.08	(0.02)**
3-4 years	0.25	(0.06)**	0.24	(0.06)**	0.00	(0.04)	0.15	(0.04)**	0.05	(0.02)**
4-5 years	0.22	(0.06)**	0.23	(0.06)**	-0.02	(0.04)	0.12	(0.04)**	0.03	(0.01)**
5-6 years	0.03	(0.06)	0.09	(0.06)	-0.05	(0.03)	-0.01	(0.04)	0.00	(0.01)
7+ years	Omitted category									
left-cens	-0.01	(0.04)	0.00	(0.04)	-0.01	(0.02)	-0.05	(0.02)**	0.00	(0.01)
right-cens	0.45	(0.05)**	0.42	(0.05)**	0.01	(0.03)	0.37	(0.04)**	0.09	(0.01)**
N	91,426		91,426		91,426		120,990		120,990	
rsq	0.47		0.47		0.94		0.18		0.19	
rsq-adj	0.16		0.16		0.87		0.08		0.09	

Notes: Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-yea fixed effects as appropriate. Omitted category is log difference in years 7+ of 7+year spells. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log difference in revenue, log difference in quantity, and log difference in unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log difference in revenue and log difference in number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 34: Dynamics of revenue, quantity, price, # products: Long sample, topcoding at 10, Part I

Panel I										
	Product rev.		Quantity		Price		Market rev.		# Products	
Spell duration	Spell intercept									
2 years	0.54	(0.03)**	0.54	(0.03)**	0.00	(0.02)	0.49	(0.05)**	0.10	(0.01)**
3 years	0.89	(0.04)**	0.87	(0.05)**	0.02	(0.03)	0.94	(0.06)**	0.17	(0.01)**
4 years	0.97	(0.06)**	0.96	(0.06)**	0.00	(0.03)	1.03	(0.07)**	0.22	(0.02)**
5 years	1.14	(0.08)**	1.16	(0.08)**	-0.02	(0.04)	1.19	(0.09)**	0.20	(0.02)**
6 years	1.12	(0.09)**	1.10	(0.09)**	0.02	(0.04)	1.30	(0.10)**	0.24	(0.02)**
7 years	1.15	(0.12)**	1.14	(0.13)**	0.02	(0.06)	1.33	(0.12)**	0.30	(0.03)**
8 years	1.36	(0.13)**	1.34	(0.14)**	0.02	(0.07)	1.51	(0.12)**	0.25	(0.03)**
9 years	1.22	(0.19)**	1.31	(0.18)**	-0.09	(0.08)	1.58	(0.15)**	0.34	(0.03)**
10+ years	1.54	(0.08)**	1.59	(0.08)**	-0.05	(0.03)	1.73	(0.06)**	0.29	(0.02)**
left-cens	2.85	(0.03)**	2.88	(0.03)**	-0.03	(0.02)*	3.67	(0.03)**	0.75	(0.01)**
right-cens	1.86	(0.03)**	1.86	(0.03)**	0.01	(0.02)	2.44	(0.03)**	0.45	(0.01)**
Market tenure	2-year spell									
2 years	-0.02	(0.04)	0.00	(0.04)	-0.02	(0.02)	-0.10	(0.06)*	-0.01	(0.01)
Market tenure	3-year spell									
2 years	0.35	(0.06)**	0.36	(0.06)**	-0.02	(0.03)	0.41	(0.08)**	0.09	(0.02)**
3 years	-0.11	(0.06)*	-0.13	(0.06)**	0.01	(0.03)	-0.02	(0.08)	0.00	(0.02)
Market tenure	4-year spell									
2 years	0.50	(0.08)**	0.53	(0.08)**	-0.04	(0.04)	0.60	(0.10)**	0.11	(0.02)**
3 years	0.50	(0.08)**	0.51	(0.08)**	-0.01	(0.04)	0.59	(0.10**	0.08	(0.02)**
4 years	0.07	(0.08)	0.06	(0.08)	0.01	(0.04)	0.22	(0.10)**	-0.02	(0.02)
Market tenure	5-year spell									
2 years	0.64	(0.10)**	0.62	(0.10)**	0.02	(0.05)	0.66	(0.12)**	0.12	(0.03)**
3 years	0.65	(0.10)**	0.63	(0.10)**	0.01	(0.05)	0.72	(0.12)**	0.15	(0.03)**
4 years	0.51	(0.10)**	0.48	(0.11)**	0.02	(0.05)	0.55	(0.12)**	0.13	(0.03)**
5 years	-0.07	(0.10)	-0.10	(0.11)	0.03	(0.05)	0.06	(0.12)	0.05	(0.03)*
Market tenure	6-year spell									
2 years	0.74	(0.12)**	0.77	(0.12)**	-0.03	(0.07)	0.61	(0.13)**	0.17	(0.03)**
3 years	0.88	(0.12)**	1.01	(0.12)**	-0.13	(0.07)	0.70	(0.13)**	0.17	(0.03)**
4 years	0.83	(0.12)**	0.88	(0.12)**	-0.05	(0.07)	0.87	(0.12)**	0.18	(0.04)**
5 years	0.64	(0.12)**	0.63	(0.13)**	0.01	(0.07)	0.59	(0.13)**	0.12	(0.03)**
6 years	-0.02	(0.13)	0.01	(0.13)	-0.03	(0.07)	-0.09	(0.13)	-0.03	(0.03)
Market tenure	7 year spell									
2 years	0.93	(0.16)**	0.96	(0.17)**	-0.02	(0.08)	0.90	(0.15)**	0.18	(0.04)**
3 years	1.07	(0.16)**	1.16	(0.17)**	-0.09	(0.08)	1.00	(0.16)**	0.21	(0.04)**
4 years	1.07	(0.16)**	1.07	(0.17)**	-0.01	(0.08)	1.10	(0.16)**	0.19	(0.04)**
5 years	1.10	(0.16)**	1.16	(0.17)**	-0.07	(0.08)	1.12	(0.15)**	0.22	(0.04)**
6 years	0.83	(0.16)**	0.86	(0.17)**	-0.03	(0.08)	0.99	(0.16)**	0.16	(0.04)**
7 years	0.16	(0.17)	0.25	(0.17)	-0.10	(0.08)	0.36	(0.16)**	0.02	(0.04)

Notes: Sample covers 1996-2014, and does not require that a firm match to the CIP in order to be included. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 35: Dynamics of revenue, quantity, price, # products: Long sample, topcoding at 10, Part II

Panel II										
	Product rev.		Quantity		Price		Market rev.		# Products	
Market tenure	8-year spell									
2 years	0.82	(0.18)**	0.78	(0.18)**	0.05	(0.09)	0.98	(0.16)**	0.15	(0.04)**
3 years	1.12	(0.17)**	1.22	(0.18)**	-0.09	(0.09)	1.32	(0.16)**	0.25	(0.04)**
4 years	1.13	(0.18)**	1.19	(0.18)**	-0.05	(0.09)	1.36	(0.16)**	0.23	(0.05)**
5 years	1.07	(0.17)**	1.18	(0.18)**	-0.11	(0.09)	1.34	(0.16)**	0.21	(0.04)**
6 years	0.93	(0.18)**	1.09	(0.18)**	-0.16	(0.09)*	1.19	(0.17)**	0.17	(0.05)**
7 years	0.70	(0.17)**	0.83	(0.18)**	-0.13	(0.09)	1.12	(0.16)**	0.17	(0.04)**
8 years	0.18	(0.18)	0.20	(0.19)	-0.02	(0.09)	0.37	(0.17)**	0.03	(0.04)
Market tenure	9 year spell									
2 years	1.00	(0.25)**	0.90	(0.24)**	0.11	(0.11)	0.98	(0.20)**	0.18	(0.05)**
3 years	1.41	(0.23)**	1.37	(0.23)**	0.04	(0.11)	1.48	(0.20)**	0.28	(0.05)**
4 years	1.54	(0.24)**	1.45	(0.24)**	0.09	(0.11)	1.54	(0.21)**	0.32	(0.05)**
5 years	1.48	(0.24)**	1.32	(0.23)**	0.16	(0.11)	1.58	(0.21)**	0.32	(0.05)**
6 years	1.32	(0.24)**	1.34	(0.23)**	-0.02	(0.11)	1.57	(0.20)**	0.30	(0.05)**
7 years	1.31	(0.24)**	1.17	(0.24)**	0.14	(0.11)	1.44	(0.21)**	0.27	(0.05)**
8 years	1.20	(0.24)**	1.05	(0.24)**	0.15	(0.12)	1.31	(0.23)**	0.19	(0.05)**
9 years	0.51	(0.25)**	0.45	(0.24)**	0.07	(0.12)	0.62	(0.22)**	0.04	(0.05)
Market tenure	10+ year spell									
2 years	0.77	(0.09)**	0.79	(0.10)**	-0.02	(0.04)	1.02	(0.07)**	0.22	(0.02)**
3 years	1.12	(0.09)**	1.14	(0.10)**	-0.02	(0.04)	1.34	(0.07)**	0.27	(0.02)**
4 years	1.31	(0.10)**	1.28	(0.10)**	0.03	(0.04)	1.53	(0.08)**	0.32	(0.02)**
5 years	1.47	(0.09)**	1.44	(0.10)**	0.03	(0.04)	1.65	(0.07)**	0.34	(0.02)**
6 years	1.53	(0.10)**	1.51	(0.10)**	0.02	(0.04)	1.65	(0.07)**	0.35	(0.02)**
7 years	1.51	(0.10)**	1.52	(0.10)**	-0.01	(0.05)	1.70	(0.07)**	0.35	(0.02)**
8 years	1.51	(0.10)**	1.50	(0.10)**	0.00	(0.05)	1.69	(0.08)**	0.35	(0.02)**
9 years	1.46	(0.10)**	1.44	(0.10)**	0.02	(0.05)	1.75	(0.08)**	0.37	(0.02)**
10+ years	1.44	(0.08)**	1.46	(0.09)**	-0.02	(0.04)	1.87	(0.07)**	0.39	(0.02)**
	Fixed effects									
Firm-prod-yr	Yes		Yes		Yes		No		No	
Firm-yr	No		No		No		Yes		Yes	
Market-yr	Yes		Yes		Yes		Yes		Yes	
N	256,354		256,354		256,354		241,998		241,998	
rsq	0.76		0.82		0.87		0.57		0.48	
rsq-adj	0.61		0.71		0.78		0.52		0.43	

Notes: Sample covers 1996-2014, and does not require that a firm match to the CIP in order to be included. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 36: Exit hazard: Long sample, topcoding at 10

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.20	(0.01)**	-0.16	(0.00)**
3 years	-0.24	(0.01)**	-0.24	(0.00)**
4 years	-0.25	(0.01)**	-0.27	(0.01)**
5 years	-0.25	(0.01)**	-0.29	(0.01)**
6 years	-0.27	(0.01)**	-0.29	(0.01)**
7 years	-0.27	(0.01)**	-0.32	(0.01)**
8 years	-0.28	(0.01)**	-0.32	(0.01)**
9 years	-0.27	(0.01)**	-0.32	(0.01)**
10+ years	-0.27	(0.01)**	-0.32	(0.01)**
left-cens.	-0.28	(0.00)**	-0.34	(0.00)**
N	242,226		228,693	
rsq	0.67		0.42	
rsq-adj	0.46		0.36	

Notes: Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 37: Dynamics of revenue, quantity, price, dropping unit value outliers

Obs. level	Firm-product-market					
Dep. var. (ln)	Revenue		Quantity		Price	
Spell lgth	Spell intercept					
2 years	0.53	(0.04)**	0.56	(0.04)**	-0.03	(0.02)
3 years	0.86	(0.06)**	0.88	(0.06)**	-0.02	(0.03)
4 years	1.07	(0.07)**	1.06	(0.07)**	0.01	(0.04)
5 years	1.14	(0.09)**	1.17	(0.10)**	-0.03	(0.05)
6 years	1.08	(0.12)**	1.09	(0.12)**	-0.02	(0.06)
7+ years	1.36	(0.07)**	1.42	(0.07)**	-0.05	(0.03)
left-cens	2.75	(0.03)**	2.81	(0.03)**	-0.06	(0.02)**
right-cens	1.57	(0.04)**	1.57	(0.04)**	0.00	(0.02)
Mkt tenure	2-year spell					
2 years	0.09	(0.05)*	0.08	(0.05)	0.01	(0.03)
Mkt tenure	3-year spell					
2 years	0.44	(0.07)**	0.43	(0.07)**	0.02	(0.04)
3 years	-0.06	(0.07)	-0.09	(0.08)	0.03	(0.04)
Mkt tenure	4-year spell					
2 years	0.51	(0.10)**	0.54	(0.10)**	-0.03	(0.05)
3 years	0.57	(0.10)**	0.61	(0.10)**	-0.05	(0.05)
4 years	0.08	(0.10)	0.07	(0.10)	0.01	(0.05)
Mkt tenure	5-year spell					
2 years	0.67	(0.13)**	0.64	(0.13)**	0.03	(0.07)
3 years	0.78	(0.13)**	0.74	(0.13)**	0.04	(0.06)
4 years	0.56	(0.13)**	0.57	(0.14)**	-0.01	(0.07)
5 years	0.03	(0.13)	0.00	(0.14)	0.03	(0.07)
Mkt tenure	6-year spell					
2 years	0.88	(0.16)**	0.91	(0.16)**	-0.03	(0.07)
3 years	1.02	(0.15)**	1.10	(0.16)**	-0.09	(0.07)
4 years	0.98	(0.15)**	1.02	(0.16)**	-0.03	(0.07)
5 years	0.74	(0.15)**	0.72	(0.16)**	0.02	(0.07)
6 years	0.20	(0.16)	0.15	(0.17)	0.05	(0.07)
Mkt tenure	7+ year spell					
2 years	0.87	(0.09)**	0.86	(0.09)**	0.00	(0.04)
3 years	1.12	(0.08)**	1.15	(0.09)**	-0.03	(0.04)
4 years	1.28	(0.09)**	1.29	(0.09)**	-0.01	(0.04)
5 years	1.42	(0.08)**	1.42	(0.09)**	0.00	(0.04)
6 years	1.30	(0.09)**	1.32	(0.09)**	-0.02	(0.04)
7+ years	1.27	(0.08)**	1.32	(0.08)**	-0.05	(0.04)
N	175,009		175,009		175,009	
rsq	0.75		0.82		0.88	
rsq-adj	0.60		0.71		0.81	

Notes: Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year fixed effects. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. Sample is restricted to observations where log change in unit value - where it is observed - is less than 2. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 38: Dynamics of revenue, quantity, price: alternative measure of quantity

Obs. level	Firm-product-market					
Dep. var. (ln)	Revenue		Quantity		Price	
Spell lgth	Spell intercept					
2 years	0.70	(0.11)**	0.80	(0.12)**	-0.10	(0.08)
3 years	0.82	(0.17)**	1.02	(0.19)**	-0.20	(0.12)*
4 years	1.20	(0.22)**	1.38	(0.24)**	-0.18	(0.16)
5 years	1.00	(0.31)**	1.53	(0.37)**	-0.53	(0.23)**
6 years	1.31	(0.42)**	1.32	(0.44)**	-0.01	(0.26)
7+ years	1.22	(0.25)**	1.35	(0.30)**	-0.13	(0.17)
left-cens	2.18	(0.10)**	2.33	(0.11)**	-0.15	(0.07)**
right-cens	1.49	(0.12)**	1.47	(0.13)**	0.02	(0.08)
Mkt tenure	2-year spell					
2 years	-0.23	(0.14)*	-0.16	(0.15)	-0.07	(0.09)
Mkt tenure	3-year spell					
2 years	0.76	(0.21)**	0.58	(0.24)**	0.18	(0.15)
3 years	-0.10	(0.22)	-0.17	(0.25)	0.06	(0.15)
Mkt tenure	4-year spell					
2 years	0.15	(0.28)	0.26	(0.31)	-0.11	(0.20)
3 years	0.27	(0.28)	0.47	(0.32)	-0.19	(0.20)
4 years	-0.35	(0.28)	-0.32	(0.31)	-0.03	(0.19)
Mkt tenure	5-year spell					
2 years	0.71	(0.44)	0.73	(0.51)	-0.01	(0.31)
3 years	0.46	(0.40)	0.26	(0.47)	0.20	(0.26)
4 years	0.44	(0.38)	0.18	(0.45)	0.26	(0.28)
5 years	0.36	(0.38)	-0.18	(0.45)	0.54	(0.26)**
Mkt tenure	6-year spell					
2 years	0.39	(0.60)	0.62	(0.66)	-0.23	(0.35)
3 years	0.30	(0.56)	0.51	(0.61)	-0.21	(0.33)
4 years	0.51	(0.50)	0.45	(0.54)	0.06	(0.32)
5 years	0.51	(0.49)	0.96	(0.54)*	-0.45	(0.31)
6 years	-0.03	(0.55)	0.54	(0.60)	-0.57	(0.34)*
Mkt tenure	7+ year spell					
2 years	0.73	(0.33)**	0.98	(0.41)**	-0.24	(0.22)
3 years	0.88	(0.30)**	0.85	(0.35)**	0.03	(0.20)
4 years	1.46	(0.32)**	1.32	(0.37)**	0.14	(0.20)
5 years	1.40	(0.32)**	1.45	(0.36)**	-0.04	(0.21)
6 years	1.41	(0.31)**	1.30	(0.36)**	0.12	(0.20)
7+ years	0.94	(0.27)**	0.89	(0.32)**	0.05	(0.18)
N	23,125		23,125		23,125	
rsq	0.79		0.80		0.86	
rsq-adj	0.63		0.65		0.76	

Notes: Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year fixed effects. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. Measure of quantity used is non-tonne measure. Sample restricted to observations for which this measure is available. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 39: Dynamics of revenue, quantity, price, # products: Consumer food

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.32	(0.12)**	0.41	(0.12)**	-0.09	(0.05)*	0.46	(0.13)**	0.12	(0.03)**
3 years	0.74	(0.17)**	0.82	(0.17)**	-0.07	(0.06)	1.00	(0.18)**	0.08	(0.05)*
4 years	0.75	(0.21)**	0.84	(0.19)**	-0.09	(0.07)	0.87	(0.20)**	0.06	(0.06)
5 years	0.58	(0.23)**	0.59	(0.23)**	-0.01	(0.06)	0.90	(0.31)**	0.17	(0.09)**
6 years	1.02	(0.26)**	1.08	(0.26)**	-0.06	(0.07)	1.30	(0.25)**	0.29	(0.08)**
7+ years	1.07	(0.14)**	1.07	(0.14)**	0.00	(0.04)	1.31	(0.14)**	0.30	(0.04)**
left-cens	2.49	(0.08)**	2.49	(0.08)**	0.00	(0.02)	3.36	(0.08)**	0.75	(0.02)**
right-cens	1.71	(0.10)**	1.69	(0.10)**	0.02	(0.03)	1.74	(0.11)**	0.30	(0.03)**
Mkt tenure	2-year spell									
2 years	0.17	(0.15)	0.08	(0.15)	0.10	(0.06)*	0.02	(0.16)	0.00	(0.04)
Mkt tenure	3-year spell									
2 years	0.42	(0.22)*	0.37	(0.21)*	0.05	(0.07)	0.08	(0.24)	0.09	(0.06)
3 years	-0.20	(0.23)	-0.27	(0.23)	0.07	(0.07)	-0.28	(0.23)	-0.01	(0.06)
Mkt tenure	4-year spell									
2 years	0.63	(0.27)**	0.51	(0.27)*	0.12	(0.09)	0.36	(0.27)	0.18	(0.08)**
3 years	0.50	(0.26)**	0.41	(0.24)*	0.09	(0.08)	0.62	(0.27)**	0.18	(0.08)**
4 years	-0.07	(0.27)	-0.12	(0.26)	0.05	(0.08)	0.22	(0.29)	0.08	(0.08)
Mkt tenure	5-year spell									
2 years	1.10	(0.34)**	1.03	(0.32)**	0.07	(0.10)	0.41	(0.38)	0.20	(0.12)*
3 years	0.88	(0.31)**	0.98	(0.31)**	-0.10	(0.09)	0.43	(0.40)	0.08	(0.12)
4 years	0.62	(0.32)*	0.65	(0.31)**	-0.03	(0.08)	0.48	(0.41)	0.06	(0.12)
5 years	-0.08	(0.32)	-0.12	(0.32)	0.04	(0.09)	-0.20	(0.39)	-0.06	(0.12)
Mkt tenure	6-year spell									
2 years	0.89	(0.40)**	0.90	(0.41)**	-0.02	(0.10)	-0.06	(0.34)	0.15	(0.11)
3 years	1.06	(0.38)**	0.94	(0.37)**	0.11	(0.10)	0.16	(0.37)	0.10	(0.12)
4 years	0.80	(0.35)**	0.72	(0.35)**	0.07	(0.09)	0.34	(0.34)	0.08	(0.12)
5 years	0.23	(0.38)	0.21	(0.37)	0.03	(0.09)	0.27	(0.35)	0.09	(0.12)
6 years	0.36	(0.36)	0.24	(0.35)	0.12	(0.10)	-0.28	(0.35)	-0.07	(0.12)
Mkt tenure	7+ year spell									
2 years	0.63	(0.17)**	0.62	(0.17)**	0.00	(0.05)	0.92	(0.17)**	0.17	(0.06)**
3 years	0.96	(0.17)**	0.98	(0.17)**	-0.02	(0.05)	1.28	(0.16)**	0.25	(0.05)**
4 years	1.22	(0.17)**	1.21	(0.17)**	0.02	(0.05)	1.37	(0.17)**	0.27	(0.05)**
5 years	1.30	(0.17)**	1.30	(0.17)**	0.00	(0.05)	1.51	(0.17)**	0.28	(0.05)**
6 years	1.20	(0.18)**	1.21	(0.17)**	-0.01	(0.05)	1.42	(0.17)**	0.29	(0.06)**
7+ years	1.36	(0.16)**	1.33	(0.15)**	0.03	(0.05)	1.58	(0.15)**	0.32	(0.05)**
N	27,441		27,441		27,441		22,416		22,416	
rsq	0.78		0.78		0.89		0.60		0.57	
rsq-adj	0.59		0.59		0.80		0.52		0.48	

Notes: Sample restricted to firms in the consumer food sector. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 40: Exit hazard: Consumer food

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.12	(0.01)**	-0.14	(0.01)**
3 years	-0.20	(0.02)**	-0.24	(0.02)**
4 years	-0.21	(0.02)**	-0.28	(0.02)**
5 years	-0.21	(0.02)**	-0.30	(0.02)**
6 years	-0.21	(0.02)**	-0.28	(0.02)**
7+ years	-0.23	(0.02)**	-0.31	(0.02)**
cens	-0.25	(0.01)**	-0.34	(0.01)**
N	25,227		20,803	
rsq	0.70		0.44	
rsq-adj	0.43		0.33	

Notes: Sample restricted to firms in the consumer food sector. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 41: Dynamics of revenue, quantity, price, # products: Consumer non-food non-durables

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.72	(0.12)**	0.73	(0.12)**	-0.01	(0.08)	0.58	(0.11)**	0.13	(0.02)**
3 years	1.13	(0.16)**	1.15	(0.16)**	-0.02	(0.10)	0.98	(0.13)**	0.21	(0.03)**
4 years	1.24	(0.23)**	1.19	(0.23)**	0.04	(0.12)	1.19	(0.20)**	0.18	(0.04)**
5 years	1.56	(0.27)**	1.61	(0.26)**	-0.05	(0.17)	1.54	(0.20)**	0.31	(0.05)**
6 years	0.91	(0.56)	1.07	(0.51)**	-0.16	(0.24)	1.89	(0.23)**	0.33	(0.07)**
7+ years	0.91	(0.20)**	1.14	(0.19)**	-0.22	(0.12)*	1.48	(0.14)**	0.27	(0.03)**
left-cens	3.06	(0.10)**	3.10	(0.10)**	-0.04	(0.06)	3.07	(0.07)**	0.53	(0.01)**
right-cens	1.77	(0.17)**	1.65	(0.16)**	0.12	(0.08)	1.77	(0.10)**	0.27	(0.02)**
Mkt tenure	2-year spell									
2 years	-0.13	(0.16)	-0.04	(0.16)	-0.09	(0.10)	-0.18	(0.13)	-0.01	(0.03)
Mkt tenure	3-year spell									
2 years	0.26	(0.22)	0.26	(0.23)	0.00	(0.13)	0.61	(0.17)**	0.12	(0.04)**
3 years	-0.19	(0.22)	-0.31	(0.22)	0.12	(0.13)	0.02	(0.17)	0.00	(0.04)
Mkt tenure	4-year spell									
2 years	0.64	(0.31)**	0.70	(0.31)**	-0.06	(0.16)	0.39	(0.26)	0.13	(0.05)**
3 years	0.59	(0.29)**	0.51	(0.30)*	0.08	(0.18)	0.45	(0.25)*	0.12	(0.05)**
4 years	0.05	(0.30)	0.07	(0.31)	-0.02	(0.19)	0.14	(0.25)	0.00	(0.05)
Mkt tenure	5-year spell									
2 years	0.56	(0.37)	0.62	(0.34)*	-0.06	(0.23)	0.56	(0.27)**	0.10	(0.07)
3 years	0.74	(0.39)*	0.61	(0.38)	0.14	(0.23)	0.59	(0.28)**	0.06	(0.07)
4 years	0.33	(0.43)	0.22	(0.42)	0.12	(0.23)	0.23	(0.27)	0.02	(0.07)
5 years	-0.29	(0.40)	-0.38	(0.40)	0.09	(0.23)	-0.31	(0.27)	-0.08	(0.07)
Mkt tenure	6-year spell									
2 years	1.49	(0.68)**	1.17	(0.65)*	0.32	(0.28)	0.65	(0.32)**	0.24	(0.10)**
3 years	1.04	(0.63)*	1.09	(0.61)*	-0.05	(0.31)	0.54	(0.33)	0.25	(0.10)**
4 years	1.50	(0.66)**	1.31	(0.62)**	0.19	(0.28)	0.83	(0.32)**	0.29	(0.11)**
5 years	1.36	(0.66)**	1.08	(0.58)*	0.28	(0.31)	0.76	(0.32)**	0.20	(0.11)**
6 years	1.14	(0.76)	0.22	(0.71)	0.92	(0.42)**	0.04	(0.36)	0.12	(0.11)
Mkt tenure	7+ year spell									
2 years	1.20	(0.24)**	1.01	(0.23)**	0.19	(0.13)	1.02	(0.17)**	0.20	(0.04)**
3 years	1.59	(0.24)**	1.48	(0.24)**	0.11	(0.14)	1.21	(0.17)**	0.19	(0.04)**
4 years	1.48	(0.25)**	1.43	(0.25)**	0.05	(0.14)	1.20	(0.17)**	0.24	(0.04)**
5 years	1.74	(0.25)**	1.68	(0.26)**	0.06	(0.14)	1.30	(0.17)**	0.27	(0.04)**
6 years	1.60	(0.27)**	1.57	(0.27)**	0.03	(0.14)	1.32	(0.17)**	0.21	(0.04)**
7+ years	1.99	(0.24)**	1.91	(0.23)**	0.08	(0.13)	1.22	(0.15)**	0.20	(0.04)**
N	25,872		25,872		25,872		33,816		33,816	
rsq	0.74		0.76		0.87		0.61		0.46	
rsq-adj	0.60		0.63		0.73		0.55		0.38	

Notes: Sample restricted to firms in the consumer non-food non-durables sector. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 42: Exit hazard: Consumer non-food non-durables

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.12	(0.02)**	-0.15	(0.01)**
3 years	-0.19	(0.02)**	-0.20	(0.01)**
4 years	-0.22	(0.02)**	-0.25	(0.01)**
5 years	-0.24	(0.02)**	-0.28	(0.02)**
6 years	-0.24	(0.03)**	-0.28	(0.02)**
7+ years	-0.24	(0.02)**	-0.29	(0.01)**
cens	-0.27	(0.02)**	-0.33	(0.01)**
N	24,559		31,985	
rsq	0.67		0.46	
rsq-adj	0.50		0.38	

Notes: Sample restricted to firms in the consumer non-food non-durables sector. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 43: Dynamics of revenue, quantity, price, # products: Intermediates

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.56	(0.10)**	0.56	(0.10)**	0.00	(0.06)	0.44	(0.10)**	0.08	(0.02)**
3 years	0.85	(0.13)**	0.87	(0.13)**	-0.02	(0.08)	0.81	(0.13)**	0.14	(0.03)**
4 years	1.06	(0.19)**	1.10	(0.20)**	-0.03	(0.11)	0.99	(0.15)**	0.19	(0.04)**
5 years	1.05	(0.23)**	0.96	(0.25)**	0.09	(0.15)	1.36	(0.19)**	0.19	(0.04)**
6 years	0.90	(0.31)**	0.82	(0.35)**	0.08	(0.15)	1.14	(0.19)**	0.24	(0.05)**
7+ years	1.39	(0.19)**	1.52	(0.20)**	-0.13	(0.10)	1.49	(0.11)**	0.27	(0.03)**
left-cens	2.77	(0.08)**	2.74	(0.08)**	0.04	(0.05)	3.46	(0.05)**	0.66	(0.01)**
right-cens	1.48	(0.12)**	1.52	(0.12)**	-0.04	(0.06)	1.77	(0.07)**	0.30	(0.02)**
Mkt tenure	2-year spell									
2 years	0.08	(0.12)	0.05	(0.13)	0.03	(0.07)	0.07	(0.12)	0.00	(0.02)
Mkt tenure	3-year spell									
2 years	0.41	(0.17)**	0.42	(0.17)**	-0.01	(0.10)	0.60	(0.16)**	0.11	(0.04)**
3 years	-0.03	(0.17)	-0.04	(0.17)	0.01	(0.10)	0.16	(0.16)	0.03	(0.04)
Mkt tenure	4-year spell									
2 years	0.36	(0.26)	0.34	(0.26)	0.03	(0.14)	0.61	(0.21)**	0.12	(0.05)**
3 years	0.54	(0.25)**	0.60	(0.26)**	-0.06	(0.14)	0.48	(0.21)**	0.08	(0.05)*
4 years	0.09	(0.25)	-0.15	(0.26)	0.24	(0.14)*	0.30	(0.20)	-0.02	(0.05)
Mkt tenure	5-year spell									
2 years	0.54	(0.32)*	0.60	(0.33)*	-0.07	(0.19)	0.99	(0.25)**	0.15	(0.06)**
3 years	0.95	(0.32)**	0.99	(0.32)**	-0.04	(0.18)	0.98	(0.25)**	0.24	(0.06)**
4 years	0.83	(0.32)**	0.92	(0.34)**	-0.10	(0.18)	0.62	(0.25)**	0.17	(0.06)**
5 years	0.22	(0.31)	0.32	(0.33)	-0.10	(0.18)	0.11	(0.26)	0.03	(0.06)
Mkt tenure	6-year spell									
2 years	1.21	(0.41)**	1.16	(0.44)**	0.04	(0.19)	0.89	(0.25)**	0.17	(0.06)**
3 years	1.20	(0.38)**	1.36	(0.42)**	-0.16	(0.20)	1.24	(0.24)**	0.14	(0.07)**
4 years	0.65	(0.38)*	0.53	(0.43)	0.11	(0.19)	1.11	(0.25)**	0.16	(0.06)**
5 years	0.63	(0.38)*	0.58	(0.43)	0.06	(0.20)	0.78	(0.26)**	0.07	(0.07)
6 years	0.03	(0.42)	0.14	(0.45)	-0.11	(0.22)	0.11	(0.25)	-0.08	(0.07)
Mkt tenure	7+ year spell									
2 years	0.98	(0.23)**	0.81	(0.25)**	0.17	(0.12)	1.04	(0.13)**	0.21	(0.03)**
3 years	1.17	(0.23)**	0.99	(0.25)**	0.18	(0.12)	1.28	(0.13)**	0.26	(0.03)**
4 years	1.39	(0.24)**	1.28	(0.25)**	0.11	(0.12)	1.54	(0.13)**	0.28	(0.03)**
5 years	1.59	(0.23)**	1.49	(0.24)**	0.10	(0.12)	1.50	(0.13)**	0.27	(0.03)**
6 years	1.46	(0.24)**	1.38	(0.25)**	0.08	(0.12)	1.46	(0.13)**	0.25	(0.04)**
7+ years	1.23	(0.22)**	1.14	(0.23)**	0.08	(0.11)	1.52	(0.12)**	0.26	(0.03)**
N	30,590		30,590		30,590		53,847		53,847	
rsq	0.77		0.80		0.87		0.56		0.45	
rsq-adj	0.58		0.63		0.77		0.50		0.37	

Notes: Sample restricted to firms in the intermediates sector. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 44: Exit hazard: Intermediates

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.14	(0.01)**	-0.16	(0.01)**
3 years	-0.20	(0.02)**	-0.25	(0.01)**
4 years	-0.25	(0.02)**	-0.28	(0.01)**
5 years	-0.24	(0.02)**	-0.31	(0.01)**
6 years	-0.25	(0.03)**	-0.30	(0.01)**
7+ years	-0.28	(0.02)**	-0.33	(0.01)**
cens	-0.30	(0.01)**	-0.36	(0.01)**
N	29,101		50,310	
rsq	0.68		0.43	
rsq-adj	0.43		0.35	

Notes: Sample restricted to firms in the Intermediates sector. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 45: Dynamics of revenue, quantity, price, # products: Capital goods

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.49	(0.06)**	0.54	(0.07)**	-0.05	(0.03)	0.57	(0.09)**	0.11	(0.02)**
3 years	0.84	(0.09)**	0.82	(0.09)**	0.03	(0.05)	0.74	(0.12)**	0.14	(0.03)**
4 years	1.14	(0.12)**	1.17	(0.12)**	-0.03	(0.06)	1.00	(0.15)**	0.30	(0.03)**
5 years	1.29	(0.16)**	1.37	(0.17)**	-0.08	(0.09)	1.03	(0.17)**	0.20	(0.04)**
6 years	1.09	(0.17)**	1.06	(0.18)**	0.03	(0.09)	1.17	(0.19)**	0.27	(0.05)**
7+ years	1.41	(0.11)**	1.41	(0.12)**	0.00	(0.05)	1.47	(0.10)**	0.29	(0.03)**
left-cens	2.59	(0.05)**	2.71	(0.06)**	-0.12	(0.03)**	3.24	(0.05)**	0.77	(0.01)**
right-cens	1.47	(0.07)**	1.44	(0.07)**	0.03	(0.04)	1.71	(0.07)**	0.35	(0.02)**
Mkt tenure	2-year spell									
2 years	-0.03	(0.08)	-0.03	(0.08)	0.00	(0.04)	-0.25	(0.11)**	0.01	(0.02)
Mkt tenure	3-year spell									
2 years	0.35	(0.12)**	0.39	(0.12)**	-0.04	(0.06)	0.31	(0.15)**	0.12	(0.04)**
3 years	-0.13	(0.12)	-0.12	(0.12)	-0.01	(0.07)	-0.04	(0.15)	0.03	(0.04)
Mkt tenure	4-year spell									
2 years	0.35	(0.15)**	0.38	(0.16)**	-0.03	(0.08)	0.81	(0.19)**	0.12	(0.05)**
3 years	0.46	(0.16)**	0.48	(0.16)**	-0.02	(0.08)	0.70	(0.19)**	0.10	(0.04)**
4 years	-0.08	(0.16)	-0.07	(0.16)	-0.01	(0.08)	0.25	(0.20)	0.01	(0.05)
Mkt tenure	5-year spell									
2 years	0.39	(0.21)*	0.39	(0.22)*	0.00	(0.11)	0.55	(0.22)**	0.13	(0.06)**
3 years	0.27	(0.22)	0.22	(0.22)	0.05	(0.11)	0.60	(0.23)**	0.14	(0.06)**
4 years	0.25	(0.21)	0.26	(0.23)	-0.01	(0.11)	0.68	(0.22)**	0.22	(0.05)**
5 years	-0.21	(0.21)	-0.25	(0.23)	0.03	(0.11)	0.22	(0.23)	0.16	(0.05)**
Mkt tenure	6-year spell									
2 years	0.68	(0.24)**	0.79	(0.25)**	-0.10	(0.12)	0.62	(0.25)**	0.19	(0.07)**
3 years	0.62	(0.23)**	0.71	(0.24)**	-0.09	(0.12)	0.65	(0.26)**	0.20	(0.07)**
4 years	0.76	(0.23)**	0.83	(0.25)**	-0.06	(0.12)	0.87	(0.26)**	0.27	(0.07)**
5 years	0.64	(0.24)**	0.59	(0.26)**	0.05	(0.11)	0.61	(0.26)**	0.15	(0.07)**
6 years	0.10	(0.23)	0.19	(0.25)	-0.09	(0.12)	0.06	(0.27)	0.00	(0.07)
Mkt tenure	7+ year spell									
2 years	0.76	(0.14)**	0.92	(0.15)**	-0.16	(0.07)**	0.93	(0.12)**	0.21	(0.03)**
3 years	1.06	(0.14)**	1.21	(0.15)**	-0.15	(0.07)**	1.23	(0.12)**	0.28	(0.03)**
4 years	1.18	(0.14)**	1.22	(0.15)**	-0.04	(0.07)	1.42	(0.12)**	0.33	(0.03)**
5 years	1.26	(0.14)**	1.31	(0.15)**	-0.05	(0.07)	1.54	(0.12)**	0.35	(0.03)**
6 years	1.13	(0.14)**	1.26	(0.15)**	-0.13	(0.07)*	1.40	(0.12)**	0.36	(0.03)**
7+ years	1.04	(0.13)**	1.13	(0.14)**	-0.09	(0.06)	1.48	(0.10)**	0.37	(0.03)**
N	67,853		67,853		67,853		53,785		53,785	
rsq	0.73		0.73		0.78		0.55		0.51	
rsq-adj	0.57		0.58		0.66		0.50		0.45	

Notes: Sample restricted to firms in the capital goods sector. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at mean of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 46: Exit hazard: Capital goods

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.12	(0.01)**	-0.16	(0.01)**
3 years	-0.20	(0.01)**	-0.25	(0.01)**
4 years	-0.23	(0.01)**	-0.27	(0.01)**
5 years	-0.23	(0.01)**	-0.30	(0.01)**
6 years	-0.25	(0.02)**	-0.30	(0.01)**
7+ years	-0.29	(0.01)**	-0.35	(0.01)**
cens	-0.26	(0.01)**	-0.34	(0.01)**
N	62,876		49,847	
rsq	0.65		0.44	
rsq-adj	0.46		0.38	

Notes: Sample restricted to firms in the Capital goods sector. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at mean of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 47: Dynamics of revenue, quantity, price, # products: Domestic-owned

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.48	(0.08)**	0.61	(0.09)**	-0.13	(0.04)**	0.60	(0.09)**	0.10	(0.02)**
3 years	0.70	(0.12)**	0.77	(0.12)**	-0.07	(0.06)	0.94	(0.11)**	0.16	(0.03)**
4 years	0.88	(0.16)**	0.93	(0.17)**	-0.06	(0.07)	0.93	(0.13)**	0.17	(0.04)**
5 years	0.66	(0.21)**	0.60	(0.22)**	0.06	(0.12)	1.26	(0.16)**	0.25	(0.04)**
6 years	0.44	(0.22)**	0.52	(0.23)**	-0.07	(0.09)	1.46	(0.19)**	0.28	(0.05)**
7+ years	0.89	(0.13)**	1.04	(0.14)**	-0.15	(0.05)**	1.60	(0.10)**	0.30	(0.03)**
left-cens	2.27	(0.07)**	2.39	(0.07)**	-0.12	(0.03)**	3.30	(0.05)**	0.67	(0.01)**
right-cens	1.41	(0.09)**	1.50	(0.09)**	-0.08	(0.04)**	1.79	(0.07)**	0.26	(0.02)**
Mkt tenure	2-year spell									
2 years	0.05	(0.11)	0.03	(0.12)	0.02	(0.06)	-0.08	(0.11)	-0.01	(0.02)
Mkt tenure	3-year spell									
2 years	0.29	(0.15)*	0.26	(0.16)	0.03	(0.08)	0.49	(0.15)**	0.11	(0.03)**
3 years	-0.16	(0.16)	-0.16	(0.17)	0.01	(0.08)	-0.06	(0.15)	-0.01	(0.03)
Mkt tenure	4-year spell									
2 years	0.43	(0.20)**	0.47	(0.22)**	-0.04	(0.08)	0.59	(0.18)**	0.10	(0.05)**
3 years	0.39	(0.20)*	0.36	(0.22)**	0.03	(0.08)	0.44	(0.18)**	0.10	(0.05)**
4 years	-0.03	(0.21)	-0.02	(0.23)	-0.01	(0.09)	0.36	(0.18)**	-0.02	(0.05)
Mkt tenure	5-year spell									
2 years	0.84	(0.27)**	0.98	(0.30)**	-0.14	(0.14)	0.63	(0.22)**	0.15	(0.06)**
3 years	0.65	(0.28)**	0.72	(0.30)**	-0.07	(0.13)	0.77	(0.22)**	0.15	(0.06)**
4 years	0.71	(0.29)**	0.81	(0.30)**	-0.10	(0.14)	0.32	(0.22)	0.09	(0.06)
5 years	0.02	(0.30)	0.15	(0.31)	-0.13	(0.13)	-0.13	(0.23)	0.00	(0.06)
Mkt tenure	6-year spell									
2 years	1.20	(0.30)**	1.17	(0.32)**	0.03	(0.14)	0.48	(0.26)*	0.17	(0.07)**
3 years	1.28	(0.29)**	1.28	(0.31)**	-0.01	(0.14)	0.58	(0.27)**	0.14	(0.07)**
4 years	1.16	(0.31)**	1.19	(0.33)**	-0.02	(0.13)	0.55	(0.25)**	0.15	(0.07)**
5 years	0.76	(0.31)**	0.78	(0.32)**	-0.02	(0.14)	0.41	(0.26)	0.10	(0.07)
6 years	0.46	(0.35)	0.32	(0.39)	0.14	(0.14)	-0.38	(0.27)	-0.08	(0.07)
Mkt tenure	7+ year spell									
2 years	0.76	(0.16)**	0.68	(0.17)**	0.08	(0.07)	0.85	(0.12)**	0.19	(0.04)**
3 years	1.01	(0.17)**	0.93	(0.17)**	0.08	(0.06)	1.09	(0.12)**	0.23	(0.04)**
4 years	1.25	(0.17)**	1.21	(0.18)**	0.04	(0.06)	1.20	(0.12)**	0.27	(0.04)**
5 years	1.37	(0.16)**	1.34	(0.17)**	0.03	(0.07)	1.28	(0.12)**	0.29	(0.04)**
6 years	1.24	(0.17)**	1.20	(0.18)**	0.04	(0.07)	1.07	(0.13)**	0.24	(0.04)**
7+ years	1.30	(0.15)**	1.24	(0.16)**	0.06	(0.06)	1.16	(0.11)**	0.26	(0.03)**
N	41,514		41,514		41,514		61,942		61,942	
rsq	0.80		0.89		0.94		0.60		0.52	
rsq-adj	0.63		0.79		0.88		0.52		0.43	

Notes: Sample restricted to domestic-owned firms. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at means of m^i and f^k for domestic-owned firms. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 48: Exit hazard: Domestic-owned

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.13	(0.01)**	-0.15	(0.01)**
3 years	-0.21	(0.02)**	-0.25	(0.01)**
4 years	-0.23	(0.02)**	-0.28	(0.01)**
5 years	-0.21	(0.02)**	-0.31	(0.01)**
6 years	-0.24	(0.02)**	-0.29	(0.01)**
7+ years	-0.26	(0.02)**	-0.33	(0.01)**
cens	-0.24	(0.01)**	-0.36	(0.01)**
N	38,505		57,357	
rsq	0.70		0.45	
rsq-adj	0.43		0.35	

Notes: Sample restricted to domestic-owned firms. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at means of m^i and f^k for domestic-owned firms. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 49: Dynamics of revenue, quantity, price, # products: Foreign-owned

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.54	(0.04)**	0.55	(0.05)**	-0.01	(0.03)	0.44	(0.06)**	0.09	(0.01)**
3 years	0.87	(0.06)**	0.84	(0.07)**	0.03	(0.04)	0.75	(0.08)**	0.15	(0.02)**
4 years	1.02	(0.09)**	1.01	(0.09)**	0.02	(0.05)	0.98	(0.10)**	0.21	(0.02)**
5 years	1.24	(0.11)**	1.25	(0.12)**	-0.01	(0.06)	1.17	(0.13)**	0.19	(0.03)**
6 years	1.21	(0.14)**	1.22	(0.14)**	-0.01	(0.07)	1.24	(0.13)**	0.28	(0.04)**
7+ years	1.42	(0.09)**	1.47	(0.09)**	-0.05	(0.04)	1.35	(0.07)**	0.26	(0.02)**
left-cens	2.77	(0.04)**	2.80	(0.04)**	-0.04	(0.02)	3.30	(0.04)**	0.68	(0.01)**
right-cens	1.49	(0.05)**	1.43	(0.05)**	0.05	(0.03)*	1.71	(0.05)**	0.33	(0.01)**
Mkt tenure	2-year spell									
2 years	0.01	(0.06)	0.00	(0.06)	0.00	(0.03)	-0.08	(0.07)	0.00	(0.02)
Mkt tenure	3-year spell									
2 years	0.48	(0.08)**	0.51	(0.08)**	-0.03	(0.05)	0.47	(0.10)**	0.10	(0.02)**
3 years	-0.04	(0.08)	-0.05	(0.09)	0.00	(0.05)	0.09	(0.10)	0.02	(0.02)
Mkt tenure	4-year spell									
2 years	0.43	(0.12)**	0.49	(0.12)**	-0.06	(0.06)	0.60	(0.13)**	0.13	(0.03)**
3 years	0.57	(0.11)**	0.64	(0.12)**	-0.06	(0.06)	0.62	(0.13)**	0.10	(0.03)**
4 years	0.09	(0.12)	0.09	(0.12)	0.00	(0.06)	0.16	(0.13)	0.01	(0.03)
Mkt tenure	5-year spell									
2 years	0.52	(0.15)**	0.54	(0.15)**	-0.02	(0.08)	0.67	(0.16)**	0.12	(0.04)**
3 years	0.58	(0.15)**	0.57	(0.15)**	0.00	(0.08)	0.67	(0.17)**	0.16	(0.04)**
4 years	0.45	(0.15)**	0.48	(0.16)**	-0.03	(0.08)	0.61	(0.16)**	0.16	(0.04)**
5 years	-0.05	(0.15)	-0.08	(0.16)	0.03	(0.08)	0.07	(0.17)	0.04	(0.04)
Mkt tenure	6-year spell									
2 years	0.80	(0.18)**	0.88	(0.19)**	-0.08	(0.09)	0.70	(0.17)**	0.19	(0.05)**
3 years	0.87	(0.18)**	0.94	(0.19)**	-0.06	(0.09)	0.90	(0.17)**	0.19	(0.05)**
4 years	0.82	(0.18)**	0.84	(0.19)**	-0.02	(0.09)	1.06	(0.17)**	0.23	(0.05)**
5 years	0.62	(0.18)**	0.59	(0.19)**	0.03	(0.09)	0.75	(0.18)**	0.12	(0.05)**
6 years	0.07	(0.19)	0.04	(0.19)	0.02	(0.10)	0.18	(0.18)	0.00	(0.05)
Mkt tenure	7+ year spell									
2 years	0.85	(0.11)**	0.85	(0.11)**	0.00	(0.05)	1.06	(0.08)**	0.21	(0.02)**
3 years	1.17	(0.11)**	1.22	(0.11)**	-0.05	(0.05)	1.42	(0.08)**	0.27	(0.02)**
4 years	1.31	(0.11)**	1.33	(0.11)**	-0.02	(0.05)	1.56	(0.08)**	0.31	(0.02)**
5 years	1.41	(0.11)**	1.39	(0.11)**	0.02	(0.05)	1.64	(0.08)**	0.31	(0.02)**
6 years	1.30	(0.11)**	1.31	(0.11)**	-0.02	(0.06)	1.62	(0.08)**	0.30	(0.02)**
7+ years	1.22	(0.12)**	1.28	(0.11)**	-0.06	(0.05)	1.67	(0.07)**	0.31	(0.02)**
N	123,609		123,609		123,609		112,159		112,159	
rsq	0.73		0.75		0.78		0.54		0.46	
rsq-adj	0.60		0.62		0.67		0.51		0.42	

Notes: Sample restricted to foreign-owned firms. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at means of m^i and f^k for foreign-owned firms. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 50: Exit hazard: Foreign-owned

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.12	(0.01)**	-0.16	(0.01)**
3 years	-0.19	(0.01)**	-0.23	(0.01)**
4 years	-0.23	(0.01)**	-0.25	(0.01)**
5 years	-0.24	(0.01)**	-0.29	(0.01)**
6 years	-0.24	(0.01)**	-0.29	(0.01)**
7+ years	-0.26	(0.01)**	-0.32	(0.01)**
cens	-0.27	(0.01)**	-0.33	(0.00)**
N	115,893		105,063	
rsq	0.65		0.41	
rsq-adj	0.47		0.36	

Notes: Sample restricted to foreign-owned firms. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at means of m^i and f^k for foreign-owned firms. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 51: Dynamics of revenue, quantity, price, # products: Intrastat only

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.42	(0.06)**	0.46	(0.07)**	-0.04	(0.03)	0.45	(0.09)**	0.09	(0.02)**
3 years	0.83	(0.10)**	0.90	(0.09)**	-0.08	(0.06)	0.78	(0.12)**	0.13	(0.03)**
4 years	0.79	(0.13)**	0.81	(0.13)**	-0.02	(0.05)	0.77	(0.15)**	0.17	(0.03)**
5 years	1.10	(0.15)**	1.10	(0.16)**	0.00	(0.07)	1.12	(0.18)**	0.19	(0.04)**
6 years	0.92	(0.16)**	0.90	(0.18)**	0.02	(0.08)	0.95	(0.20)**	0.26	(0.05)**
7+ years	1.25	(0.09)**	1.27	(0.10)**	-0.03	(0.04)	1.33	(0.12)**	0.23	(0.03)**
left-cens	2.76	(0.05)**	2.85	(0.05)**	-0.09	(0.02)**	3.50	(0.06)**	0.61	(0.01)**
right-cens	1.61	(0.06)**	1.70	(0.07)**	-0.08	(0.03)**	1.62	(0.08)**	0.19	(0.02)**
Mkt tenure	2-year spell									
2 years	0.04	(0.08)	0.00	(0.09)	0.04	(0.04)	-0.18	(0.11)*	-0.01	(0.03)
Mkt tenure	3-year spell									
2 years	0.36	(0.12)**	0.35	(0.12)**	0.02	(0.06)	0.47	(0.15)**	0.10	(0.04)**
3 years	-0.14	(0.13)	-0.21	(0.13)*	0.07	(0.07)	0.00	(0.15)	0.00	(0.04)
Mkt tenure	4-year spell									
2 years	0.71	(0.16)**	0.78	(0.17)**	-0.07	(0.07)	0.70	(0.20)**	0.13	(0.05)**
3 years	0.74	(0.16)**	0.75	(0.16)**	-0.01	(0.06)	0.57	(0.20)**	0.08	(0.05)*
4 years	0.27	(0.17)*	0.30	(0.17)*	-0.03	(0.07)	0.40	(0.20)**	-0.01	(0.05)
Mkt tenure	5-year spell									
2 years	0.88	(0.19)**	0.96	(0.21)**	-0.08	(0.09)	0.66	(0.22)**	0.12	(0.06)**
3 years	0.63	(0.19)**	0.69	(0.21)**	-0.06	(0.09)	0.80	(0.24)**	0.13	(0.06)**
4 years	0.50	(0.21)**	0.58	(0.22)**	-0.08	(0.08)	0.58	(0.23)**	0.15	(0.06)**
5 years	-0.08	(0.21)	-0.01	(0.22)	-0.07	(0.09)	0.15	(0.25)	0.04	(0.06)
Mkt tenure	6-year spell									
2 years	0.95	(0.22)**	1.03	(0.24)**	-0.08	(0.10)	0.76	(0.26)**	0.16	(0.07)**
3 years	0.95	(0.22)**	1.10	(0.24)**	-0.15	(0.10)	0.94	(0.26)**	0.14	(0.07)**
4 years	0.88	(0.22)**	1.02	(0.25)**	-0.14	(0.10)	1.13	(0.26)**	0.23	(0.07)**
5 years	0.62	(0.23)**	0.73	(0.26)**	-0.11	(0.10)	0.80	(0.27)**	0.13	(0.07)**
6 years	0.21	(0.25)	0.18	(0.27)	0.03	(0.10)	-0.08	(0.28)	-0.07	(0.07)
Mkt tenure	7+ year spell									
2 years	0.74	(0.11)**	0.78	(0.12)**	-0.04	(0.04)	1.02	(0.15)**	0.18	(0.04)**
3 years	1.09	(0.11)**	1.17	(0.12)**	-0.08	(0.05)*	1.29	(0.14)**	0.18	(0.04)**
4 years	1.24	(0.11)**	1.31	(0.12)**	-0.07	(0.05)	1.36	(0.14)**	0.24	(0.04)**
5 years	1.35	(0.11)**	1.40	(0.12)**	-0.04	(0.04)	1.52	(0.14)**	0.26	(0.04)**
6 years	1.32	(0.11)**	1.40	(0.12)**	-0.07	(0.05)	1.36	(0.15)**	0.24	(0.04)**
7+ years	1.22	(0.10)**	1.32	(0.11)**	-0.10	(0.04)**	1.43	(0.12)**	0.25	(0.03)**
N	89,909		89,909		89,909		76,475		76,475	
rsq	0.82		0.86		0.83		0.64		0.62	
rsq-adj	0.70		0.77		0.88		0.59		0.56	

Notes: Sample restricted to Intrastat markets. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at means of m^i and f^k for Intrastat markets. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 52: Exit hazard: Intrastat only

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.12	(0.01)**	-0.13	(0.01)**
3 years	-0.20	(0.01)**	-0.21	(0.01)**
4 years	-0.21	(0.01)**	-0.22	(0.01)**
5 years	-0.22	(0.01)**	-0.26	(0.01)**
6 years	-0.22	(0.01)**	-0.23	(0.02)**
7+ years	-0.23	(0.01)**	-0.28	(0.01)**
cens	-0.26	(0.01)**	-0.29	(0.01)**
N	84,164		71,572	
rsq	0.74		0.50	
rsq-adj	0.55		0.42	

Notes: Sample restricted to Intrastat markets. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at means of m^i and f^k for Intrastat markets. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 53: Dynamics of revenue, quantity, price, # products: Extrastat only

Obs. level	Firm-product-market						Firm-market			
Dep. var. (ln)	Revenue		Quantity		Price		Revenue		# Products	
Spell lgth	Spell intercept									
2 years	0.54	(0.05)**	0.56	(0.05)**	-0.02	(0.03)	0.42	(0.06)**	0.11	(0.01)**
3 years	0.86	(0.07)**	0.83	(0.07)**	0.03	(0.04)	0.68	(0.07)**	0.17	(0.02)**
4 years	1.13	(0.09)**	1.07	(0.09)**	0.06	(0.05)	1.01	(0.09)**	0.25	(0.02)**
5 years	1.24	(0.12)**	1.26	(0.12)**	-0.02	(0.08)	1.17	(0.12)**	0.23	(0.03)**
6 years	1.24	(0.16)**	1.28	(0.16)**	-0.04	(0.08)	1.50	(0.14)**	0.28	(0.03)**
7+ years	1.42	(0.12)**	1.53	(0.11)**	-0.11	(0.06)*	1.40	(0.07)**	0.34	(0.02)**
left-cens	2.58	(0.05)**	2.58	(0.05)**	0.00	(0.03)	2.99	(0.03)**	0.75	(0.01)**
right-cens	1.49	(0.06)**	1.43	(0.06)**	0.05	(0.03)	1.57	(0.05)**	0.39	(0.01)**
Mkt tenure	2-year spell									
2 years	0.02	(0.06)	0.03	(0.06)	-0.01	(0.03)	0.00	(0.07)	0.01	(0.01)
Mkt tenure	3-year spell									
2 years	0.38	(0.09)**	0.40	(0.09)**	-0.02	(0.05)	0.45	(0.10)**	0.11	(0.02)**
3 years	-0.07	(0.09)	-0.02	(0.09)	-0.05	(0.05)	0.14	(0.09)	0.04	(0.02)*
Mkt tenure	4-year spell									
2 years	0.23	(0.12)**	0.32	(0.12)**	-0.09	(0.07)	0.58	(0.12)**	0.14	(0.03)**
3 years	0.37	(0.12)**	0.50	(0.12)**	-0.13	(0.07)*	0.60	(0.12)**	0.13	(0.03)**
4 years	0.00	(0.12)	0.01	(0.13)	-0.01	(0.07)	0.22	(0.12)*	0.03	(0.03)
Mkt tenure	5-year spell									
2 years	0.49	(0.17)**	0.45	(0.17)**	0.04	(0.10)	0.73	(0.15)**	0.17	(0.04)**
3 years	0.45	(0.17)**	0.44	(0.17)**	0.01	(0.10)	0.77	(0.16)**	0.20	(0.04)**
4 years	0.50	(0.17)**	0.48	(0.17)**	0.02	(0.10)	0.57	(0.16)**	0.14	(0.04)**
5 years	-0.10	(0.17)	-0.15	(0.17)	0.05	(0.10)	-0.02	(0.16)	0.03	(0.04)
Mkt tenure	6-year spell									
2 years	0.58	(0.20)**	0.52	(0.21)**	0.06	(0.11)	0.50	(0.18)**	0.18	(0.05)**
3 years	0.79	(0.20)**	0.78	(0.21)**	0.00	(0.11)	0.73	(0.18)**	0.24	(0.05)**
4 years	0.84	(0.20)**	0.81	(0.21)**	0.02	(0.11)	0.76	(0.18)**	0.24	(0.05)**
5 years	0.53	(0.21)**	0.46	(0.21)**	0.06	(0.11)	0.47	(0.19)**	0.12	(0.05)**
6 years	-0.06	(0.22)	-0.07	(0.22)	0.01	(0.12)	0.01	(0.18)	-0.01	(0.05)
Mkt tenure	7+ year spell									
2 years	0.79	(0.14)**	0.73	(0.14)**	0.06	(0.07)	0.98	(0.09)**	0.24	(0.02)**
3 years	1.04	(0.14)**	1.04	(0.14)**	0.00	(0.07)	1.32	(0.09)**	0.33	(0.02)**
4 years	1.27	(0.15)**	1.23	(0.14)**	0.04	(0.07)	1.45	(0.09)**	0.37	(0.02)**
5 years	1.38	(0.14)**	1.29	(0.14)**	0.09	(0.07)	1.50	(0.09)**	0.37	(0.02)**
6 years	1.17	(0.14)**	1.12	(0.14)**	0.04	(0.07)	1.44	(0.09)**	0.36	(0.02)**
7+ years	1.18	(0.13)**	1.07	(0.13)**	0.11	(0.07)*	1.52	(0.08)**	0.34	(0.02)**
N	86,673		86,673		86,673		91,335		91,335	
rsq	0.70		0.73		0.79		0.53		0.50	
rsq-adj	0.52		0.57		0.67		0.47		0.43	

Notes: Sample restricted to Extrastat markets. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at means of m^i and f^k for Extrastat markets. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 54: Exit hazard: Extrastat only

Market tenure	Firm-prod-mkt		Firm-mkt	
2 years	-0.12	(0.01)**	-0.16	(0.01)**
3 years	-0.19	(0.01)**	-0.23	(0.01)**
4 years	-0.24	(0.01)**	-0.28	(0.01)**
5 years	-0.24	(0.01)**	-0.30	(0.01)**
6 years	-0.25	(0.02)**	-0.32	(0.02)**
7+ years	-0.28	(0.01)**	-0.35	(0.01)**
cens	-0.27	(0.01)**	-0.36	(0.01)**
N	80,610		84,976	
rsq	0.63		0.42	
rsq-adj	0.41		0.34	

Notes: Sample restricted to Extrastat markets. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at means of m^i and f^k for Extrastat markets. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 55: Dynamics of revenue, quantity, price: Only 1-1 CN8 matches

Obs. level	Firm-product-market					
Dep. var. (ln)	Revenue		Quantity		Price	
Spell lgth	Spell intercept					
2 years	0.51	(0.04)**	0.54	(0.04)**	-0.03	(0.02)
3 years	0.74	(0.06)**	0.75	(0.06)**	-0.01	(0.03)
4 years	0.95	(0.08)**	0.92	(0.08)**	0.03	(0.04)
5 years	0.89	(0.10)**	0.89	(0.11)**	0.00	(0.06)
6 years	0.86	(0.13)**	0.85	(0.13)**	0.01	(0.07)
7+ years	1.24	(0.08)**	1.26	(0.08)**	-0.02	(0.04)
left-cens	2.44	(0.04)**	2.49	(0.04)**	-0.04	(0.02)**
right-cens	1.44	(0.05)**	1.42	(0.05)**	0.02	(0.02)
Mkt tenure	2-year spell					
2 years	-0.01	(0.05)	-0.03	(0.05)	0.02	(0.03)
Mkt tenure	3-year spell					
2 years	0.41	(0.08)**	0.42	(0.08)**	-0.02	(0.04)
3 years	-0.10	(0.08)	-0.14	(0.08)*	0.04	(0.04)
Mkt tenure	4-year spell					
2 years	0.44	(0.11)**	0.50	(0.11)**	-0.06	(0.05)
3 years	0.51	(0.11)**	0.57	(0.11)**	-0.06	(0.06)
4 years	0.02	(0.11)	0.02	(0.11)	0.00	(0.06)
Mkt tenure	5-year spell					
2 years	0.72	(0.14)**	0.68	(0.14)**	0.03	(0.07)
3 years	0.68	(0.14)**	0.71	(0.14)**	-0.03	(0.07)
4 years	0.56	(0.14)**	0.59	(0.14)**	-0.03	(0.07)
5 years	-0.01	(0.14)	-0.01	(0.14)	0.00	(0.08)
Mkt tenure	6-year spell					
2 years	0.98	(0.18)**	1.05	(0.18)**	-0.07	(0.08)
3 years	1.17	(0.17)**	1.26	(0.18)**	-0.09	(0.09)
4 years	1.06	(0.18)**	1.09	(0.18)**	-0.03	(0.09)
5 years	0.80	(0.17)**	0.78	(0.18)**	0.02	(0.08)
6 years	0.31	(0.18)*	0.26	(0.19)	0.05	(0.09)
Mkt tenure	7+ year spell					
2 years	0.78	(0.10)**	0.79	(0.10)**	0.00	(0.04)
3 years	1.03	(0.10)**	1.07	(0.10)**	-0.04	(0.04)
4 years	1.14	(0.10)**	1.17	(0.10)**	-0.03	(0.05)
5 years	1.29	(0.10)**	1.34	(0.10)**	-0.04	(0.05)
6 years	1.17	(0.10)**	1.21	(0.10)**	-0.05	(0.05)
7+ years	1.13	(0.09)**	1.19	(0.09)**	-0.06	(0.04)
N	151,691		151,691		151,691	
rsq	0.76		0.84		0.88	
rsq-adj	0.58		0.72		0.80	

Notes: Sample restricted to products where there is a 1-1 match across all CN8 revisions from 1996 through 2009. Table reports fitted values based on regression of relevant dependent variable on combinations of indicator variables for spell duration and tenure, these indicator variables interacted with m^i and f^k, and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is spells that last one year. Fitted values evaluated at means of m^i and f^k. Dependent variable in first three columns is in turn log revenue, log quantity, and log unit value at the firm-product-market-year level. In the first column, the sample is restricted to firm-product-market-years for which quantity data are available. Dependent variables in fourth and fifth columns are log revenue and log number of products at the firm-market-year level. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 56: Exit hazard: Only 1-1 CN8 matches

Market tenure	Firm-prod-mkt	
2 years	-0.12	(0.01)**
3 years	-0.19	(0.01)**
4 years	-0.23	(0.01)**
5 years	-0.23	(0.01)**
6 years	-0.23	(0.01)**
7+ years	-0.25	(0.01)**
cens	-0.26	(0.01)**
N	141,559	
rsq	0.68	
rsq-adj	0.44	

Notes: Sample restricted to products where there is a 1-1 match across all CN8 revisions from 1996 through 2009. Table reports fitted values based on regression of an indicator for exit in the next period on indicators for tenure, indicators for tenure interacted with m^i and f^k and firm-product-year and market-product-year or firm-year and market-year fixed effects as appropriate. Omitted category is market tenure equal to one year. Fitted values evaluated at means of m^i and f^k. Robust standard errors calculated. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 57: Cross-sectional relationship between quantity and price and gravity variables

	Quantity		Price	
Distance	-0.88	(0.02)**	0.02	(0.00)**
Destination GDP	0.46	(0.00)**	-0.00	(0.00)**
Destination GDP per capita	0.09	(0.01)**	0.03	(0.00)**
Remoteness	1.88	(0.06)**	-0.06	(0.02)**
Constant	-0.49	(1.55)**	4.53	(0.54)**
	Fixed effects			
Firm-product-year	Yes		Yes	
N	370684		370684	
rsq	0.77		0.89	
rsq-adj	0.62		0.83	

Notes: Dependent variable is in turn log quantity and log unit value at the firm-product-market-year level. Gravity variables are from CEPII. Remoteness is calculated as the distance-weighted average of partner GDP. All independent variables are in logs. Full set of product-market-year effects are included. Standard errors are clustered at the product-market-year level. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 58: Dynamics of quantity, price: Not controlling for spell length

	Quantity		Price	
Market tenure	All spells			
2 years	0.82	(0.03)**	-0.01	(0.01)
3 years	1.27	(0.04)**	-0.01	(0.01)
4 years	1.59	(0.05)**	-0.01	(0.02)
5 years	1.77	(0.05)**	-0.00	(0.02)
6 years	1.99	(0.06)**	-0.01	(0.02)
7+ years	2.37	(0.08)**	-0.07	(0.02)**
cens	2.92	(0.13)**	-0.03	(0.03)
	Fixed effects			
Firm-product-year	Yes		Yes	
Product-market-year	Yes		No	
N	131905		265194	
rsq	0.81		0.85	
rsq-adj	0.68		0.82	

Notes: The specifications in this table are the baseline specifications of Berman et al (2019). The sample includes all spells for which the entry date is observed, and all spells that are both right- and left-censored. Dependent variable is in turn log quantity and log unit value at the firm-product-market-year level. Full set of firm-product-year effects are included in both quantity and price regressions. Product-market-year effects are included in the quantity regressions. Omitted category is first year of the spell. Standard errors are clustered at the firm level. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 59: Dynamics of quantity, price: Not controlling for firm-level heterogeneity I

	Quantity		Price	
Market tenure	7+ year spells only			
2 years	0.87	(0.09)**	0.03	(0.05)
3 years	1.20	(0.10)**	0.07	(0.05)
4 years	1.30	(0.12)**	0.12	(0.06)**
5 years	1.49	(0.13)**	0.10	(0.07)
6 years	1.47	(0.15)**	0.11	(0.08)
7+ years	1.58	(0.18)**	0.10	(0.10)
cens	2.03	(0.17)**	0.14	(0.10)
	Fixed effects			
Product-market-year	Yes		Yes	
N	71545		71545	
rsq	0.80		0.87	
rsq-adj	0.40		0.61	

Notes: The specifications in this table are the baseline specifications of Piveteau (2016). The sample includes only spells that last 7 or more years. Dependent variable is in turn log quantity and log unit value at the firm-product-market-year level. Full set of product-market-year effects are included. Omitted category is first year of the spell. Standard errors are clustered at the firm-product-market level. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

Table 60: Dynamics of prices: Not controlling for firm-level heterogeneity I

Market tenure	Our sample		All	
2 years	0.03	(0.01)**	0.03	(0.01)**
3 years	0.03	(0.02)	0.04	(0.01)**
4 years	0.05	(0.02)**	0.06	(0.02)**
5 years	0.01	(0.02)	0.03	(0.02)
6 years	0.00	(0.03)	0.02	(0.03)
7+ years	-0.07	(0.02)**	-0.04	(0.02)**
cens	0.03	(0.01)**	0.04	(0.01)**
exit	-0.07	(0.01)**	-0.06	(0.01)**
	Fixed effects			
Product-market-year	Yes		Yes	
N	171,683		253,398	
rsq	0.65		0.69	
rsq-adj	0.55		0.59	

Notes: The specification in this table is based on Foster et al. (2008). Dependent variable is log unit value at the firm-product-market-year level. Full set of product-market-year effects are included. Omitted category is observations where tenure=1. Standard errors are clustered at the firm-product-market level. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

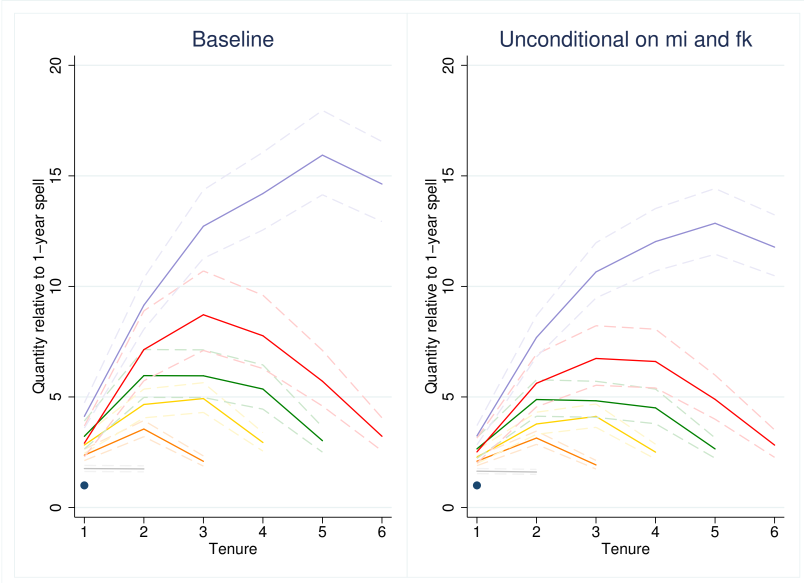
Table 61: Firm-product prices and firm-product age, not controlling for costs or selection

	Unweighted		Weighted	
5-9 yrs	0.18	(0.05)**	0.15	(0.11)
10+ yrs	0.13	(0.06)**	0.15	(0.11)
exit	-0.03	(0.03)	-0.10	(0.09)
Constant	2.42	(0.02)**	1.96	(0.06)**
	Fixed effects			
Product-year	Yes		Yes	
N	49713		49616	
rsq	0.85		0.89	
rsq-adj	0.80		0.85	

Notes: The specifications in this table are intended to mimic those of Foster, Haltiwanger and Syverson (2008). Data comes from PRODCOM. Dependent variable is log unit value at the firm-product-year level from PRODCOM, concorded over time using the method of Pierce and Schott (2012). Age is calculated at the firm-product level. Omitted category is 1-4 years. Exit is an indicator for firm-product-level spells that terminate in the next age bin. Full set of product-year effects are included. Weights in the weighted regression are employment. Standard errors are clustered at the firm level. ** significant at 5%, * significant at 10%. Source: CSO and authors' calculations.

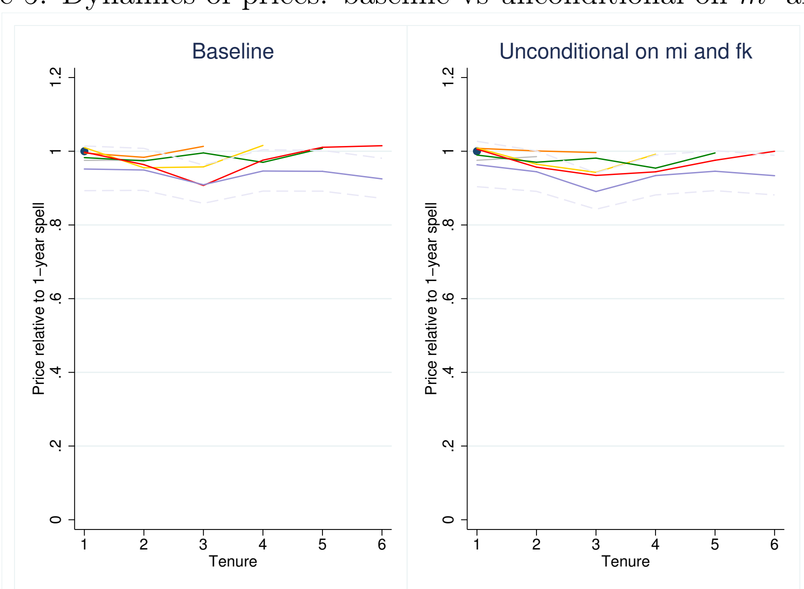
G Additional figures: Reduced form empirical analysis

Figure 4: Dynamics of quantity: baseline vs unconditional on m^i and f^k



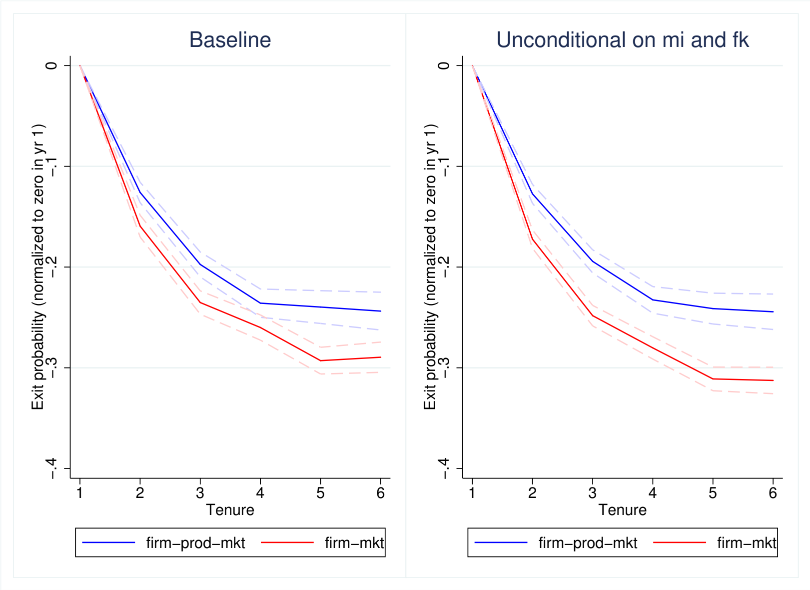
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation unconditional on m^i and f^k. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 5: Dynamics of prices: baseline vs unconditional on m^i and f^k



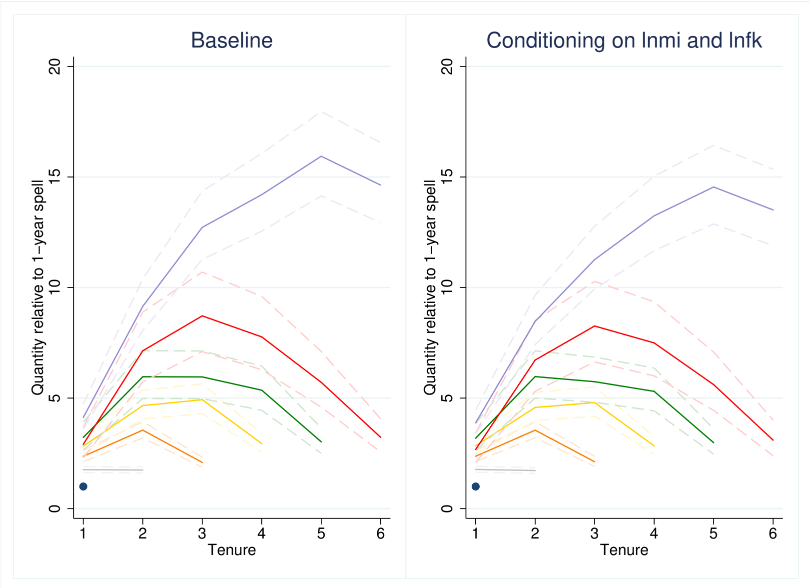
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation unconditional on m^i and f^k. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums for 7+ spell are reported in dotted lines. Source: CSO and authors' calculations.

Figure 6: Exit hazard: baseline vs unconditional on m^i and f^k



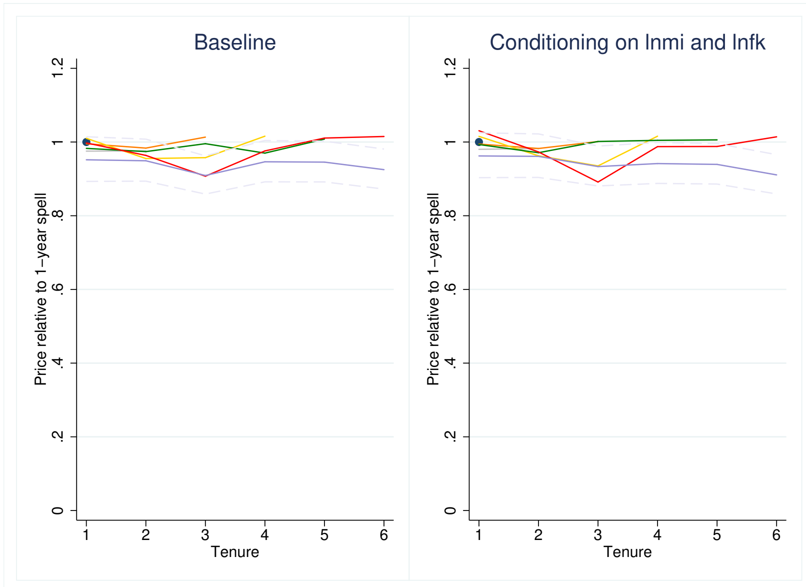
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations unconditional on m^i and f^k. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 7: Dynamics of quantity: baseline vs conditional on $\ln(m^i)$ and $\ln(f^k)$



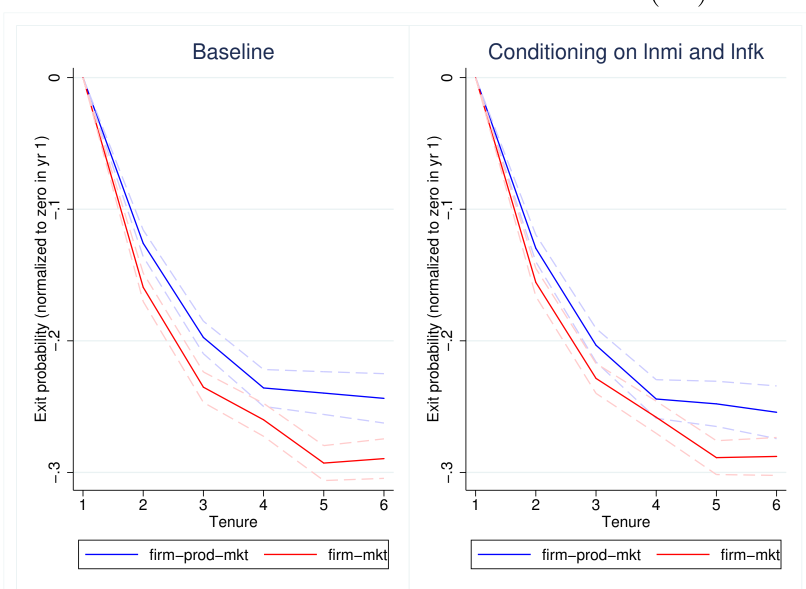
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation conditional on $\ln(m^i)$ and $\ln(f^k)$. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 8: Dynamics of prices: baseline vs conditional on $\ln(m^i)$ and $\ln(f^k)$



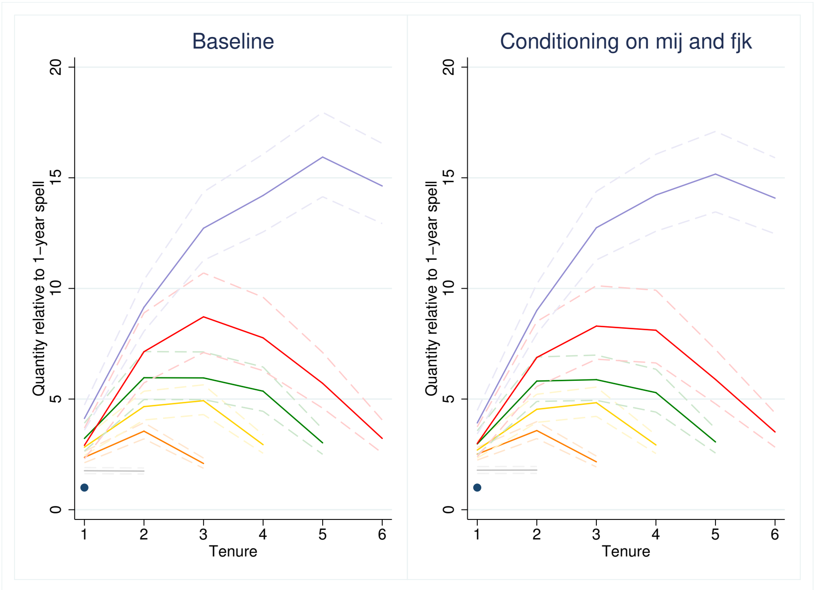
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation conditional on $\ln(m^i)$ and $\ln(f^k)$. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 9: Exit hazard: baseline vs conditional on $\ln(m^i)$ and $\ln(f^k)$



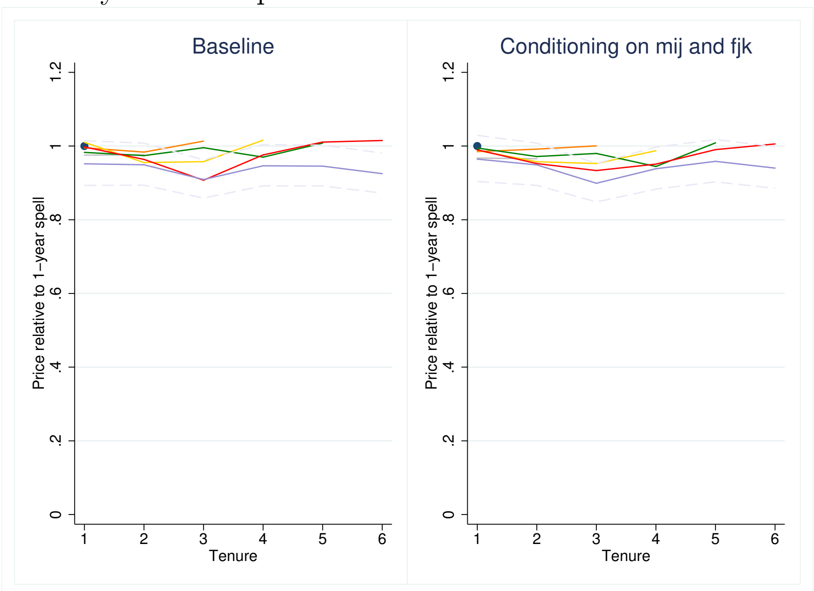
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations conditional on $\ln(m^i)$ and $\ln(f^k)$. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 10: Dynamics of quantity: baseline vs conditional on m^{ij} and f^{jk}



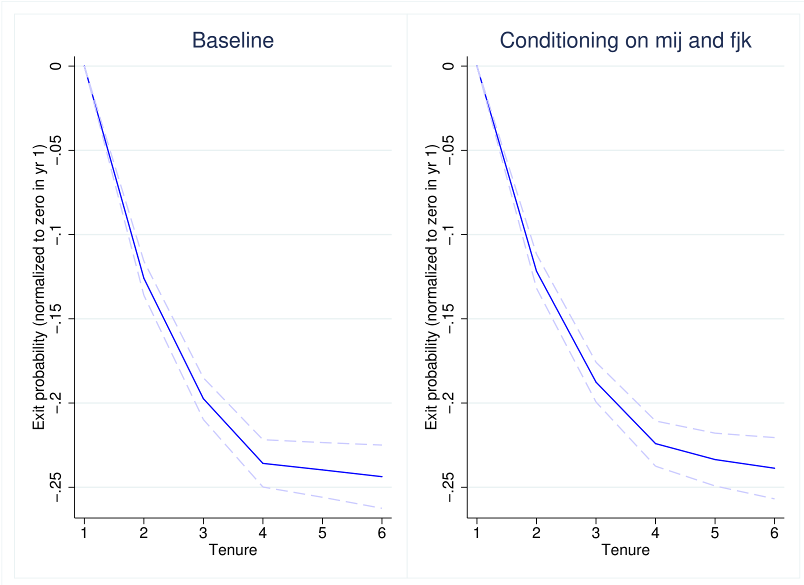
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation conditional on m^{ij} and f^{jk}. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 11: Dynamics of prices: baseline vs conditional on m^{ij} and f^{jk}



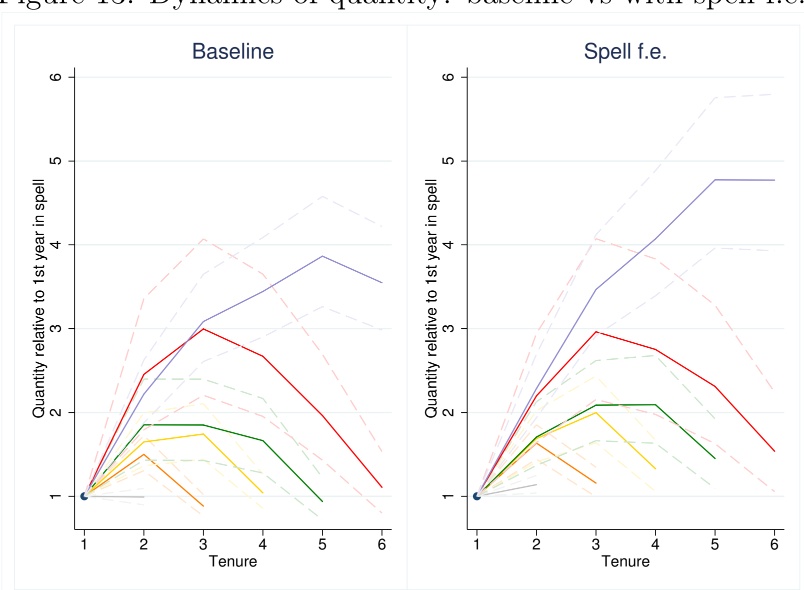
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation conditional on m^{ij} and f^{jk}. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 12: Exit hazard: baseline vs conditional on m^{ij} and f^{jk}



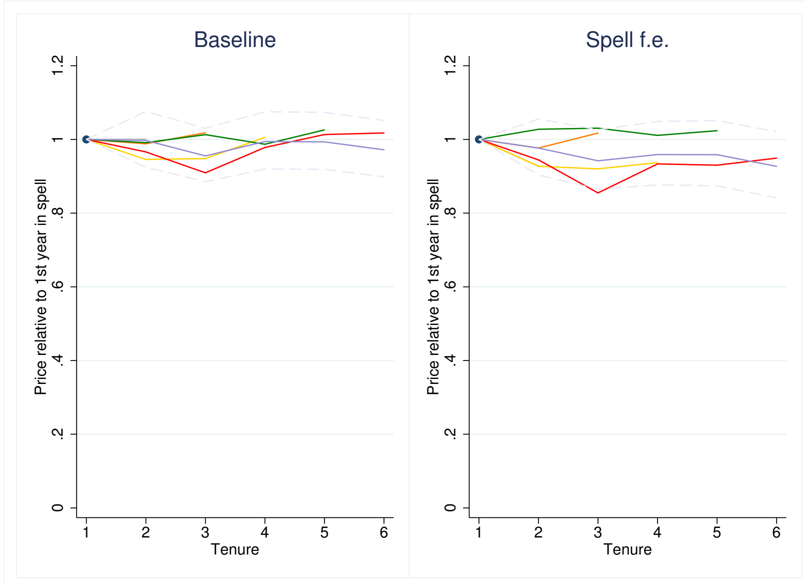
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations conditional on $\ln\left(m^{i}\right)$ and $\ln\left(f^{k}\right)$. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 13: Dynamics of quantity: baseline vs with spell f.e.



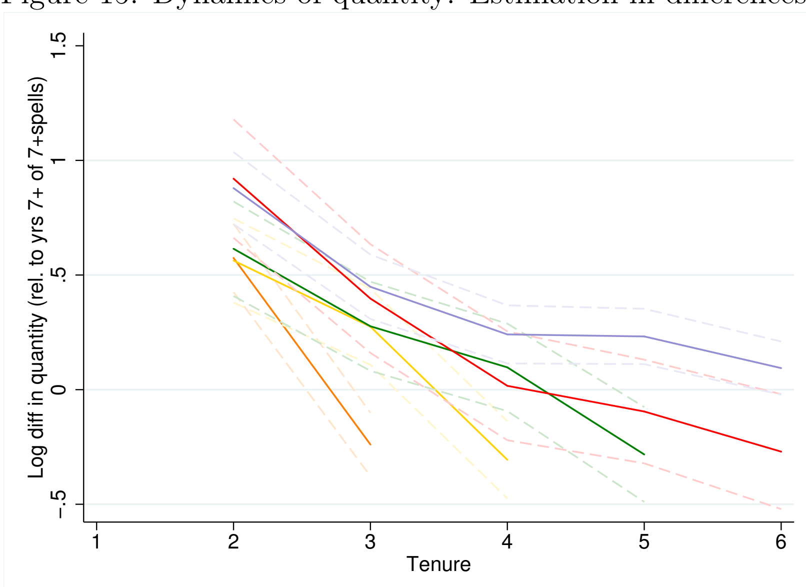
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation with spell fixed effects. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 14: Dynamics of prices: baseline vs with spell f.e.



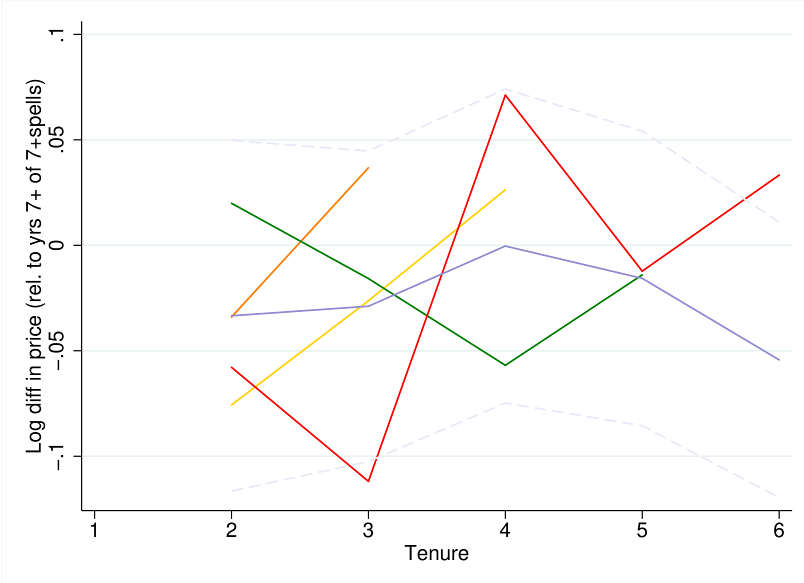
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation with spell fixed effects. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 15: Dynamics of quantity: Estimation in differences



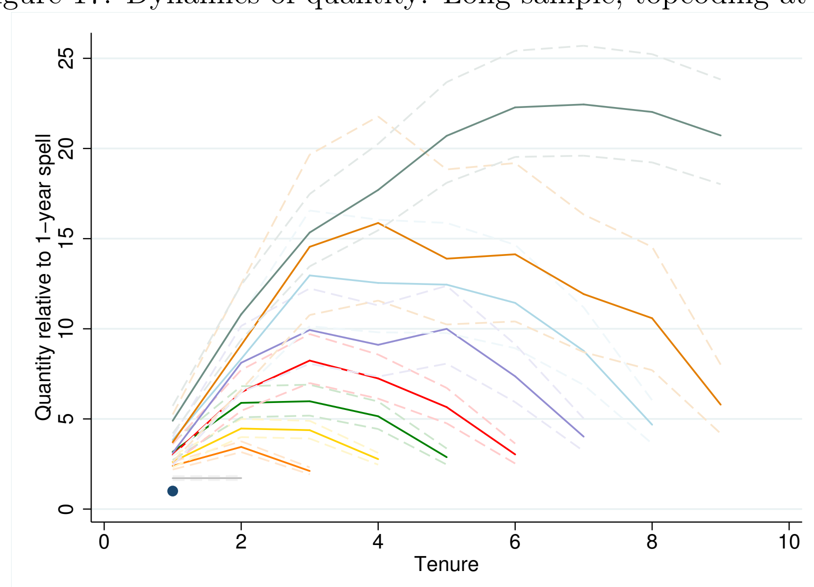
Notes: Figure illustrates trajectories based on estimation of the product quantity equation in differences. All log differences are relative to the average annual log difference in years 7+ of 7+year spells.Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 16: Dynamics of prices: Estimation in differences



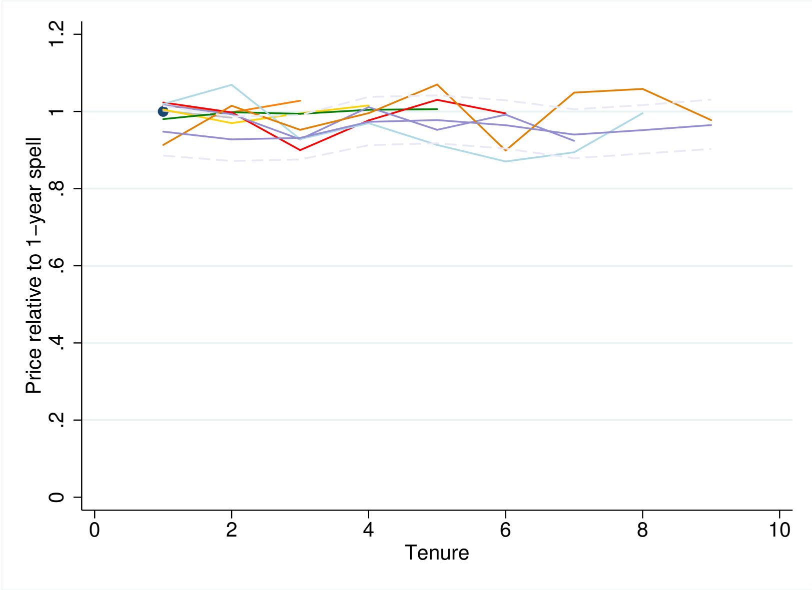
Notes: Figure illustrates trajectories based on estimation of the product quantity equation in differences. All log differences are relative to the average annual log difference in years 7+ of 7+year spells.Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 17: Dynamics of quantity: Long sample, topcoding at 10



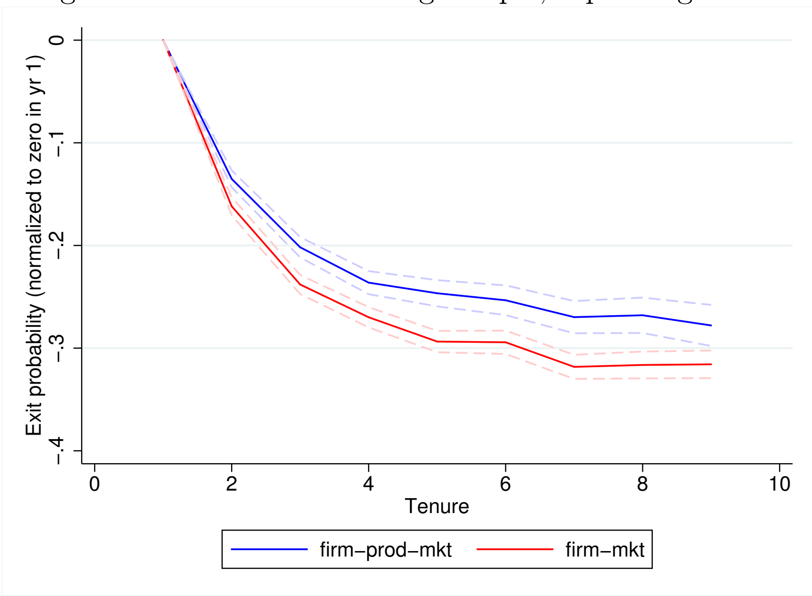
Notes: Figure illustrates trajectories based on estimation of the product quantity equation in the long sample 1996-2014 which is not matched to the Census of Industrial Production. Duration and tenure are topcoded at 10 years. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 18: Dynamics of prices: Long sample, topcoding at 10



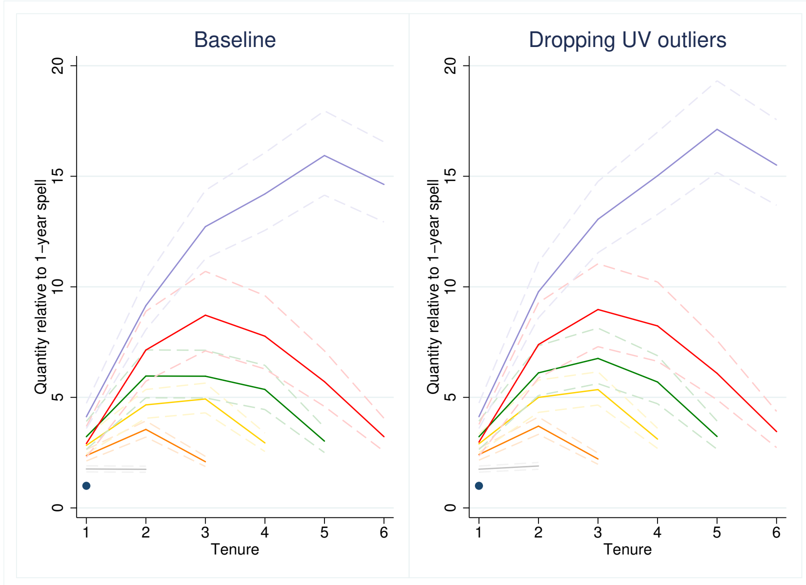
Notes: Figure illustrates trajectories based on estimation of the product quantity equation in the long sample 1996-2014 which is not matched to the Census of Industrial Production. Duration and tenure are topcoded at 10 years. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 19: Exit hazard: Long sample, topcoding at 10



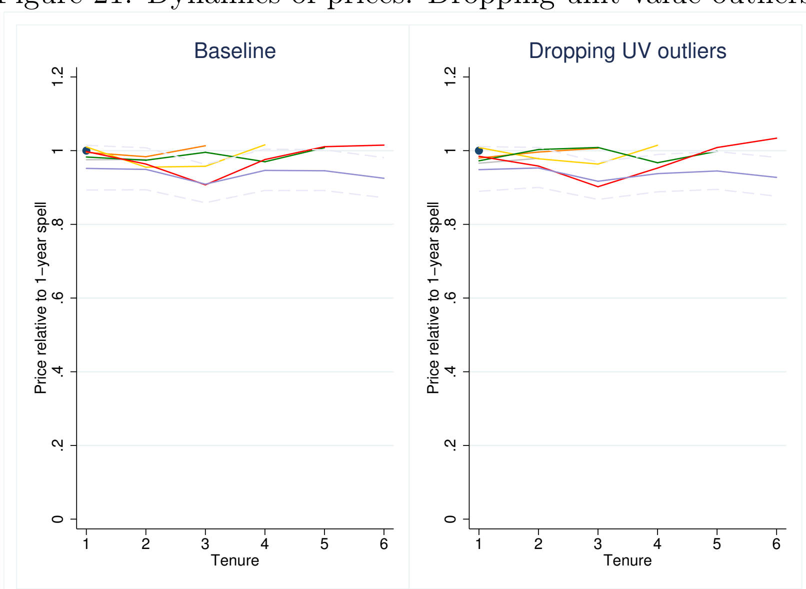
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations in the long sample 1996-2014 which is not matched to the Census of Industrial Production.. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 20: Dynamics of quantity: Dropping unit value outliers



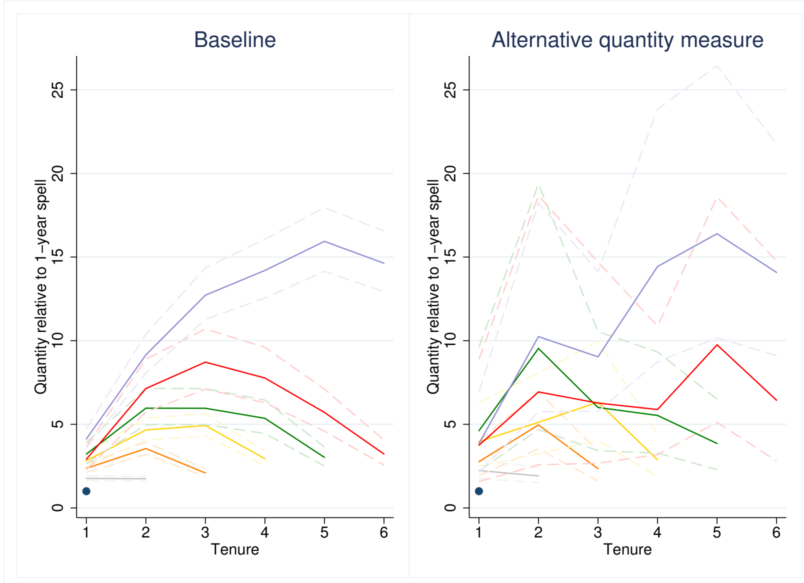
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated dropping unit value outliers. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 21: Dynamics of prices: Dropping unit value outliers



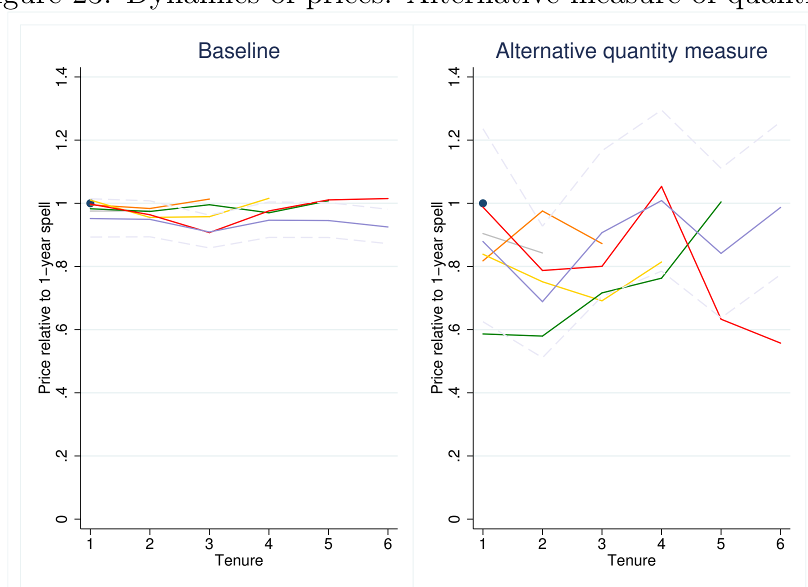
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated dropping unit value outliers. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 22: Dynamics of quantity: Alternative measure of quantity



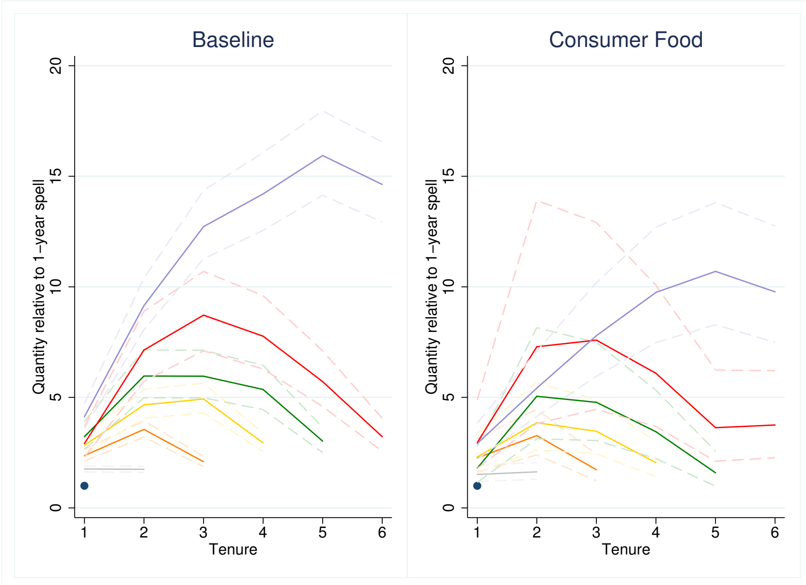
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample for which an alternative measure of quantity is available. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 23: Dynamics of prices: Alternative measure of quantity



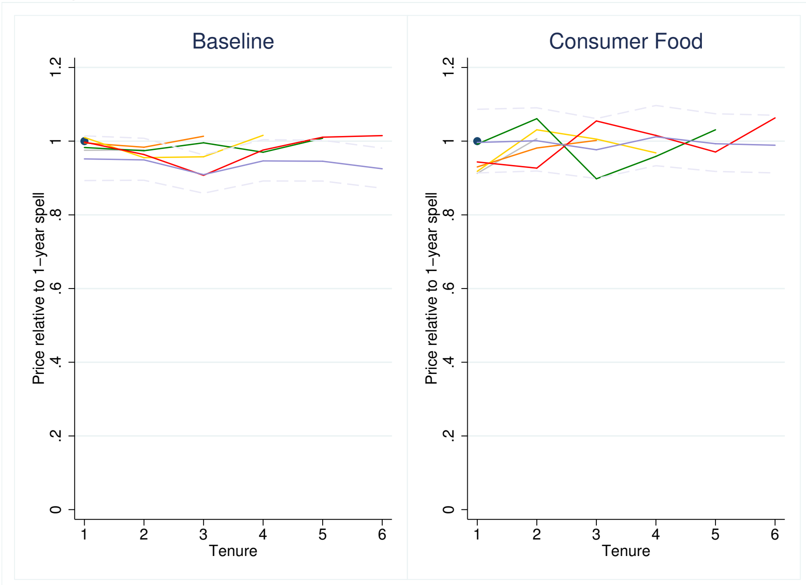
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample for which an alternative measure of quantity is available. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 24: Dynamics of quantity: Consumer food sector



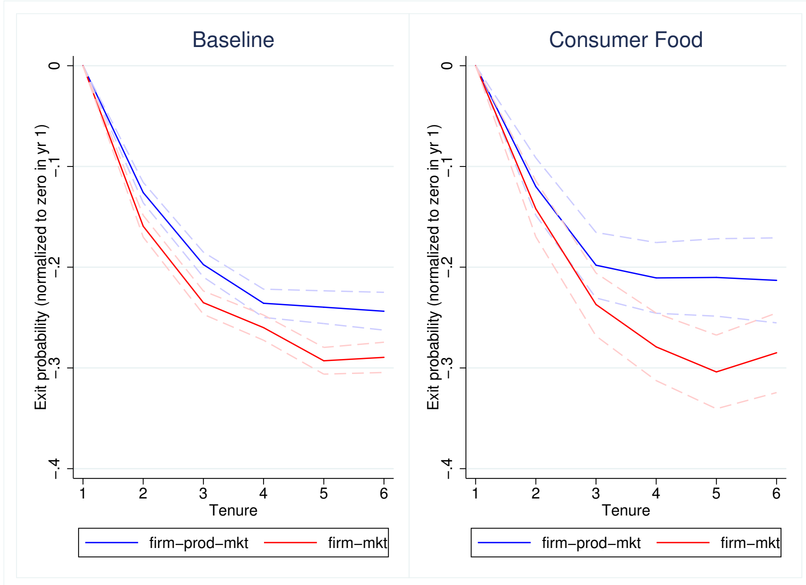
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of firms in the consumer food sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 25: Dynamics of prices: Consumer food sector



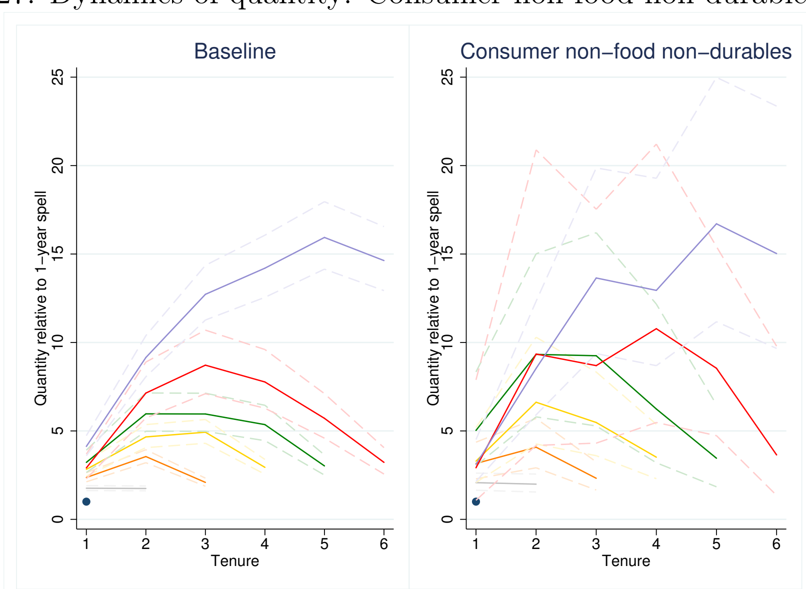
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of firms in the consumer food sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 26: Exit hazard: Consumer food sector



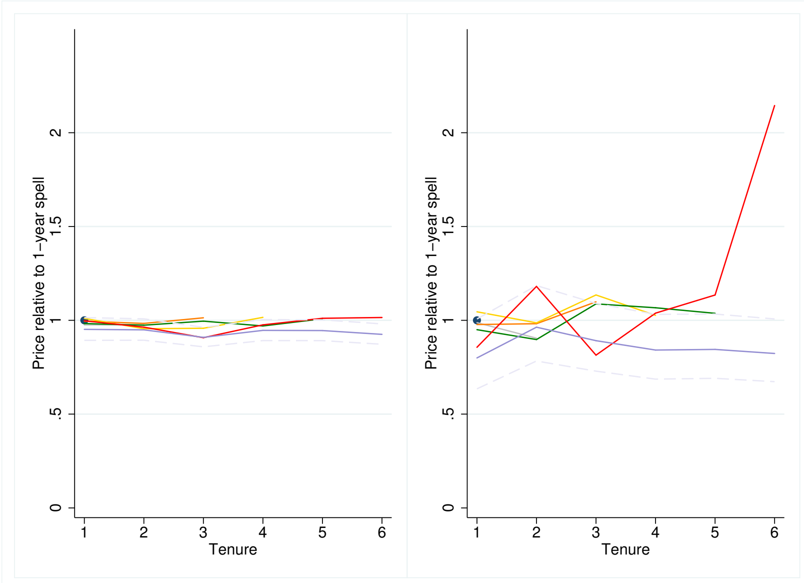
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using firms in the consumer food sector. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 27: Dynamics of quantity: Consumer non-food non-durables sector



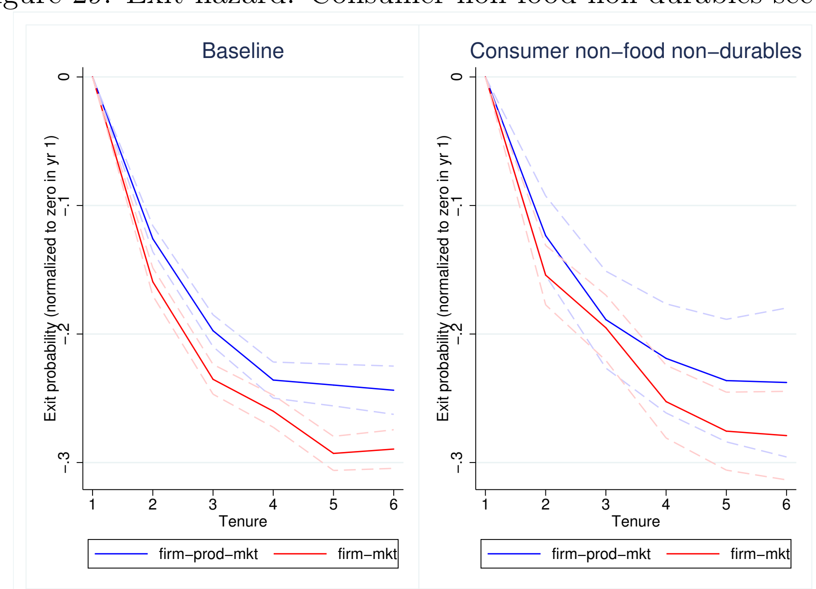
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of firms in the consumer non-food non-durables sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 28: Dynamics of prices: Consumer non-food non-durables sector



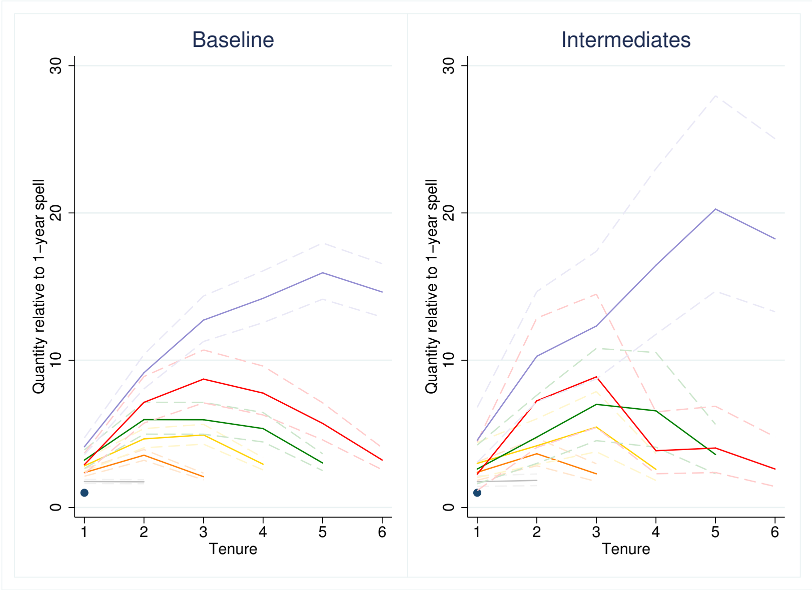
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of firms in the consumer non-food non-durables sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 29: Exit hazard: Consumer non-food non-durables sector



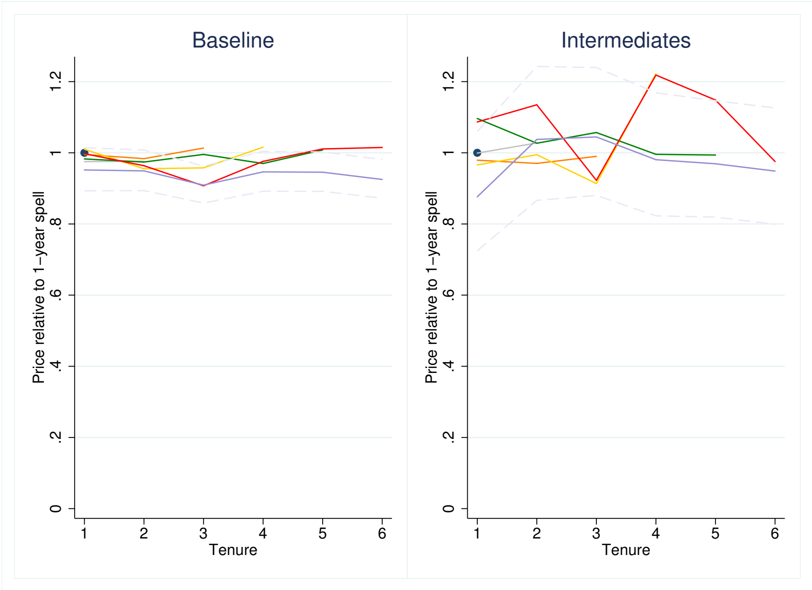
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using firms in the consumer non-food non-durables sector. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 30: Dynamics of quantity: Intermediates sector



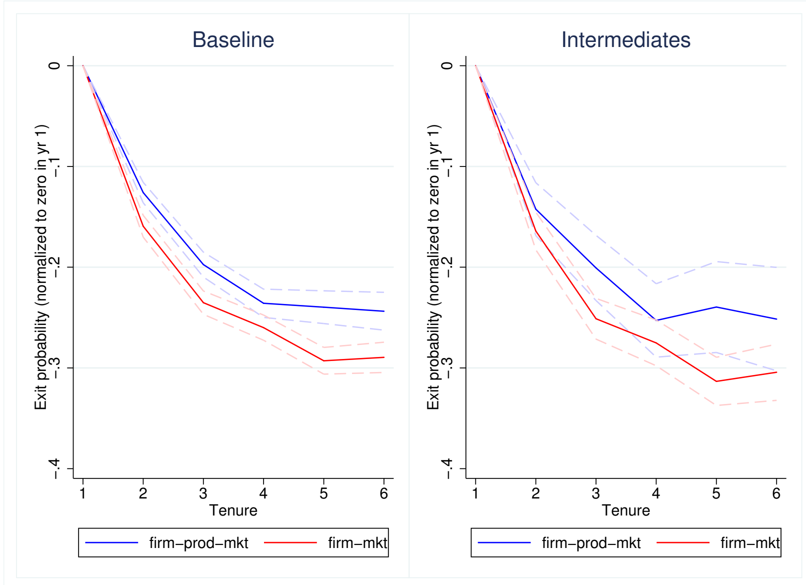
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of firms in the intermediates sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 31: Dynamics of prices: Intermediates sector



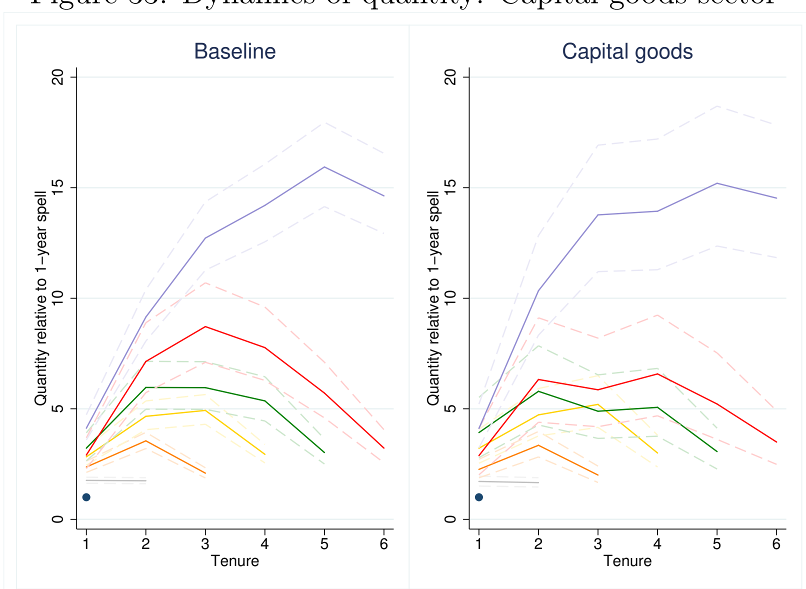
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of firms in the intermediates sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 32: Exit hazard: Intermediates sector



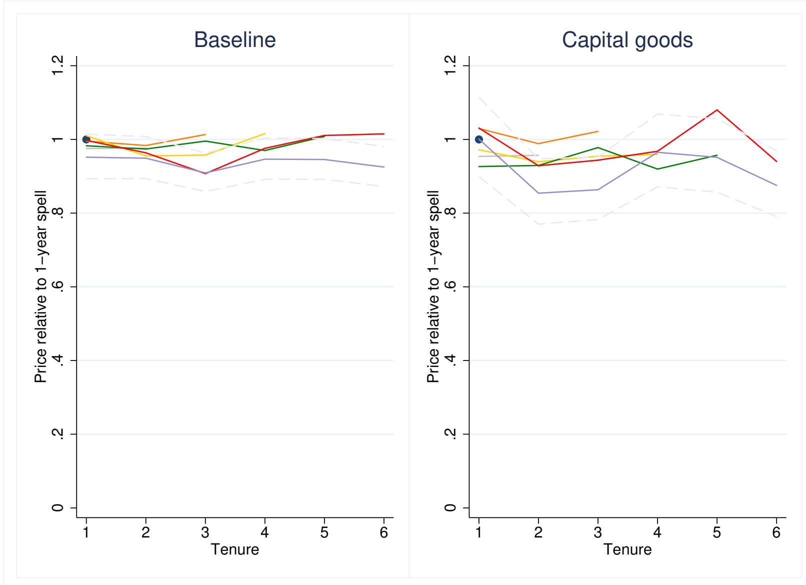
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using firms in the intermediates sector. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 33: Dynamics of quantity: Capital goods sector



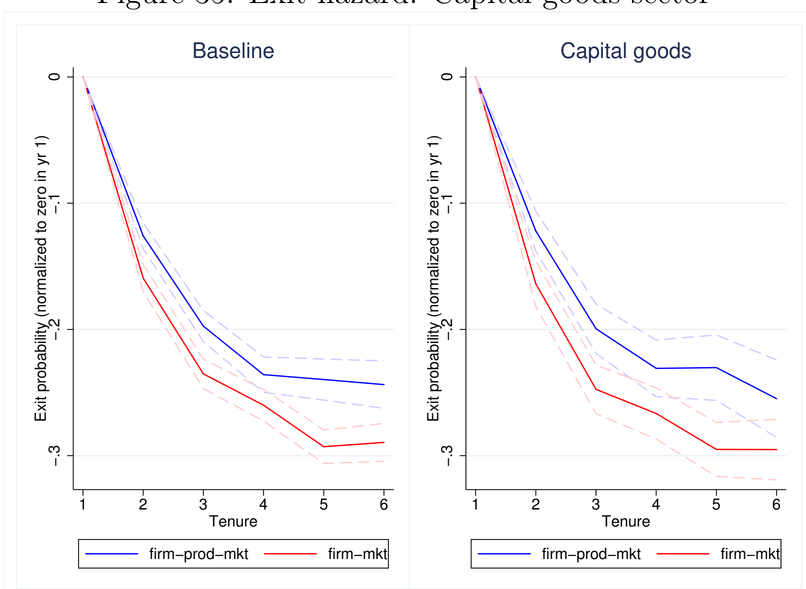
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of firms in the capital goods sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 34: Dynamics of prices: Capital goods sector



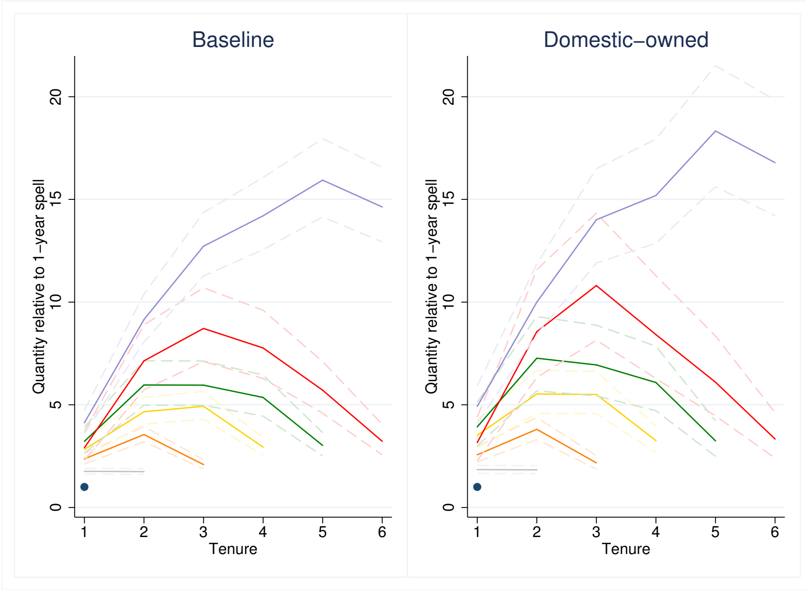
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of firms in the capital goods sector. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 35: Exit hazard: Capital goods sector



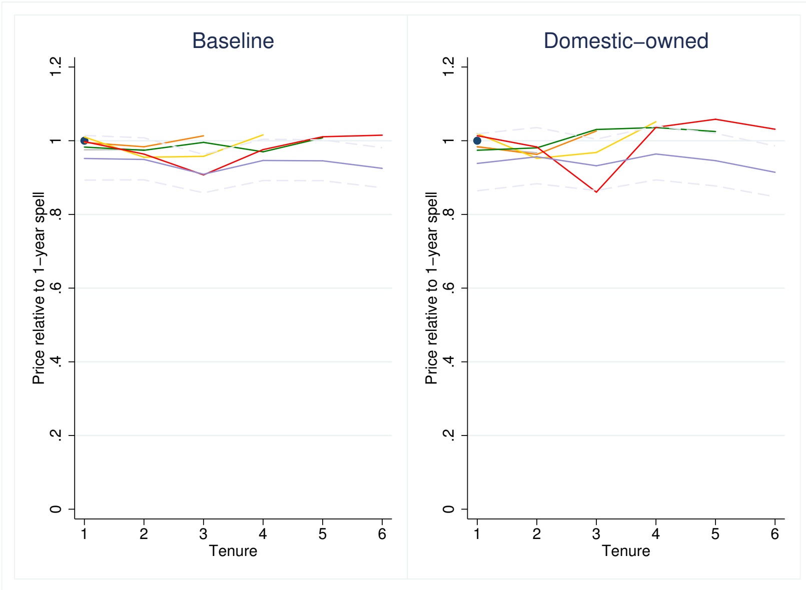
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using firms in the capital goods sector. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 36: Dynamics of quantity: Domestic-owned



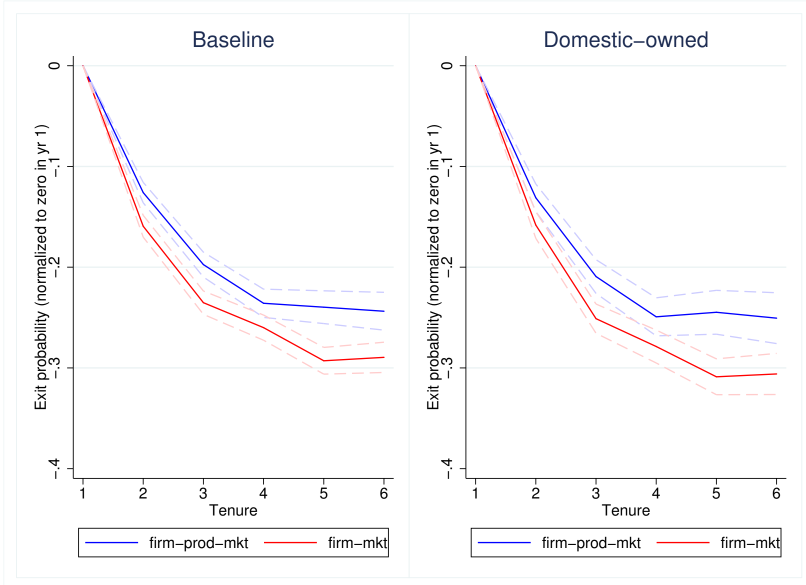
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of domestic-owned firms and evaluated at means of m^i and f^k for domestic-owned firms. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 37: Dynamics of prices: Domestic-owned



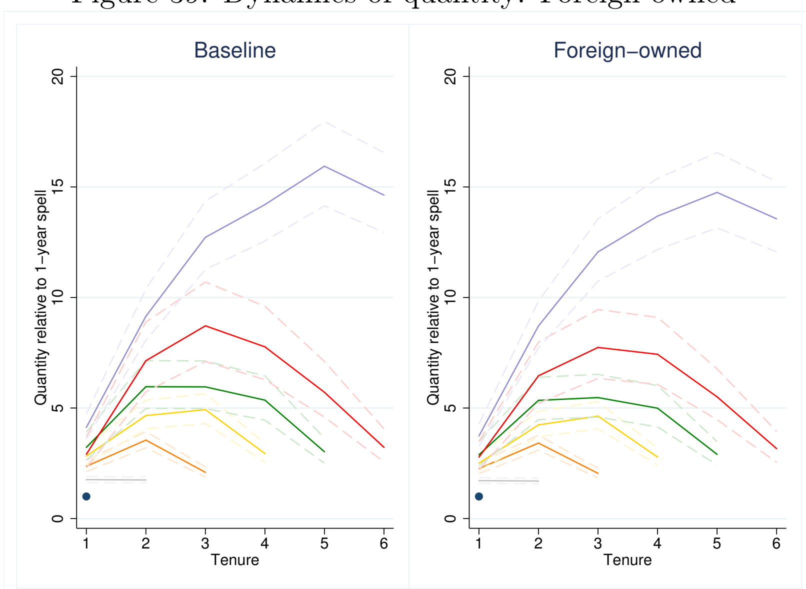
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of domestic-owned firms, evaluated at the means of m^i and f^k for domestic-owned firms. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 38: Exit hazard: Domestic-owned



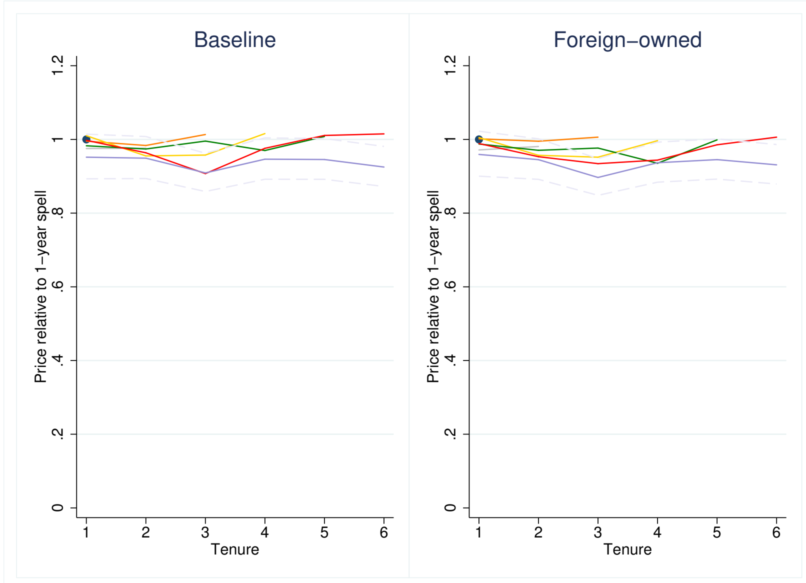
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using the sample of domestic-owned firms, evaluated at the means of m^i and f^k for domestic-owned firms. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 39: Dynamics of quantity: Foreign-owned



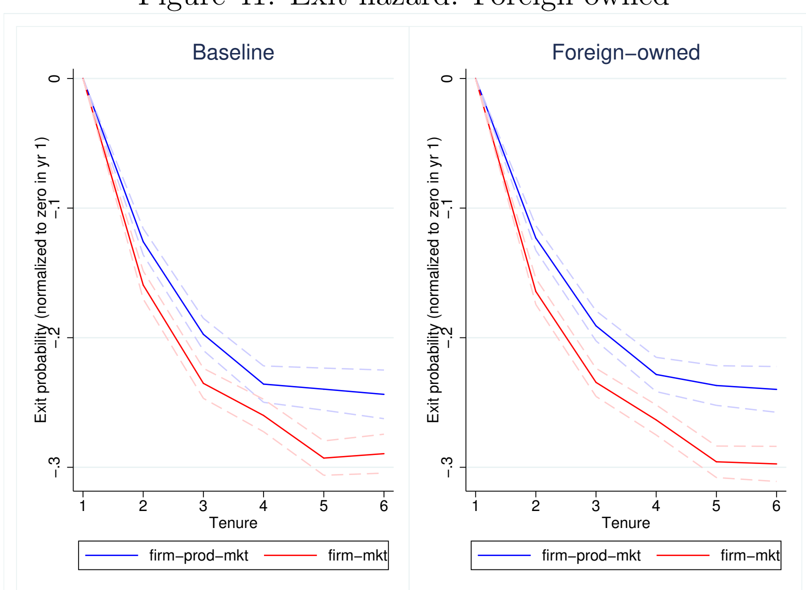
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of foreign-owned firms and evaluated at means of m^i and f^k for foreign-owned firms. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 40: Dynamics of prices: Foreign-owned



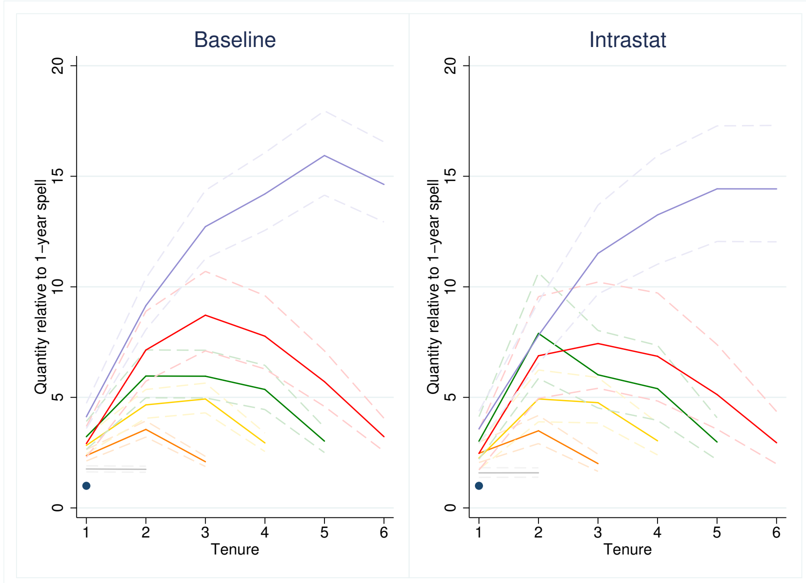
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of foreign-owned firms, evaluated at the means of m^i and f^k for foreign-owned firms. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 41: Exit hazard: Foreign-owned



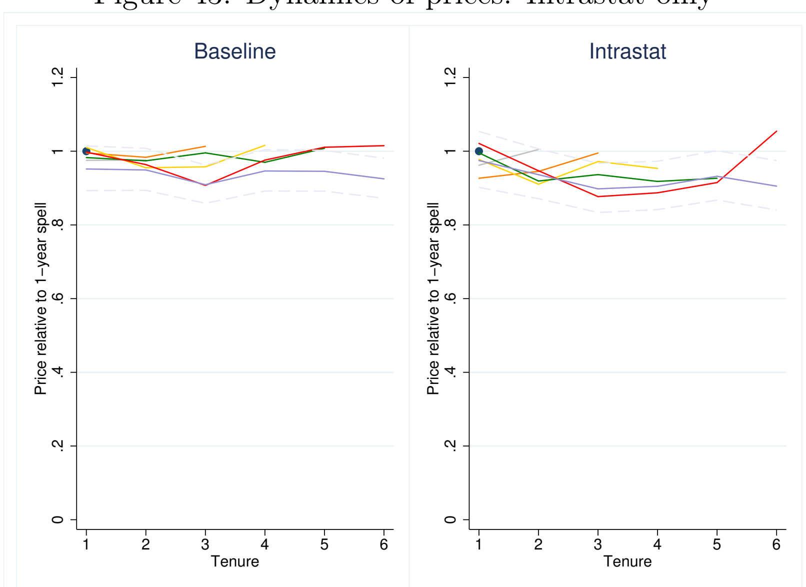
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using the sample of foreign-owned firms, evaluated at the means of m^i and f^k for foreign-owned firms. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 42: Dynamics of quantity: Intrastat only



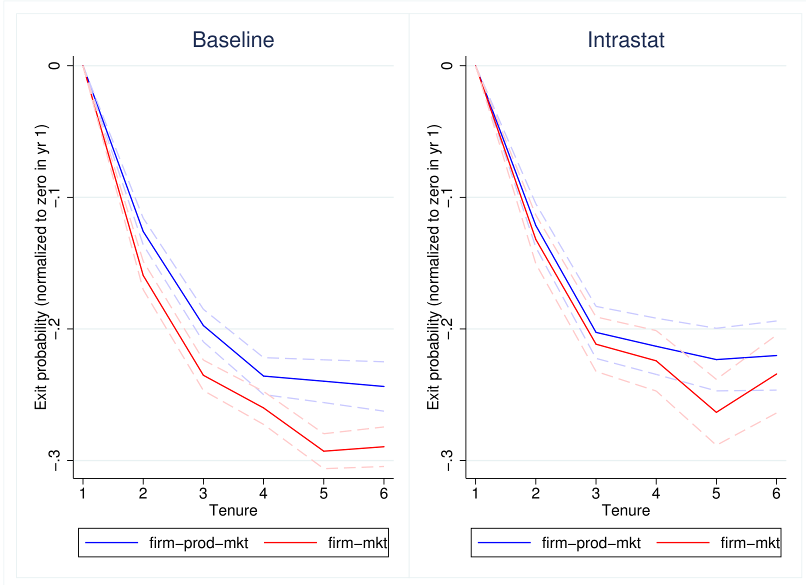
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of Intrastat markets and evaluated at means of m^i and f^k for Intrastat markets. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 43: Dynamics of prices: Intrastat only



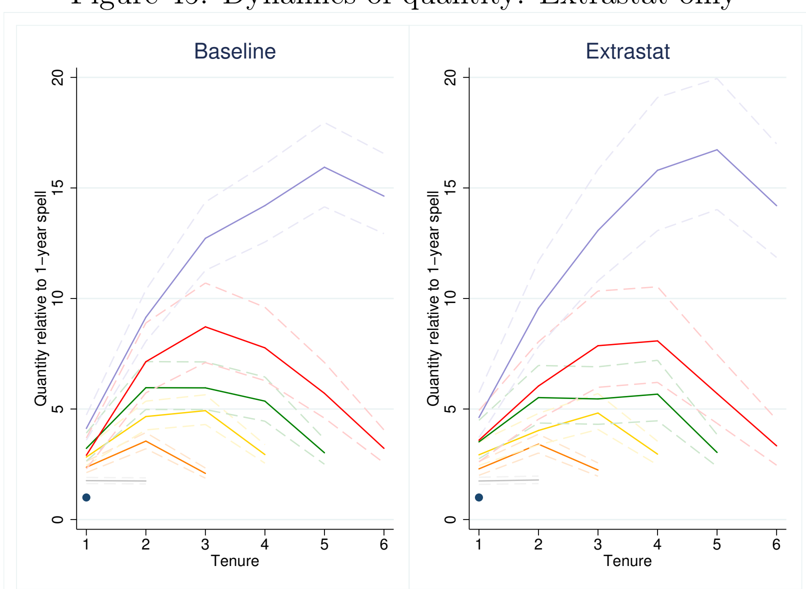
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of Intrastat markets, evaluated at the means of m^i and f^k for Intrastat markets. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 44: Exit hazard: Intrastat only



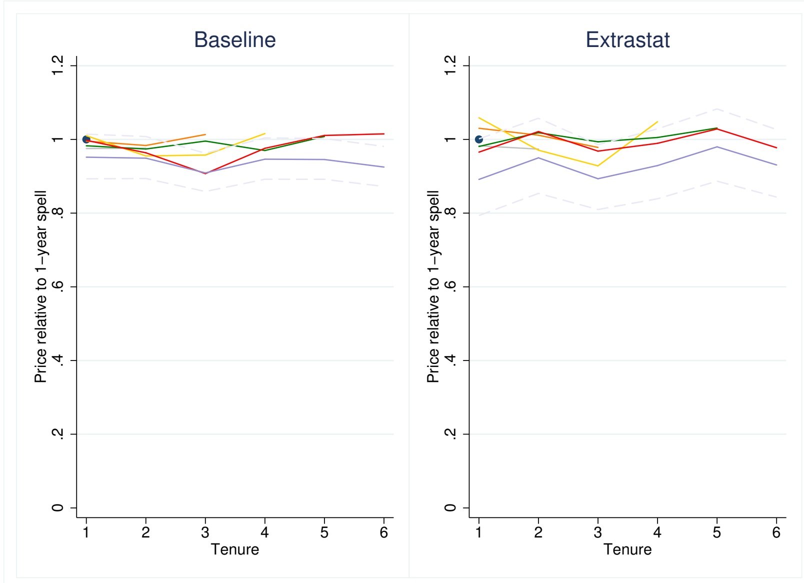
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using the sample of Intrastat markets, evaluated at the means of m^i and f^k for Intrastat markets. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 45: Dynamics of quantity: Extrastat only



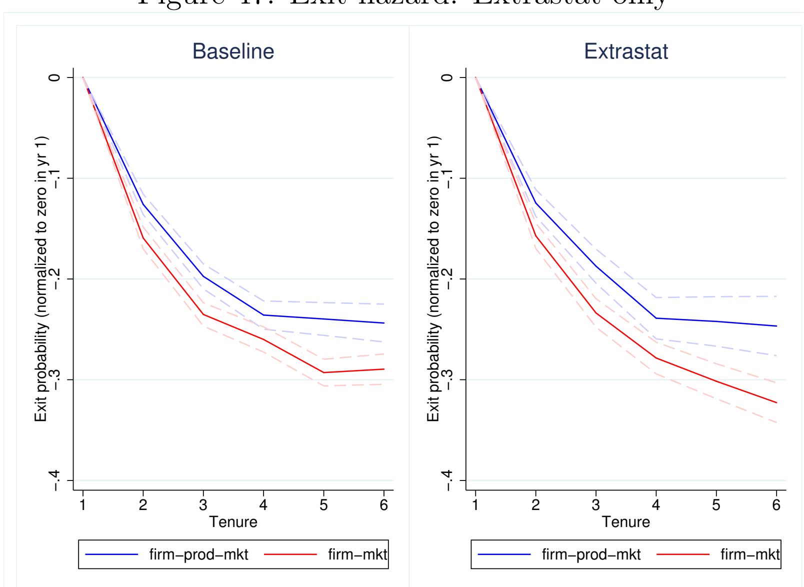
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of Extrastat markets and evaluated at means of m^i and f^k for Extrastat markets. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 46: Dynamics of prices: Extrastat only



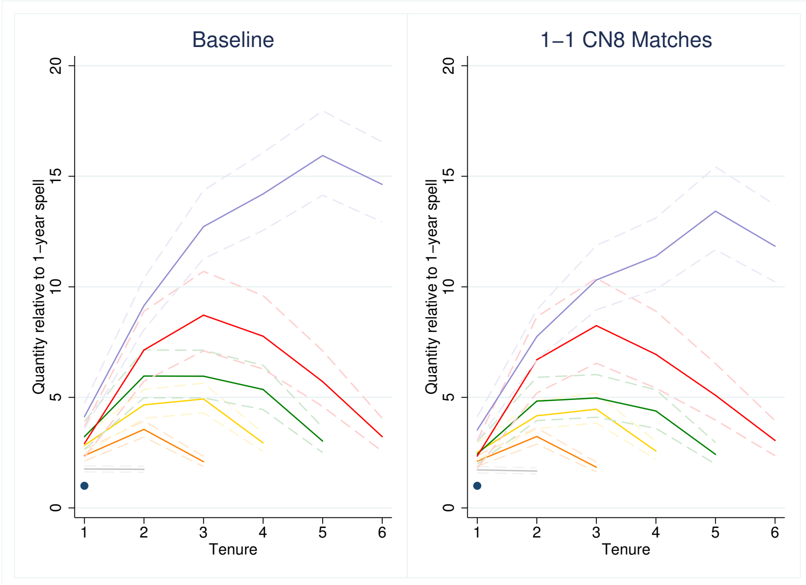
Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of Extrastat markets, evaluated at the means of m^i and f^k for Extrastat markets. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 47: Exit hazard: Extrastat only



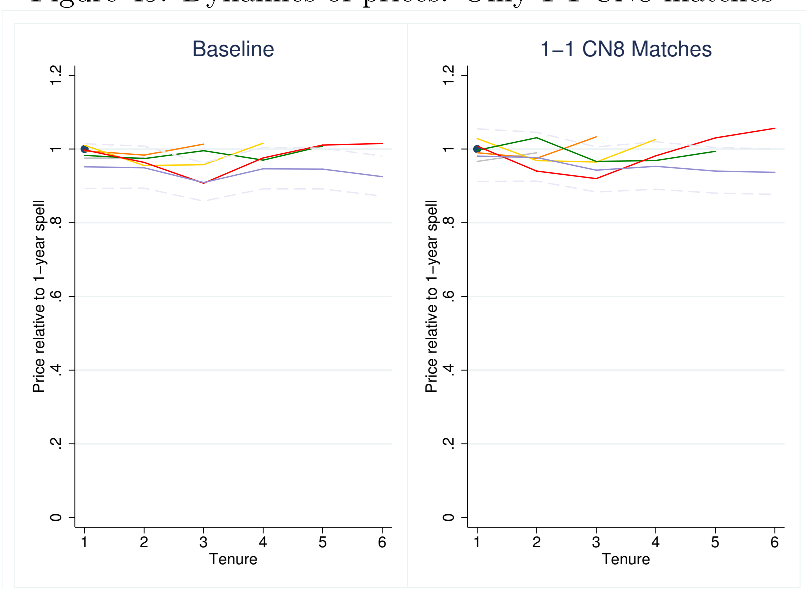
Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated using the sample of Extrastat markets, evaluated at the means of m^i and f^k for Extrastat markets. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

Figure 48: Dynamics of quantity: Only 1-1 CN8 matches



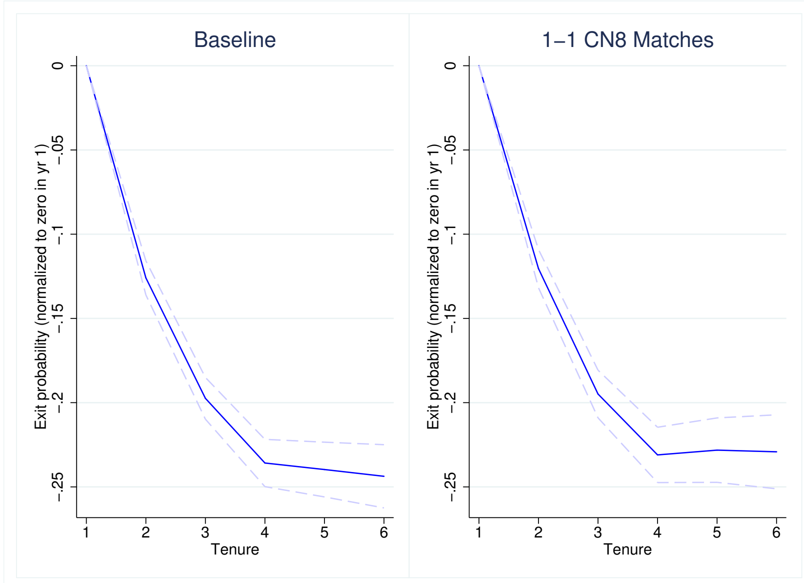
Notes: Figure illustrates trajectories based on estimation of the baseline product quantity equation and the product quantity equation estimated on the sample of products where there are only 1-1 matches between the CN8 classifications from 1996 through 2009. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 49: Dynamics of prices: Only 1-1 CN8 matches



Notes: Figure illustrates trajectories based on estimation of the baseline product price equation and the product price equation estimated on the sample of products where there are only 1-1 matches between the CN8 classifications from 1996 through 2009. Trajectories are constructed using exponent of relevant sums of coefficients. Exponent of two standard deviation confidence intervals for these sums are reported in dotted lines. Source: CSO and authors' calculations.

Figure 50: Exit hazard: Only 1-1 CN8 matches



Notes: Figure illustrates exit hazard based on estimation of the baseline firm-product-market and firm-market exit equations, and the equivalent exit equations estimated on the sample of products where there are only 1-1 matches between the CN8 classifications from 1996 through 2009. Two standard deviation confidence intervals are reported in dotted lines. Source: CSO and authors' calculations.

H Standard errors on structural parameter estimates

We calculate standard errors for our estimates of the model conditional on $\psi = 1$ using a parametric bootstrap. This is implemented by repeating the following procedure $i = 1, \ldots, N$ times. We take our estimated vector of parameters $\hat{\boldsymbol{\mu}}_0$. We take draws of idiosyncratic demand and fixed and sunk costs for 10,000 firms for 14 periods (as in our baseline estimates) using seed s_i, where this differs from the seed (s_0) used in our original estimation. Call these draws S_i. We use the parameter vector $\hat{\boldsymbol{\mu}}_0$ and draws S_i to construct target moments m_i. For each $i = 1, \ldots, N$ we then estimate the parameters of the model to match moments m_i using an identical procedure: 10 particle swarms followed by a pattern search, using seed $s_{i'}$ (which differs from s_i) throughout. We choose the best vector of estimates from these 10 rounds. This gives rise to the parameter vector $\hat{\boldsymbol{\mu}}_i$. At the end of this procedure, we have N parameter vectors $\{\hat{\boldsymbol{\mu}}_1, \ldots, \hat{\boldsymbol{\mu}}_N\}$. This is as described in Footnote 53 in Cervantes and Cooper (2022).

We perform this exercise for $N = 160$. The distribution for each parameter is reported in Figure 51. We use the distribution of these parameter vectors to calculate 95% confidence intervals for each of the 11 parameters (excluding ψ). We do this following Wooldridge (2010) by ranking the bootstrapped estimates and finding the 2.5th and 97.5th percentiles.

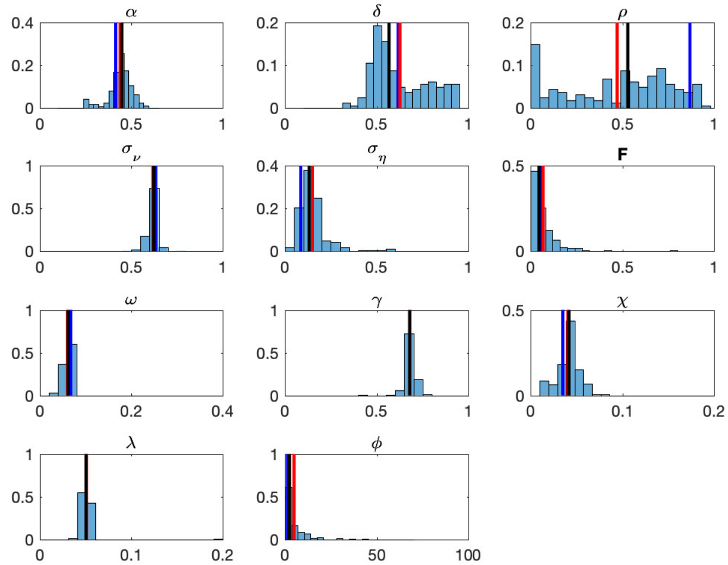


Figure 51: Distribution of bootstrapped parameter estimates

Notes: Blue line is our original parameter estimate. Red line is mean of bootstrapped parameter estimates. Black line is median of bootstrapped parameter estimates. F refers to the parameter which governs the fixed cost. χ refers to the parameter which governs customer capital on entry.

I How model fit varies with ψ

I.1 A note on our optimization routine

Our model involves discrete choices (whether to participate in an export market, whether to invest in future customer base). We solve it by discretizing the state-space, using value function iteration to solve for optimal choices, simulating the actions of firms with randomly drawn shocks, and calculating the same moments in the simulated data as in the actual data. Since the problem is not smooth, we do not use derivative-based methods to minimize the distance between model and data moments. Instead, we implement a global search over the parameter space using a particle swarm, complemented with a pattern search to further improve estimates locally. We speculate that our objective function exhibits local minima. One not-so-nice feature of the particle swarm method is that it is not guaranteed to find the global minimum. We address this problem by repeating the optimization routine at least 10 times with different starting values.

I.2 Fixing ψ

To understand how model fit depends on ψ, we choose a vector of values in the range $[0,1]$. For each of these values, we fix ψ and estimate the remaining parameters of the model, $\boldsymbol{\mu}_{-\psi}$. Figure 52 illustrates how the model fit (i.e. the optimized value of the criterion function $m(\psi)' \Omega m(\psi))$ varies with ψ based on this exercise. The circles indicate the values of ψ for which we estimate the model. The shaded area shows the range of values of ψ for which at least some firms optimally choose positive non-price investment A given our estimates of $\boldsymbol{\mu}_{-\psi}$.

Ex post, we can exploit the results from Section B to transform parameter values such that fit is identical for all values of ψ such that $A = 0$. We do this for the vector of parameter values that minimizes the fit criterion conditional on $A = 0$. The dashed line and lighter dots show our original estimates by value of of ψ. Note that this original exercise is necessary to establish the range of ψ for which $A = 0$.

When ψ is such that at least some firms choose $A > 0$, fit improves almost monotonically as $\psi \to 1$. We believe that the small nonmonotonicity is due to the issues described above with finding a global minimum using the particle swarm. The best fit is when $\psi = 1$. This is consistent with what we find when we allow our algorithm to search over all parameters including ψ, with the restriction that $\psi \in [0,1]$.

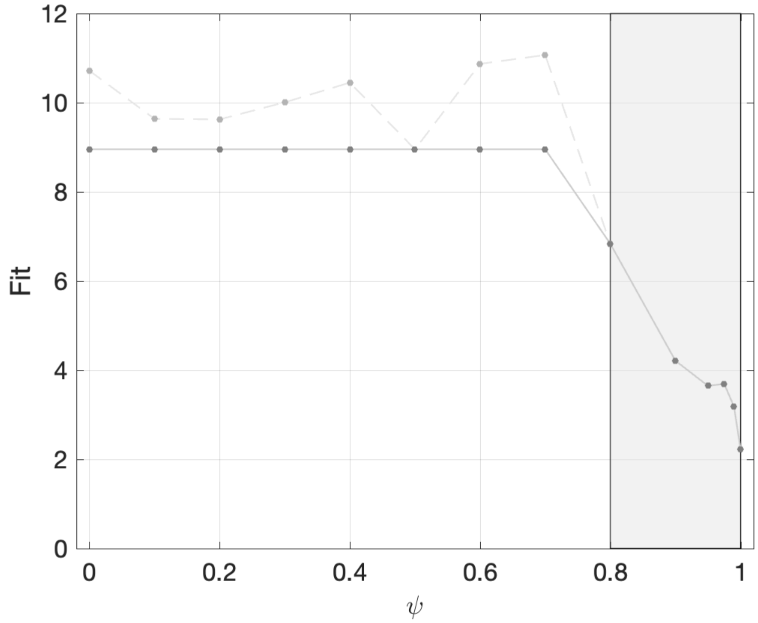


Figure 52: Fit of the model for different values of $\psi \in [0, 1]$

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\psi)' \Omega m(\psi)$) varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. Lower values of fit indicate smaller differences between data and model moments. Shaded region indicates values of ψ where we find that firms optimally choose $A > 0$. Solid line indicates minimum values of fit for each value of ψ. Dashed line indicates values obtained directly by our optimization routine. We exploit the fact that fit of the model is invariant to ψ as long as firms optimally choose $A = 0$ to obtain the solid line.

We also investigate the components of fit. Figure 53 shows that fit improves as $\psi \to 1$ primarily because fit of the quantity and price moments improves. Fit of exit and entry moments is not sensitive to ψ. This is unsurprising, as the components of the model that generate entry and exit do not depend on ψ. Figures 54 through 65 plot quantity and price moments, data and model, for the different values of ψ. Note that model moments are identical for all values of ψ below 0.8, and data and model moments for $\psi = 1$ are shown in the text of the paper (Figures 5 and 6).

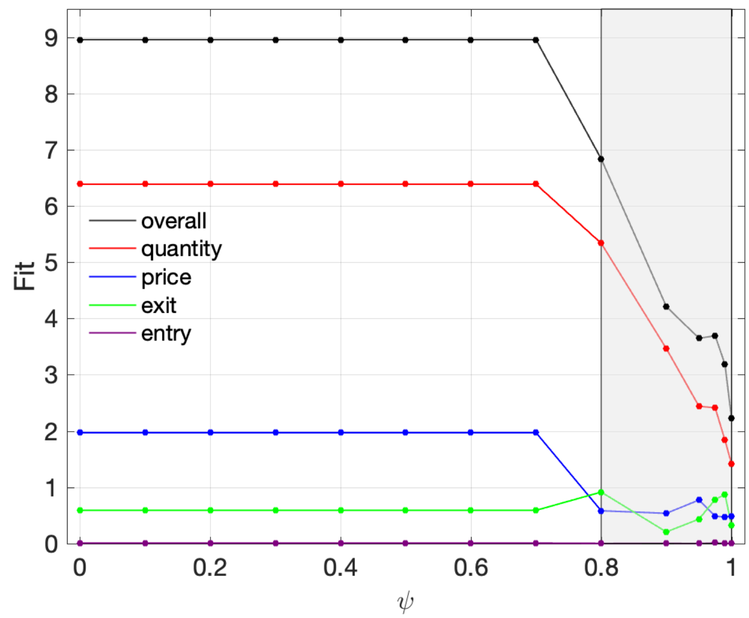
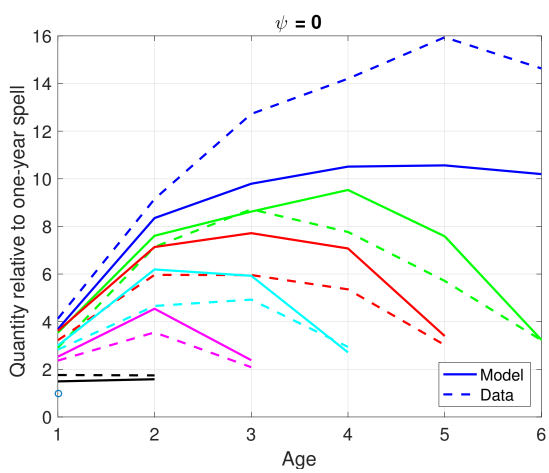


Figure 53: Fit components for different values of psi

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\psi)' \Omega m(\psi)$) varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Overall refers to fit summing over all moments. Quantity refers to fit for quantity moments only. Price refers to fit for price moments only. Exit refers to fit for exit moments only. Entry refers to fit for entry moments only. Source: Authors' calculations.



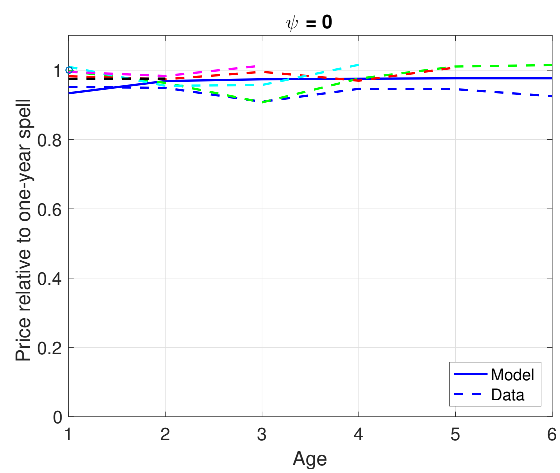
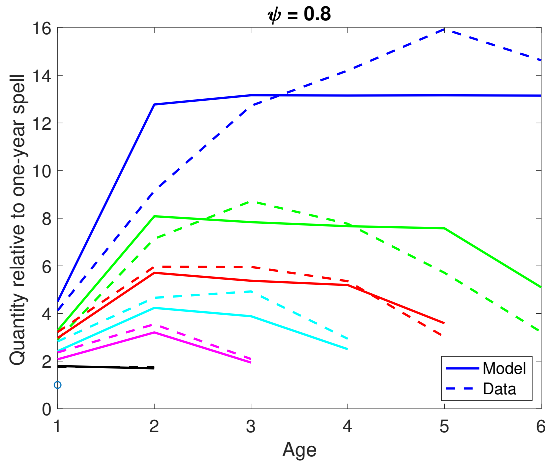


Figure 54: Quantity moments: $\psi = 0$

Figure 55: Price moments: $\psi = 0$

Notes: Figures show evolution of quantities and prices with age, for spells of different duration. Data is from Figures 1 and 2 in the paper, while Model refers to the corresponding fitted values from the estimated model with $\psi = 0$. Quantities are expressed relative to the quantity in a 1-year spell while prices are expressed relative to the price in a 1-year spell. Source: CSO and authors' calculations.



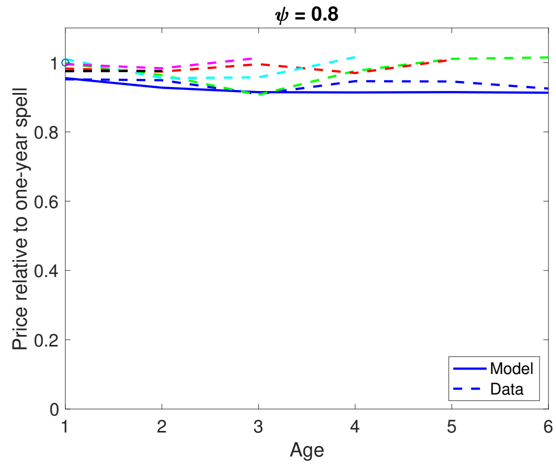
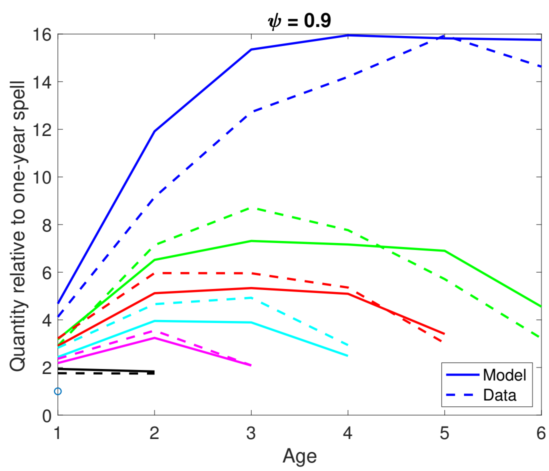


Figure 56: Quantity moments: $\psi = 0.8$

Figure 57: Price moments: $\psi = 0.8$

Notes: Figures show evolution of quantities and prices with age, for spells of different duration. Data is from Figures 1 and 2 in the paper, while Model refers to the corresponding fitted values from the estimated model with $\psi = 0.8$. Quantities are expressed relative to the quantity in a 1-year spell while prices are expressed relative to the price in a 1-year spell. Source: CSO and authors' calculations.



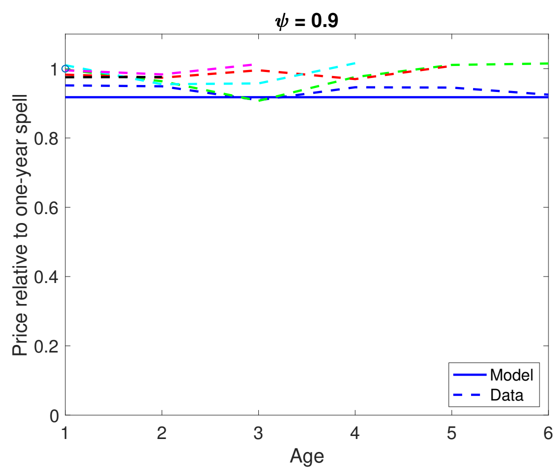


Figure 58: Quantity moments: $\psi = 0.9$

Figure 59: Price moments: $\psi = 0.9$

Notes: Figures show evolution of quantities and prices with age, for spells of different duration. Data is from Figures 1 and 2 in the paper, while Model refers to the corresponding fitted values from the estimated model with $\psi = 0.9$. Quantities are expressed relative to the quantity in a 1-year spell while prices are expressed relative to the price in a 1-year spell. Source: CSO and authors' calculations.

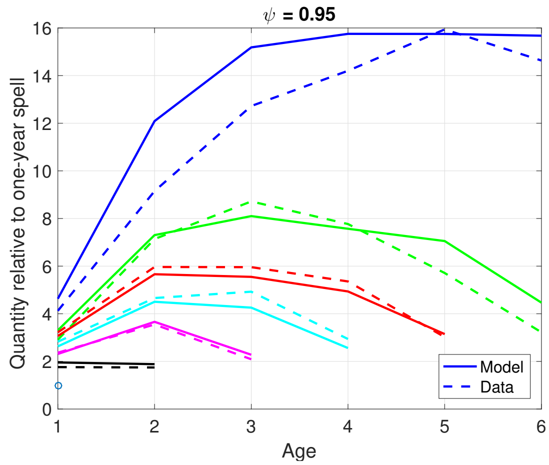


Figure 60: Quantity moments: $\psi = 0.95$

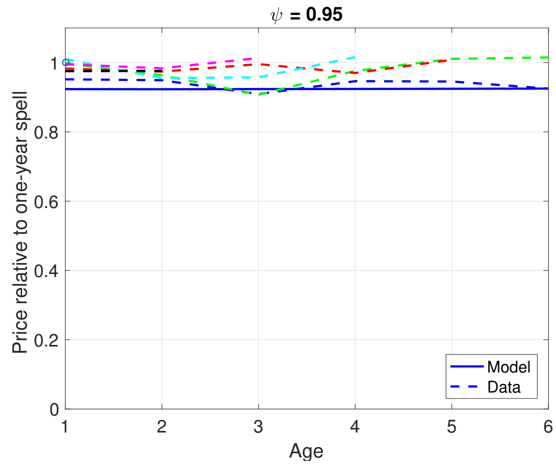


Figure 61: Price moments: $\psi = 0.95$

Notes: Figures show evolution of quantities and prices with age, for spells of different duration. Data is from Figures 1 and 2 in the paper, while Model refers to the corresponding fitted values from the estimated model with $\psi = 0.95$. Quantities are expressed relative to the quantity in a 1-year spell while prices are expressed relative to the price in a 1-year spell. Source: CSO and authors' calculations.

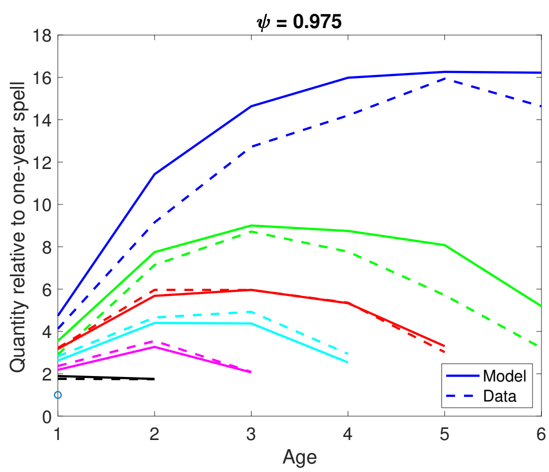


Figure 62: Quantity moments: $\psi = 0.975$

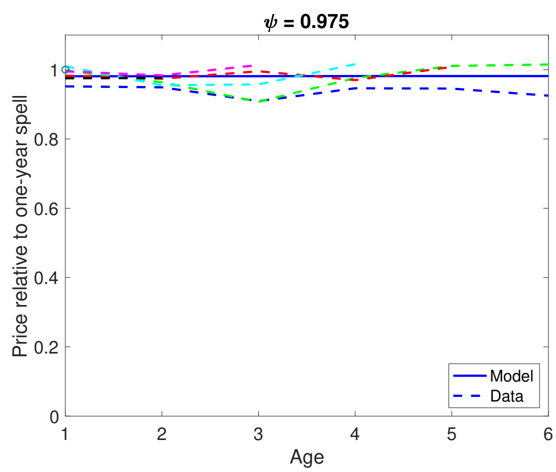
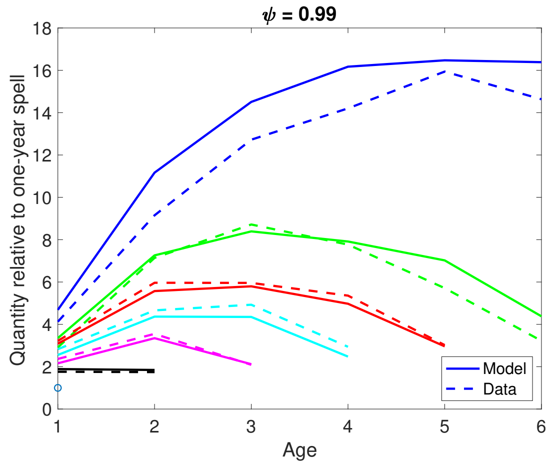


Figure 63: Price moments: $\psi = 0.975$

Notes: Figures show evolution of quantities and prices with age, for spells of different duration. Data is from Figures 1 and 2 in the paper, while Model refers to the corresponding fitted values from the estimated model with $\psi = 0.975$. Quantities are expressed relative to the quantity in a 1-year spell while prices are expressed relative to the price in a 1-year spell. Source: CSO and authors' calculations.



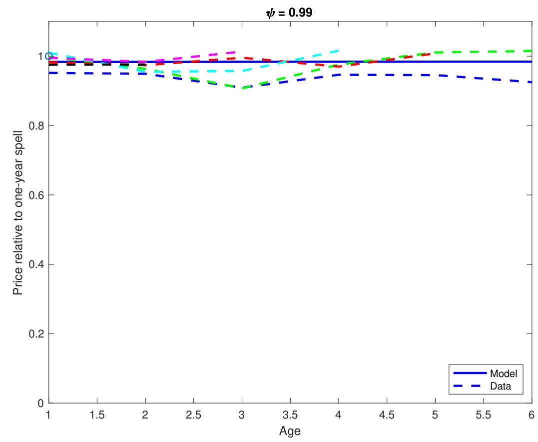


Figure 64: Quantity moments: $\psi = 0.99$

Figure 65: Price moments: $\psi = 0.99$

Notes: Figures show evolution of quantities and prices with age, for spells of different duration. Data is from Figures 1 and 2 in the paper, while Model refers to the corresponding fitted values from the estimated model with $\psi = 0.99$. Quantities are expressed relative to the quantity in a 1-year spell while prices are expressed relative to the price in a 1-year spell. Source: CSO and authors' calculations.

I.3 How other parameter values vary with ψ

We also examine how the estimated values of other parameters vary with ψ.[5] For several parameters, estimates are systematically different when ψ is such that firms optimally choose $A > 0$ compared to the case where $A = 0$. This is especially true for α. The model with $A > 0$ clearly implies a higher value for α than the model where $A = 0$. We illustrate this in Figure 66.

The intuition for this is as follows. Remember that the price elasticity of demand θ and α are related through the assumption that the long run trade elasticity, $\theta/(1-\alpha)$, is equal to 3. Because of this relationship, the higher is θ, the lower is α. Now when firms accumulate customer base through lagged sales only, there is a tight relationship between θ and the effectiveness of markup discounts in accumulating customer base. The higher is θ, the bigger the increase in current demand for a given change in the markup, and therefore the bigger the increase in future customer base. High θ therefore improves the ability of the model to match quantity dynamics while restricting price dynamics. The model therefore wants a high θ (and therefore implies a low α) when firms do not use marketing and advertising. However there is a countervailing force: when α is low, the marginal benefit of accumulating customer base is modest, so firms prefer not to invest much, thus restricting the ability of the model to match quantity dynamics. This at least partially explains why the fit of the

[5] We do not do this for ϕ, since it is not identified when ψ is such that $A = 0$.

model to quantities and prices is poor when ψ is such that firms rely on lagged sales for customer base accumulation.

In contrast, when firms choose to use marketing and advertising to accumualate customer base, the tight link between θ and quantity dynamics is broken. Quantity dynamics therefore depend primarily on α. With a higher value of α, the return to investment in customer base increases, and the ability of the model to match quantity dynamics is improved.

The implications of varying ψ for other parameters are illustrated in Figures 67 through 75.

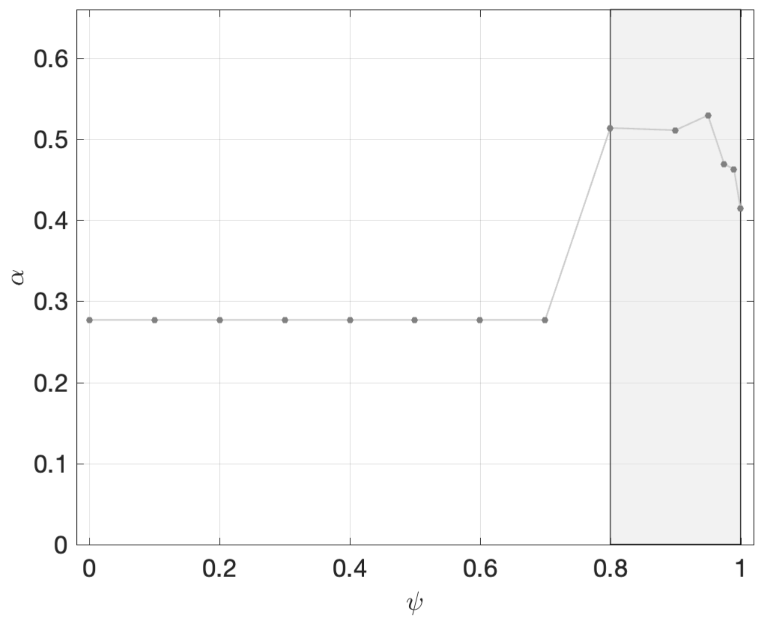


Figure 66: Alpha for different values of psi

Notes: Figure shows how estimate of α varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

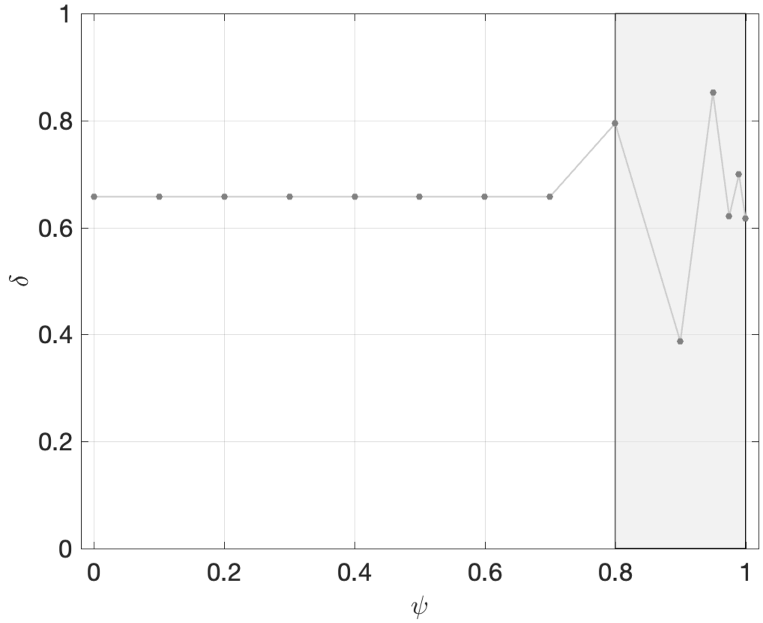


Figure 67: Delta for different values of psi

Notes: Figure shows how estimate of δ varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

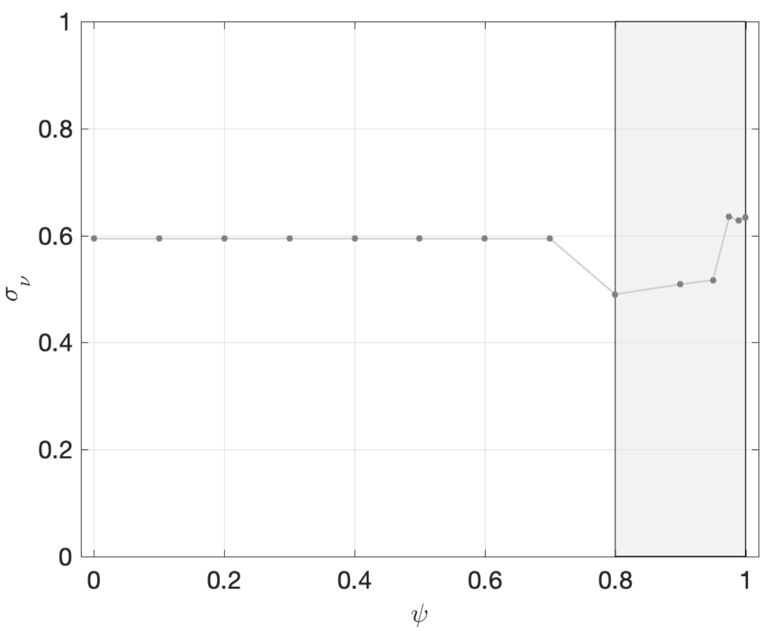


Figure 68: Signu for different values of psi

Notes: Figure shows how estimate of σ_ν varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

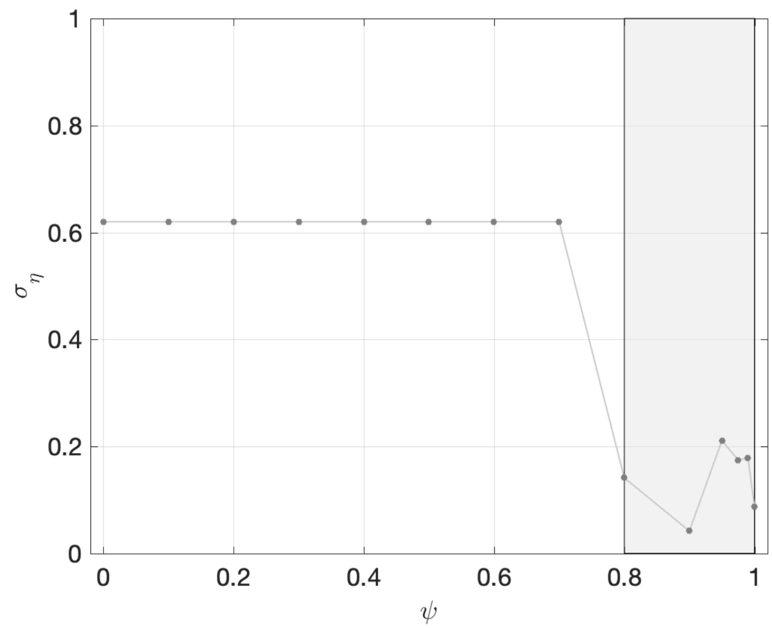


Figure 69: Sigeta for different values of psi

Notes: Figure shows how estimate of σ_η varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

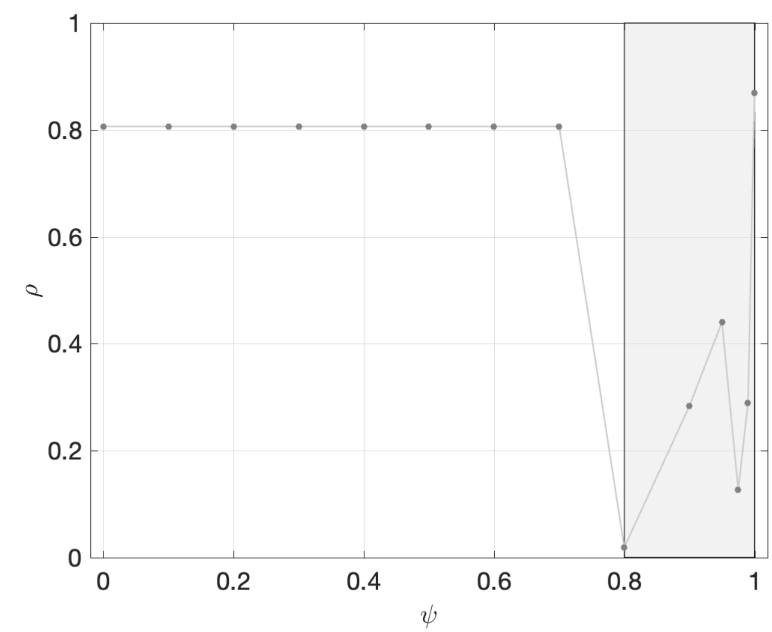


Figure 70: Rho for different values of psi

Notes: Figure shows how estimate of ρ varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

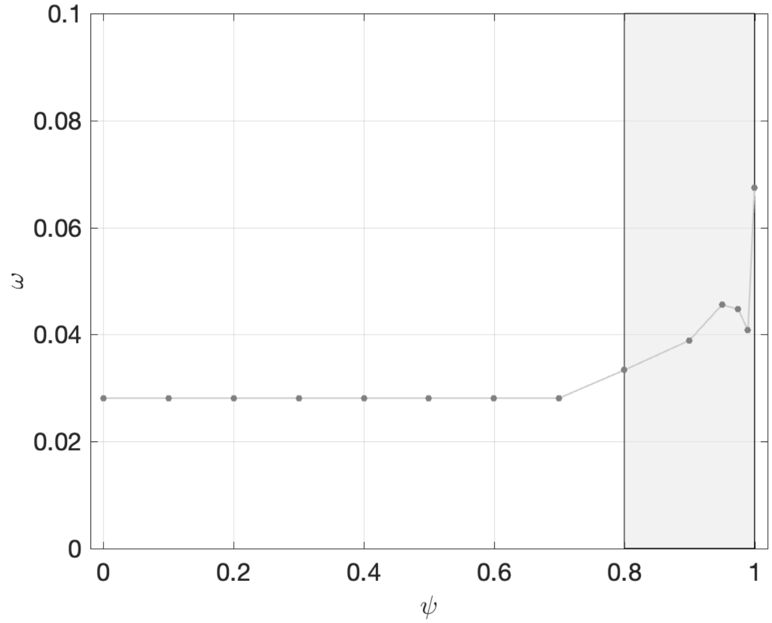


Figure 71: Omega for different values of psi
Notes: Figure shows how estimate of ω varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

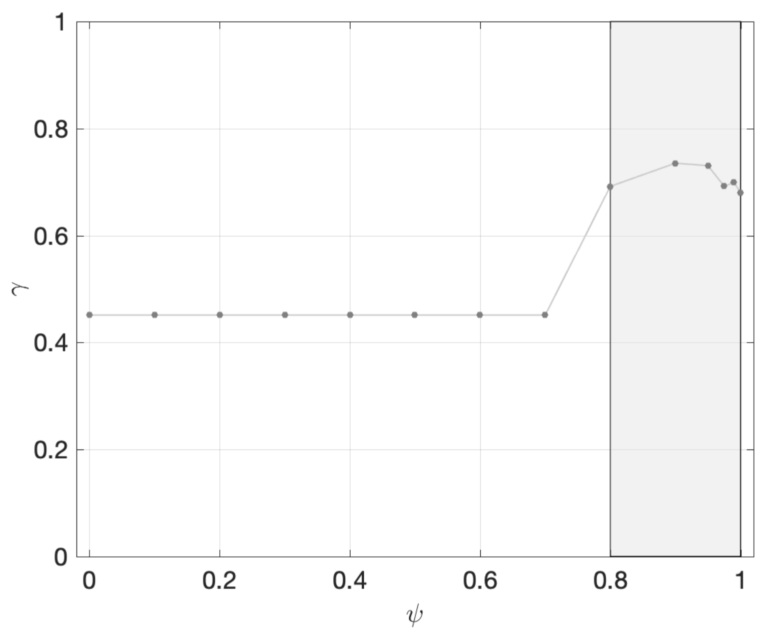


Figure 72: Gamma for different values of psi
Notes: Figure shows how estimate of γ varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

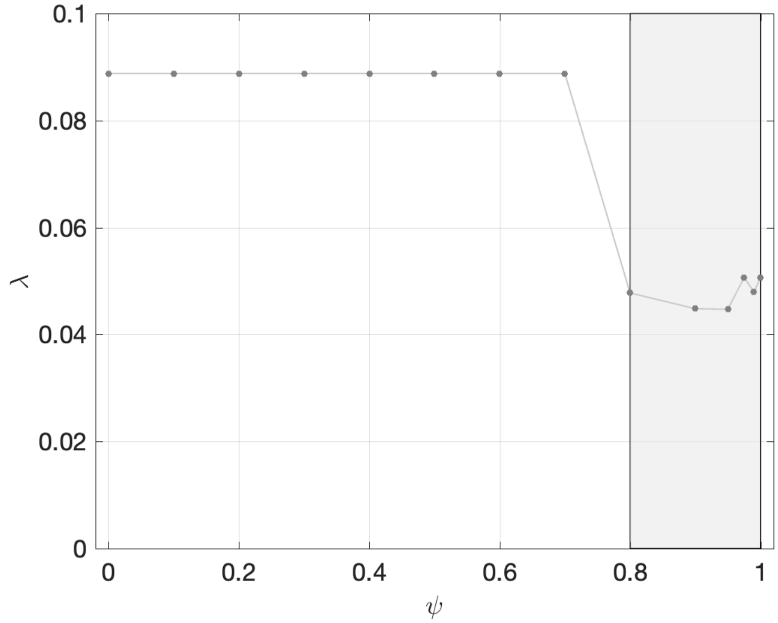


Figure 73: Lambda for different values of psi

Notes: Figure shows how estimate of λ varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

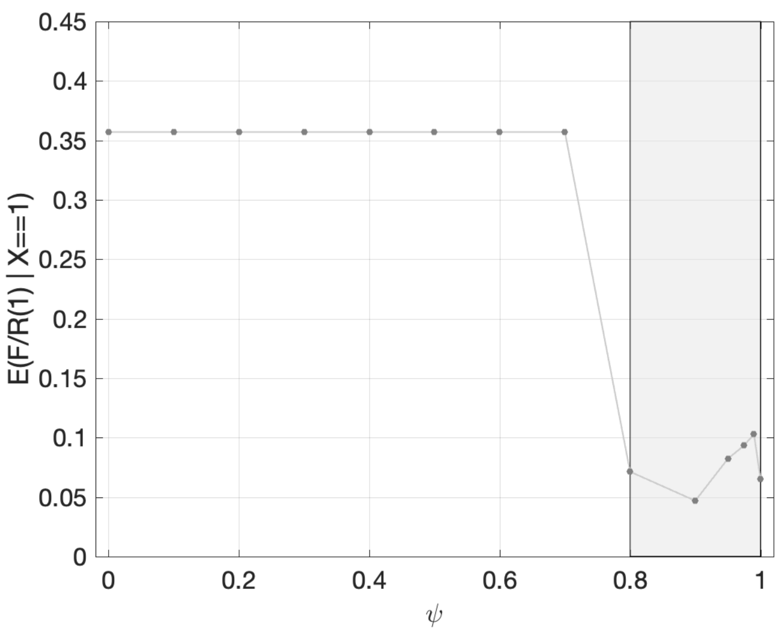


Figure 74: F for different values of psi

Notes: Figure shows how F varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

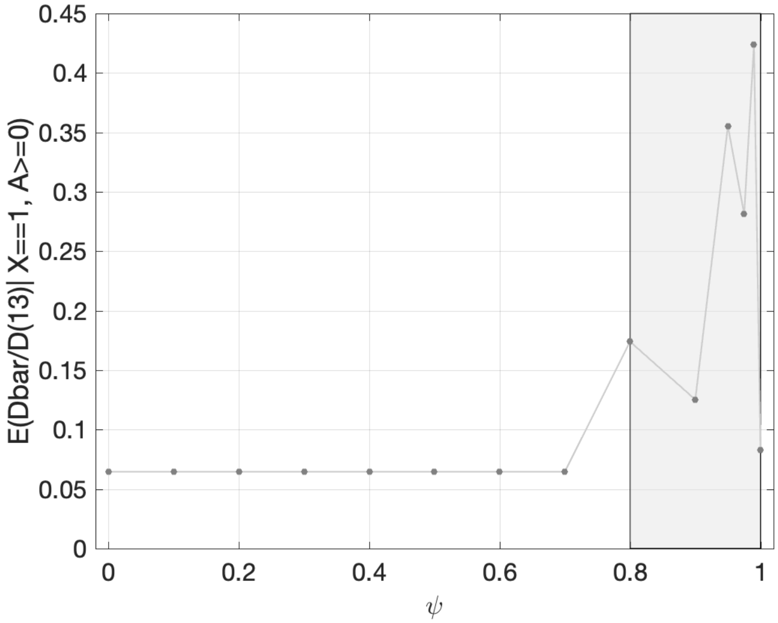


Figure 75: $\underline{D}$ for different values of psi

Notes: Figure shows how $\underline{D}$ varies with ψ, the parameter governing the relative effectiveness of marketing and advertising and current sales in adding to future customer base. This is based on estimates of the model holding ψ fixed at the values indicated by the circles. In the shaded region, firms optimally choose $A > 0$. Source: Authors' calculations.

J Identification of parameters other than ψ

To get a sense of how precisely identified the remaining parameters are, and what moments identify which parameters, we perform a similar set of exercises for other parameters. For each of the parameters $\{\alpha, \delta, \phi, \sigma_\nu, \sigma_\eta, \rho, \gamma\}$, we decide on a vector of possible values that spans the range of reasonable values for that parameter. For each parameter and for each value in the corresponding vector, we hold that parameter fixed at the given level, and re-estimate the remaining parameters This gives rise to a large number of estimates of the model, which allows us to trace out the relationship between parameter values and fit, both for $\{\alpha, \delta, \phi, \sigma_\nu, \sigma_\eta, \rho, \gamma\}$, and for the remaining parameters, $\{\omega, \lambda, F, \underline{D}\}$.

We started this exercise estimating ψ along with the other remaining parameters. We always found ψ close to 1 ($\psi > 0.96$ for all cases). Since estimating the model is very time-consuming for the reasons described in Appendix I, we eventually switched to fixing $\psi = 1$ to leverage improvements in speed when .

This exercise is therefore a complement to the parametric bootstrap, which we describe in Appendix H. Our findings on identification are very similar across the two exercises.

Note that the key parameters which govern the incumbent responses to trade liberalizations that we focus on in our application (Section 7 of the paper and Appendix M) are $\{\alpha, \delta, \phi\}$. The remaining parameters are specific to the fact that we match moments for large exporters in large export markets, and to the distributional assumptions and discrete representions of those distributions that we assume for idiosyncratic demand, fixed and sunk costs.

J.1 Alpha

We first examine the fit of the model for values of $\alpha \in [0.1, 0.6]$ noting that our assumption about the value of the trade elasticity requires $\alpha < 2/3$. The results of this exercise are illustrated in Figure 76, which also shows our best fit value of α. Note that $\psi > 0.99$ in all cases where ψ is estimated.

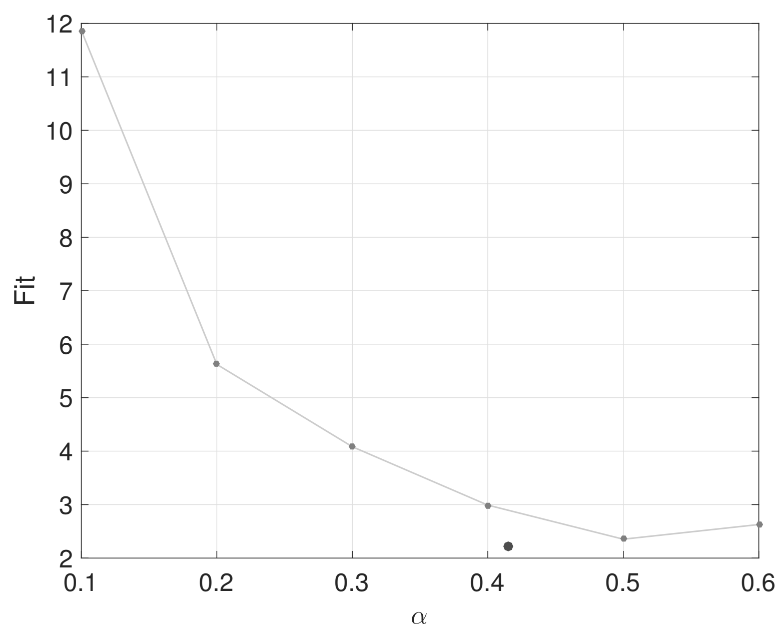


Figure 76: Fit for fixed values of α

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\alpha)' \Omega m(\alpha)$) varies with α. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding α fixed at the values indicated by the circles. The bigger dot indicates the value of α and fit for our best estimate of the model with unconstrained α. Source: Authors' calculations.

But as noted above, we can also make use of the estimates where we hold fixed other parameters at different values. In Figure 77 we show (a) the scatter plot of $\{\alpha, \text{Fit}\}$, (b) the lower part of the convex hull of $\{\alpha, \text{Fit}\}$, and (c) our best fit value of α (red dot). Note that this value lies on the convex hull.

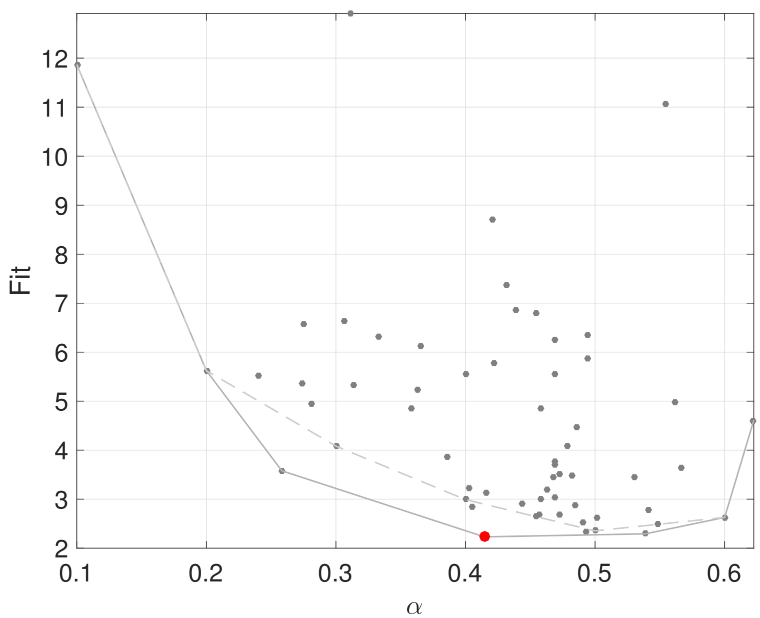


Figure 77: Fit for all values of α

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and α for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of α. Large red dot indicates our best estimate of the model with unconstrained α. Source: Authors' calculations.

In addition, in Figures 78 and 79 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of α, so we do not show it.

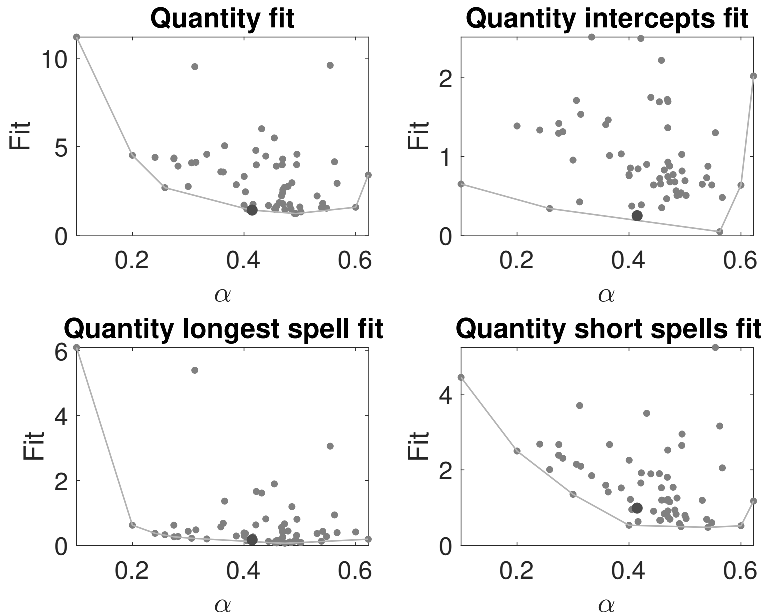


Figure 78: Quantity fit for all values of α

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and α for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained α. Source: Authors' calculations.

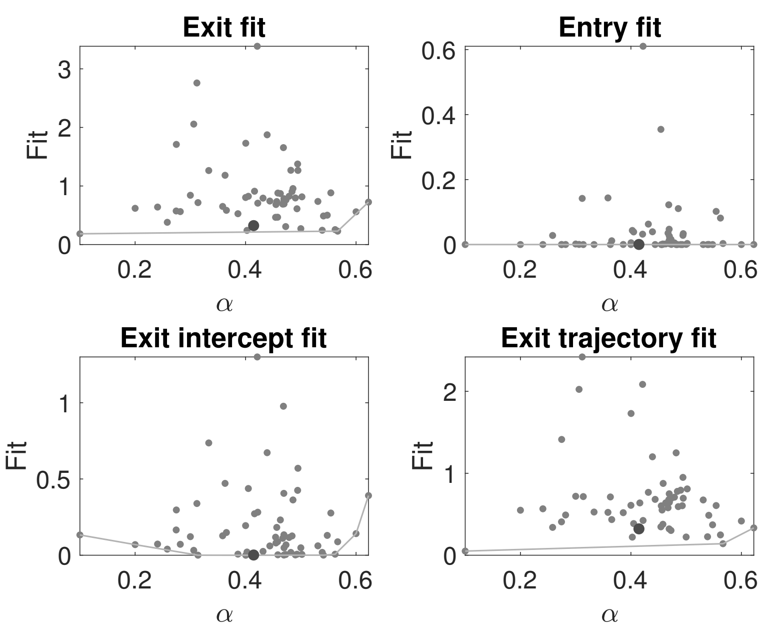


Figure 79: Exit and entry fit for all values of α

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and α for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained α. Source: Authors' calculations.

To summarize the results for α, the behavior of quantities appears to pin α down in the range $[0.4, 0.55]$.

J.2 Delta

We examine the fit of the model for values of $\delta \in [0.1, 1]$. This is illustrated in Figure 80, which also shows our best fit value of δ. Note that $\psi > 0.99$ in all cases.

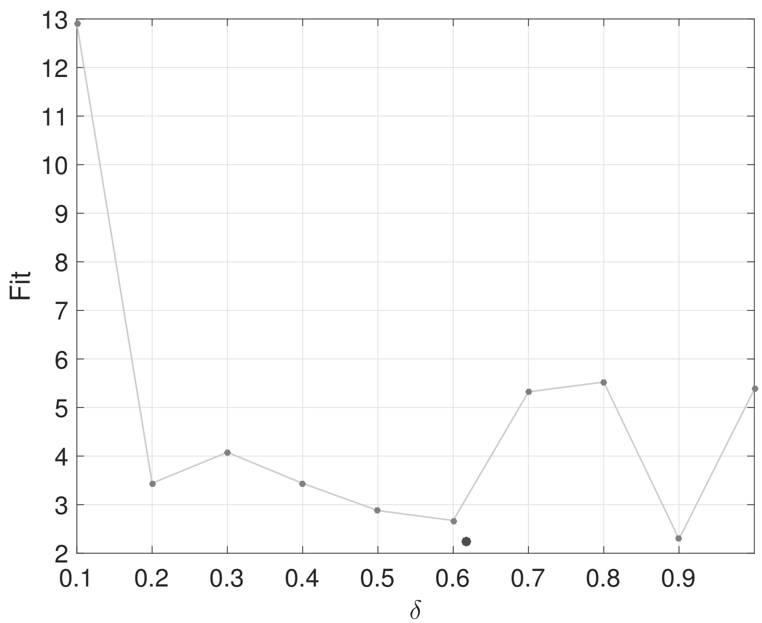


Figure 80: Fit for fixed values of δ

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\delta)' \Omega m(\delta)$) varies with δ. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding δ fixed at the values indicated by the circles. The bigger dot indicates the value of δ and fit for our best estimate of the model with unconstrained δ. Source: Authors' calculations.

We also make use of the estimates where we hold fixed other parameters at different values. In Figure 81 we show the scatter plot of $\{\delta, \text{Fit}\}$, the (lower part of) the convex hull of $\{\delta, \text{Fit}\}$, along with our best fit value of δ (red dot). Note that this value lies on the convex hull.

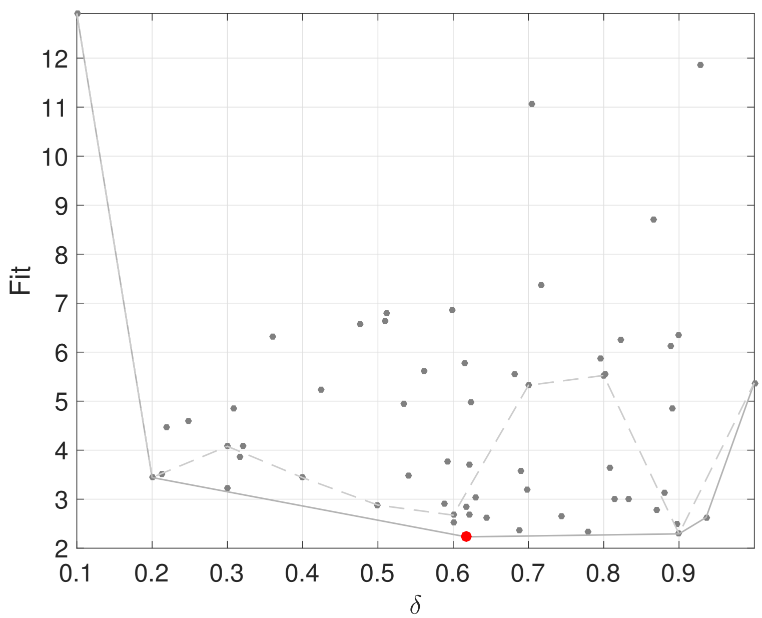


Figure 81: Fit for all values of δ

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and δ for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of δ. Large red dot indicates our best estimate of the model with unconstrained δ. Source: Authors' calculations.

In addition, in Figures 82 and 83 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of α.

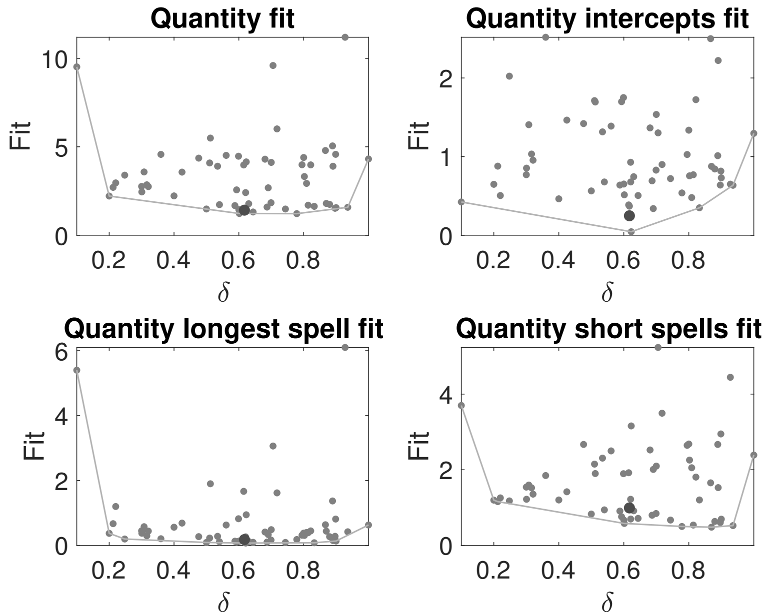


Figure 82: Quantity fit for all values of δ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and δ for all constrained estimates of the model, and different dimensions of quantity fit. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained δ. Source: Authors' calculations.

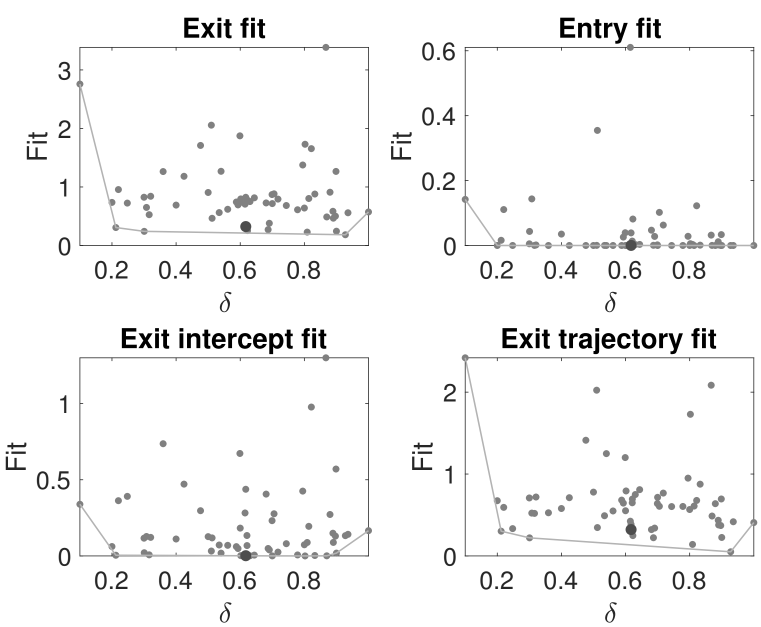


Figure 83: Exit and entry fit for all values of δ

Notes: Figures show scatter plot of fit and δ for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained δ. Source: Authors' calculations.

The behavior of quantities appears to pin δ down in the range $[0.6, 0.9]$.

J.3 Phi

We examine the fit of the model for values of $\phi \in [0, 60]$. This is illustrated in Figure 84, which also shows our best fit value of ϕ. Note that $\psi > 0.99$ in all cases (this is a little more tricky for this parameter, which is undefined if firms always choose $A = 0$).

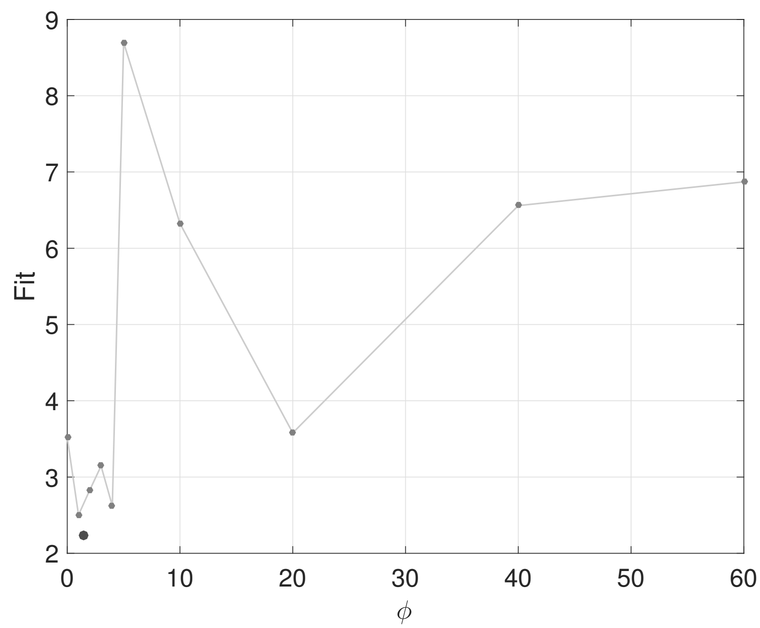


Figure 84: Fit for fixed values of ϕ

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\phi)' \Omega m(\phi)$) varies with ϕ. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding ϕ fixed at the values indicated by the circles. The bigger dot indicates the value of ϕ and fit for our best estimate of the model with unconstrained ϕ. Source: Authors' calculations.

We also make use of the estimates where we hold fixed other parameters at different values. In Figure 85 we show the scatter plot of $\{\phi, \text{Fit}\}$, the (lower part of) the convex hull of $\{\phi, \text{Fit}\}$, along with our best fit value of ϕ (red dot). Note that this value lies on the convex hull.

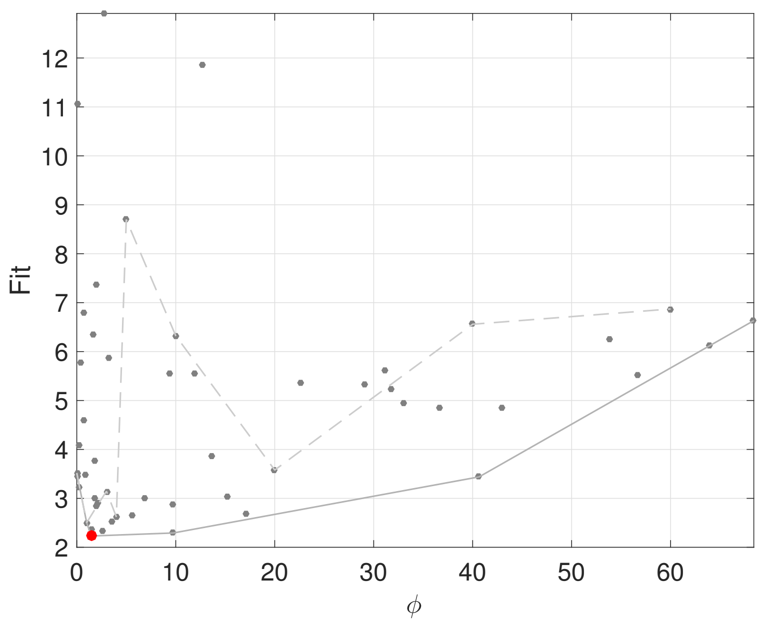


Figure 85: Fit for all values of ϕ

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ϕ for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of ϕ. Large red dot indicates our best estimate of the model with unconstrained ϕ. Source: Authors' calculations.

In addition, in Figures 86 and 87 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of ϕ.

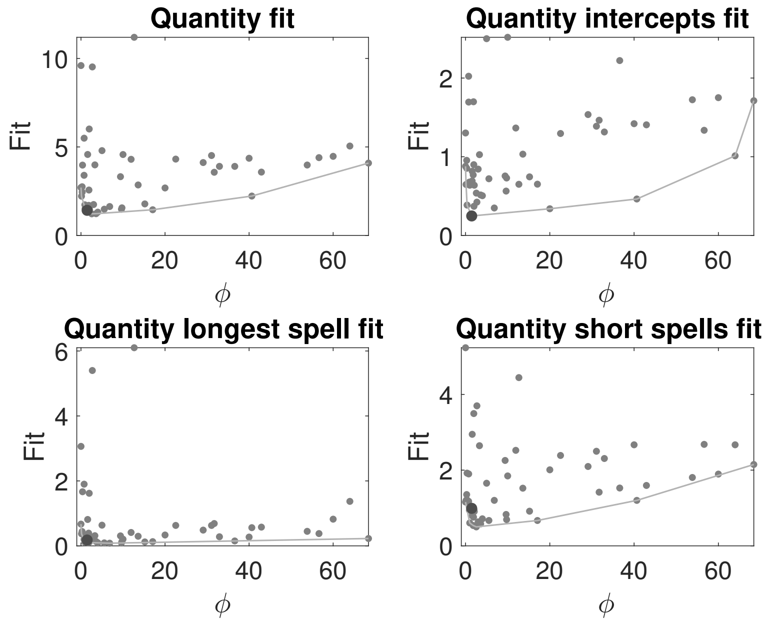


Figure 86: Quantity fit for all values of ϕ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ϕ for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained ϕ. Source: Authors' calculations.

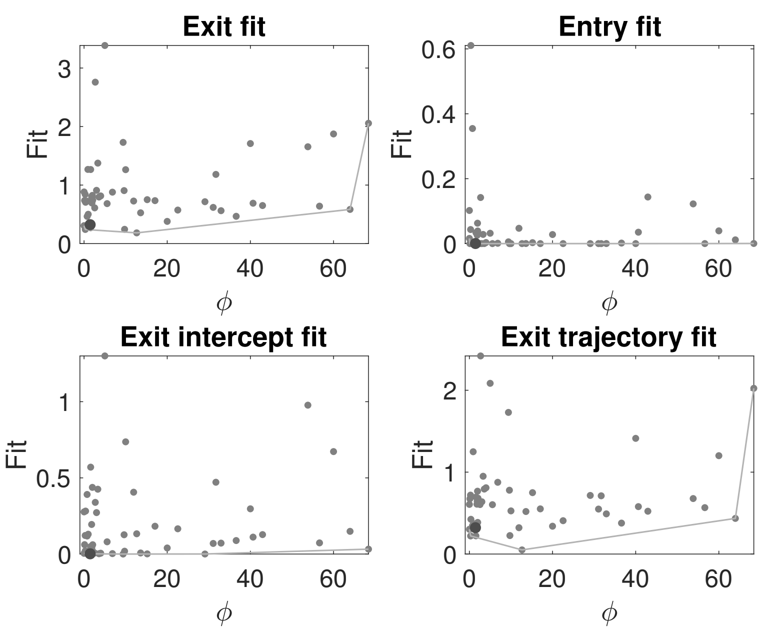


Figure 87: Exit and entry fit for all values of ϕ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ϕ for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained ϕ. Source: Authors' calculations.

The behavior of quantities appears to pin ϕ down to be close to 0, but above 0.

J.4 Signu

We examine the fit of the model for values of $\sigma_\nu \in [0, 0.8]$. This is illustrated in Figure 88, which also shows our best fit value of σ_ν. Note that $\psi > 0.96$ in all cases.

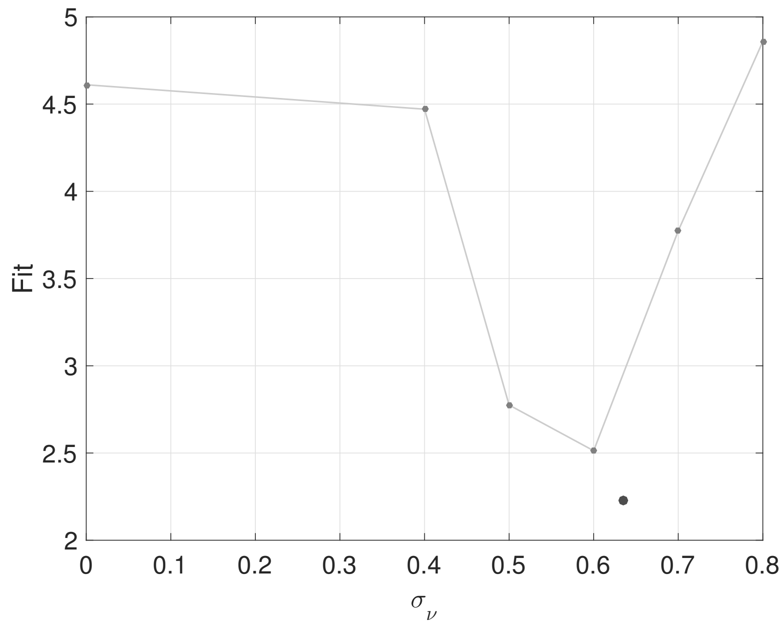


Figure 88: Fit for fixed values of σ_ν

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\sigma_\nu)' \Omega m(\sigma_\nu))$ varies with σ_ν. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding σ_ν fixed at the values indicated by the circles. The bigger dot indicates the value of σ_ν and fit for our best estimate of the model with unconstrained σ_ν. Source: Authors' calculations.

We also make use of the estimates where we hold fixed other parameters at different values. In Figure 89 we show the scatter plot of $\{\sigma_\nu, \text{Fit}\}$, the (lower part of) the convex hull of $\{\sigma_\nu, \text{Fit}\}$, along with our best fit value of σ_ν (red dot). Note that this value lies on the convex hull.

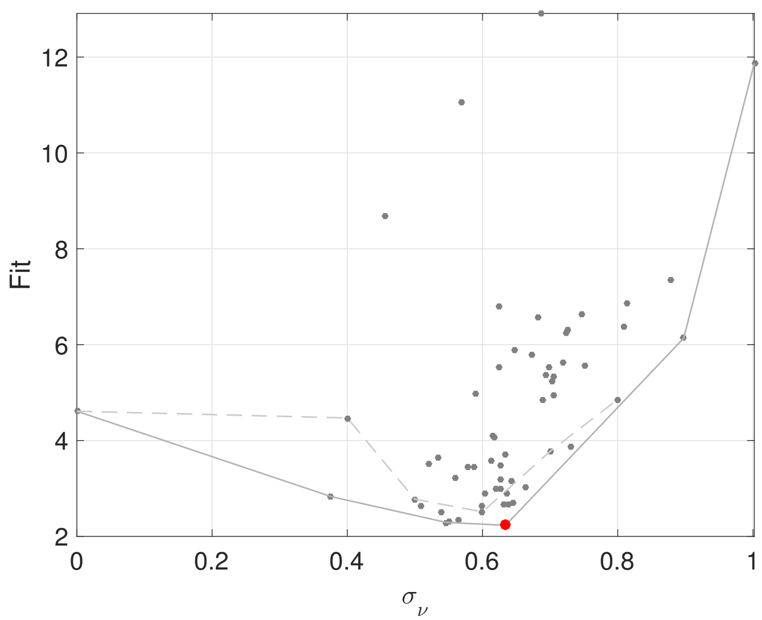


Figure 89: Fit for all values of σ_ν

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and σ_ν for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of σ_ν. Large red dot indicates our best estimate of the model with unconstrained σ_ν. Source: Authors' calculations.

In addition, in Figures 90 and 91 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of σ_ν.

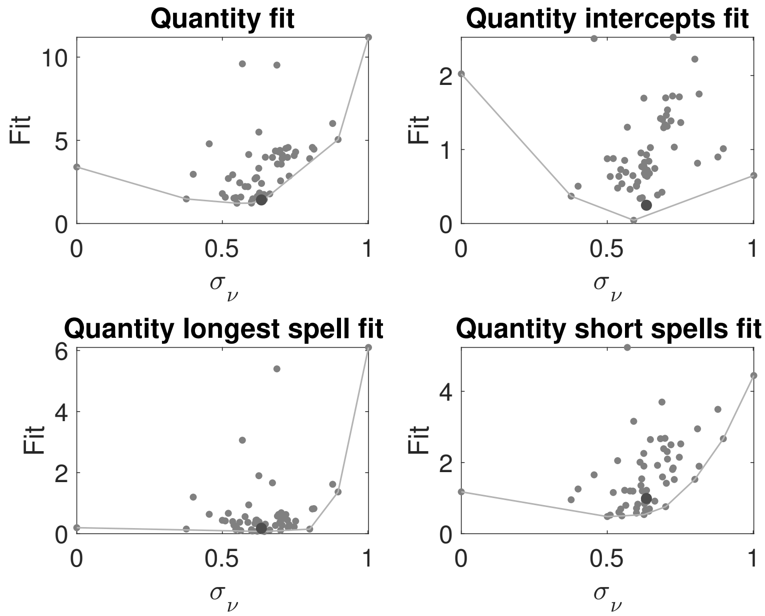


Figure 90: Quantity fit for all values of σ_ν

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and σ_ν for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained σ_ν. Source: Authors' calculations.

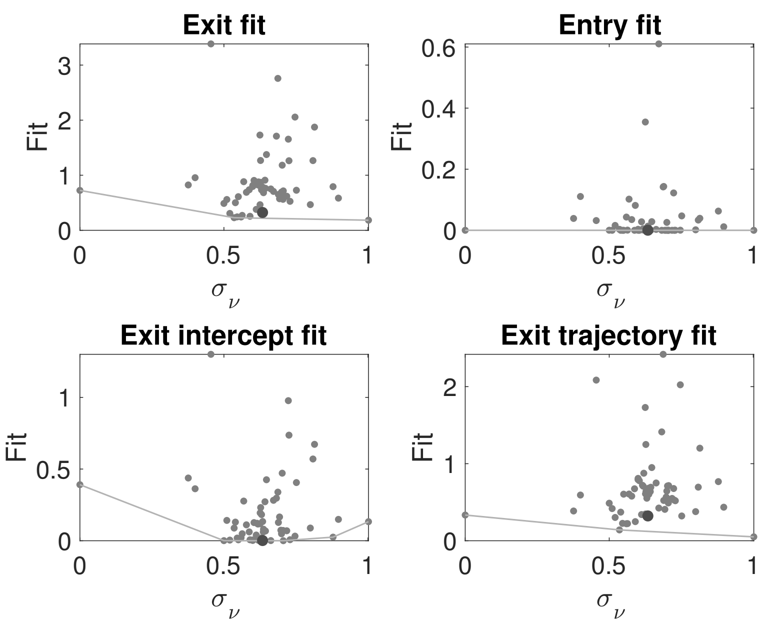


Figure 91: Exit and entry fit for all values of σ_ν

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and σ_ν for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained σ_ν. Source: Authors' calculations.

σ_ν appears to be pinned down in the range $[0.55, 0.65]$ by the behavior of quantities.

J.5 Sigeta

We examine the fit of the model for values of $\sigma_\eta \in [0, 0.8]$. This is illustrated in Figure 92, which also shows our best fit value of σ_η. Note that $\psi > 0.99$ in all cases.

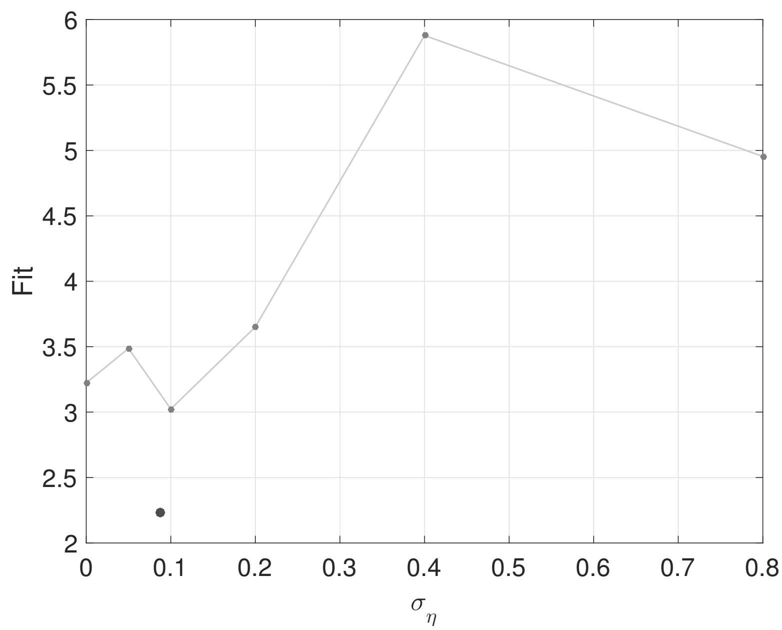


Figure 92: Fit for fixed values of σ_η

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\sigma_\eta)' \Omega m(\sigma_\eta)$) varies with σ_η. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding σ_η fixed at the values indicated by the circles. The bigger dot indicates the value of σ_η and fit for our best estimate of the model with unconstrained σ_η. Source: Authors' calculations.

We also make use of the estimates where we hold fixed other parameters at different values. In Figure 93 we show the scatter plot of $\{\sigma_\eta, \text{Fit}\}$, the (lower part of) the convex hull of $\{\sigma_\eta, \text{Fit}\}$, along with our best fit value of σ_η (red dot). Note that this value lies on the convex hull.

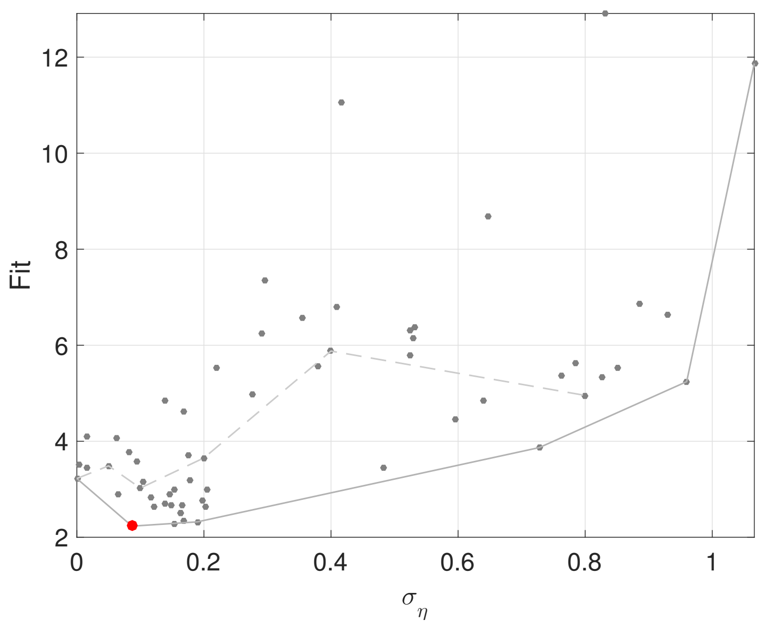


Figure 93: Fit for all values of σ_η

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and σ_η for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of σ_η. Large red dot indicates our best estimate of the model with unconstrained σ_η. Source: Authors' calculations.

In addition, in Figures 94 and 95, we show fit in terms of quantity moments, exit moments, and entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of σ_η.

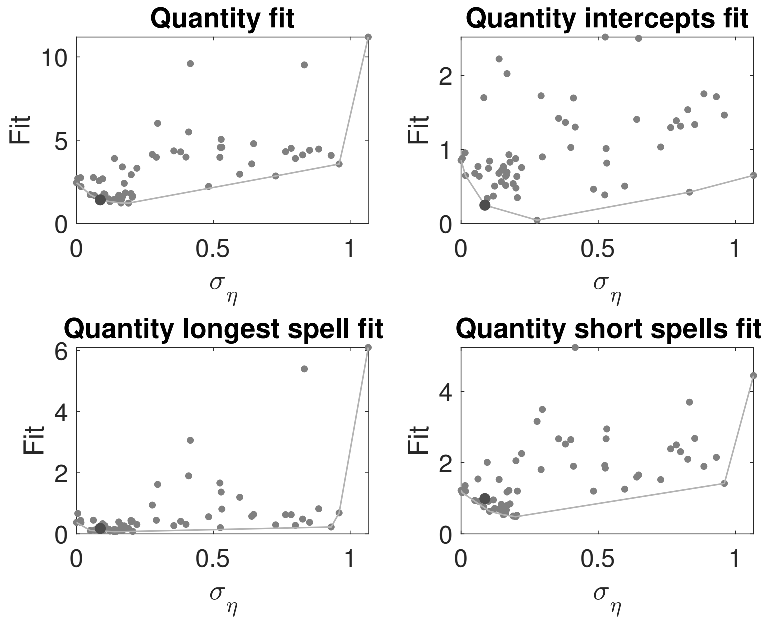


Figure 94: Quantity fit for all values of σ_η

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and σ_η for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained σ_η. Source: Authors' calculations.

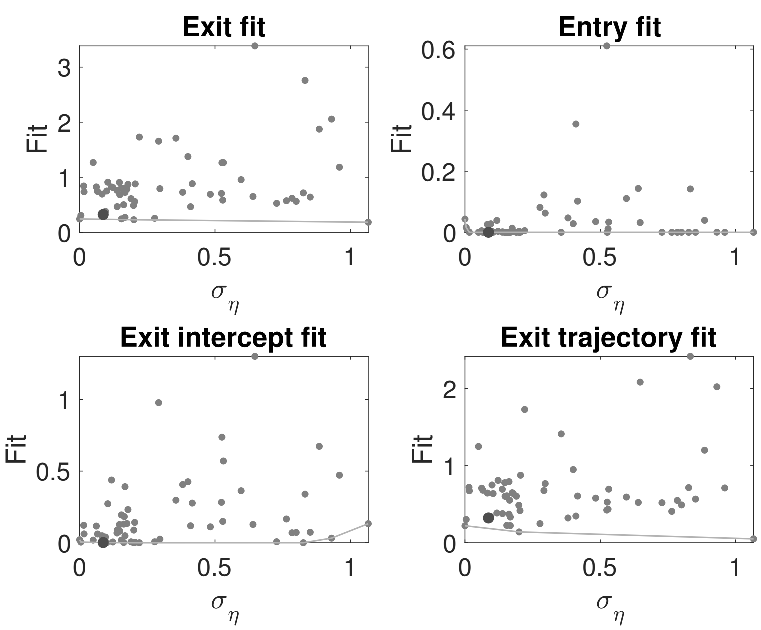


Figure 95: Exit and entry fit for all values of σ_η

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and σ_η for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained σ_η. Source: Authors' calculations.

σ_η appears to be pinned down in the range $[0.1, 0.2]$, again by the behavior of quantities.

J.6 Rho

We examine the fit of the model for values of $\rho \in [0, 0.9]$. This is illustrated in Figure 96, which also shows our best fit value of ρ. Note that $\psi > 0.96$ in all cases.

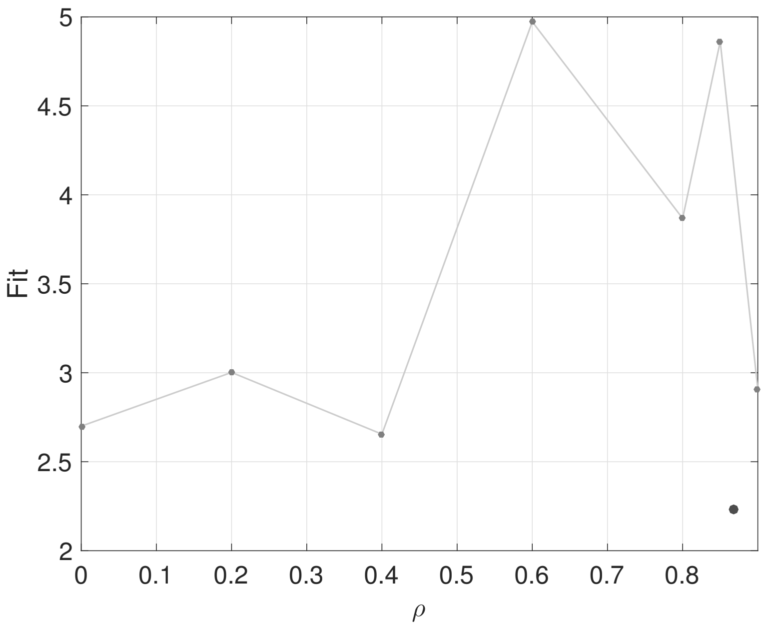


Figure 96: Fit for fixed values of ρ

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\rho)' \Omega m(\rho)$) varies with ρ. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding ρ fixed at the values indicated by the circles. The bigger dot indicates the value of ρ and fit for our best estimate of the model with unconstrained ρ. Source: Authors' calculations.

We also make use of the estimates where we hold fixed other parameters at different values. In Figure 97 we show the scatter plot of $\{\rho, \text{Fit}\}$, the (lower part of) the convex hull of $\{\rho, \text{Fit}\}$, along with our best fit value of ρ (red dot). Note that this value lies on the convex hull.

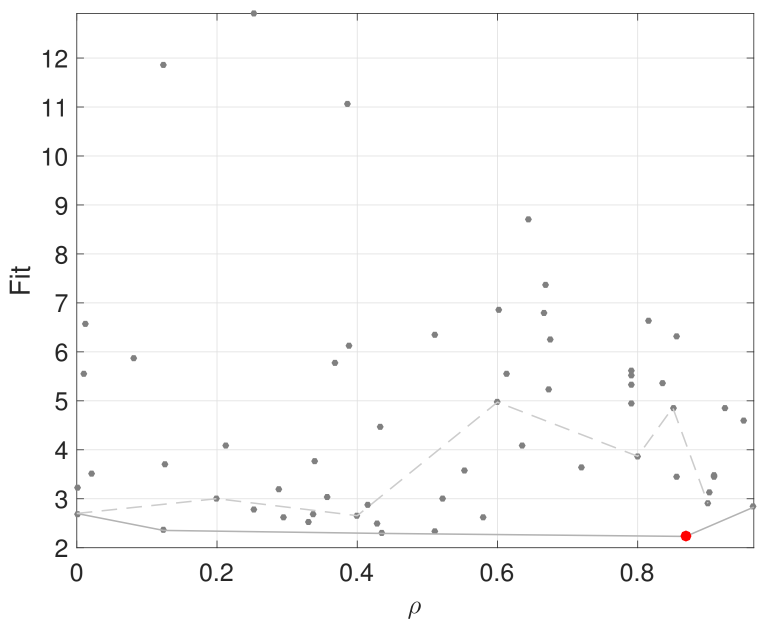


Figure 97: Fit for all values of ρ

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ρ for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of ρ. Large red dot indicates our best estimate of the model with unconstrained ρ. Source: Authors' calculations.

In addition, in Figures 98 and 99, we show fit in terms of quantity moments, exit moments, and entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of ρ.

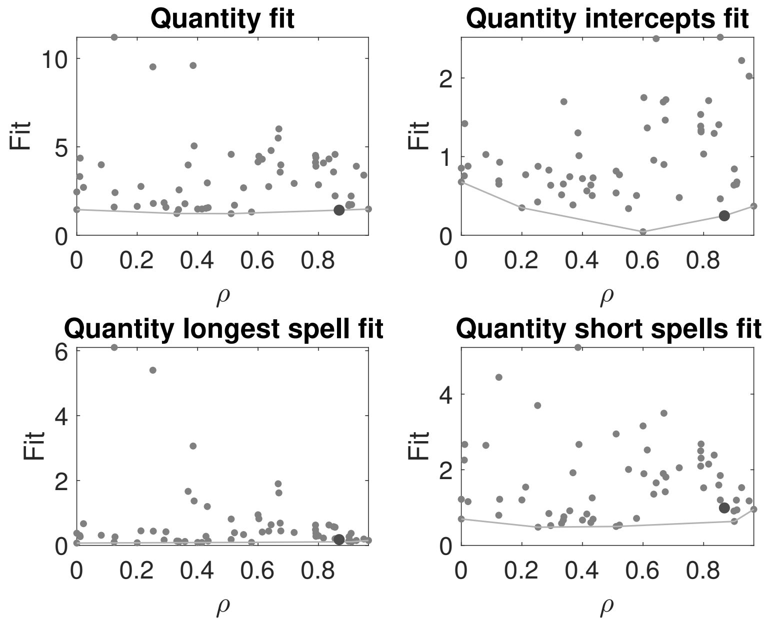


Figure 98: Quantity fit for all values of ρ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ρ for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained ρ. Source: Authors' calculations.

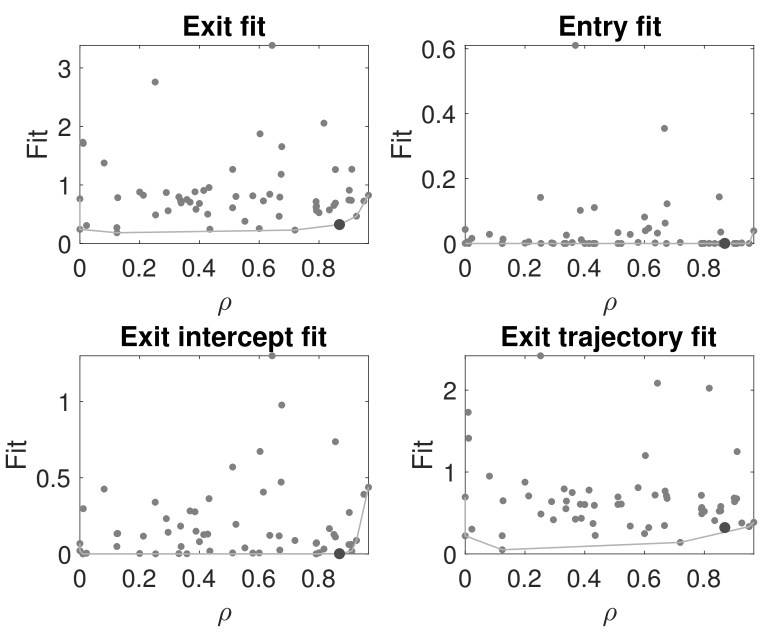


Figure 99: Exit and entry fit for all values of ρ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ρ for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained ρ. Source: Authors' calculations.

The value of ρ is not tightly pinned down. It appears to be greater than 0, and less than 1, but fit appears insensitive within a very wide range of values.

J.7 Gamma

We examine the fit of the model for values of $\gamma \in [0.1, 0.9]$. This is illustrated in Figure 100, which also shows our best fit value of γ. Note that $\psi > 0.99$ in all cases.

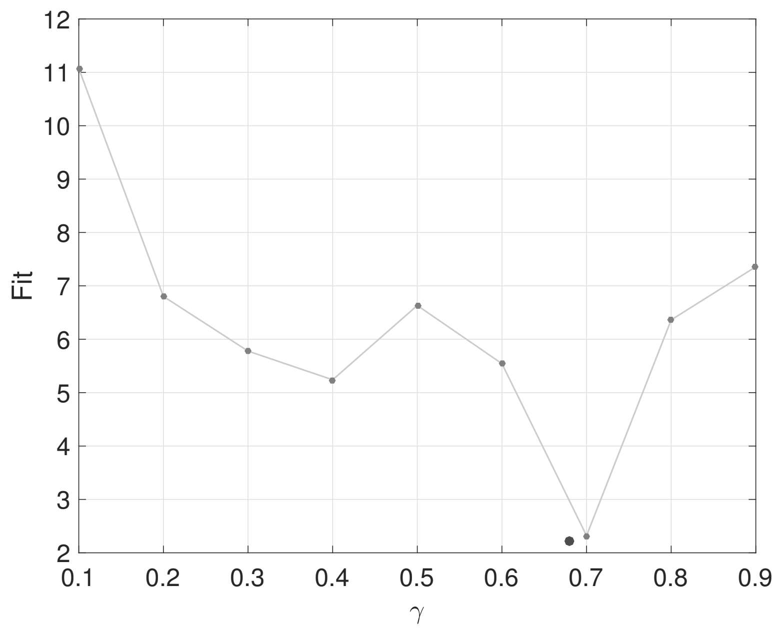


Figure 100: Fit for fixed values of γ

Notes: Figure shows how model fit (i.e. the optimized value of the criterion function $m(\gamma)' \Omega m(\gamma)$) varies with γ. Lower values of fit indicate smaller differences between data and model moments. This is based on estimates of the model holding γ fixed at the values indicated by the circles. The bigger dot indicates the value of γ and fit for our best estimate of the model with unconstrained γ. Source: Authors' calculations.

We also make use of the estimates where we hold fixed other parameters at different values. In Figure 101 we show the scatter plot of $\{\gamma, \text{Fit}\}$, the (lower part of) the convex hull of $\{\gamma, \text{Fit}\}$, along with our best fit value of γ (red dot). Note that this value lies on the convex hull.

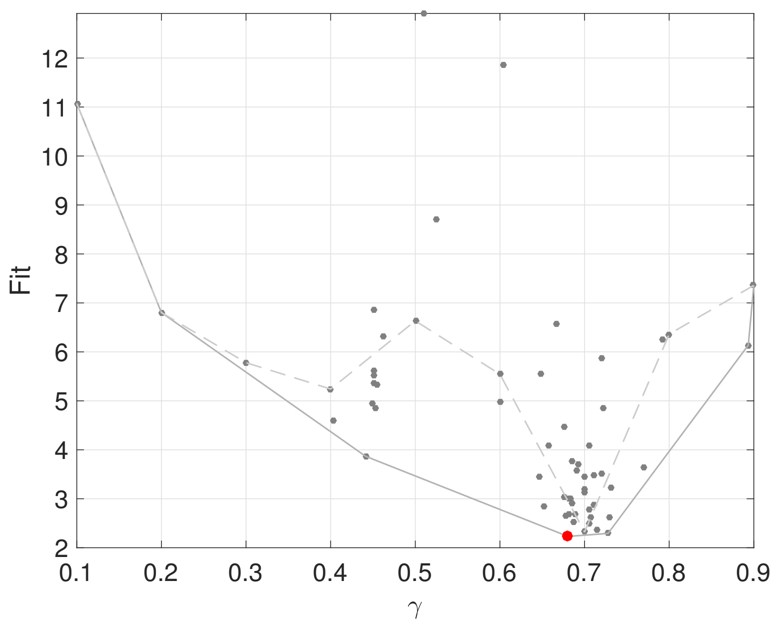


Figure 101: Fit for all values of γ

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and γ for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Dotted line indicates estimates for fixed values of γ. Large red dot indicates our best estimate of the model with unconstrained γ. Source: Authors' calculations.

In addition, in Figures 102 and 103 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of γ.

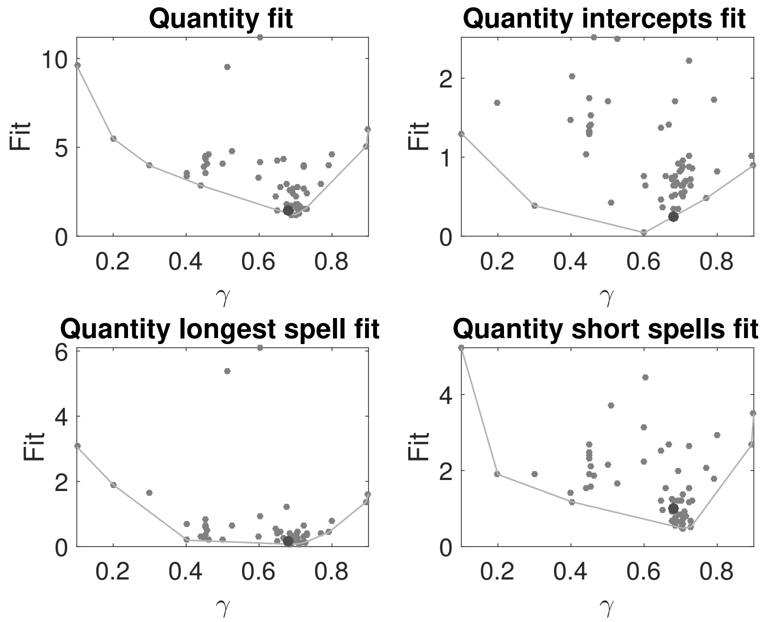


Figure 102: Quantity fit for all values of γ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and γ for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained γ. Source: Authors' calculations.

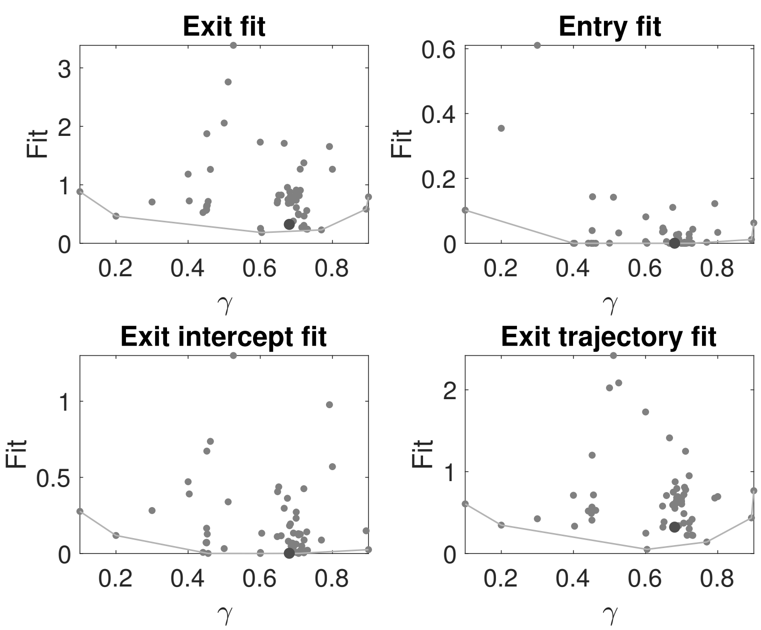


Figure 103: Exit and entry fit for all values of γ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and γ for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained γ. Source: Authors' calculations.

The value of γ appears quite tightly pinned down in a range around 0.7 by the behavior of quantities.

J.8 Omega

We have not done the exercise of holding fixed values of ω and re-estimating the remaining parameters. However we can still perform the exercise of making use of all of the other estimates. In Figure 104 we show the scatter plot of $\{\omega, \text{Fit}\}$, the (lower part of) the convex hull of $\{\omega, \text{Fit}\}$, along with our best fit value of ω (red dot). Note that this value lies on the convex hull.

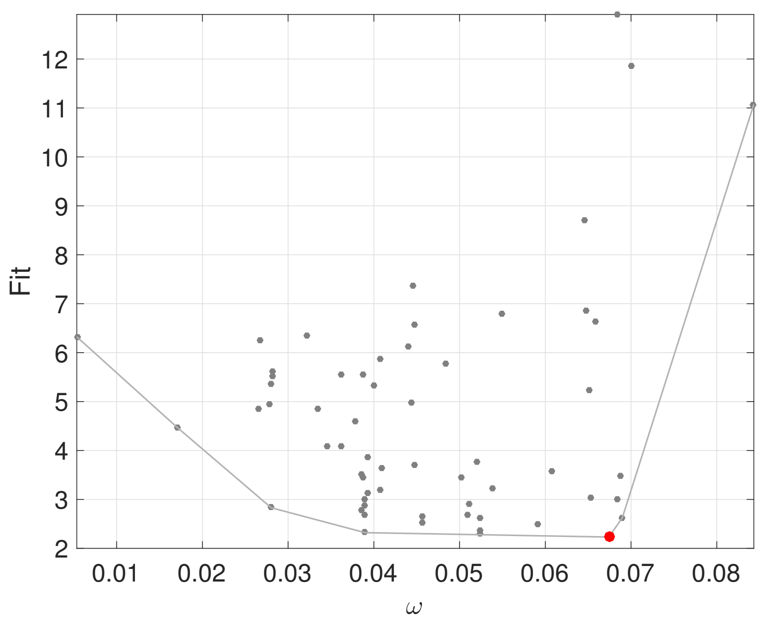


Figure 104: Fit for all values of ω

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ω for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Large red dot indicates our best estimate of the model with unconstrained ω. Source: Authors' calculations.

In addition, in Figures 105 and 106 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of ω.

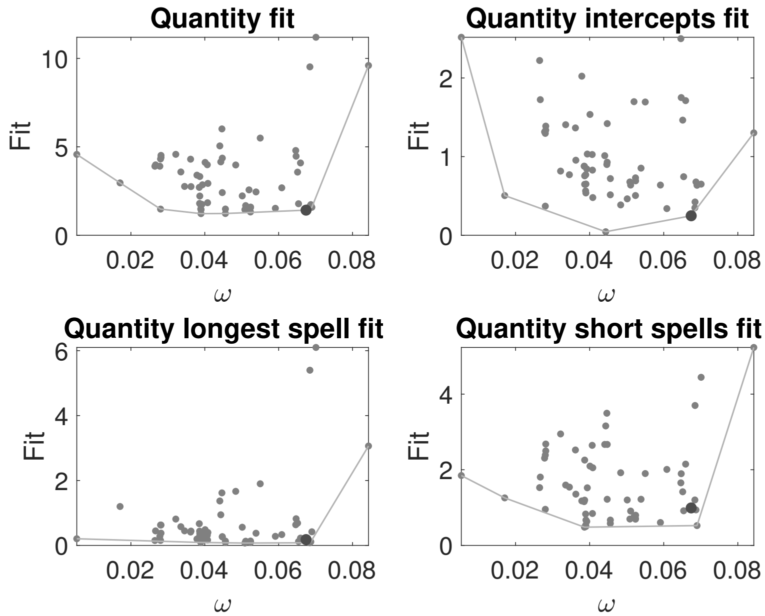


Figure 105: Quantity fit for all values of ω
Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ω for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained ω. Source: Authors' calculations.

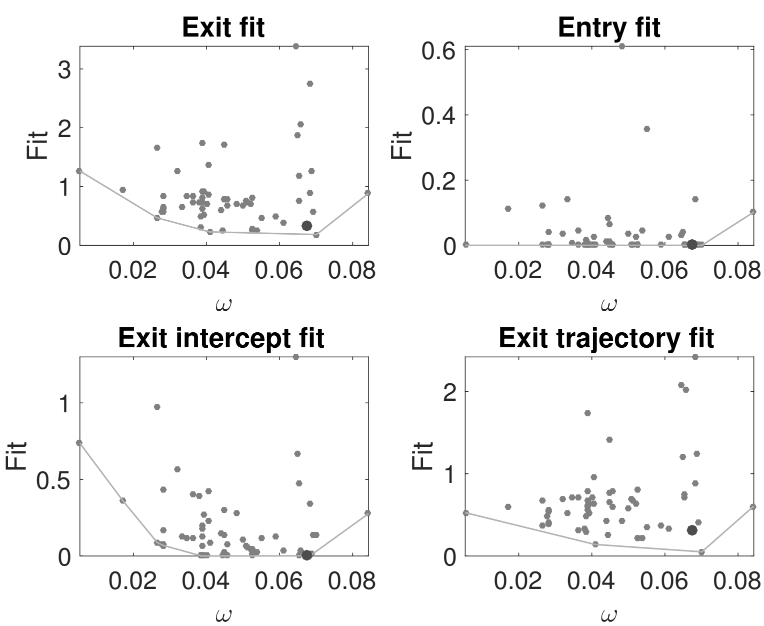


Figure 106: Exit and entry fit for all values of ω
Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and ω for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained ω. Source: Authors' calculations.

The value of ω appears to be pinned down within the range $[0.04, 0.07]$ by the behavior of quantities and exit.

J.9 Lambda

We have not done the exercise of holding fixed values of λ and re-estimating the remaining parameters. However we can still perform the exercise of making use of all of the other estimates. In Figure 107 we show the scatter plot of $\{\lambda, \text{Fit}\}$, the (lower part of) the convex hull of $\{\lambda, \text{Fit}\}$, along with our best fit value of λ (red dot). Note that this value lies on the convex hull.

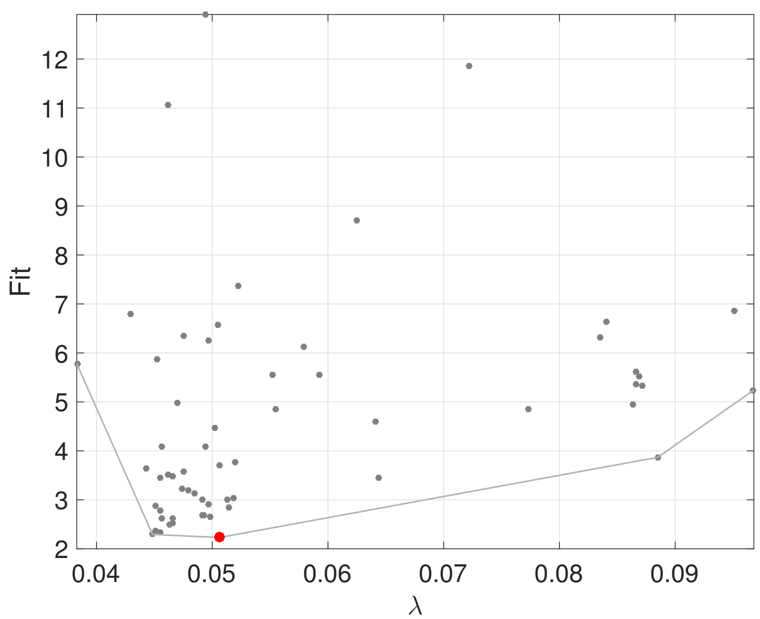


Figure 107: Fit for all values of λ

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and λ for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Large red dot indicates our best estimate of the model with unconstrained ω. Source: Authors' calculations.

In addition, in Figures 108 and 109 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of λ.

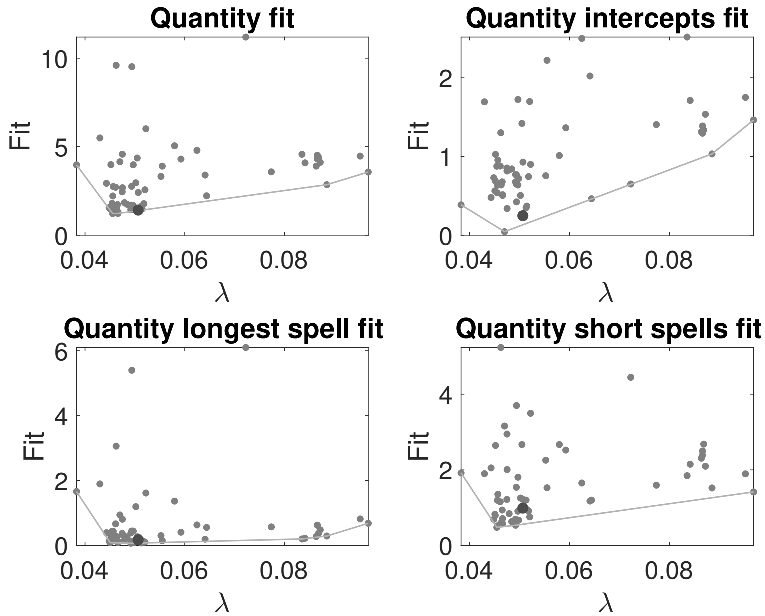


Figure 108: Quantity fit for all values of λ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and λ for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained λ. Source: Authors' calculations.

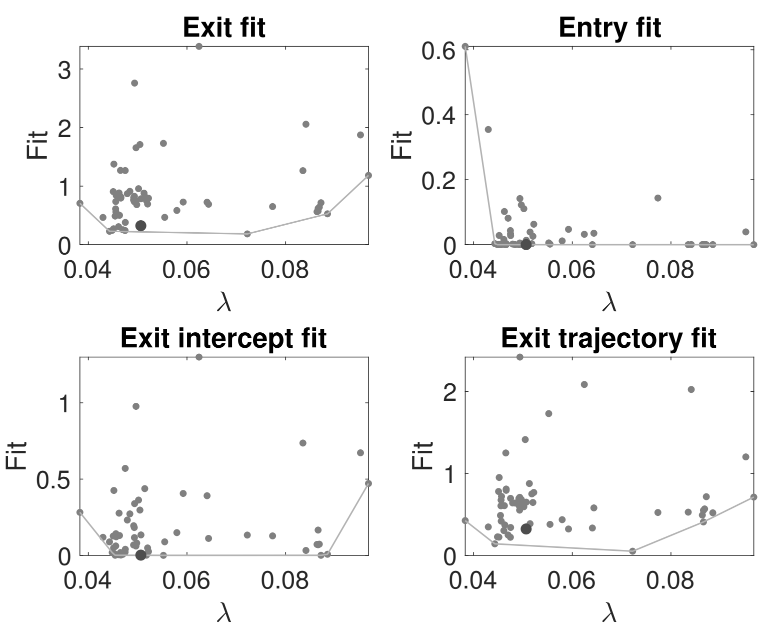


Figure 109: Exit and entry fit for all values of λ

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and λ for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained λ. Source: Authors' calculations.

The value of λ appears to be pinned down in the range $[0.045, 0.05]$ by the behavior of quantities.

J.10 Fixed cost F

Other than setting $F = 0$, we have not done the exercise of holding fixed values of F and re-estimating the remaining parameters. However we can still perform the exercise of making use of all of the other estimates to see what they imply about fixed costs of participation. In Figure 110 we show the scatter plot of $\{F, \text{Fit}\}$, the (lower part of) the convex hull of $\{F, \text{Fit}\}$, along with our best fit value of F (red dot). Note that this value lies on the convex hull.

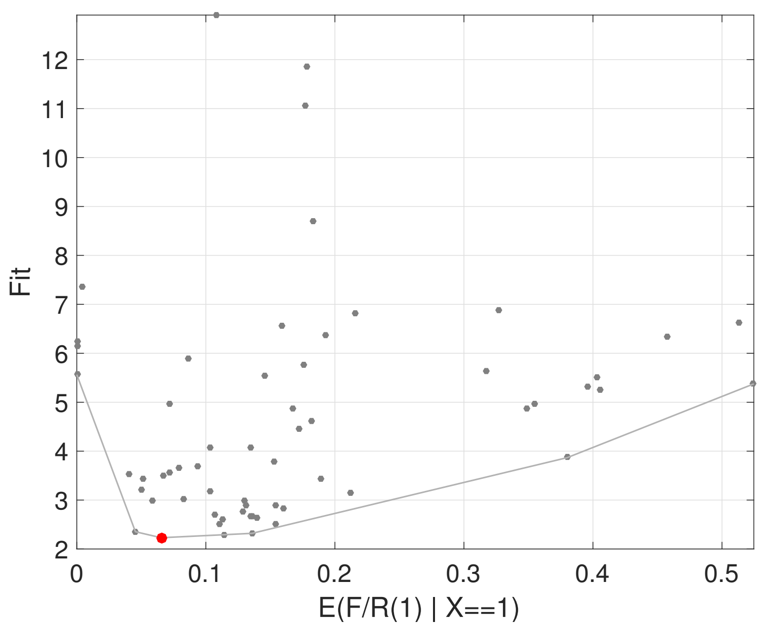


Figure 110: Fit for all values of F

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and F for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Large red dot indicates our best estimate of the model with unconstrained F. Source: Authors' calculations.

In addition, in Figures 111 and 112 we show fit in terms of quantity moments, exit moments, and the entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of F.

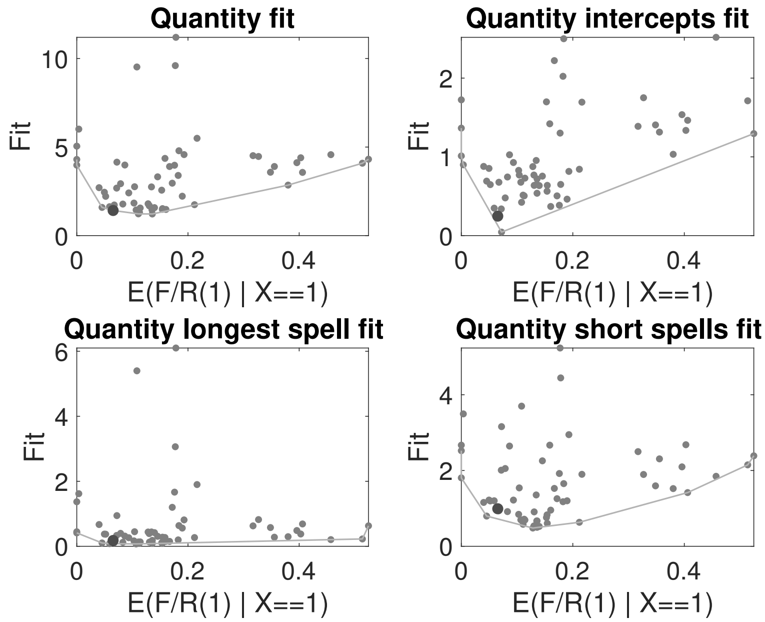


Figure 111: Quantity fit for all values of F

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and F for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained F. Source: Authors' calculations.

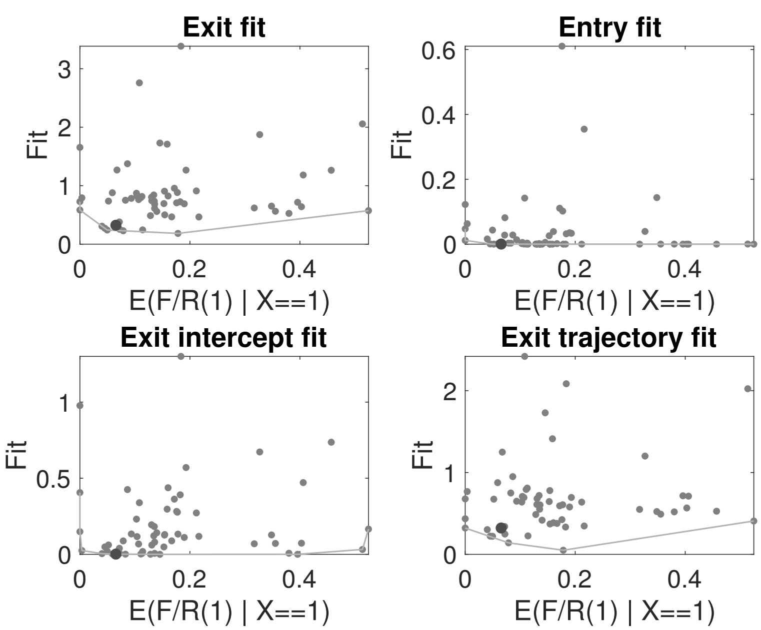


Figure 112: Exit and entry fit for all values of F

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and F for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained F. Source: Authors' calculations.

The value of F as a share of revenue in year 1 appears to be pinned down in the range $[0.05, 0.1]$ by the behavior of quantities.

J.11 Customer base on entry $\underline{D}$

We have not done the exercise of holding fixed values of $\underline{D}$ and re-estimating the remaining parameters. However we can still perform the exercise of making use of all of the other estimates to see what they imply about customer base on entry. The value of this parameter is quite sensitive to ψ. We perform this exercise for the cases where $\psi = 1$. In Figure 113 we show the scatter plot of $\{\underline{D}, \text{Fit}\}$, the (lower part of) the convex hull of $\{\underline{D}, \text{Fit}\}$, along with our best fit value of $\underline{D}$ (red dot). Note that this value lies on the convex hull.

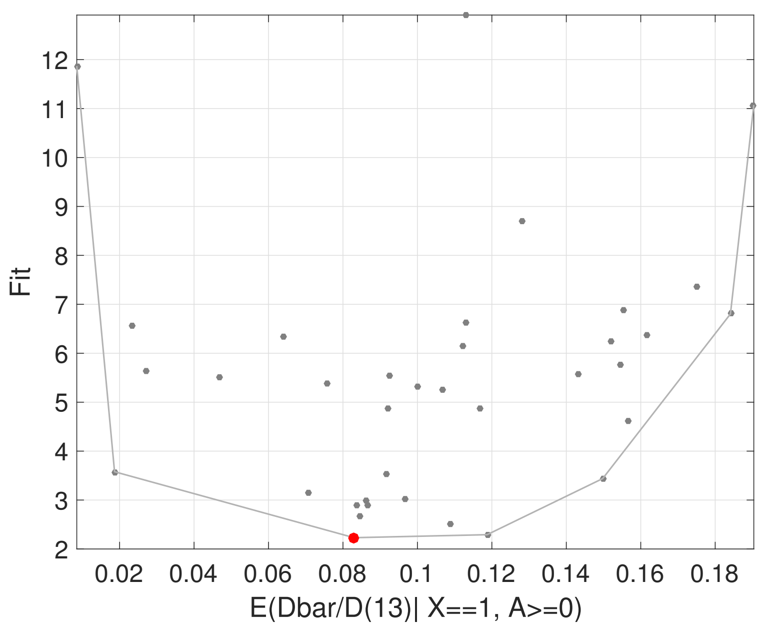


Figure 113: Fit for all values of $\underline{D}$

Notes: Figure shows scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and $\underline{D}$ for all constrained estimates of the model. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of this scatter plot. Large red dot indicates our best estimate of the model with unconstrained $\underline{D}$. Source: Authors' calculations.

In addition, in Figures 114 and 115 we show fit in terms of quantity moments, exit moments, and entry moment. As long as $\psi = 1$, the fit for price moments is the same for all values of $\underline{D}$.

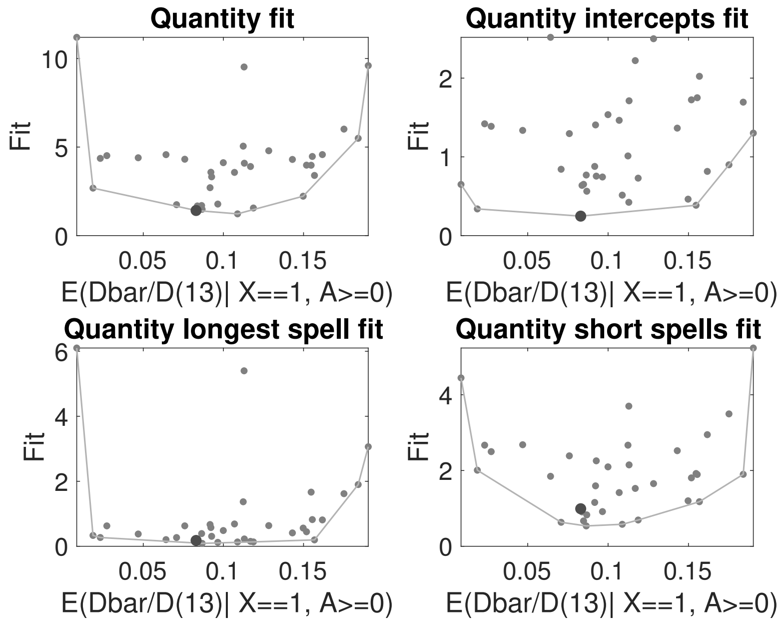


Figure 114: Quantity fit for all values of $\underline{D}$

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and $\underline{D}$ for all constrained estimates of the model, and different dimensions of quantity fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained $\underline{D}$. Source: Authors' calculations.

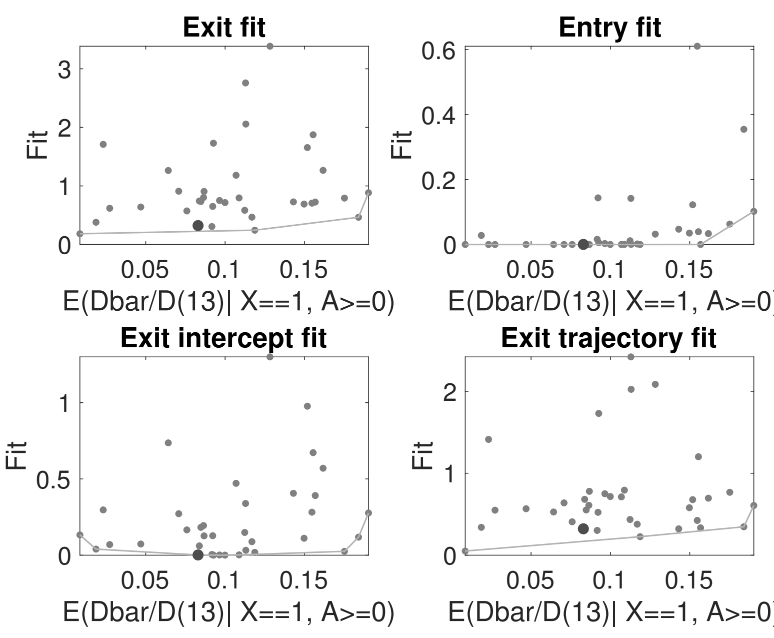


Figure 115: Exit and entry fit for all values of $\underline{D}$

Notes: Figures show scatter plot of model fit (i.e. the optimized value of the criterion function $m'\Omega m$) and $\underline{D}$ for all constrained estimates of the model, and different dimensions of entry and exit fit. Lower values of fit indicate smaller differences between data and model moments. Solid line indicates lower part of convex hull of the relevant scatter plot. Large dot indicates our best estimate of the model with unconstrained $\underline{D}$. Source: Authors' calculations.

As long as $\psi = 1$, capital on entry as a share of capital at the end of the longest spell is pinned down in the range $[0.08, 0.12]$.

K Additional tables: Structural estimation

Table 62: Structural model: parameter estimates for trade elasticity of 3, $\psi = 0$

	α	δ	σ_ν	σ_η	ρ	λ	$F^\dagger$	ω	γ	$\underline{D}^\S$
Param	0.28	0.66	0.58	0.62	0.81	0.09	0.36	0.03	0.45	0.06

Notes: †The value reported for F is the average ratio of F_t^{ik} to revenue across all participants in their first period (6 months) of participation. This includes participants for whom $F_t^{ik} = 0$. §The value reported for $\underline{D}$ is the average of $\underline{D}/D_{13}$ across all participants who survive 13 (6-month) periods in the market, and have nonnegative investment in period 13, where D_{13} is customer base in period 13. ϕ is not defined when $\psi = 0$.

Table 63: Data and model moments: Quantities and prices

	Quantity					Price				
	Data		Models			Data		Models		
	(1)		(2)	(3)	(4)	(5)		(6)	(7)	(8)
		s.e.	Base	CM	Learn		s.e.	Base	CM	Learn
Duration	Spell intercept									
2 years	0.57	(0.04)	0.61	0.69	0.26	-0.02	(0.02)	0	0.00	0.06
3 years	0.86	(0.06)	0.83	0.86	0.41	0.00	(0.03)	0	0.00	0.07
4 years	1.04	(0.07)	1.01	0.94	0.44	0.01	(0.04)	0	0.00	0.08
5 years	1.17	(0.10)	1.16	1.06	0.48	-0.02	(0.05)	0	0.00	0.08
6 years	1.07	(0.12)	1.21	1.06	0.50	0.00	(0.05)	0	0.00	0.09
7+ years	1.42	(0.07)	1.45	1.32	0.60	-0.05	(0.03)	0	-0.01	0.09
Tenure	2-year spell									
2 years	-0.01	(0.05)	-0.07	-0.12	-0.30	0.00	(0.03)	0	-0.01	0.01
Tenure	3-year spell									
2 years	0.41	(0.07)	0.43	0.51	0.43	-0.01	(0.04)	0	0.00	0.00
3 years	-0.12	(0.07)	-0.17	-0.07	0.10	0.02	(0.04)	0	-0.01	0.00
	4-year spell									
2 years	0.50	(0.10)	0.57	0.57	0.65	-0.06	(0.05)	0	0.00	0.00
3 years	0.56	(010)	0.51	0.58	0.74	-0.05	(0.05)	0	0.00	-0.01
4 years	0.04	(0.10)	-0.05	0.01	0.42	0.01	(0.05)	0	-0.01	-0.01
	5-year spell									
2 years	0.62	(0.13)	0.64	0.63	0.65	-0.01	(0.06)	0	0.00	0.00
3 years	0.62	(0.13)	0.67	0.74	0.74	0.01	(0.06)	0	0.00	-0.01
4 years	0.51	(0.13)	0.54	0.71	0.80	-0.01	(0.06)	0	0.00	-0.01
5 years	-0.06	(0.14)	0.03	0.16	0.47	0.03	(0.06)	0	0.00	-0.01
	6-year spell									
2 years	0.90	(0.16)	0.78	0.71	0.78	-0.03	(0.07)	0	0.00	-0.01
3 years	1.10	(0.16)	0.92	0.88	0.90	-0.09	(0.07)	0	0.00	-0.01
4 years	0.98	(0.16)	0.88	0.89	0.97	-0.02	(0.07)	0	0.00	-0.01
5 years	0.67	(0.16)	0.78	0.86	1.01	0.01	(0.07)	0	0.00	-0.01
6 years	0.10	(0.17)	0.29	0.33	0.67	0.02	(0.08)	0	0.00	-0.01
	7+ year spell									
2 years	0.80	(0.09)	0.88	0.79	1.01	0.00	(0.04)	0	0.00	-0.01
3 years	1.13	(0.09)	1.16	1.05	1.18	-0.05	(0.04)	0	0.00	-0.02
4 years	1.24	(0.09)	1.24	1.14	1.28	-0.01	(0.04)	0	0.00	-0.02
5 years	1.35	(0.09)	1.27	1.18	1.35	-0.01	(0.04)	0	0.00	-0.02
6 years	1.27	(0.09)	1.27	1.19	1.40	-0.03	(0.04)	0	0.00	-0.02

Notes: Data moments are taken from Table 9 in Appendix F. “Base” refers to the baseline model. “CM” refers to the model with $\psi = 0$ and θ unrestricted. “Learn” refers to the learning about demand model described in Appendix C.

Table 64: Data and model moments: Entry and exit

	Data		Models		
	(1)		(2)	(3)	(4)
		s.e.	Base	CM	Learn
entry	0.065	(0.000)	0.065	0.059	0.069
$exit_1$	0.44	(0.00)	0.44	0.43	0.32
$exit_2 - exit_1$	-0.16	(0.006)	-0.12	-0.14	-0.25
$exit_3 - exit_1$	-0.24	(0.006)	-0.21	-0.21	-0.28
$exit_4 - exit_1$	-0.26	(0.006)	-0.26	-0.25	-0.28
$exit_5 - exit_1$	-0.29	(0.007)	-0.28	-0.28	-0.28
$exit_6 - exit_1$	-0.29	(0.008)	-0.29	-0.30	-0.29

Notes: Data moments are taken from the second column of Table 17 in Appendix F, and the second column of Table 8 in the paper. "Adv" refers to the marketing and advertising model. "CM" refers to the model with $\psi = 0$ and θ unrestricted. "Learn" refers to the learning about demand model.

Table 65: Model with $\psi = 0$ and θ unrestricted: parameters and fit

	σ_ν	σ_η	ρ	λ	$F^\dagger$	ω	γ	$\underline{D}^\S$	α	δ	θ	$m'Vm$
param	0.36	0.84	0.09	0.04	0.01	0.04	0.26	0.25	0.69	0.79	31.9	4.56

Notes: †The value reported here is the average ratio of F_t^{ik} to revenue. §The value reported here is the average of $\underline{D}/R_{13}$ across all participants who survive 13 periods in the market, where R_{13} is revenue in period 13. "Fit" is the value of the criterion function, $m'Vm$, where m is the difference between data moments and moments of the model conditional on the parameter vector, and V is a diagonal matrix with the vector of inverses of the standard errors of the data moments on the diagonal.

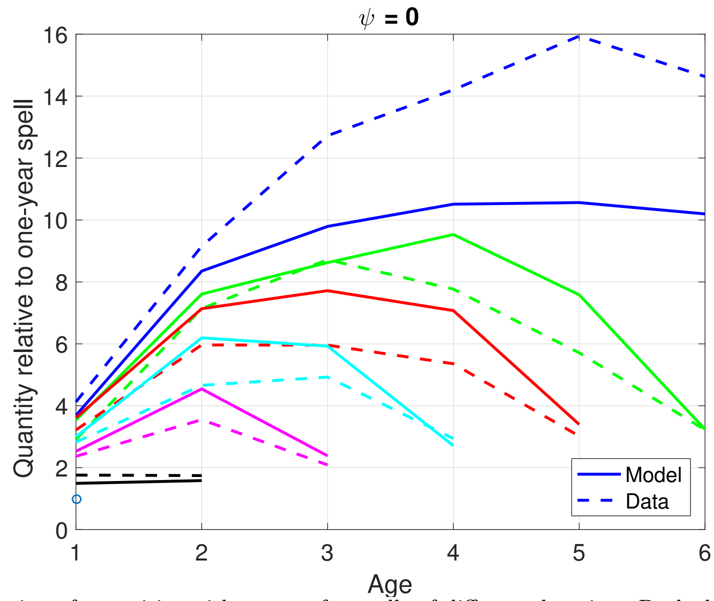
Table 66: Learning about demand model: parameters and fit

	σ_ν	σ_η	ρ	λ	$F^\dagger$	γ	θ	$m'Vm$
Learn	3.08	0.11	0.00	0.04	0.04	0.73	50	47.6

Notes: †The value reported here is the average ratio of F_t^{ik} to revenue across all participants in their first period (6 months) of participation. "Fit" is the value of the criterion function, $m'Vm$, where m is the difference between data moments and moments of the model conditional on the parameter vector, and V is a diagonal matrix with the vector of inverses of the standard errors of the data moments on the diagonal.

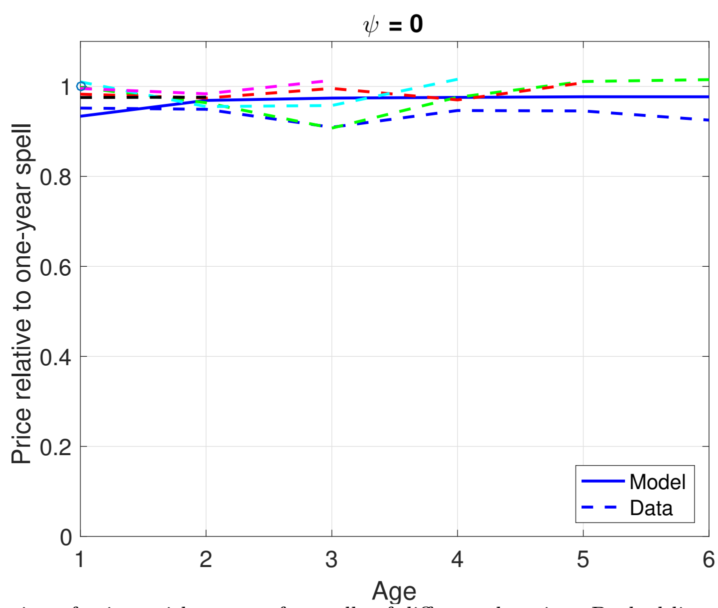
L Additional figures: Structural estimation

Figure 116: Fit of model with trade elasticity of 3, $\psi = 0$: Quantities



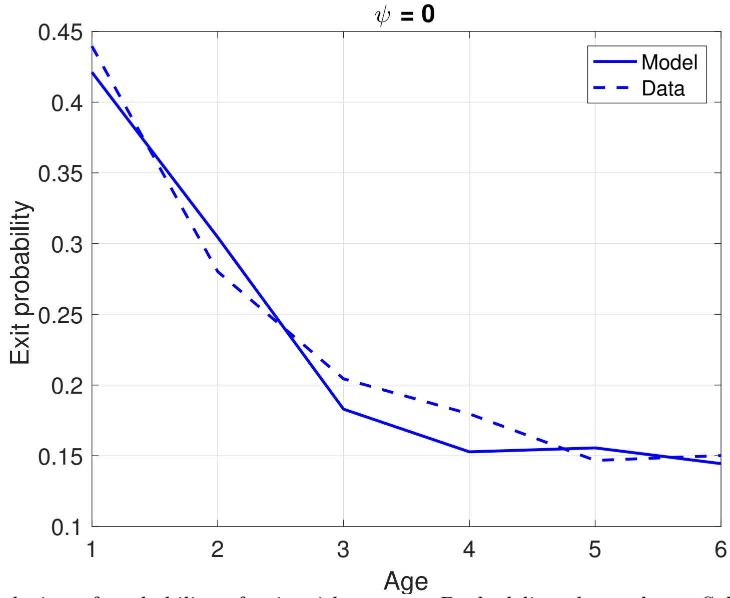
Notes: Figure shows evolution of quantities with tenure, for spells of different duration. Dashed lines show data. Solid lines show corresponding quantity trajectories for the model with trade elasticity set equal to 3 and $\psi = 0$. All quantities expressed relative to quantity in a 1-year spell Source: CSO and authors' calculations.

Figure 117: Fit of model with trade elasticity of 3, $\psi = 0$: Prices



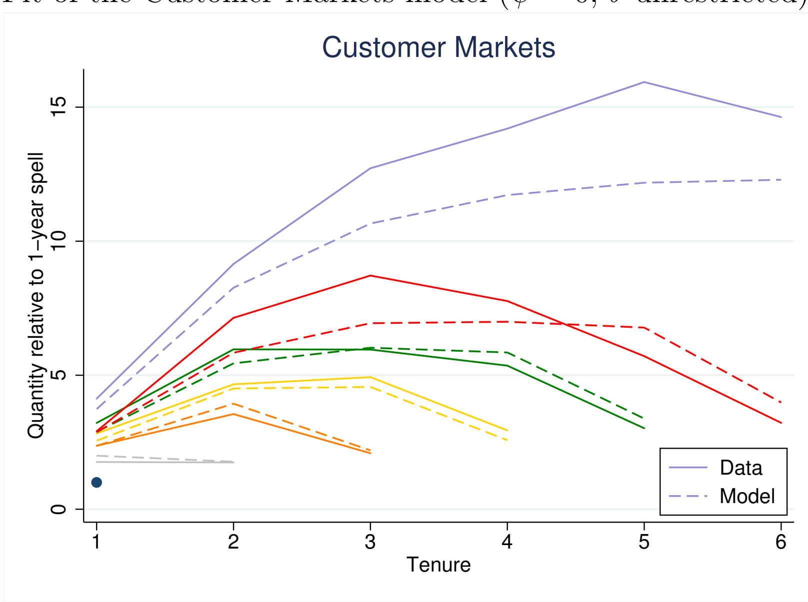
Notes: Figure shows evolution of prices with tenure, for spells of different duration. Dashed lines show data. Solid line shows corresponding price trajectories for the longest spell in the model with trade elasticity set equal to 3 and $\psi = 0$. All prices expressed relative to price in a 1-year spell Source: CSO and authors' calculations.

Figure 118: Fit of model with trade elasticity of 3, $\psi = 0$: Exit



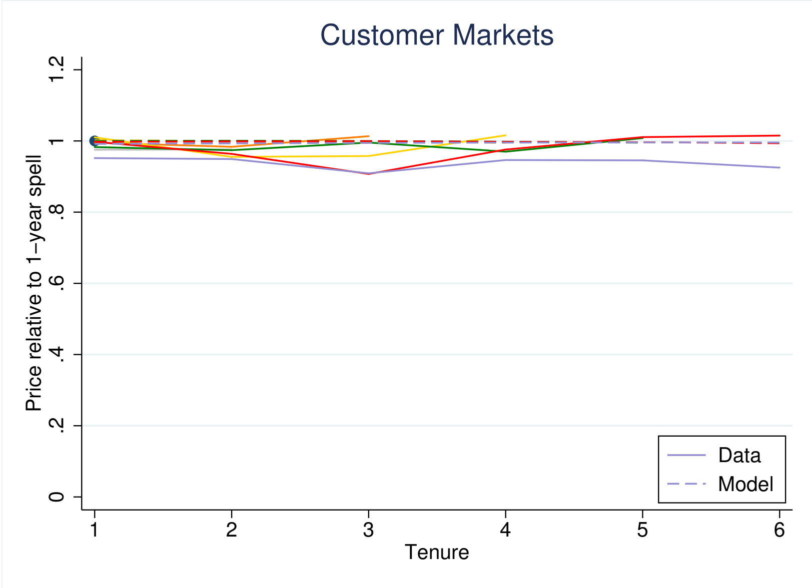
Notes: Figure shows evolution of probability of exit with tenure. Dashed line shows data. Solid line shows corresponding evolution of exit for the model with trade elasticity set at 3 and $\psi = 0$. Source: CSO and authors' calculations.

Figure 119: Fit of the Customer Markets model ($\psi = 0$, θ unrestricted): Quantities



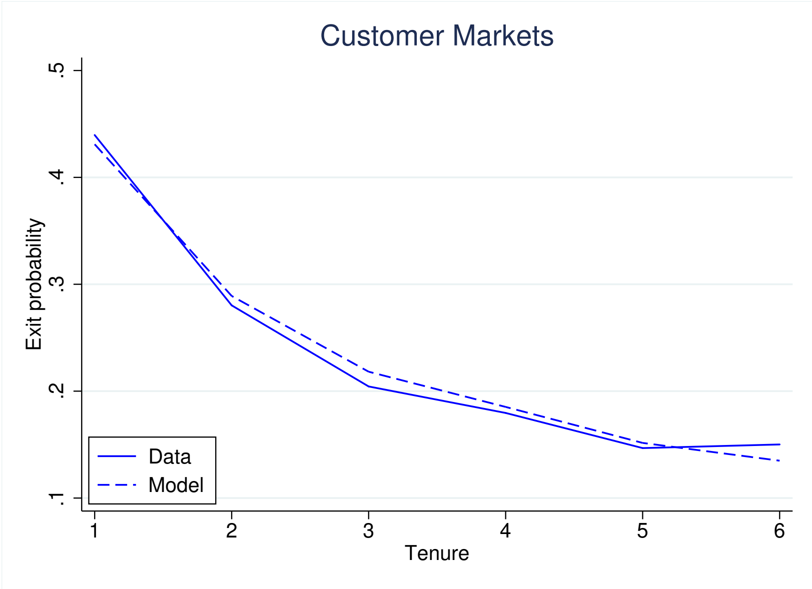
Notes: Figure shows evolution of quantities with tenure, for spells of different duration. Solid lines show data. Dashed lines show corresponding quantity trajectories for the Customer Markets model (i.e. model with $\psi = 0$ and θunrestricted). All quantities expressed relative to quantity in a 1-year spell Source: CSO and authors' calculations.

Figure 120: Fit of the Customer Markets model ($\psi = 0$, θ unrestricted): Prices



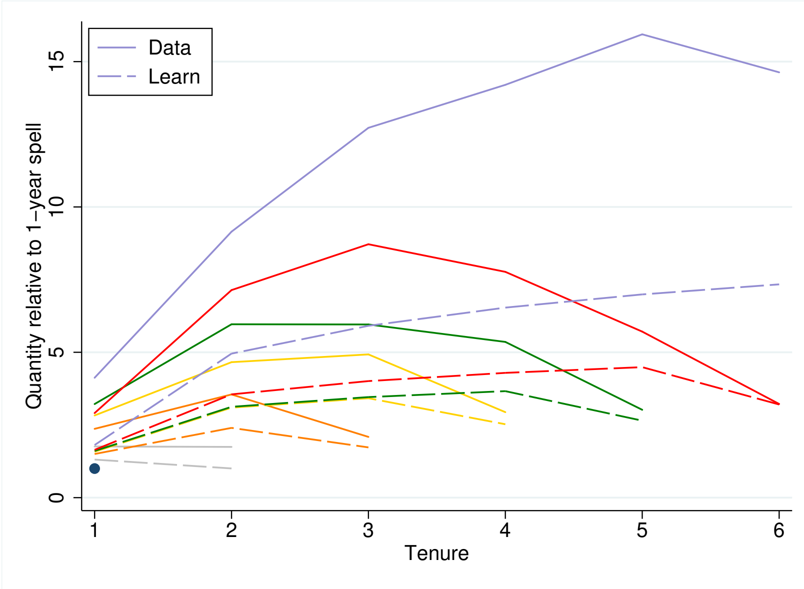
Notes: Figure shows evolution of prices with tenure, for spells of different duration. Solid lines show data. Dashed lines show corresponding price trajectories for the Customer Markets model (i.e. model with $\psi = 0$ and θunrestricted). All prices expressed relative to price in a 1-year spell Source: CSO and authors' calculations.

Figure 121: Fit of the Customer Markets model ($\psi = 0$, θ unrestricted): Exit



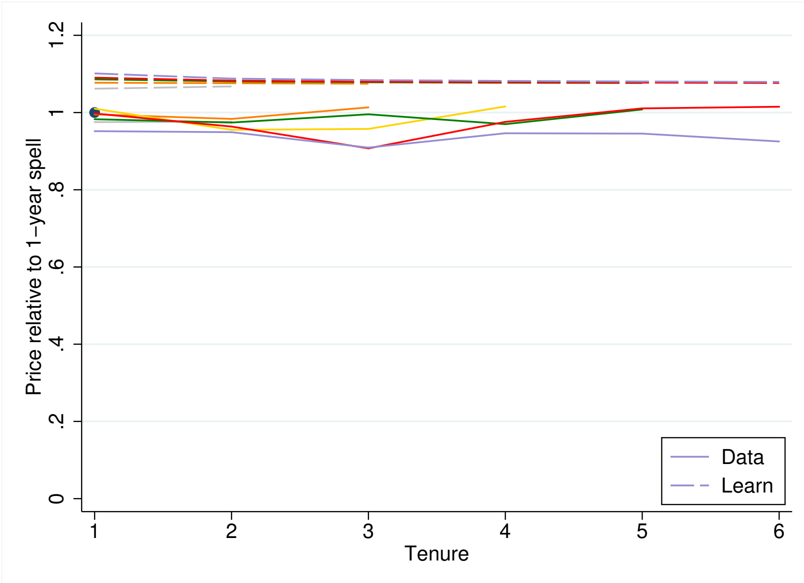
Notes: Figure shows evolution of probability of exit with tenure. Solid line shows data. Dashed line shows corresponding evolution of exit for the Customer Markets model (i.e. model with $\psi = 0$ and θunrestricted). Source: CSO and authors' calculations.

Figure 122: Fit of the learning about demand model: Quantities



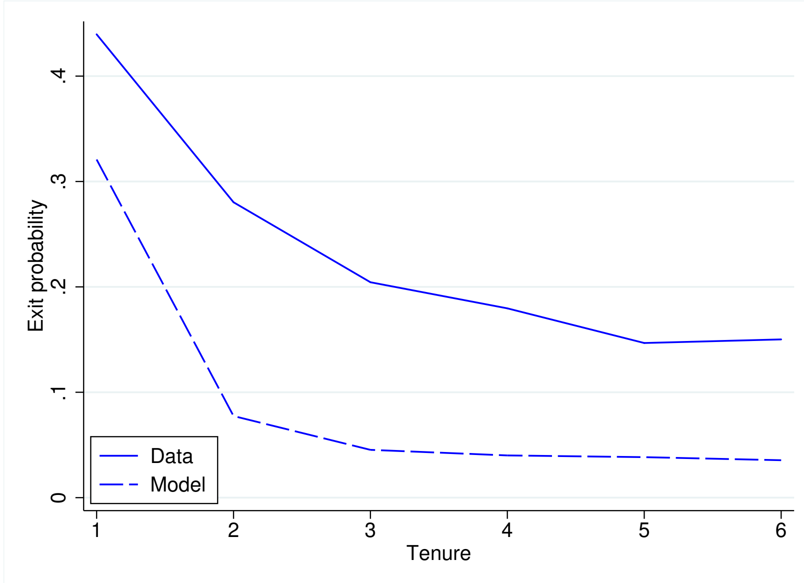
Notes: Figure shows evolution of quantities with tenure, for spells of different duration. Solid lines show data. Dashed lines show corresponding quantity trajectories for the Learning about Demand model. All quantities expressed relative to quantity in a 1-year spell Source: CSO and authors' calculations.

Figure 123: Fit of the learning about demand model: Prices



Notes: Figure shows evolution of prices with tenure, for spells of different duration. Solid lines show data. Dashed lines show corresponding price trajectories for the Learning about Demand model. All quantities expressed relative to quantity in a 1-year spell Source: CSO and authors' calculations.

Figure 124: Fit of the learning about demand model: Exit



Notes: Figure shows evolution of probability of exit with tenure. Solid line shows data. Dashed line shows corresponding evolution of exit for the Learning about Demand model. Source: CSO and authors' calculations.

M Impulse-responses to tariff changes

M.1 Tariff experiments

We perform the following tariff experiments:

1. Unanticipated permanent change in tariffs (decrease and increase).

2. Announcement that in 4 periods (2 years) tariffs will change permanently (decrease and increase). This is a news shock followed by an anticipated shock.

3. One standard deviation innovation (tariff decrease) to AR(1) with low persistence. The tariff process is modeled as:

$$\ln \tau_t = \rho_l \ln \tau_{t-1} + \varepsilon_t$$

where $\varepsilon_t \sim N(0, \sigma^2)$, where $\rho_l = 0.5$ and $\sigma = 0.05$. Note that there are two periods in a year in the model.

4. One standard deviation innovation (tariff decrease) to AR(1) with high persistence. he tariff process is modeled as:

$$\ln \tau_t = \rho_l \ln \tau_{t-1} + \varepsilon_t$$

where $\varepsilon_t \sim N(0, \sigma^2)$, where $\rho_l = 0.5$ and $\sigma = 0.05$. Note that there are two periods in a year in the model.

In all cases, we calculate impulse-responses for an incumbent who faces a zero probability of exit and no idiosyncratic demand shocks. We aggregate over two model periods to the yearly level, assuming that the initial tariff shock always realizes in the first period of a year. We calculate impulse-reponses out to 10 years from the shock. Impulse-responses are reported as elasticities with respect to the initial tariff innovation for comparability across exercises.

We perform these exercises for our baseline marketing and advertising model ($\psi = 1$) and for our best estimates of the pure customer markets model ($\psi = 0$).

M.2 Baseline model impulse-responses

In the baseline model, the elasticity of export price with respect to ad valorem tariffs is equal to zero for all shocks at all time horizons. As a result, revenue and quantity elasticities coincide. We therefore report only revenue elasticities. Figure 125 plots these elasticities for the permanent unanticipated tariff reduction and for the AR(1) shocks with different degrees of persistence. The dashed lines are the responses fixing export prices and customer base at their pre-shock levels. This illustrates the extent to which revenue responses are driven by the property of the shock (combined with the price elasticity of demand), and to what extent they are driven by the endogenous response of investment in customer base.

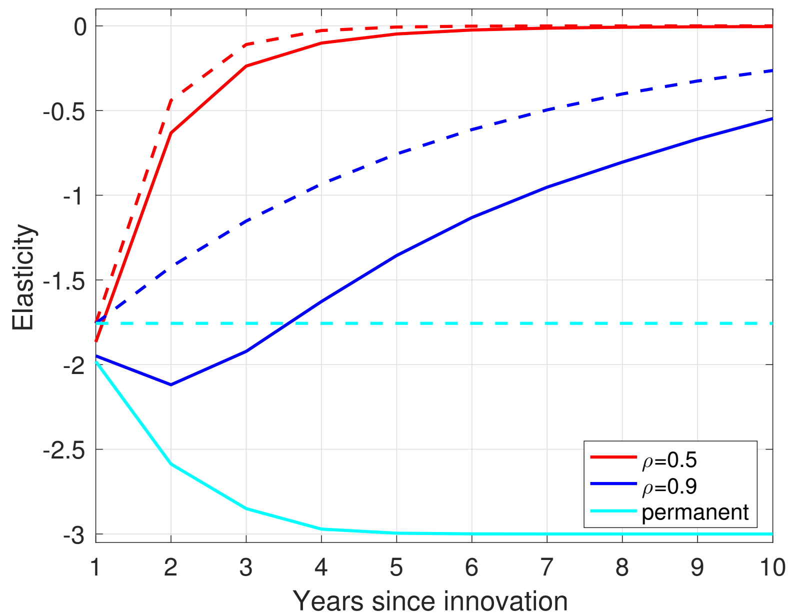


Figure 125: Impulse-responses of incumbent exports to tariff changes: baseline model
Notes: Figure shows trade elasticity based on impulse-responses of incumbent exports to (a) an unanticipated permanent change in tariffs, (b) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.9, and (c) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.5. The dashed lines show the responses to shocks holding fixed customer base. Source: Authors' calculations.

Note that by assumption, the long-run elasticity of export revenue to a permanent tariff shock is -3, since this is the value hardwired into our model by assuming $\theta/(1-\alpha)=3$. Meanwhile, in the absence of any endogenous response of customer base, the elasticity of export revenue to a tariff shock is given by $-\theta$. Since we estimate that $\alpha = 0.41$ then $\theta = 1.76$.

It is apparent from Figure 125 that the long run elasticity of export revenue with respect to a permanent tariff change is greater (in absolute value) than the short run elasticity. The ratio of the short run elasticity to the long run elasticity is 0.66. In addition, adjustment to the permanent change in tariffs takes time. It takes 5 years for the elasticity to reach its long run level. The speed of the response depends on δ (the depreciation rate of customer base) as well as ϕ (the adjustment cost parameter).

Figure 125 also shows that responses to tariff shocks are increasing (in absolute value) in the persistence of the shock. This is true to a modest extent on impact, where the response is greatest (in absolute value) to the permanent shock, and least to the low persistence AR(1) shock. In subsequent periods there is very little accumulation of customer base, and hence endogenous persistence, in response to the low persistence shock. There is non-trivial accumulation of customer base in response to the high persistence shock, which gives rise to a hump-shaped response.

Figure 126 illustrates the response of export revenue to the news shock in the baseline model. The dashed line is the response fixing export prices and customer base at their pre-shock levels. Accumulation of customer base starts two years in advance of the change in tariffs. Because of this, export revenue fully adjusts to its new steady state level three years after the tariff change is implemented, rather than five years for unanticipated shocks.

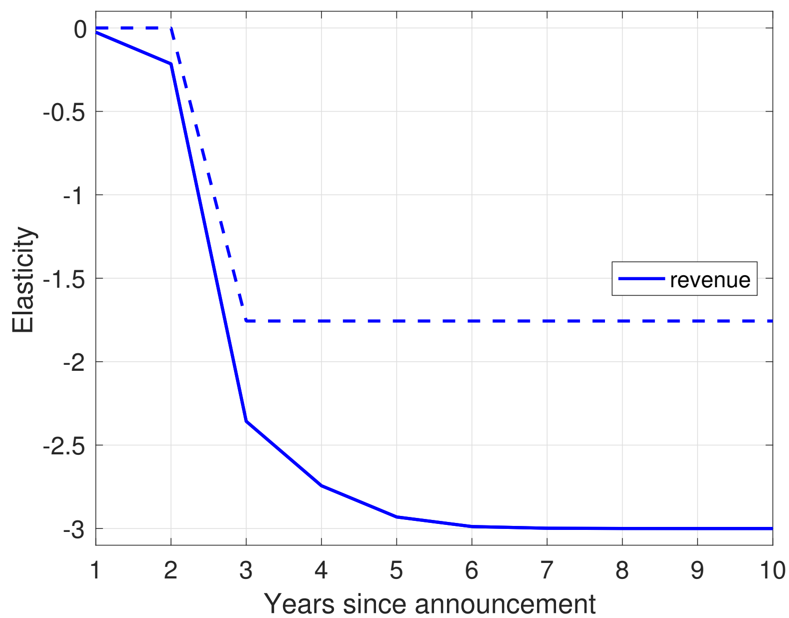


Figure 126: Impulse-responses of incumbent exports to news shock: baseline model
Notes: Figure shows trade elasticity based on impulse-response of incumbent exports to the news that tariffs will decrease at the beginning of year 3. The dashed line shows the response holding fixed customer base. Source: Authors' calculations.

M.3 Impulse-responses for customer markets model

In the customer markets model, prices may respond to tariff shocks. As a result, revenue and quantity elasticities may differ. For expositional purposes, we focus on revenue and price responses, with the understanding that quantity elasticities may be obtained by subtracting price responses from revenue responses.

Figure 127 plots revenue elasticities for the permanent unanticipated tariff reduction and for the AR(1) shocks with different degrees of persistence. The dashed lines are the responses fixing export prices and customer base at their pre-shock levels. This illustrates the extent to which revenue responses are driven by the property of the shock (combined with the price elasticity of demand), and to what extent they are driven by by changes in customer base, which in this case takes place through deviations of markups from their steady state level, but also exogenously through the change in quantity sold implied by the change in tariffs holding markups fixed.

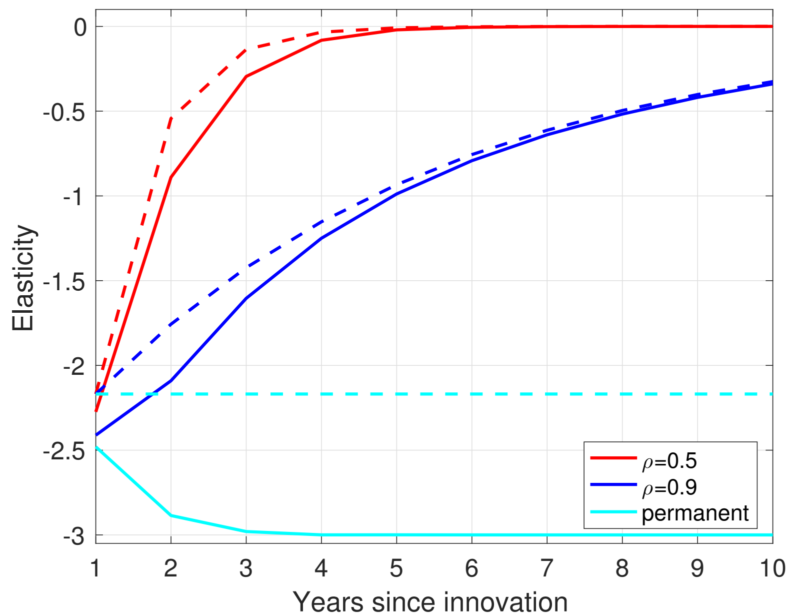


Figure 127: Impulse-responses of incumbent exports to tariff changes: customer markets model

Notes: Figure shows trade elasticity based on impulse-responses of incumbent exports to (a) an unanticipated permanent change in tariffs, (b) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.9, and (c) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.5. The dashed lines show the responses to shocks holding fixed prices and customer base. Source: Authors' calculations.

Note that by assumption, the long-run elasticity of export revenue to a permanent tariff shock is -3, the same as in the baseline model, since this is the value hardwired into our model by assuming $\theta/(1-\alpha)=3$. Meanwhile, in the absence of any endogenous response of customer base, the elasticity of export revenue to a tariff shock is given by $-\theta$. Since we estimate that $\alpha = 0.28$ in this model, then $\theta = 2.17$.

For the customer markets model, the long run elasticity of export revenue with respect to a permanent tariff change is greater (in absolute value) than the short run elasticity, but the two elasticities are closer than is the case for the baseline model. The ratio of the short run elasticity to the long run elasticity is 0.83. Adjustment to the permanent change in tariffs is faster than in the baseline model: it takes 4 years for the elasticity to reach its long run level. The speed of the response depends on δ: there are no adjustment costs in this model.

Figure 127 also shows that responses to tariff shocks are increasing (in absolute value) in the persistence of the tariff shock. In contrast to the baseline model, there is relatively little endogenous persistence from accumulation of customer base, and no hump-shape in response to the high persistence AR(1) shock.

To highlight the differences between the responses of revenue in the customer markets model and the baseline model, Figure 128 plots them side-by-side. Consistent with the higher value of θ in the customer markets model, there are greater responses to tariff shocks on impact. Consistent with the lower value of α and hence lower marginal return to customer base accumulation in the customer markets model, there is less endogenous persistence.

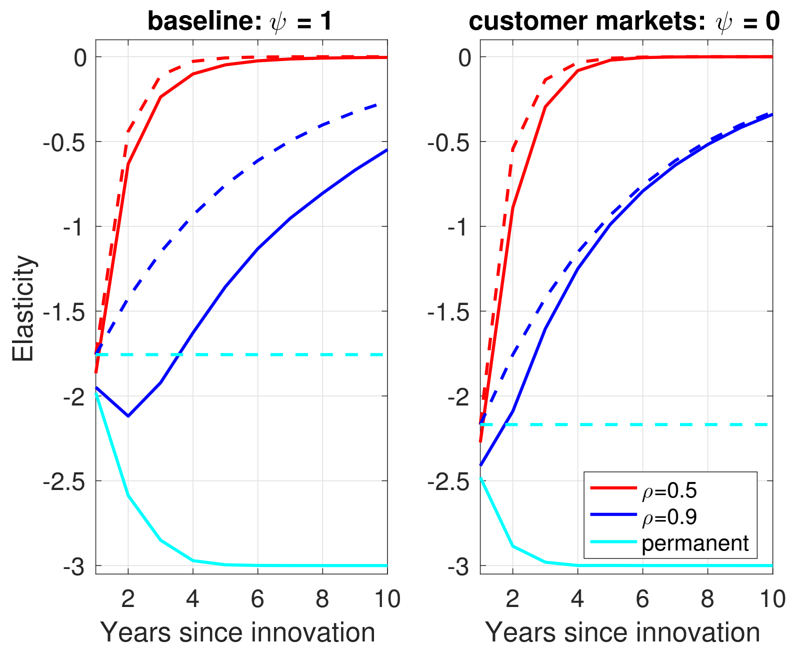


Figure 128: Comparison of revenue elasticities across models

Notes: Figure shows trade elasticity based on impulse-responses of incumbent exports to (a) an unanticipated permanent change in tariffs, (b) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.9, and (c) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.5. The dashed lines show the responses to shocks holding fixed prices and customer base. Left panel shows responses for baseline model ($\psi = 1$). Right panel shows responses for customer markets model ($\psi = 0$). Source: Authors' calculations.

Figure 129 plots the elasticity of export prices (which are always net of tariffs) with respect to the relevant tariff innovation. In contrast to the baseline model, there are non-zero price responses. The sign and shape of these responses differs with the persistence of the shock. In response to a permanent unanticipated decrease in tariffs, firms depress markups below their steady state level (hence the positive elasticity) in order to accumulate customer base. This implies a more than one-for-one passthrough of tariff changes into import prices (the price that customers in the destination market face) on impact.

In contrast, firms respond to a negative innovation in the low persistence AR(1) process by increasing markups above their steady state level (hence the negative elasticity). This implies a less than one-for-one passthrough of tariff changes into import prices on impact.

The intuition for this response is that when tariffs fall, this increases current sales, which contributes positively to future customer base without any action on the firm's part. However because the tariff is strongly mean-reverting, the path of desired future customer base is declining. The firm can implement this by raising markups above their steady state level. Meanwhile, the response to a negative innovation in the high persistence AR(1) process is a non-monotonic path of prices.

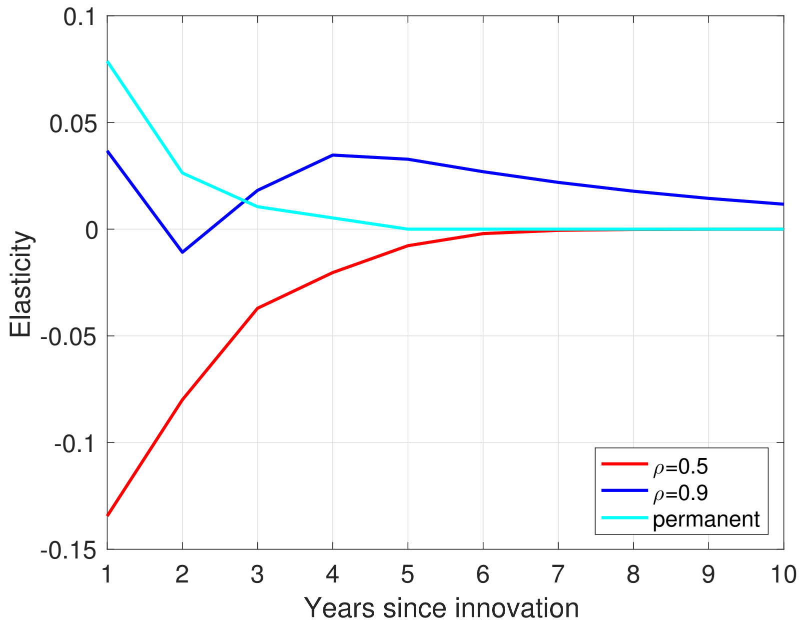


Figure 129: Impulse-responses of incumbent export prices to tariff changes: customer markets model
Notes: Figure shows elasticity of export prices to tariff innovation based on impulse-responses of incumbent export prices to (a) an unanticipated permanent change in tariffs, (b) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.9, and (c) a one-standard-deviation innovation to an AR(1) process for log tariffs with persistence 0.5. Source: Authors' calculations.

Figure 130 illustrates the response of export revenue and export prices to the news shock in the customer markets model. The dashed line is the response of revenue fixing export prices and customer base at their pre-shock levels. Accumulation of customer base starts two years in advance of the change in tariffs, as firms depress markups below their steady state levels (positive elasticity). Export revenue fully adjusts to its new steady state level one year after the tariff change is implemented, rather than four years for unanticipated shocks.

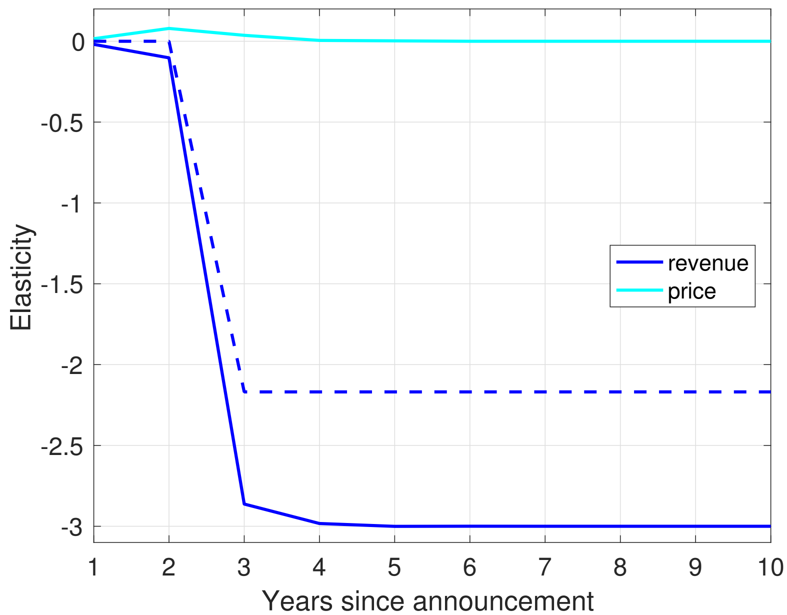


Figure 130: Impulse-responses of incumbent exports to news shock: customer markets model
Notes: Figure shows trade elasticity based on impulse-response of incumbent exports and elasticity of export prices to the news that tariffs will decrease at the beginning of year 3. The dashed line shows the export response holding fixed prices and customer base. Source: Authors' calculations.

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[1] Cervantes, C. V., & Cooper, R. (2022). Labor market implications of education mismatch. European Economic Review, 148, 104179.

[2] Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. MIT press.