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Firm Output Adjustment to Trade Liberalization

Theory with Application to the Moroccan Experience

Mark A. Dutz

Output among firms is likely to be reallocated as a result of trade liberalization. In imperfectly competitive industries, such a "rationalization" effect can be an important component of the welfare impact of trade reform.

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This paper — a product of the Trade Policy Division, Country Economics Department — is part of a larger effort in PRE to examine industrial competition, productive efficiency, and their relation to trade regimes. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Sheila Fallon, room N10-017, extension 38009 (46 pages).

In an imperfectly competitive market environment, whether an economy gains from trade liberalization is necessarily an empirical question. How trade liberalization affects resource allocation depends not only on trade policies but on the nature of oligopolistic interactions and the ease of entry into and exit from particular industries.

In addition to generally lowering domestic industry prices, an increase in imports in recently liberalized industries causes domestic firms to adjust. Depending on assumptions in theoretical models, domestic output (and the equilibrium price) can either rise or fall after trade liberalization.

Dutz shows in an imperfectly competitive (Cournot oligopoly) model that loosening a quota on elastically supplied imports will typically cause smaller firms with high marginal costs to contract more (and to exit with a higher probability) than larger firms with low costs. This "rationalization" effect, a redistribution of resources from smaller to larger users, leads to lower industry-wide average costs and is an important component of the welfare impact of trade reform.

Dutz examines the extent to which incumbent firms in certain imperfectly competitive industries adjusted their output choice in Morocco between 1984 and 1987. During this period, Morocco scaled down an extensive system of quantitative restrictions. The econometric work focuses on industries subject to binding import quotas before and after the reforms. Dutz explores the distribution of output adjustment to the changes in imports among incumbent firms in such industries. He finds that:

• The more imports increased, the more firms tended to contract output.

• As imports increased, smaller firms were more likely to exit the industry than larger firms.

• Among survivors, small firms also tended to contract output proportionately more than larger firms. Small firms are more likely to bear the brunt of an industry's contraction in output in response to an increase in imports. (Dutz examines the impact of firm market share on firm output adjustment in percentage terms rather than in levels; no evidence of a shift of production from small to large firms is therefore presented in this paper.)

• The available pertinent data provide tentative (though weak) evidence that firms with higher marginal costs (as indicated by higher labor/output ratios) did have the smaller market shares, suggesting that the trade reforms in Morocco did result in the rationalization effects that theory would predict.

Firm Output Adjustment to Trade Liberalization:
Theory with Application to the Moroccan Experience

by
Mark A. Dutz

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I. Introduction [1]

Over the past few years, a consensus has been emerging regarding the impact of trade liberalization on domestic welfare in an environment with imperfectly competitive markets: whether or not an economy gains from trade liberalization is necessarily an empirical question.[2] It is widely recognized that the effects of trade liberalization on resource allocation depend not only on existing trade policies but on the nature of oligopolistic interactions and the ease of entry into and exit from particular industries. Depending on the assumptions underlying specific theoretical models, domestic output can fall or rise following trade liberalization; the equilibrium price may also either fall or rise.[3] Economic theory alone does not provide an unambiguous answer.

The extent to which incumbent firms actually adjust their output choice in response to trade liberalization is examined in this paper. Is there a systematic pattern

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1/ I am very grateful for helpful comments and discussions with Tim Besley, Tom Bogart, David Card, John DiNardo, Avinash Dixit, Gene Grossman, Guy Lacroix, Thomas Lemieux, Ceyla Pazarbasioglu, Daniel Sullivan, Jim Tybout and Robert Willig. I also thank participants at seminars at NYU Stern School of Business, Princeton University, Queen's University and at the World Bank for comments. This paper is part of the World Bank research project "Industrial Competition, Productive Efficiency and Their Relation to Trade Regimes" (RPO-674-46); I am appreciative for the opportunity to use data from the Moroccan Ministry of Commerce and Industry. Financial support from the Social Sciences and Humanities Research Council of Canada and funding from a Sloan grant to the International Finance Section at Princeton University is gratefully acknowledged.

2/ See, in particular, the survey by Richardson (1988).

3/ In a symmetric oligopoly model, Buffie and Spiller (1986) show that, in the short-run, a rise in domestic firm output in response to an increase in imports is consistent with existence and stability conditions. For price to increase in the long-run in their model, the degree of competition (as captured by a firm-specific conjectural variations parameter) must increase as the number of firms falls.

of firm output response to a loosening of import quotas? Do larger firms contract output more than their smaller rivals, less than their rivals, or do they expand output? If firm size reflects cost efficiency and large firms are more cost efficient, then output "rationalization" following trade reform, with resources shifting from smaller to larger, more cost efficient users may be welfare-improving. At the firm level, competing theories exist to explain how contraction differs by firm size.[4/] At the industry level, there is a general presumption that the more competitive the industry, the larger the industry output adjustment following an exogenous increase in imports. Holding technology constant, highly concentrated industries with substantial rents have scope to compress these rents and therefore may contract output only a little or not at all in response to trade liberalization. More competitive industries, on the other hand, with no margin of slack to compress, will have to adjust more on the output side. This perspective suggests that the domestic industry output response to trade liberalization may reveal information about the degree of competition in the domestic market. To my knowledge, relatively few empirical studies of such firm and industry output

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4/ See Lieberman (1989) for a review of theoretical findings on divestment in declining industries. Differences in efficiency among firms, with larger firms being more cost efficient, would cause smaller producers to exit earlier during a decline in demand. On the other hand, in a Cournot-Nash model where firms are equally efficient and under the assumption of all-or-nothing capacity reduction, large firms exit first since smaller firms can remain profitable over a longer period as demand falls to zero. Under a similar model but with continuous capacity adjustment, large firms reduce capacity first; subsequent capacity reductions as demand falls further are predicted to be identical across firms. See Ghemawat and Nalebuff (1987).

adjustment exist, and even fewer examine adjustment as a response to trade liberalization.[5] No study employs as detailed firm-level data as this one.

This study seeks to explore the distribution of output adjustment to industry-specific shocks (here, a reduction in still-binding quota levels), both across asymmetric firms within a given industry and also among industries. It examines, in a heterogeneous-firm context, the positive impact of changes in a particular trade policy. The study is based on a sample of approximately 750 manufacturing firms drawn from those surveyed by Morocco's Ministry of Commerce and Industry for the years 1984 and 1987. Among industrializing countries that have recently implemented a major trade reform, Morocco was chosen because of the particularly appropriate nature of its industrial data. For 1984 (at the onset of Morocco's trade liberalization program) and for 1987 (four years into the program), a special supplement to the annual survey was included to collect much more disaggregated production data. I was also able to collect data on import values and degree of quota protection at the same level of disaggregation, and to match it to the industrial nomenclature. Work at a more aggregate level would mask the simultaneous loosening of quotas on some products and tightening of quotas on other products within the same industrial sector. Significant changes in quotas across different industries provide a natural experiment that allows the testing of firm output responsiveness as a function of pre-reform firm size.

The following section presents a theoretical specification of firm and industry adjustment to an exogenous increase in imports. The analysis focuses on the (partial) equilibrium impact of such trade liberalization on domestic firms' outputs and

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5/ Recent studies that analyze growth rates of plants or firms while explicitly considering plant or firm failure include Dunne, Roberts and Samuelson (1989), Evans (1987a, 1987b) and Hall (1987). Two interesting papers examining closely-related issues involving the relationship between an industry's trade pattern and the industry's structure and performance are Roberts (1989) and Tybout (1989), on Colombia and Chile, respectively.

on domestic welfare. Section III contains a detailed description of the data used in the study. Section IV then presents the statistical framework and reports the empirical results. A final section provides concluding comments and some suggestions for further research in this area.

The evidence from the trade reform experience suggests that firm output contraction is more pronounced the larger the increase in imports. Importantly, both the probability of exit and the percentage contraction in output among survivors is larger for small firms than for larger firms. Both these forces provide evidence that resources may be shifting on average from smaller to larger firms in response to an increase in imports. If large firms are more cost efficient, as both theory and the data suggest, such a reallocation of output among firms is likely to be an additional source of welfare gain from trade liberalization.[6/]

II. An Asymmetric Oligopoly Model of Output Adjustment

The theoretical framework of this study is a domestic oligopoly model of firm output adjustment where competing firms are not equally efficient. Domestic firms in a given industry j are assumed to produce a homogeneous good for the home market; a foreign good potentially competes with domestic production, with the actual level of imports determined by a binding quota.[7/] For most of the theoretical analysis and for the empirical implementation, the foreign good will be assumed to be a perfect

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6/ This paper provides evidence that rationalization (in the sense of a reallocation of output from smaller to larger incumbent firms) occurred following a particular trade liberalization episode. Further work is needed to combine these results with the effect of new entrant behavior on welfare.

7/ What is crucial is that the international price be low enough so that the quota is always filled.

substitute for domestic production.[8] Trade liberalization acts like a shift parameter on the residual demand facing domestic suppliers. A higher level of imports as the quota is relaxed decreases the residual demand for domestic output. Let domestic firms face the residual demand $p^j(Q_j,M_j;\alpha)$, where p^j is domestic price in industry j, Q_j is domestic producers' total output, M_j is the exogenously-imposed binding import quota and the shift variable α represents an economy-wide shock (for example, changes in real national income); residual demand is downward sloping ($p^j_Q<0$) and clearly shifts in as the quota is relaxed ($p^j_M<0$). It is assumed that $p^j_\alpha>0$. With perfect substitutability between domestic and foreign output, $p^j_Q=p^j_M$ and $p^j_{QQ}=p^j_{QM}$.

Each domestic firm's technology is summarized by a quadratic cost function. Firms can differ according to both the level of sunk capital invested K_{ij} and an exogenous efficiency parameter e_{ij} (representing, for example, differing managerial ability). The general form of firm i's technology can be summarized by the cost function:

$$C^j(\mathbf{w},q_{ij},e_{ij},K_{ij}) = a^j(\mathbf{w},e_{ij},K_{ij}) + b^j(\mathbf{w},e_{ij},K_{ij})q_{ij} + f^j(\mathbf{w},e_{ij},K_{ij})q_{ij}^2 \tag{1}$$

where q_{ij} is firm i's output and $\mathbf{w}$ is the vector of factor prices. Importantly, $C^{ij}_{qK} < 0$ so that additional capital lowers the marginal cost curve; non-sunk fixed costs are increasing in K. K_{ij} is firm i's equilibrium capacity choice given anticipated (pre-

8/ If the imported good is an imperfect substitute to the domestic good within a given industry, domestic firms retain more market power as the quantitative trade barrier is relaxed than in the perfect substitutes case. This alternative assumption may be explored in subsequent work, especially for the most relevant industries.

liberalization) market conditions.[9] Total and marginal cost are also increasing in e: a better-managed firm is characterized by a lower e.

Firm i's profits in industry j are $\pi^{ij}(q_{ij},Q_{.ij},M_j) = p^j(q_{ij}+Q_{.ij},M_j;\alpha)q_{ij} - C^j(q_{ij},e_{ij},K_{ij})$, where $Q_{.ij} = Q_j - q_{ij}$, the aggregate industry output of all firms other than firm i. Firms are assumed to behave as Cournot competitors, with the equilibrium being Nash in quantities.[10] Firm i's first-order condition, $\partial\pi^{ij}/\partial q_{ij} = 0$, is

$$p^j(Q_j,M_j;\alpha) + q_{ij}p^j_Q(Q_j,M_j;\alpha) - C^{ij}_q = 0 \qquad i=1,...n. \tag{2}$$

It is instructive to re-write equation (2) as:

$$q_{ij}^*(M_j,\alpha;e_{ij},K_{ij}) = \frac{p^j(Q_j^*(M_j,\alpha),M_j,\alpha) - C^j_q(q_{ij}^*(M_j,\alpha),e_{ij},K_{ij})}{-p^j_Q(Q_j^*(M_j,\alpha),M_j,\alpha)} \tag{3}$$

where q_{ij}^* denotes firm i's output at the noncoöperative equilibrium and Q_j^* is total equilibrium output of all domestic competitors. Firms with lower marginal cost (more capital, better managed) have larger equilibrium output levels. In equilibrium, firm size reflects cost efficiency.

To determine the effect of a small loosening of the quota on firm output, its effect on aggregate output must first be determined. Totally differentiating firm i's first-order condition (2) given that $de_{ij}=dK_{ij}=0$ yields

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9/ A fuller model might attempt to relate the distribution of sunk asset stocks across firms (K's) to the distribution of efficiency parameters (e's), a relation which depends on views of capital market conditions. This extension and its empirical implementation, making use of the predicted correlation between K's and e's, are beyond the scope of this paper.

10/ The analysis can be generalized in a straightforward fashion to include conjectural variation equilibria, allowing for more or less aggressive behavior by firms.

$$dq_{ij} = - \frac{[-p^j_M - q_{ij} p^j_{QM}]}{C^{ij}_{qq} - p^j_Q} \cdot dM_j \; - \; \frac{[-p^j_Q - q_{ij} p^j_{QQ}]}{C^{ij}_{qq} - p^j_Q} \cdot dQ_j \; + \; \frac{[p^j_\alpha + q_{ij} p^j_{Q\alpha}]}{C^{ij}_{qq} - p^j_Q} \cdot d\alpha$$

$$= - \gamma_{ij}\, dM_j - \lambda_{ij}\, dQ_j + \omega_{ij}\, d\alpha \qquad (4)$$

Two effects arise from the loosening of the quota. There is both a direct effect, as firm i adjusts to the increase in imports, and an indirect effect, as firm i adjusts to the aggregate domestic output response to the rise in imports: γ_{ij} and λ_{ij} measure firm i's output responses to import changes and aggregate domestic output changes, respectively. An economy-wide shock α will have an additional impact on firm output captured by ω_{ij}.

For the remainder of the analysis, let $p^j = p^j(Q_j + M_j;\alpha)$; under this assumption of perfect substitutability between domestic output and imports, $\gamma_{ij} = \lambda_{ij}$, so that $dq_{ij} = - \lambda_{ij}(dQ_j + dM_j) + \omega_{ij} d\alpha$. Each firm's output change therefore depends critically on its λ_{ij}. How much each firm adjusts to the total change in industry output $(dQ_j + dM_j)$ will depend on how these λ_{ij} vary with firm size. For a given increase in imports, ceteris paribus, small firms will bear the brunt of any industry output contraction if λ_{ij} is decreasing in q_{ij}; the likelihood of this will be discussed shortly, in the context of the estimation equation. Note that under two standard assumptions on Cournot equilibrium,[11/] that industry marginal revenue slopes downward (a weak condition for existence implying $p^j_Q + q_{ij} p^j_{QQ} < 0$) and that each firm's residual demand curve intersects its marginal cost curve from above ($C^{ij}_{qq} > p^j_Q$, a weak stability condition), $\lambda_{ij} > 0$ for all firms. The sign of ω_{ij} depends on how the economy-wide shock affects the slope of the inverse demand curve, but will likely be positive (unless $p^j_{Q\alpha}$ is sufficiently negative). Summing equation (4) across firms and letting $\Lambda_j = \Sigma_i \lambda_{ij}$ and $\Omega_j = \Sigma_i \omega_{ij}$ yields:

11/ See Shapiro (1989).

$$dQ_j = \frac{-\Lambda_j}{1+\Lambda_j} \bullet dM_j + \frac{\Omega_j}{1+\Lambda_j} \bullet d\alpha \tag{5}$$

Ceteris paribus, aggregate domestic output will fall in response to an exogenous increase in imports. The effect on aggregate output of a simultaneous economy-wide shock ($d\alpha \neq 0$) is more ambiguous. In the case of a growing economy, where $d\alpha > 0$ represents an increase in real national income, the per-firm response to a positive aggregate shock (if $\omega_{ij} > 0$ for sufficient firms such that $\Omega_j > 0$) will tend to increase aggregate output. The adjustment of firms to such a positive economy-wide shock will tend to attenuate the aggregate contraction in response to the trade shock, or may even result in a net increase in aggregate output.

The effect of a loosening of the quota on individual domestic firms' output choices follows directly by substituting the industry output response (5) into equation (4):

$$\begin{aligned} dq_{ij} &= \frac{-\lambda_{ij}}{1+\Lambda_j} \bullet dM_j + \frac{(1+\Lambda_j)\omega_{ij} - \lambda_{ij}\Omega_j}{1+\Lambda_j} \bullet d\alpha \\ &= \frac{(1/(1+\Lambda_j))[p^j_Q + q_{ij} p^j_{QQ}]}{C^{ij}_{qq} - p^j_Q} \bullet dM_j + \frac{[p^j_\alpha + q_{ij} p^j_{Q\alpha} + (\Omega_j/(1+\Lambda_j))[p^j_Q + q_{ij} p^j_{QQ}]]}{C^{ij}_{qq} - p^j_Q} \bullet d\alpha \end{aligned} \tag{6}$$

Each firm's output adjustment to an increase in imports, ceteris paribus, depends both on industry-specific terms (the slope and curvature of demand functions) as well as on firm-specific terms (pre-reform equilibrium output and the curvature of the firm's cost function).

In the empirical estimation of this relationship across industries, it is more natural to examine the impact of market share (rather than value of production) on percentage output adjustment (rather than adjustment in levels). Such a formulation allows magnitudes to be compared across industries. In addition, since equilibrium output across firms depends only on cost variables, it is convenient to re-express the adjustment equation either exclusively in terms of cost parameters or in terms of output. Since the data set to be used contains very detailed output figures but limited cost information, it is preferable to substitute out for C^{ij}_{qq}. Given quadratic costs, C^{ij}_{qq} equals $2f_i$; by substituting the assumed cost function (1) for C^{ij}_{q} in equation (2), $2f_i$ can be shown to equal $(p^j + q_{ij}p^j_Q - b^j_i)/q_{ij}$. Substituting this expression into equation (6), and re-expressing the relationship in proportional terms yields:

$$\frac{dq_{ij}}{q_{ij}} = \frac{[p^j_Q/Q_j \pm s_{ij}p^j_{QQ}]}{p^j - b^j_i}\frac{(Q_j M_j)}{1+\Lambda_j}\cdot\frac{dM_j}{M_j} + \frac{[p^j_\alpha/Q_j \pm s_{ij}p^j_{Q\alpha} \pm (\Omega_j/(1+\Lambda_j))(p^j_Q/Q_j \pm s_{ij}p^j_{QQ})]}{p^j - b^j_i}\cdot d\alpha \qquad (7)$$

where $s_{ij} = q_{ij}/Q_j$, firm i's market share in industry j. This adjustment equation forms the basis of the empirical estimation.

For a given percentage increase in imports, <u>ceteris paribus</u>, firm output adjustment is a function of pre-reform firm size. Larger firms in Cournot equilibrium are characterized by lower marginal cost levels, where $C^i_q = b(w,e_i,K_i) + 2f(w,e_i,K_i)q_i$; such firms have lower e and/or larger K. If big firms have lower b than small firms, then the denominator of the first term is larger for big firms. This effect suggests a smaller percentage contraction for big firms. Note that the numerator of the first term is negative if industry marginal revenue slopes down. Therefore for convex demand,[12/] the numerator will be less negative for bigger firms, also suggesting a smaller percentage contraction for big firms. Both effects reinforce each other: assuming convex demand and a negative numerator, the numerator is less negative and the denominator

12/ The assumption of convex demand seems more appropriate than linear or concave demand as a working assumption to determine the likely direction of firm adjustment; isoelastic demand functions, for example, seem in general to fit data much better than linear functions.

is larger for big firms. Under these conditions, small firms are predicted to contract more in percentage terms than big firms in response to a given percentage increase in imports.

In the presence of an economy-wide shock (when $d\alpha \neq 0$), equation (7) highlights the existence of a firm size - firm adjustment relationship that is independent of the trade shock. For a growing economy, the likely positive second term (unless $p'_{\alpha}>0$ is sufficiently small in magnitude and $p_{Q\alpha}$ is sufficiently negative) will attenuate the firm output contraction from the loosening of the quota. Importantly, the magnitude of the per-firm adjustment to the economy-wide shock will also depend on pre-reform firm size. The relation between firm size and firm adjustment is more ambiguous here. Again, if big firms have lower b than small firms, then the denominator is larger for big firms. This effect here suggests a smaller percentage expansion for big firms. Given that $p'_{\alpha}>0$, the numerator reinforces this tendency if $p'_{Q\alpha}<0$ (as long as the second part of the term is not significantly less negative for big firms). However, the numerator suggests a larger expansion for big firms if $p'_{Q\alpha}>0$. While the extent of firm adjustment to an economy-wide shock clearly depends on pre-reform firm size, the direction of that dependence within this framework is a question that can only be resolved at the empirical level. Equation (7) underlines the importance of controlling for a more general relationship between size and adjustment in the empirical implementation in order to isolate the import-related size effect.

Within this model, for non-infinitesimal changes in imports, the same set of variables predicting firm output contraction also predict exit. Given the assumed convexity of the firm's cost function and recurring non-sunk fixed costs, exit is a consistent outcome to avoid large fixed costs. In concentrated industries with convex demand where differences in output between smallest and biggest firms are large, small firms contract more than large ones in response to an increase in imports, ceteris paribus, and very small firms exit. While the same analytic framework is used here to unify views of contraction and exit, the purpose in this section is merely to suggest which variables are significant in affecting firm output adjustment. More sophisticated, dynamic models are required for a detailed analysis of exit decisions given the irreversibility of asset dissolution.[13/]

One important extension to the comparative statics of equilibrium output in response to trade liberalization involves imported intermediate inputs. Typically, products which are used as inputs by a given industry are liberalized simultaneously with the lowering of trade barriers on the final good itself. This positive supply shock on the input side should be included in an assessment of the impact of trade liberalization on a particular industry. The simplest way to include concurrent liberalization of intermediate inputs is to consider the change in cost as reducing variable input costs uniformly across all firms within a given industry.[14/] If the liberalization of imported inputs lowers costs, then the effect on firm output of adding such a term is an expansionary one. Importantly, the magnitude of the cost reduction effect also in general depends on firm size. To the extent that small firms are big users of inputs per unit of output, the percentage drop in their costs will be more substantial than for big firms. Therefore, the addition of the cost reducing effect from the liberalization of imported inputs attenuates the predicted firm adjustment - firm size relationship in equation (7):

13/ See Dixit (1989) for a careful theoretical treatment of optimal inertia in investment decisions under uncertainty. When the output price follows a random walk, the exit trigger price is less than the variable cost minus the interest on the exit cost; the entry trigger price correspondingly exceeds variable cost. This band around the predictions of a static model suggests a forward-looking perspective on the variance of cost and demand as they affect firm profitability. However, lacking such proxies in the Moroccan data, this industry-specific noise is absorbed into industry dummies or the error term.

14/ In practice, different firms within an industry may rely on imported inputs to different degrees. The inclusion of data on changes in firm average unit cost, if available, would control for these differences across firms in the empirical implementation.

a given percentage fall in cost from the liberalization of imported inputs will have a larger expansionary effect on smaller firms.[15] However, with convex demand, small firms are predicted to contract more in percentage terms in response to an increase in imports as long as the impact of the output adjustment term captured in equation (7) outweighs this additional liberalization effect.[16]

While the main goal of this paper is to characterize the firm adjustment - firm size relationship in response to an exogenous change in imports, it is interesting to examine what the implications of the predicted pattern of output adjustment are for national welfare. Since this study focuses on the adjustment of incumbent firms to a loosening of import quotas, the welfare comparative statics will not consider the additional effects introduced from simultaneous economy-wide shocks. Let welfare from economic activity in industry j, W_j, be defined as the sum of consumers' surplus, producers' surplus and quota rents. Consumers' gross benefits are captured by the total area under the demand curve, $B(Q_j+M_j) = \int_0^{Q_j+M_j} p^j(z)dz$, so that:

$$W_j = [B(Q_j+M_j) - (Q_j+M_j)\cdot p^j(Q_j+M_j)] + \Sigma_i \pi^{ij}(q_{ij},Q_{-ij},M_j) + (p_j-p^*_j)M_j \tag{8}$$

where the existing quota protection has created a wedge between the world price p^*_j and the resulting higher domestic price p_j. Since the marginal gross benefits of output changes $B'(Q_j+M_j)$ are just measured by the prevailing domestic market price, the welfare effect of an exogenous change in imports, <u>ceteris paribus</u>, is given by:

15/ For an illustrative example of the analytics of simultaneous intermediate input liberalization, see the appendix.

16/ It is a plausible conjecture that small firms may be less involved in trade in their role as importers of intermediate inputs. Such a conjecture would strengthen the presumption that small firms contract more, in percentage terms. This empirical issue will be pursued in further work.

$$dW_j = -(Q_j+M_j)\bullet p'(dQ_j+dM_j) + \Sigma_i[q_{ij}\bullet p'(dQ_j+dM_j)+(p_j-C^{ij}_q)dq_{ij}] + (p_j-p^*_j)dM_j + M_j\bullet p'(dQ_j+dM_j) \tag{9}$$

The first term represents the effect on consumers' surplus of the price change from increased imports (and the aggregate output change in response to the import change); the next bracketted terms are the effect on profits, while the last two terms are the effect on quota rents ($dp^*_j=0$ under the small country assumption). The profit effect is decomposed into a direct price effect (the pre-reform output multiplied by the price change) and a firm output adjustment effect (markups multiplied by firm output changes). This expression is very general and holds for any theory of oligopoly behavior.

While the first two terms and the last term in equation (9) offset each other, it is the third term, the adjustment of output across firms, that is the focus of this study. Note that the first term represents the positive impact on welfare as the domestic price falls in response to increased imports. However, this effect is a transfer to consumers from firms and from holders of quota rents (who both receive a lower domestic price). The other remaining term represents the gain in quota rents from allowing additional imports to enter the country. By substituting equations (2) and (6) into (9) to re-express the firm output adjustment term, the welfare effect can be rewritten as:

$$dW_j = p'\bullet\Sigma_i\left(\frac{q_{ij}\bullet\lambda_{ij}}{1+\Lambda_j}\right)\bullet dM_j + (p_j-p^*_j)\bullet dM_j \tag{10}$$

The first term, the output adjustment term, which is identically $-p'\bullet\Sigma_i q_{ij}dq_{ij}$, can be decomposed into an aggregate output effect and a distribution of output effect. Given that $\Sigma_i q_{ij} dq_{ij}$ can be re-expressed [17] as $H_j Q_j dQ_j + ½Q_j^2 dH_j$ (where the domestic industry's Herfindahl index, $H_j = \Sigma_i (q_{ij}/Q_j)^2$), the effect of additional imports on welfare becomes:

$$\frac{dW_j}{dM_j} = -p' \frac{H_j Q_j^2}{M_j} \left[\frac{dQ_j}{dM_j} \frac{M_j}{Q_j} + ½ \frac{dH_j}{dM_j} \frac{M_j}{H_j}\right] + (p_j - p^*_j) \tag{11}$$

The first term within the square brackets, the responsiveness of aggregate output to the import change, is negative; less domestic production, with lower domestic profits, is socially harmful to the extent that profits are socially desirable. However, an increase in concentration as a result of additional imports is positive for welfare, as highlighted by the second term within the square brackets. Though the fall in aggregate domestic output puts downward pressure on profits and welfare, a re-distribution of domestic output from smaller, less cost efficient firms to larger more efficient firms would be welfare-improving.[18] To see whether concentration increases with imports, note that

$$dH_j = \Sigma_i \left[\left(\frac{q_{ij}}{Q_j^2}\right) \bullet \left(\frac{Q_j dq_{ij} - q_{ij} dQ_j}{(dQ_j)^2}\right)\right]$$

$$= 2 \bullet \Sigma_i [(s_{ij}/\omega_j) \bullet (\nu_j q_{ij} - \lambda_{ij} Q_j)] \, dM_j \tag{12}$$

where $\nu_j = (1+\Lambda_j)/(\Lambda_j^2 dM_j^2) > 0$ is constant across firms and s_{ij} again refers to firm market share. The sum of the terms in square brackets will be positive if λ_{ij} is

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17/ For a detailed derivation, see Farrell and Shapiro (1990a). Basically, $\Sigma q_{ij} dq_{ij} = ½d[\Sigma q_{ij}^2] = ½d[Q_j^2 H_j] = H_j Q_j dQ_j + ½Q_j^2 dH_j$.

18/ This general result under oligopoly with uneven short-run technologies has been noted in Lahiri and Ono (1988) and Farrell and Shapiro (1990a,b): national welfare will increase if a firm with a sufficiently low share is removed from the market despite the attendant increase in concentration. A similar effect occurs in the licensing model of Katz and Shapiro (1985).

decreasing in q_{ij}, the same condition encountered earlier in the firm output adjustment analysis.

III. Data

The empirical analysis is based primarily on firm-level data collected by Morocco's Ministry of Commerce and Industry for the years 1984 and 1987. The database contains the results of an exhaustive survey of all manufacturing firms employing 10 or more workers, as well as firms with less than 10 workers but with total sales revenues exceeding 100,000 DH (roughly U$10,000 at the average 1984-87 official exchange rate). The annual survey contains standard statistics at the firm level by main "activity" (1 observation per firm, where firms are classified according to a 4-digit Moroccan industrial nomenclature), including total sales revenue, value of production, total wage bill and year of creation. However, for 1984 (at the onset of the trade liberalization) and for 1987 (four years into the program), the survey also contains much more disaggregated firm-level data by "product" (up to 6 observations per firm depending on the number of products produced by each firm, where the 4-digit codes are broken down further to a 6-digit level). This more detailed data includes value of production, quantity produced and capacity ("realizable", in quantity terms). Employment data are not available at this level of disaggregation. Consequently, this study uses production values as a measure of firm size, and changes in production values (deflated) as a measure of firm adjustment. Since the analysis focuses on firm output adjustment, I limit the empirical analysis to these two years. The level of aggregation chosen is the 5-digit level of the Moroccan industrial nomenclature (referred to as "product-groups" in the Moroccan nomenclature, and henceforth referred to as "industries"); this level was chosen due to sometimes inconsistent reporting practices for the same firm across different 6-digit products within the same 5-digit "industry".

Data on import values and degree of quota protection were collected and matched to the industrial nomenclature at the same level of disaggregation.[19/] Import data only cover one of the three import regimes in Morocco, namely goods imported directly for domestic use. However, the main impact of trade liberalization policies must be reflected in these numbers, since goods imported under the temporary admission regime (inputs for both direct and indirect exports) benefitted from a free-trade status both preceding the trade reforms and throughout the liberalization period, while goods imported under the industrial investment codes (specific capital goods) were exempt from customs duties. There is furthermore no evidence of major shifts in goods between import regimes.[20/] The "degree of quota protection" variable summarizes whether the products contained within a given industry are either in list A (freely importable) or under some quantitative restriction (in list B - importable under authorization (license) or in list C - prohibited); there are unfortunately no data available on the actual size of quota per product. For each of the two years, the quota variable records the share of 6-digit BTN codes within a given industry that are under a controlled list (lists B or C). In practice, the correlation between a loosening of quotas as captured by this quota variable and a corresponding increase in imports is not as strong as one would expect since it is commonplace for a larger or smaller number of import licenses to be granted with no corresponding movement between quota lists.

19/ Since a complete trade data set from Morocco was not available, data used as an input to a World Bank study (1987a) were used. Trade data for 1987 at this level of disaggregation were not available, so 1986 data were used. Data for 1986, however, seem to be a good instrument for 1987 since at a more aggregate level (at the 3-digit "sub-sector" level), 1987 figures are very similar to 1986 figures; according to these aggregate figures, the largest changes in imports occured between 1984 and 1986.

20/ See ibid., Vol. III, Annex IV, p. 11.

The study examines the behavior of firms in industries dominated by private ownership and not subject to heavy government price regulation.[21] Furthermore, the sample under consideration is restricted to industries that are "domestic-oriented", that is, where exports account for less than 10 percent of production.[22] Since the study attempts to determine the variables affecting adjustment of incumbent firms within particular industries, industries that disappeared entirely from the data set between 1984 and 1987, and those that appeared only after 1984 are excluded. Industries where the real value of imports actually fell between 1984 and 1987 were excluded, except where import quotas were concurrently tightened. Finally, since the study focuses on firm size as an important determinant of adjustment, single-firm industries and industries where the entire population of incumbents exits are also excluded.[23] The sample under study therefore consists of 82 5-digit industries. There were 741 firms operating in these 82 industries in 1984. Since over 40 percent of these firms are multi-product (producing output in more than 1 industry in the full data set), the number of these "firm-industry" observations is higher (if a given firm produces positive output in 3 industries, it is counted 3 times here). There were 895 firm-industry observations in the 82-industry sample in 1984.

21/ Due to limits of data availability, the relevant industries satisfying this and the following criteria were chosen based on the more aggregated 3-digit sub-sector classification. Sub-sectors with more than 50 percent state ownership or subject to major government price regulation include fertilizer, pulp and paper, sugar, tobacco, edible oils, grain processing, bakeries, milk, animal feed, cement and chemicals. See World Bank (1987b), p. 63.

22/ The impact of trade liberalization is expected to be very different in export-oriented sectors that benefit from temporary admission schemes (duty-free import of all inputs, with no license required for imports otherwise subject to quota or prohibited). While this paper focuses on the adjustment of import-competing industries, the next project envisioned is to examine the adjustment of exporting industries in response to the array of export-promotion policies implemented.

23/ A separate study on the response of single-firm industries to trade liberalization is another project for future work.

Some summary statistics on relevant firm and industry variables are reported in Table 1. The statistics include total number of observations in the sample under consideration for each variable, as well as the sample mean and quartiles for each variable. All percentage change production and import figures are expressed in real terms, with 1987 values deflated by 2-digit sectoral deflators for domestic production values, and by 3-digit sub-sectoral deflators for import values. The industries under consideration are characterized by increasing imports, with the median industry corresponding to a roughly 80 percent real increase over the 1984 import level (a few instances exist where products were moved from the freely importable list A to a more restricted list requiring licenses). While the aggregate domestic value of production declined in real terms for more than half of the industries, the remaining industries expanded domestic production. This effect can no doubt in part be attributed to the liberalization of imported inputs into some of these industries, though the available data does not allow this effect to be isolated. The exit share variable captures the value of 1984 domestic production in each industry accounted for by exiting firms (firms that are no longer recorded in a particular industry in the 1987 data set); the entry share variable, on the other hand, captures the value of production accounted for by new entry between 1984 and 1987, as a fraction of 1984 production. At the median, slightly less than 40 percent of the value of 1984 industry output exited the industry by 1987; concurrently, new entrants' production at the median accounted for slightly less than 20 percent of the value of 1984 industry output. The remaining industry statistics reflect the concentrated structure of most industries in the sample. The median industry in 1984 consists of 7 firms and exhibits an increase in concentration between 1984 and 1987, as measured by changes in the Herfindahl index as well as by changes in the 1-firm concentration index (the percentage of total industry sales constituted by the largest firm in each year).

Firm summary statistics are reported in the second half of Table 1. The firm adjustment variable ($\Delta \ln q_{ij} = \ln(q87_{ij}/q84_{ij})$), representing percentage adjustment in real value of production by firm i in industry j is clearly only available for surviving firms. Firms below the 25th percentile are very small, as measured both by firm share as well as by firm employment. One quarter of firms in the sample hire between 1 and 10 employees, a second quarter hire between 10 and 25 employees, a third quarter between 25 and 70 employees, and the largest firm hires roughly 1400 employees. The firm age variable classifies firms into 5 groups of roughly equal number according to their reported year of creation: 1 represents the youngest firms (with year of creation between 1981 and 1984), 2 represents firms that have operated in some product-line for between 4 and 7 years, 3 represents firms that are between 8 and 13 years old, and 4 and 5 capture the older firms.

IV. Statistical Framework and Empirical Results

The empirical work focuses specifically on the distribution of output adjustment of incumbent firms to changes in imports following a trade liberalization episode. In particular, the objective is to examine how percentage changes in firm production depend on percentage changes in imports, and whether the adjustment is more pronounced for smaller or larger firms. The theoretical model in this paper, with cost differences explaining size differences, predicts that firms will contract in response to an increase in imports (the expression multiplying dM/M in equation (7) is negative for all firms); with convex demand and larger firms characterized by a lower efficiency parameter e and/or a larger quantity of sunk assets K, the model predicts that small firms will contract more in percentage terms than larger firms. Under such conditions, a shift in resources from smaller to larger, more cost efficient firms would be welfare-improving.

The proportional adjustment equation, equation (7) forms the basis of the empirical estimation. It expresses the percentage change in firm output in response to a percentage change in imports as a function of firm share. The additional effect of simultaneous intermediate input liberalization will also be controlled for. By replacing the infinitessimal percentage changes in equation (7) with changes in logs, the import-related firm output relationship can be expressed as:

$$\Delta \ln q_{ij} = f(SH84_{ij}, \Delta \ln M_j, \alpha; \Delta AC_{ij}) \tag{13}$$

where $\Delta \ln q_{ij}$ represents percentage adjustment in real value of production by firm i in industry j, $\Delta \ln M_j$ represents percentage real import adjustment in industry j, and $SH84_{ij}$ represents firm i's pre-reform share of aggregate domestic production value for industry j. In addition, a variable that represents the change in firm i's average cost between 1984 and 1987 in the production of "product" j, ΔAC_{ij}, should be included to capture the potential expansionary effect on output of lower-cost liberalized inputs. However, while the Moroccan industrial data set has very detailed production figures for 1984 and 1987, it contains very little cost data, and no data on material input costs. To the extent that firms in closely-related industries use a roughly similar basket of imported inputs, the cost impact of input liberalization will vary systematically across broad groupings of industries. To capture these sectoral fixed effects, sector-specific intercepts were included at progressively finer levels of disaggregation (from the 2-digit "sector" level to the 4-digit "activity" level).[24] Results are reported for the 2-digit sectoral level, where the 82 industry sample is grouped into 14 sectors, since finer levels of disaggregation result in lack of degrees of freedom due to insufficient observa-

24/ While the fixed effects capture the average change in unit cost for firms within a given sector, they also capture productivity and technology differences and changes in markups, among other effects, to the extent that they vary across sectors. An input-output table of the Moroccan economy, when available, will permit a more careful grouping of industries along input-use lines.

tions for many groupings. Although inclusion of sectoral fixed effects is an imperfect way to control for the change in cost due to the concurrent liberalization of intermediate inputs, it is the only method available to control for such an effect given the paucity of cost data for 1984. Results including these sectoral fixed effects will be reported in the appendix.

The hypotheses to be tested are whether firm adjustment is sensitive to imports in the expected direction, and whether the distribution of firm output adjustment follows the predicted pattern. The theoretical model presented in this paper suggests that the larger the percentage increase in imports, the more significant the percentage contraction in firm output, on average. Importantly, for convex demand, smaller firms are expected to contract more in percentage terms than larger firms, on average. To test these two hypotheses, the functional relationship in equation (13) can be estimated by regressing $\Delta \ln q_{ij}$ on $\Delta \ln M_j$ and on $\Delta \ln M_j$ interacted with $SH84_{ij}$. For convex demand, the theoretical model predicts a negative relation between $\Delta \ln q_{ij}$ and $\Delta \ln M_j$ which is less negative the larger the firm: the model therefore predicts a negative coefficient on $\Delta \ln M_j$ but a positive coefficient on percentage change in imports interacted with firm share. While a regression with these two right-hand side variables captures the link between import-related firm output adjustment and firm size, it does not isolate the particular import-related effect from other economy-wide effects that may have an important impact on firm adjustment.

It is important to include additional variables in a more general regression equation to control for industry-specific and economy-wide effects. The form of the estimation equation (<u>adjustment equation</u>) that will be the focus of discussion therefore is:

$$\Delta \ln q_{ij} = \beta_0 + \beta_1 \Delta \ln M_j + \beta_2 (SH84_{ij} \cdot \Delta \ln M_j) + \beta_3 (H84_j \cdot \Delta \ln M_j) + \beta_4 SH84_{ij} + \beta_5 F_h + \epsilon_{ij} \quad (14)$$
$$= \beta_0 + (\beta_1 + \beta_2 SH84_{ij} + \beta_3 H84_j) \cdot \Delta \ln M_j + \beta_4 SH84_{ij} + \beta_5 F_h + \epsilon_{ij}$$

The newly-introduced variables include the non-interacted firm size variable (to control for economy-wide effects that may affect the firm output adjustment - firm size relationship), ΔlnM_j interacted with $H84_j$ where $H84_j$ represents industry j's Herfindahl index (to control for industry-specific effects, as explained below), and F_h which represents a vector of sectoral dummies (to control for changes in cost from input liberalization across sectors, where h indexes the 14 sectors in the sample). The appendix contains results for different alternate specifications.

It seems most natural to estimate a separate relationship for each industry. However, lack of degrees of freedom due to insufficient observations for industries with few firms, and the attendant selection bias introduced by examining only industries with many firms suggests pooling the data across industries while controlling for industry effects. One effect that could only be captured in a cross-section is the impact of capital market conditions that cut across industries on the investment decisions of high versus low efficiency firms. The results to be discussed reflect the estimation of equation (14) across all industries. In order to judge where coefficients should be allowed to vary across industries and where it may be more efficient to estimate a single coefficient across all industries, a series of F tests were performed on the various combinations of intercept industry dummies and slope industry dummies for the first two right-hand side variables. The hypothesis that all industry coefficients are jointly insignificant could not be rejected in any of these cases. The implication is that pooling the data and estimating one set of coefficients across industries may not be inappropriate. In order to allow the coefficient on ΔlnM_j to vary across industries (in addition to the variation across firms captured by the interaction term between firm share and ΔlnM_j), the impact of including one of the few additional available variables that varies across industries, the industry-specific Herfindahl index, was examined. Inclusion of such an industry-specific variable reflects a compromise between including separate slope dummies for each industry and constraining the coefficient to be the same across all industries.

A possibly important statistical issue that arises in estimating equation (14) concerns sample censoring. Firm output adjustment, here defined as the logarithmic change in real production value, can only be calculated for firms that did not exit from the database between 1984 and 1987. Since there exist a substantial number of observations for the independent variables that correspond to a dependent variable that is not observable, the sample is said to be censored. A qualitative firm survival variable, S, is coded as 1 if firm i in industry j is in the data set in both 1984 and 1987, and as 0 if the firm was in the data set in 1984 but not in 1987. Out of the total 895 firm-industry pairs operating in 1984, 52 percent of them exited from a given industry at some time over the 4 years (recall that under this calculation, a given firm exiting from three different industries is recorded as three exits); total exits accounted for a loss of 38 percent of the total 1984 production value in these industries.[25] When interpreting these figures, it is important to realize that they describe movement out of the database. Therefore, a firm with total sales revenue below 100,000 DH where employment falls below 10 workers may be dropped from the survey. A firm switching from one industry to a second one appears as an exit from the first. In addition to voluntary dissolution, exiting firms may have been acquired by other firms, may have merged with other firms, or finally may have been assigned a new firm identification

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25/ These figures seem high when compared to other empirical evidence on firm exit. In a Wisconsin industrial panel, 45 percent of firms active in 1978 exited over the subsequent 8 year period (see Pakes and Ericson, Table 1). In Chile over the period 1977-85, 21.6 percent of new plants exit, on average, within one year. The percentage of exits decrease as the plants age, stabilizing at approximately a 13 percent exit rate per year for plants that are more than 3 years old (see Roberts, pp. 21-2). However, it is important to note that in contrast to other studies, the sample of industries under consideration here is restricted to import-competing industries characterized by substantial increases in imports over the given four-year period.

code due to recording error or may have been assigned a different product code due to inconsistent reporting practices or recording error.[26]

The following framework is used to illustrate the potential source of bias from estimating equation (14) on the censored sample, and to motivate the chosen estimation method that controls for this sample selection bias. It is a standard generalized Tobit model. The dependent variable $\Delta\ln q_{ij}$ is observed, in the sense that data is available from a give~ firm in both the beginning and ending period, only if another set of observable variables $\mathbf{Z}_{ij}$ together with a random component ν_{ij} exceed a threshold c; as mentionned in the preceding paragraph, let $S_{ij}=1$ when $\Delta\ln q_{ij}$ is observed, and $S_{ij}=0$ when it is unobserved. Observed data is generated according to the following decision rule, where ν_{ij} and ϵ_{ij} are assumed to have a bivariate normal distribution with zero means, variances σ_ν^2 and σ_ϵ^2, and correlation $\rho_{\nu\epsilon}$:

$$\begin{array}{lll} \Delta\ln q_{ij} = \mathbf{X}_{ij}\beta + \epsilon_{ij} & \text{if } \mathbf{Z}_{ij}\delta + \nu_{ij} \geq c & \text{(survival; } S_{ij}=1) \\ \Delta\ln q_{ij} \text{ not observed} & \text{if } \mathbf{Z}_{ij}\delta + \nu_{ij} < c & \text{(exit; } S_{ij}=0) \end{array} \qquad (15)$$

If the observations for which $\mathbf{Z}_{ij}\delta + \nu_{ij} < c$ are ignored, the l·ast squares estimators will be biased and inconsistent. To see this, note that while $E\epsilon_{ij} = 0$ is assumed to be true for the population at large, this may not hold for the observed (censored) subsample. In particular, note that the expectation of observed values of $\Delta\ln q_{ij}$ conditional on $\mathbf{Z}_{ij}\delta + \nu_{ij} \geq c$ is:

$$\begin{aligned} E(\Delta\ln q_{ij} \mid \mathbf{Z}_{ij}\delta + \nu_{ij} \geq c) &= \mathbf{X}_{ij}\beta + E(\epsilon_{ij} \mid \mathbf{Z}_{ij}\delta + \nu_{ij} \geq c) \\ &= \mathbf{X}_{ij}\beta + E(\epsilon_{ij} \mid \nu_{ij} > c - \mathbf{Z}_{ij}\delta) \\ &= \mathbf{X}_{ij}\beta + \rho_{\nu\epsilon}\sigma_\epsilon\mu_{ij} \end{aligned} \qquad (16)$$

26/ A careful examination of the data revealed a considerable number of cases of this last source of measurement error for a given firm across different 6 digit products within the same 5-digit level of aggregation. This was the main reason for choosing to work at the 5-digit level of aggregation.

where the conditional expectation of the error term varies with X_{ij}.[27] Note that this conditional expectation is equivalently $\rho_{\nu\epsilon}\sigma_{\epsilon}\mu_{ij}$, where μ_{ij} is the inverse Mills' ratio (also known as the hazard rate in reliability theory), which is the ratio of the density to the cumulative distribution of a standard normal random variable evaluated at $Z_{ij}\delta/\sigma_{\nu}$. Ordinary least squares estimation of equation (14), ignoring the censored sample problem, omits the second term on the right-hand side of equation (16). The conditional expectation of the error term, $\rho_{\nu\epsilon}\sigma_{\epsilon}\mu_{ij}$, can be interpreted as an omitted variable in the specification of the original adjustment equation (14). To correct for this sample selection bias, Heckman's (1976) two-step estimation method is used.[28] The first step is to estimate a probit model (a survival equation) where the qualitative dependent variable (S_{ij} is 1 or zero depending on whether $\Delta \ln q_{ij}$ is observed or not) is regressed on the observed Z's; this provides a consistent estimator for μ_{ij}. The estimation of this survival equation is of course informative in its own right. The second step then consists of estimating the adjustment equation (14) on the censored sample, where the information from the survival equation is now included to correct for the sample selection bias. In this application, the variables in the survival equation (the Z's) and in the adjustment equation (the X's) are the same; absent certain financial firm variables (which are not available in the present Moroccan data set), it is not clear which real-side variable might explain the exit decision but not the surviving firms' adjustment decision.

The main estimation results are reported in Table 2. Results of the survival (probit) regression and the adjustment equation correcting for sample selection

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27/ See Griliches, Hall and Hausman (1978), pp. 144-5 for the detailed link between the second and third equations.

28/ For a careful exposition, see Amemiya (1985), pp. 368-72 and Maddala (1983), pp. 231-4, and for recent applications to the firm growth-size relationship, see Evans (1987a,b) and Hall (1987).

bias are reported in the first four columns. The estimated coefficient on the inverse Mills' ratio is positive and significantly different from zero.[29] The implication is that the disturbances of the survival and adjustment equations are positively correlated. The coefficients are therefore expected to be biased absent an appropriate correction. The corrected adjustment equation should, in principle, form the basis of the analysis. While the corrected adjustment equation exhibits multicollinearity,[30] the estimates do not seem too imprecise. The results of a second series of ordinary least squares regressions that were run on the adjustment equation are reported in the last two columns of Tables 2. This time, selection bias was not corrected for to avoid potential identification problems.

Discussion of results will proceed by first examining the estimates from the survival equation followed by an examination of the estimates from the adjustment equation; a subsequent paragraph summarizes the combination of exit and survivor adjustment effects at work. The estimates from the survival equation, columns 1 and 2 of Table 2 show that the probability of survival falls with imports, as predicted. When focusing exclusively on the relation between survival and import change (Table 2, column 1), the coefficient on import change is negative and significant; the negative coefficient on import change together with the coefficient on the crossproduct of firm

29/ The estimated coefficient on the inverse Mills' ratio is also significantly different from zero in all cases reported in the appendix except in the case where the 13 sectoral dummy variables are included; in this case, all estimates are measured with much less precision.

30/ Collinearity diagnostics, including an examination of the eigenvalues of the first moments matrix and the principal components of estimate variances, highlight that the inverse Mills' ratio, μ, is highly collinear with other regressors, in particular the constant term. Basically, there is a potential identification problem. Since the variables in the survival and adjustment equations are the same (no appropriate instrument comes to mind), identification of the parameters in the adjustment equation comes only from the nonlinearity of the Mills' ratio term.

share and import change imply that at the sample mean, a 1 percent increase in imports results in a .12 percent fall in the probability of survival. In industries with a larger percentage change in imports, the probability of exit is higher on average. The significant positive coefficient on firm share interacted with exit, on the other hand, implies that for a given increase in imports, larger firms have a higher probability of survival. With respect to the survival-exit decision, small firms appear to bear the brunt of adjustment and exit in greater numbers.[31/]

Importantly, the flavor of results is also robust to the inclusion of controls for the underlying firm adjustment - firm size relationship that is independent of the import change (due to economy-wide shocks, for instance) (Table 2, column 2). Non-interacted firm size (firm share) positively affects the survival-exit decision: larger firms have a higher probability of survival. While firm share interacted with imports is no longer a significant separate determinant of exit when adding these control variables, firms in industries with larger increases in imports still have a higher probability of exit. However, when total employment is used to control for the general firm size effect (appendix, Table A-3, columns 1 and 2), the probability of exit in response to the loosening of quotas is once again signficantly higher for smaller firms.[32/]

An examination of the results from the estimation of adjustment equations will focus on the equation that corrects for sample selection bias (columns 3 and 4 in Table 2), since the disturbances of the survival and adjustment equations are

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31/ These results are robust to the inclusion of sector dummy variables (see the appendix, Table A-1, column 2); the coefficients on import change and import change interacted with firm share are not very sensitive to whether sector dummies are included.

32/ Total employment as a measure of firm size is a much less significant independent determinant of firm survival than firm share. This may be due largely to the fact that this variable is not disaggregated according to the different industries in which a given firm operates in.

strongly positively correlated; the estimates with and without the sample selection correction are quite different in value. When focusing exclusively on the impact of imports on adjustment (Table 2, column 3), industries with larger increases in imports are characterized by firms with larger percentage contractions of firm output, on average. The significant negative coefficient on import change, together with the coefficient on the interaction term of import change with firm share evaluated at the sample mean implies that a 1 percent increase in imports results in a 1.51 percent contraction in firm output, on average. Importantly, surviving small firms also contract more in percentage terms than remaining large firms: the coefficient on firm share interacted with import change is significantly positive.33/

On the other hand, the results from surviving firm adjustment seem more robust to the inclusion of controls for non-import-related size effects (Table 2, column 4) than the results for survival-exit. Size is a significant independent determinant of adjustment: larger firms contract less in percentage terms than smaller firms. Importantly, controlling for this general size effect, adjustment of firms is still significantly sensitive to import changes in the expected direction, with smaller firms contracting more in percentage terms than larger firms in response to the increase in imports. As in the survival equations, the impact of firm size on import-related adjustment (as

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33/ The results on adjustment of surviving firms are less robust to the inclusion of sector dummy variables (appendix, Table A-1, column 4) than the results on survival-exit. This is no doubt in part because the sample is one-half as large as that for the survival equation, so the addition of these dummies leads to less precise estimates; the coefficient on import change and import change interacted with firm share are much smaller in size once these dummies are included and intra-sector variation is controlled for. The only variation from imports now arises from inter-industry variation within a given sector rather than from variation across sectors.

captured by the interaction term between imports and firm size) is much stronger when the employment measure of size is used as a control.[34]

The empirical evidence on within-industry resource shifts following trade liberalization presented here suggests that two apparently reinforcing effects are at work. These results are consistent with the implications of the theoretical framework presented in Section II. First, the significantly more pronounced exit of smaller firms (from the probit equation) suggests that resources may be shifting from small firms to larger incumbent firms in the industry or to other growing sectors of the economy. To be able to make a clear inference regarding underlying resource shifts, however, it is important also to examine the behavior of entrants.[35] The second effect at work is the more pronounced contraction of small surviving firms relative to larger firms, which may augment any resource shift from small to larger firms. Here, the crucial question is whether a more pronounced contraction in percentage terms for smaller firms actually translates into a transfer in levels of resources from small to larger firms.

The implication for welfare of the direction of within-industry resource shifts following trade reform depends on the relationship between firm size and cost efficiency. If, as the theoretical framework suggests, large firms are more cost efficient, then an aggregate shift of resources from smaller to larger firms is welfare-improving. An empirical estimate of this size-cost relationship is therefore very relevant to the welfare implications of firm output adjustment. Given limited data availability (in particular, the lack of more extensive input cost data), a natural relationship to estimate is that between firm size and firm average variable cost. Firm average

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34/ See the appendix, Table A-3, columns 3 and 4.

35/ This is the subject of current work.

variable cost is here proxied by the firm's wage bill as a fraction of the firm's quantity produced.[36] To the extent that firms within the same finely-disaggregated 6-digit classification produce goods of similar quality but with different price structures (different markups due to local market power), it is preferable to deflate the firm's wage bill by physical units. Since it is not possible to allocate a given firm's wage bill to its constituent products, it is appropriate to restrict the analysis to that sub-sample of firms where revenues from a single 6-digit product constitute a preponderant share of total firm revenues. For those firms, the equation I estimate is:

$$\frac{q84_{ij} - mq84_j}{mq84_j} = \beta_j \left(\frac{AC84_i - mAC84_j}{mAC84_j}\right) + \epsilon_{ij} \qquad (17)$$

where $q84_{ij}$ is firm i's 1984 physical quantity produced in the 6-digit product line j, $AC84_i$ is, as mentionned above, firm i's wage bill divided by firm i's quantity produced, and m-prefixes denote product-line mean values.

The natural relationship I wish to estimate is that between firm size and firm average cost in each product-line, normalizing by product-line means since I estimate one relationship across all industries in addition to estimating the relationship on a product-line by product-line basis. However, there is only one free parameter to estimate in such a regression of values relative to mean against other values relative to their mean. A re-expression of that relationship yields equation (17). The highly significant negative estimated coefficient in a regression run across product-lines suggests that larger than average firms in a particular product-line tend to have lower than average costs in that product-line.[37] While it seems more appropriate to estimate

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36/ Such a proxy is more appropriate the more likely it is that the firm's labor costs are proportional to total variable costs.

37/ Equation (17) is estimated on 343 firm-product observations, which includes 76 distinct product-lines (where the given product's revenues accounts for at least such a relation on a product-line by product-line basis, many product-lines within the 76 product-line sub-sample consist of 2, 3 or 4 firms.[38] To estimate a relation on a product-line by product-line basis, a further reduced sub-sample was examined where each product-line consisted of at least 9 firms (this sample consists unfortunately of only 9 product-lines). Product-line results from this 113 observation sub-sample are reported in Table 3. All product-line coefficients are negative, and two are significantly different from zero (one at the 1.5% level, the other at the 6.5% level). Although an inference from this result to a positive size-efficiency relationship must be tentative, these findings represent suggestive evidence that larger firms are more efficient, on average.[39]

V. Conclusions

Over the period 1984 to 1987, a major liberalization of restrictive trade policies was implemented in the Moroccan manufacturing sector. The level of imports changed across different industries according to each industry's degree of liberalization. Such a trade liberalization (shocks exogenous to individual firms) provides a natural experiment that permits the testing of specific theories of firm output adjustment both across the different firms within a given industry and across industries. In addition, the relative output adjustment of individual firms within a given industry in response to these shocks provides evidence of the underlying shift in resources occuring across firms. Such shifts in resources within an industry may in turn represent an additional

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90 percent of total firm revenues). The parameter estimate on the firm relative cost variable is -.376, with a standard error of .066.

38/ An F test performed on this 76 product-line sample does not allow rejection of the hypothesis that all coefficients are jointly insignificant.

39/ Future work will examine the firm size - cost efficiency relationship in greater detail.

source of welfare gain to the economy from trade liberalization if resources shift from relatively less cost efficient firms to more efficient ones.

The main focus of this paper has been on exploring the distribution of output adjustment among incumbent firms to the changes in imports following a particular trade liberalization episode. A domestic oligopoly model where competing firms are not equally efficient, with perfectly substitutable imports fixed at some exogenous pre-reform level, provides the theoretical framework for the study. A higher level of imports as the trade restrictions are relaxed then shifts the residual demand facing domestic suppliers. Such a model predicts that firm output contraction will be larger the greater the increase in imports. Among other factors, the model predicts that each firm's output adjustment will depend on its pre-reform equilibrium output. Firm output, in this context, serves as a proxy for firm cost; within such an oligopoly model, firms with lower marginal cost have larger equilibrium output levels. Whether smaller firms contract more than larger firms depends on the slope and curvature of demand and cost functions, and the firm's conjectural variation parameter. The analytics suggest that, given convex demand, small firms will contract more than larger firms, in percentage terms.

The empirical evidence supports the postulated link between imports and adjustment, and importantly, the link between import-related firm output adjustment and firm size. On average, firm contraction is more pronounced the larger the increase in imports. There appears to be a significant negative relationship between import-related firm adjustment and firm size. Focusing first on the exit decision, it is found that the probability of exit in response to an increase in imports is significantly larger among small firms than among large firms. When examining the behavior of survivors, small firms contract more in percentage terms than remaining larger firms. These results suggest that small firms are more likely to bear the brunt of any aggregate output contraction in response to an increase in imports. Such a finding, together with the suggested positive firm size - firm efficiency relationship in the data, supports the view that trade liberalization may well result in welfare-improving output re-adjustments.

The results of this paper represent a first step in the analysis of firm adjustment to trade liberalization. Though it appears that, on average, small firms contract more in percentage terms than larger firms in response to a given increase in imports, the impact on welfare of output re-adjustments between firms depends on the aggregate level of resource shifts within particular industries. While the paper shows that output in small firms contracts more than output in large firms, it presents no evidence of a shift of production from small to large firms. Current work in progress is directed at the calculation of the most meaningful summary statistics for the change in the level of resources underlying the percentage changes in adjustment, taking the estimated parameters into account. One additional element to a full understanding of the direction of resource shifts following trade liberalization is a careful examination of entry behavior. It is clearly relevant whether entering firms, on average, have lower average costs than exiting firms or not. While the econometric specification posited in this paper controlled for certain industry specific effects, alternative specifications to control for and to estimate varying properties of industry demand across industries can be estimated. The assumption of perfect substitutability between domestic and foreign production, and between domestic output of different firms within the same 5-digit industry can be relaxed in industries where the variance in unit values across firm outputs within a given industry is large. Additional insights are likely to emerge soon from ongoing work in these areas. As mentioned, the detailed analysis of single-firm industries in response to import liberalization, and the analysis of export-oriented industries, are productive areas for future work.

Table 1
Summary Statistics: (a) Industry variables

(standard errors in parentheses)

Variable	Total No. Obs.	Mean	Lower Quartile	Median	Upper Quartile
%Δ Ind. Imports ($\Delta \ln M_j = \ln(M87_j/M84_j)$)	82	1.091 (.131)	.136	.605	1.822
%Δ Ind. Production ($\Delta \ln Q_j = \ln(Q87_j/Q84_j)$)	82	.016 (.099)	-.551	-.031	.406
Exit Share ($\Sigma_{S=0} q84_{Sj}/Q84_j$)	82	.377 (.033)	.061	.374	.640
Entry Share ($\Sigma q87_{new}/Q84_j$)	82	.644 (.196)	.054	.182	.561
No. Firms 84	82	10.915 (1.299)	4	7	14
Herfindahl 84 ($\Sigma_i (q84_{ij}/Q84_j)^2$)	82	.346 (.021)	.187	.294	.501
%Δ Herfindahl ($(H87_j - H84_j)/H84_j$)	82	.192 (.066)	-.187	.057	.399
1-Firm Conc.84 ($q84_{largest,j}/Q84_j$)	82	.454	.302	.405	.579
%Δ 1-Firm Conc. ($(CR87_j - CR84_j)/CR84_j$)	82	.190 (.056)	-.163	.089	.448

Table 1
Summary Statistics: (b) Firm variables

(standard errors in parentheses)

Variable	Total No. Obs.	Mean	Lower Quartile	Median	Upper Quartile
Firm Share ($SH84_{ij}=q84_{ij}/Q84_j$)	895	.092 (.005)	.005	.022	.109
Firm Employment 84 ($TL84_j$)	741	68.00 (4.60)	10	24	69.5
Firm Adjustment ($\Delta \ln q_{ij}=\ln(q87_{ij}/q84_{ij})$)	429	.166 (.052)	-.378	.144	.620
Firm Age 84 (AGE_i)	741	3.059 (.050)	2	3	4

Table 2
Import-Related Firm Adjustment

(OLS standard errors in parentheses; White's heteroskedasticity-consistent standard errors in brackets)

	Probit Survival equation[1] (obs = 895) Maximum Likelihood		Selection Correction Adjustment equation (obs = 429) O.L.S.		Uncorrected Adjustment equation (obs = 429) O.L.S.	
	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	.087	-.064	-13.487	-15.150	.239	.373
	(.063)	(.076)	(4.328)	(3.508)	(.075)	(.095)
			[5.166]	[3.398]	[.073]	[.099]
%Δ	-.175	-.104	-2.133	-1.419	-.034	-.105
Ind.Imports	(.044)	(.048)	(.664)	(.303)	(.057)	(.065)
($PERM_j$)			[.791]	[.300]	[.064]	[.073]
Firm Share •	.644	.040	6.845	1.118	-.299	.174
%ΔImports	(.177)	(.045)	(2.261)	(.354)	(.204)	(.288)
($SH84_{ij} \cdot PERM_j$)			[2.742]	[.334]	[.231]	[.274]
Firm Share		1.428		13.552		-.979
($SH84_{ij}$)		(.406)		(3.309)		(.423)
				[3.168]		[.371]
Inverse Mills' ratio			18.508	18.695		
(μ_{ij})			(5.835)	(4.223)		
			[6.964]	[4.106]		

[1] Regressions labelled by (1) exclude controls for non-import related size effects and industry-specific effects while those labelled by (2) control for these effects.

Table 3
Firm size - Cost efficiency Relationship

(OLS standard errors in parentheses)

$$\frac{q84_{ij} - mq84_j}{mq84_j} = \beta_j \frac{(AC84_{ij} - mAC84_j)}{mAC84_j} + \epsilon_{ij}$$

(obs = 113)

Product-line		
153111	-.392	(.918)
203110	-.204	(.272)
203117	-.249	(.355)
203220	-.343	(.427)
257191	-3.136	(1.248)
263110	-1.121	(.598)
263210	-.273	(.460)
263440	-.181	(.279)
271110	-.438	(.455)

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Appendix

Simultaneous Intermediate Input Liberalization

Let firm i's short-run technology be summarized by the variable cost function:

$$C^{j}(w,q_{ij},e_{ij},K_{ij}) = g^{j}(w)\bullet e_{ij}\bullet[q_{ij}+f^{j}(K_{ij})q_{ij}^{2}/2]$$

where $g^{j}(w)$ captures the prices of variable inputs and $f' < 0$ so that additional capital lowers the marginal cost curve.[40] This is a special form of the general technological representation embodied in equation (1). Implicit in this simplified linear relationship between variable factor prices and output is the assumption that the ratio of variable inputs is independent of output. Assume that liberalization of intermediate inputs reduces $g^{j}(w)$ uniformly across all firms within the industry and that there are no economy-wide shocks. Totally differentiating firm i's first-order condition (equation 2) where $dg^{j} < 0$ and substituting in the industry output response yields:

$$dq_{ij} = \frac{[p_j'+q_{ij}p_{jj}'']}{C^{ij}_{qq}-p_j'}\bullet\frac{dM_j}{1+\Lambda_j} - \frac{C^{ij}_{qg}}{C^{ij}_{qq}-p_j'}\bullet dg^{j}$$

Given the assumed technological specification, $C^{ij}_{qg} = C^{ij}_{q}/g^{j} > 0$ such that a fall in the cost of imported inputs lowers marginal cost. This effect tends to offset the output contraction in response to the increase in final good imports; the magnitude of the effect (the extent to which it offsets the fall in output) clearly depends on the size of input liberalization and the input's importance in the production process. Importantly, the

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40/ The basic form of this variable cost function, absent the efficiency parameter and the factor price term, has been used by Perry and Porter (1985), and more recently by Farrell and Shapiro (1990b) to examine the effects of changes in the ownership of productive assets in an oligopoly context.

magnitude of the cost reduction effect also depends on firm size: in equilibrium, larger firms have lower marginal cost, hence lower C^{ij}_{qg}. By re-expressing the term multiplying dg^j in terms of output, in a manner similar to the derivation of equation (7)[41/], the augmented adjustment equation becomes:

$$\frac{dq_{ij}}{q_{ij}} = \frac{[(p_j'/Q_j) + (q_{ij}/Q_j)p_j'']}{p_j - g^j e_{ij}} \frac{Q_j \bullet M_j}{1+\Lambda_j} \bullet \frac{dM_j}{M_j} - \frac{[(p_j/Q_j) + (q_{ij}/Q_j)p_j']}{p_j - g^j e_{ij}} \bullet \frac{dg^j}{g^j}$$

If the liberalization of imported inputs lowers costs (such that dg^j/g^j is negative), then the effect of adding this second term on firm output is an expansionary one. The second term will be more positive for small firms: on the one hand, the denominator is smaller in magnitude if small firms are characterized by higher e, and concurrently, the numerator will be larger since the negative p_j' term is weighted by a smaller firm share magnitude (the numerator will always be positive). Therefore, the addition of the cost reducing effect from the liberalization of imported inputs attenuates the predicted firm adjustment - firm size relationship from equation (7).

Alternative regression specifications

Different alternate specifications of the general estimation equation (14) are included in Tables A-1, A-2 and A-3.

In Table A-1, the original regression results discussed in the main text (the impact of imports and firm size on adjustment reported in Table 2, columns 1, 3 and 5) are reproduced in order to compare them with results including sectoral fixed effects. As mentionned in the main text, to the extent that firms in closely-related industries use a

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41/ By substituting the assumed functional form for C^{ij}_q in equation (2), and re-arranging, C^{ij}_q/g^j can be shown to equal $(p_j+p_j' q_{ij})/g^j$.

similar basket of inputs, sectoral dummies may control for changes in cost from input liberalization across sectors.

Tables A-2 and A-3 report results where both non-import-related size effects (due to an economy-wide shock, for instance) and industry-specific effects (the industry-specific Herfindahl interacted with ΔlnM) are controlled for. These two tables differ by considering two different measures of firm size as control variables: Table A-2 reports results where firm share is used as the control for the size effect, while Table A-3 reports results where total firm employment (firm i's employment of permanent and temporary workers) is used[42/]. Given the imprecise nature of the estimates when sectoral fixed effects are also estimated, results reported in Tables A-2 and A-3 do not include sectoral dummies. In each of these tables, results are reported with and without the inclusion of an additional firm age variable. The motivation to control for this additional firm-specific effect comes from several recent empirical papers examining patterns of firm growth and failure and their relation both to firm size and firm age

42/ Most of the empirical studies cited in the introduction of Dunne et.al. (1989) focus on the relation between the firm or plant's size, generally measured by employment, and the rate of growth. The advantage of firm share data based on production values, in the case of the Moroccan data set, is that a separate observation can be used for each industry in which a given firm operates rather than using the same employment number across these industries.

Table A-1
Import-Related Firm Adjustment (without control variables)

(OLS standard errors in parentheses; White's heteroskedasticity-consistent standard errors in brackets)

	Probit Survival equation[1] (obs = 895) Maximum Likelihood		Selection Correction Adjustment equation (obs = 429) O.L.S.		Uncorrected Adjustment equation (obs = 429) O.L.S.	
	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	.087	.383	-13.487	-3.204	.239	.261
	(.063)	(.288)	(4.328)	(2.552)	(.075)	(.311)
			[5.166]	[2.576]	[.073]	[.416]
%Δ Ind.Imports ($PERM_j$)	-.175	-.144	-2.133	-.560	-.034	.013
	(.044)	(.051)	(.664)	(.423)	(.057)	(.067)
			[.791]	[.421]	[.064]	[.075]
Firm Share • %ΔImports ($SH84_{ij} \cdot PERM_j$)	.644	.549	6.845	1.603	-.299	-.406
	(.177)	(.181)	(2.261)	(1.483)	(.204)	(.214)
			[2.742]	[1.462]	[.231]	[.224]
Sectoral Fixed Effects (F1 - F13)		*		*		*
Inverse Mills' ratio (μ_{ij})			18.508	6.156		
			(5.835)	(4.499)		
			[6.964]	[4.393]		

[1] Regressions labelled by (1) exclude sectoral fixed effects while those labelled by (2) control for sectoral fixed effects. Results for 13 sector dummy variables (*) are presented on the following page; the 14th, sector 27, is reflected in the intercept.

Table A-1 (continued)
Import-Related Firm Adjustment (without control variables)

(OLS standard errors in parentheses; White's heteroskedasticity-consistent standard errors in brackets)

	Probit Survival equation (obs = 895) Maximum Likelihood		Selection Correction Adjustment equation[1] (obs = 429) O.L.S.		Uncorrected Adjustment equation (obs = 429) O.L.S.	
Sector Dummy Variables						
12	2.090	(2.138)	2.969	(2.533) [2.443]	-.308	(.824) [.414]
13	-.196	(.300)	-.912	(.608) [.610]	-.211	(.327) [.455]
15	-.217	(.352)	-.940	(.699) [.690]	-.148	(.392) [.495]
16	-.286	(.475)	-1.614	(.947) [.847]	-.546	(.537) [.499]
17	-.054	(.336)	.028	(.384) [.455]	.187	(.367) [.463]
18	.562	(.711)	1.621	(1.314) [1.268]	.033	(.619) [.775]
20	-.708	(.294)	-3.157	(2.100) [1.997]	-.319	(.327) [.462]
21	-.340	(.377)	-.924	(1.010) [.904]	.329	(.427) [.520]
22	-.396	(.363)	-1.320	(1.162) [1.082]	.165	(.414) [.453]
23	-.334	(.348)	-1.171	(.991) [.973]	.076	(.389) [.527]
24	.675	(.656)	2.334	(1.405) [1.430]	.559	(.540) [.539]
25	-.075	(.310)	-.319	(.400) [.451]	-.023	(.336) [.435]
26	-.284	(.296)	-1.004	(.838) [.813]	.054	(.322) [.445]

Table A-2
Import-Related Firm Adjustment (controlling for industry-specific and age effects)
(with firm production share as size control)

(OLS standard errors in parentheses; White's heteroskedasticity-consistent standard errors in brackets)

	Probit Survival equation[1] (obs = 895) Maximum Likelihood		Selection Correction Adjustment equation (obs = 429) O.L.S.		Uncorrected Adjustment equation (obs = 429) O.L.S.	
	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	-.073 (.077)	-.085 (.121)	-16.053 (3.933) [3.680]	-16.942 (4.053) [3.784]	.390 (.096) [.099]	.371 (.145) [.157]
%Δ Ind.Imports	-.065 (.070)	-.065 (.070)	-1.021 (.221) [.220]	-1.059 (.225) [.221]	-.168 (.087) [.089]	-.169 (.087) [.088]
Firm Share • %ΔImports	.093 (.255)	.095 (.255)	1.922 (.539) [.520]	2.056 (.557) [.536]	.055 (.307) [.287]	.064 (.311) [.289]
Herfindahl • %ΔImports	-.164 (.218)	-.165 (.218)	-2.046 (.614) [.551]	-2.163 (.627) [.567]	.288 (.260) [.263]	.285 (.261) [.266]
Firm Share	1.450 (.407)	1.442 (.412)	14.571 (3.753) [3.467]	14.980 (3.774) [3.474]	-1.024 (.425) [.369]	-1.044 (.441) [.382]
Age		.004 (.032)		.086 (.043) [.044]		.007 (.040)
Inverse Mills' ratio			19.649 (4.699) [4.417]	20.418 (4.777) [4.475]		

1 Regressions labelled by (1) exclude the age term while those labelled by (2) control for this additional firm-specific effect.

Table A-3
Import-Related Firm Adjustment (controlling for industry-specific and age effects)
(with firm employment as size control)

(OLS standard errors in parentheses; White's heteroskedasticity-consistent standard errors in brackets)

	Probit Survival equation[1] (obs = 895) Maximum Likelihood		Selection Correction Adjustment equation (obs = 429) O.L.S.		Uncorrected Adjustment equation (obs = 429) O.L.S.	
	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	.032	-.007	-14.649	-15.535	.370	.378
	(.133)	(.148)	(5.559)	(5.755)	(.164)	(.177)
			[5.947]	[6.120]	[.171]	[.188]
%Δ Ind.Imports	-.151	-.149	-1.925	-1.946	-.082	-.083
	(.066)	(.066)	(.686)	(.678)	(.079)	(.080)
			[.738]	[.724]	[.080]	[.080]
Firm Share • %ΔImports	.655	.659	7.372	7.644	-.340	-.343
	(.207)	(.207)	(2.864)	(2.899)	(.254)	(.256)
			[3.064]	[3.077]	[.266]	[.270]
Herfindahl • %ΔImports	-.092	-.104	-1.157	-1.347	.201	.206
	(.218)	(.219)	(.566)	(.620)	(.262)	(.265)
			[.555]	[.609]	[.259]	[.265]
Firm Size (Employm.)	.015	.007	.168	.081	-.036	-.033
	(.034)	(.036)	(.086)	(.062)	(.042)	(.046)
			[.089]	[.062]	[.041]	[.046]
Age		.021		.256		-.005
		(.034)		(.103)		(.042)
				[.110]		[.043]
Inverse Mills' ratio			19.215	19.733		
			(7.109)	(7.134)		
			[7.610]	[7.584]		

1 Regressions labelled by (1) exclude the age term while those labelled by (2) control for this additional firm-specific effect.

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