Price Impacts of Small Firm Entry in US Manufacturing

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I. Introduction

While there has been a vast economic literature on determinants and effects of entry (for a few, Dunne, Roberts and Samuelson (1988), Bresnahan and Reiss (1991), Geroski (1995)), little of this work has examined differential impacts by type of entry. Geroski (1995) did suggest that the limited survival of small entrants likely made incumbent responses to this type of entry more limited. Acs and Audretsch (1989) do a careful analysis of determinants of small scale entry, but do not consider the competitive impacts of this (or other) types of entry. More recent work has also been more focused on determinants of small firm survival than on market responses to small entrepreneurial entry. The latter is the focus of this project.

Economic theory related to entry effects is straightforward in static models, less so in dynamic and strategic models of incumbent behavior. In any static model – whether perfect competition, dominant firm price leadership (just monopoly with a competitive fringe), or standard Cournot – any increase in supply will drive down price; furthermore, the measure of entry which should matter is clearly net entry (entry minus exit), as it is

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the level of supply and its change which determines (along with demand) the price. However, in strategic/dynamic models, the effect of entry is less clear, and the appropriate measure is also somewhat ambiguous.

For example, in the static entry-limit pricing literature it is the threat of entry which determines incumbent pricing (and little discussion is given as to what happens if entry actually occurs). In dynamic versions of this model an equilibrium rate of entry is consistent with a price path by the incumbent. Gross entry in these models may proxy entry threat (and barriers) better than net entry. Davis et al.(2004) present a model in which actual entry may have no or perverse effects of incumbent pricing while potential entry (threat) will constrain that price.

In Feinberg and Shaanan (1997), entry at the 4-digit SIC level for 44 industries was disaggregated into 3 domestic types and 2 types of foreign (import) entry, for the 1972-82 period, and price effects of these different types was the focus of the econometric analysis. While pro-competitive impacts on domestic producer prices are found, these are limited to new entrepreneurial entry and (what might be viewed as the foreign analogy) gains in non-OECD imports. One limitation of that work was the small sample, representing roughly 10 percent of manufacturing industries – this was necessitated by the use of 4-digit industries as the unit of observation. Another limitation was the identification of entry by a firm not previously engaged in manufacturing as entry by "new entrepreneurs", when in fact these ventures could have been quite large and

controlled by either major retail/service sector players or well-funded by consortia of investors.

This study updates and expands on the Feinberg/Shaanan work, using annual data for the decade of the 1990s, and virtually all 3-digit SIC industries. Instead of distinguishing between types of entry, entry and expansion by firms in different employment size categories is examined and the econometric analysis seeks to find differential impacts on producer prices. A second innovation of this study is to examine competitive impacts of both net and gross entry. Finally, this study is the first to link an exploration of entry with a body of work on exchange rate impacts on domestic prices (e.g., Feinberg (1989)), with the expectation that a domestic entry effect will be more likely to be accurately observed if other determinants (both foreign and domestic) are better controlled for.

II. Literature Review and Theoretical Motivation

As noted above, there have been a large number of empirical studies investigating the determinants of entry. I discuss just a few of the more recent studies here. First though, much of the recent Industrial Organization literature on entry starting with Bresnahan and Reiss (1991) has equated explaining entry to explaining the number of market participants (generally by measures of market size); as Toivanen and Waterson (2005) note this assumes all participants —including incumbents -- can be viewed as equally placed in making a decision each period to enter or remain in the industry, and ignores differences among firms and sunk entry costs. In counting firms, this literature

also assumes that all market participants have access to the same technology and same input prices, so have identical costs.[1]

Essentially what is explained is *net entry* (entry minus exit) rather than simply the forces determining the flow of new arrivals to the market (and as found in Dunne et al. (1988), there is much "churning" in manufacturing markets, with significant amounts of both gross entry and gross exit, yet little net entry). However, as noted above, the driving force in limit pricing models of industrial organization is the *threat* of entry – whether or not entry actually occurs may not matter; one would expect though for this threat to be credible some entry must take place, and here *gross entry* may be most relevant.

Gorecki (1975) divides the determinants of entry into barriers to entry and entry-inducing factors and divides types of entry into new and diversifying firms. He finds that industry growth and product differentiation have positive effects on both types of entry, but that diversifying entrants can more easily overcome entry barriers than new firms. Khemani and Shapiro (1987) analyze entry and exit equations to examine whether their determinants are symmetric. They find that high market concentration acts as a deterrent to entry, and (surprisingly) that high profit industries experience more exits; the latter effect is explained as high profits attracting more entrants who then displace some incumbents. "In general, both entry and exit are deterred in industries where the minimum efficient plant size and its associated capital requirements are high and where multi-plant firms are prevalent" (p. 25).

[1] Bresnahan and Reiss (1991) do discuss how their method can be adjusted when firms differ in both entry costs and variable costs, however, there is no sense in their empirical work of the differing impact of entry when entrants are quite small (or for that matter large) relative to incumbents.

Dunne et al. (1988) look at the period 1963-1982, describing and explaining patterns of entry, exit, and growth in US manufacturing. They focus on "the relative importance of different types of entrants, the correlation of entry and exit patterns across industries and over time, and the entrants' post-entry size and exit patterns" (p. 513). Acs and Audretsch (1989) focus on the determinants of small-firm entry. They find that while past industry growth rates are a stimulant to both large and small firm entry, lagged profitability has little impact on entry by small firms. The need for high research and development intensity deters small firm entry, which is not true for entry of firms in general, however small entrants are often able to pursue innovative niche entry strategies.

There have been far fewer studies of the effects of entry. Geroski (1991, p. 290) notes: "… entry is a multi-dimensional phenomenon, and the real question may be less that of ascertaining whether 'entry' has an effect on market performance than that of discovering what kinds of effects are associated with the various dimensions of entry that one observes using the range of conventional measures available." Feinberg and Shaanan (1994) found only weak effects on domestic prices in US manufacturing, using net entry as the variable of interest, and not distinguishing by type of entry (and similarly finding a weak effect of foreign entry, measured as change in import shares). Katics and Peterson (1994) discuss the effects of import competition on price-cost margins in U.S. manufacturing for 1976-1986, finding evidence suggesting a stronger competitive effect as domestic industries have greater market power. Amel and Liang (1997) find that entry in local banking markets has the expected pro-competitive effect of reducing market-level profits, though only in rural markets. Marion (1998) explores how prices

vary with concentration and entry in grocery retailing; warehouse supermarkets lower the prices of other grocery stores when they enter a market successfully.

Finally, Geroski (1995) provides a survey of stylized facts and results derived from the empirical literature on entry. One is that entry seems to have a limited effect on industry profit margins, possibly because of the high risk of failure associated with entry. He stresses that while entry "can be an important influence on the evolution of industry structure and performance, … it is so only selectively" (p. 437). This suggests the need to consider differing definitions of entry. In what follows, the impact of both net and gross entry on incumbent pricing is considered.

Why might there be differing effects of entry by size of entrants? Feinberg and Shaanan (1997), as discussed above, find that only new entrepreneurial entry had a procompetitive impact; this result is consistent with large-scale entry having a price-disciplining impact *pre-entry* (viewed as a threat by incumbents) and little effect *post-entry*, while small-scale entrants may be a force which not only adds to industry capacity and supply but disrupts attempts by incumbents at tacit collusion.[2] Furthermore, to the extent that new establishment entry by large firms reflects expansion of an existing presence in the market, enhanced market power (and higher prices) may result. Schumpeter (1950, p. 84) long ago had noted that the most effective type of competition in driving down prices in an industry comes "… from the new commodity, the new

[2] In fact, one might consider the possibility of a positive impact on price if such large-firm entry leads incumbents to drop a limit price strategy and become more accommodative towards their new "colleagues" in the market.

technology, the new source of supply, the new type of organization…." These relatively unanticipated sources of entry are more likely to be small firms.[3]

III. Model and Econometric Specification

Feinberg and Shaanan (1994) develop, in the context of a competitive model, a reduced-form expression for price changes in terms of demand and cost factors. Take supply (S) and demand (D) to be written as

$$S_t = s_0 + s_1 a_t + s_2 p_t \quad (1)$$

and

$$D_t = d_0 + d_1 b_1 + d_2 p_t \quad (2)$$

where a and b are supply and demand shift factors (respectively) and p is price.

In terms of changes these equations become

$$\Delta S = S_2 - S_1 = s_1(a_2 - a_1) + s_2(p_2 - p_1) \quad (3)$$

and

$$\Delta D = D_2 - D_1 = d_1(b_2 - b_1) + d_2(p_2 - p_1) \quad . \quad (4)$$

Expressing the equilibrium condition as $\Delta S = \Delta D$, one can then write

$$s_1 \Delta a + s_2 \Delta p = d_1 \Delta b + d_2 \Delta p \quad (5)$$

After a little manipulation, the change in price is then obtained as

$$\Delta p = (d_1/(s_2 - d_2))\Delta b - (s_1/(s_2 - d_2))\Delta a \quad (6)$$

[3] Feinberg (1989a) discussed the role that unanticipated imports (from a new source country), even if relatively small, could play in disrupting the stability of a tacitly collusive domestic industry.

Supply curve shifters include number of firms in the industry (or number of new firms, depending on whether one looks at net or gross entry), N, and changes in cost, C, so

$$\Delta a = k_1 \Delta N + k_2 \Delta C \quad (7)$$

Demand shifters include changes in real GDP (G) and the real exchange rate (X),[4] so

$$\Delta b = h_1 \Delta G + h_2 \Delta X \quad (8)$$

Substituting (7) and (8) into (6), one obtains the reduced-form equation

$$\Delta p = \alpha_1 \Delta N + \alpha_2 \Delta C + \alpha_3 \Delta G + \alpha_4 \Delta X \quad (9)$$

with the expected signs for entry and real dollar appreciation both negative, $\alpha_1<0$ and $\alpha_4<0$, and for cost and demand growth both positive, $\alpha_2>0$ and $\alpha_3>0$.

While the above model was developed in the context of a competitive model, the same explanatory variables would be expected to influence price changes in imperfectly competitive markets as well. I do not directly control for market structure (including entry barriers) and imports in this paper; however, the former is more likely to impact price *levels* not the price *changes* examined here, while the latter is dealt with more appropriately than in the prior work by interacting exchange rate pressures with broad sector import shares to gauge the impact of international shocks. In so doing, the approach is that taken in Feinberg (1989) which focused on exchange rate effects on US domestic prices. Rather than directly control for demand and cost pressures, industry dummies are interacted with an index of real GDP and an aggregate employee

[4] Of course, to the extent imported inputs are used the exchange rate will also affect costs, but the direction of impact on prices will be the same whether through demand effects on import-competing goods or on the cost-side through imported inputs.

compensation index, respectively, to allow each industry's price to reflect these pressures.[5]

A pooled cross-section time-series model will be estimated below on roughly 1200 observations. As annual price changes, not levels, are used no industry fixed effects are included.[6] The basic model then is:

$$\%chg\ PPI_{it} = f(small\ firm\ entry_{t-1,i}, large\ firm\ expansion_{t-1,i}, \%chg\ real\ exhange\ rate*import\ share, \%chg\ real\ GDP*industry\ fixed\ effects, \%chg\ wage\ index\ total*\ industry\ fixed\ effects)$$

IV. Data

Annual data (from 1989-1998) for 139 3-digit SIC manufacturing industries are available from the US Small Business Administration (SBA) (but developed by the US Census Bureau) on establishment – plant-level – births and deaths by firms in several employment size categories.[7] For small firms establishment births represent firm entry, however for large firms, the overwhelming majority of these births represent expansions by existing firms (though if this expansion involves diversification into a new industry, this would correspond to the usual notion of "entry").

[5] This approach may also be viewed as controlling for differing market structure impacts on dynamic responses to cost and demand pressures.
[6] However, including industry fixed effects produces little change in the estimated coefficients of interest.
[7] This is referred to as the Statistics of US Businesses, and is built on the Census Bureau's annual County Business Patterns database. All business establishments with employees are included, and firm-wide employment and payroll data on the parent firm of each establishment are attached.

Unfortunately, at the 3-digit level the data do not allow a distinction between new firm entry and new establishments by existing firms, however for all of manufacturing 95 percent of establishment births in firms of under 500 employees were new firm entry (and 98 percent for firms under 100 employees) while only 2 percent of establishment births in firms of over 500 employees represented new firm entry. For this reason, only small firm entry can be clearly expected to have a disciplining effect on prices; changes in numbers of large firm establishments (especially of the largest size category) may be more likely to proxy increased market power and have more ambiguous impacts on price changes in an industry.

The focus of the statistical work reported below is both on the impact of gross entry (births) and that resulting from net entry (change in numbers of establishments, or gross entry minus exit). Both total entry, and entry broken down by size of entering firm will be considered; the SBA generally defines small businesses in manufacturing to be those with under 500 employees – some of the statistical analysis will examine firms under 100 employees separately.

The variable to be explained is the annual percentage change in the industry's producer price index, this available from US Bureau of Labor Statistics data at the same level of industry detail. Other explanatory variables include annual rates of change in a real exchange rate index defined at the broader 2-digit SIC level (interacted with import penetration for that broader industry sector to capture the industry's vulnerability to international pressures), and real GDP (interacted with industry fixed effects to allow

differing price responses by industry), the latter is included in lieu of industry level growth, which may be endogeneous to price changes. Aggregate labor compensation, interacted with industry fixed effects will be included to account for cost trends. Given measurement problems (both in general and at the level of aggregation used here) in using concentration ratios and entry barrier variables, these are excluded (and the implicit assumption is that the industry interaction terms with aggregate demand and cost will account for these factors).

Timing issues are of course important to consider. Models relating entry and *profit rates* must confront endogeneity concerns, even where lagged profit rates are included (as entry decisions are likely to be forward-looking). However, when – as in the current study – the variable of interest is price (and its changes), such concerns are less relevant; entry should respond not to contemporaneous price changes, but rather to expected future movements in demand and cost (and proxies for these are included in the statistical model). Having said this, the entry data are for the year ending in March, while producer price changes are for the period ending the following December, so a 9-month lag in entry effects is assumed. Similarly, exchange rate changes are first-quarter annual changes, implying a roughly 9- month lag in these effects as well. Demand and cost proxies, real GDP and the Employment Cost Index are changes in annual averages – the use of end-of-year prices assumes some modest degree of lagged response.

V. Results

Descriptive statistics and variable definitions are given in Table 1. Considering annual changes in prices and rates of entry, there are 9 years of data available for up to 139 industries (and up to 1251 pooled observations), though reduced a bit in the statistical analysis due to some missing data. Several points to note: (1) while the average rate of annual price change was under 2 percent, this varied quite a bit from more than a 25 percent reduction to more than a 50 percent increase; (2) on average establishment births per year represented about 8 percent of initial period number of establishments, though less than 3 percent of employment; (3) the rate of growth in establishments for smaller firms was somewhat larger, 9.6 percent for those under 500 employees in size, 10.6 percent for those under 100 employees;[8] (4) net entry (births – deaths) was close to zero on average, but varied from a 23 percent reduction to a 23 percent increase; (5) import shares, reflecting the intensity of foreign competition through which exchange rate pressures should be felt, varied greatly – at the broader 2-digit SIC level – from 1 percent (tobacco) to 57 percent.(leather products).

Table 2 examines intertemporal and sectoral variation in gross and net entry (in terms of number of establishments). There is (somewhat surprisingly) relatively little variation over time in entry rates, with more variation across industry sectors. This is consistent with the evidence of Dunne et al (1988) and Feinberg and Shaanan (1997) suggesting that industry-specific factors imply more entry, consistently over time, in

[8] Due to considerable amounts of non-disclosed data, employment growth attributed to births by size category cannot be reported.

some sectors than in others. There is also a clear pattern of greater rates of establishment entry in smaller firm size categories than in the total industry.

Table 3 presents results explaining price changes in 134 industries, alternatively, by rates of gross entry (measured by new establishments as percentage of initial period number, i.e., growth in numbers of births) and net entry (measured by numbers of births minus numbers of deaths, as percentage of initial period number of establishments), without distinguishing by size of firm.[9] The data incorporates some lagged impacts of both exchange rate changes and entry on price changes, as the latter are recorded end-of-year while exchange rate changes are first-quarter to first-quarter changes and entry is defined as March to March changes.

As industries are likely to differ in the variability of price changes, heteroscedasticity is a problem that needs to be addressed; furthermore, preliminary testing suggested the presence of some within-industry autocorrelation. Therefore, the Table 3 estimates are obtained via Feasible Generalized Least Squares (FGLS) correcting for both issues (using the *xtgls* command in STATA). All coefficient estimates are statistically significant, most at the 1% level. A ten percentage point increase in the rate of gross establishment entry leads to a 0.6 percentage point reduction in the rate of price increase; net entry has a smaller impact, with a ten percentage point increase leading to a

[9] As noted earlier this measure combines new entry (primarily by small firms) and new plants by established (usually large) firms. In preliminary work gross entry rates in terms of employment by new establishments was considered as well (and results were similar to what is reported below); however a significant number of additional industries needed to be dropped due to missing data (nondisclosure requirements from Census data); this was a particular concern in attempting to deal with autocorrelation issues.

0.3 percentage point reduction in price change. As specified, the real appreciation of the dollar has a price-reducing impact which increases as imports are a larger part of the broader industry sector. At the average import share of 17 percent, the predicted exchange rate impact is that a ten percent real appreciation reduces the rate of price increase by 0.3 percentage points.[10]

Table 4 presents results controlling for firm size of new establishments. In terms of gross entry, it is quite clear that the driving force disciplining domestic prices is that of entry in the smallest size categories (whether these are broken down separately into under 100 employees and 100 to 500 employees, or the two categories are lumped together). A ten percentage point increase in the rate of births under 500 employees reduces price change by 0.5 percentage points (statistically significant at 1%), while there is no statistically significant impact of plant expansion/entry by large firms. A similar impact of net entry is found: a ten point increase in the rate of net entry also lowers price change by 0.5 percentage points, with increased net establishment change by large firms actually *increasing* prices. As mentioned earlier, this latter effect may reflect an accommodative response by incumbents to large-scale entry (which had previously been disciplining prices when viewed as a threat) as well as increased market power impacts of large-firm expansion.[11]

[10] While not directly comparable, this seems to be a considerably smaller passthrough of exchange rates into US domestic prices than found in Feinberg (1989). Part of the explanation may be the controls for entry not present in that earlier study, and the nominal nature of the price term in this study. However, a number of authors have noted dramatically diminishing domestic price impacts of exchange rates – especially for the US – since the mid-1990s (see, for example, Frankel et al (2005)).

[11] Chen and Riordan (2007) – after citing several recent empirical studies of competition in differentiated products industries displaying this counter-intuitive finding -- develop a theoretical model in which entry can raise price.

VI. Some Additional Findings

The same patterns emerge at the industry sector level. In results not reported here, separate FGLS regressions of the type reported in Table 4 were performed on each of the 20 broad manufacturing industry sectors. In terms of gross entry, 15 of the 20 estimates of small firm entry impacts were negative, 9 statistically significant (at least at the 10% level), while only 6 of the 20 large firm entry/expansion effects were negative (and only 2 of these statistically significant). Similar findings emerged for net entry, with 14 of the 20 small firm impacts being negative (though only 4 statistically significant), and 6 of the 20 large firm effects negative (only 1 significant). Industry sectors which appear to have the strongest price response to small firm entry are apparel, furniture, machinery and computers, and miscellaneous manufactures.

Interaction terms of entry with consumer/producer and durable/non-durable good dummy variables proved to have no statistically significant impact on price changes, suggesting no systematic relationship with these categories of goods. One finding of interest, which will need to be investigated in future research, is that gross entry (and especially *small-firm* gross entry) has an increasingly pro-competitive effect on prices as import shares increase, while the same does not hold for net entry. Another result of interest is that when both gross entry and net entry are included in the regression equation, only gross entry has a significantly negative impact, consistent with the dominance of the entry threat rationale in disciplining incumbent prices.

VII. Conclusions and Future Research

The results presented here, while limited by data availability, confirm previous work suggesting an important market-disciplining role of small-firm entry. Industries experiencing greater rates of small-firm entry show smaller price increases, after controlling for cost, demand, and exchange rate pressures. This impact holds for both gross entry and net entry, and reinforces the view of small business as a driving force of competition in US markets.

International pressures are also shown to play the expected price-restraining role in the manufacturing sector, though limited by the "tradeability" of the sector (as proxied by broad sector import shares). Furthermore, as noted in other recent literature on exchange rate passthrough into domestic prices, this effect – while statistically significant – has diminished in economic importance since the late 1980s.

It would be useful in future research to further disentangle the causes of small firm vs. large firm competitive influences, and perhaps to distinguish between small firm entry as measured by growth in numbers of establishments and as measured by growth in employment, for the limited number of industries for which these latter data are available. An examination of determinants of small-firm entry would enable consideration of the simultaneity involved in pricing and entry decisions.

References

Acs, Zoltan J. and David B. Audretsch. "Small-Firm Entry in US Manufacturing." *Economica* 56 (May 1989): 255-265.

Amel, Dean F. and J. Nellie Liang, "Determinants of Entry and Profits in Local Banking Markets," *Review of Industrial Organization* 12 (February 1997): 59-78.

Bresnahan, Timothy F. and Peter C. Reiss. "Entry and Competition in Concentrated Markets." *Journal of Political Economy* 99 (Oct. 1991): 977-1009.

Chen, Yongmin and Michael H. Riordan, "Price-Increasing Competition," unpublished working paper (April 2007).

Davis, Steven J., Kevin M. Murphy, and Robert H. Topel. "Entry, Pricing, and Product Design in an Initially Monopolized Market." *Journal of Political Economy* 112 (Feb. 2004): S188-S225.

Dunne, Timothy, Mark Roberts, and Larry Samuelson. "Patterns of Firm Entry and Exit in U.S. Manufacturing Industries." *The RAND Journal of Economics* 19 (Winter 1988): 495-515.

Feinberg, Robert M. "The Effects of Foreign Exchange Movements on U.S. Domestic Prices." *Review of Economics and Statistics* 71 (August 1989): 505-511.

Feinberg, Robert M. "Imports as a Threat to Cartel Stability." *International Journal of Industrial Organization* 7 (1989a): 281-288.

Feinberg, Robert M. and Joseph Shaanan. "The Relative Price Discipline of Domestic Versus Foreign Entry." *Review of Industrial Organization* 9 (1994): 211-220.

Feinberg, Robert M. and Joseph Shaanan. "Disaggregated Measures of Domestic and Foreign Entry into U.S. Manufacturing Industries: Patterns and Price Effects." *Antitrust Bulletin* 42 (Spring 1997): 197-213.

Frankel, Jeffrey A., David C. Parsley, and Shang-Jin Wei. "Slow Passthrough Around the World: A New Import for Developing Countries?" NBER Working Paper 11199 (March 2005).

Geroski. Paul A. "What Do We Know About Entry?" *International Journal of Industrial Organization* 13 (1995): 421-440.

Geroski, Paul A. Chapter 15. "Some Data-Driven Reflections on the Entry Process." Entry and Market Contestability: an international comparison. Edited By P. Geroski and J. Schwalbach. Cambridge: Blackwell, 1991. 282-296.

Gorecki, Paul K. "The Determinants of Entry by New and Diversifying Enterprises in the U.K. Manufacturing Sector, 1958-1963: some tentative results." *Applied Economics* 7 (1975): 139-147.

Katics, Michelle M. and Bruce C. Peterson. "The Effect of Rising Import Competition on Market Power: A Panel Data Study of US Manufacturing." *Journal of Industrial Economics* 42 (Sept. 1994): 277-286.

Khemani, R.S. and Daniel Shapiro. "The Determinants of Entry and Exit Reconsidered." *International Journal of Industrial Organization* 5 (1987): 15-26.

Marion, Bruce W. "Competition in Grocery Retailing: The Impact of a New Strategic Group on BLS Price Increases." *Review of Industrial Organization* 13 (1998): 381-399.

Schumpeter, Joseph A. Capitalism, Socialism, and Democracy. 3rd ed. New York: Harper & Row, 1950.

Shapiro, Daniel, Chapter 5. "Entry, Exit, and the Theory of Multinational Corporations." The Multinational Corporation in the 1980s . Edited By David B. Audretsch and Charles P. Kindleberger, Cambridge: MIT Press, 1983. 103-121.

Toivanen, Otto and Michael Waterson. "Market structure and entry: where's the beef?" *The RAND Journal of Economics* 36 (Autumn 2005): 680-699.

United States. Bureau of Labor Statistics. Handbook of U.S. Labor statistics. "Table 6-3: Producer Price Indexes for the Net Output of Selected Industries, 1988-2001." 6th ed. By Eva E. Jacobs. GPO, 2003.

Table 1. Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Price Change	1225	1.75	4.32	-25.71	56.57
Firm Gross Entry	1251	8.10	3.78	0	61.54
Firm Net Entry	1251	-0.41	3.59	-23.31	23.08
Emplt Gross Entry	1068	2.76	1.78	0	14.72
Firm Gross Entry (<100)	1251	10.61	7.59	0	150.00
Firm Gross Entry (100,500)	1235	4.53	4.51	0	54.55
Firm Gross Entry (<500)	1251	9.61	6.49	0	150.00
Firm Gross Entry (>500)	1242	3.38	3.63	0	60.00
Firm Net Entry (<100)	1251	0.40	7.06	-50.00	100.00
Firm Net Entry (100,500)	1235	-0.48	6.74	-100.00	45.45
Firm Net Entry (<500)	1251	0.14	5.93	-50.00	100.00
Firm Net Entry (>500)	1242	-1.64	5.09	-50.00	50.00
Broad Sector Import Share	1251	16.98	14.93	1.16	56.97
M-Wt Real XR Change	1251	1.85	4.82	-9.76	18.40

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Variable Definitions:

Price Change = annual percentage change in Producer Price Index, 3-digit SIC level, from BLS data (Source: Handbook of US Labor Statistics)

Firm Gross Entry = new establishments ("births") in 3-digit SIC industry as percentage of previous year establishments (March to March changes) (Source: SBA data, http://www.sba.gov/advo/stats/dyn_us_89_98s4.txt)

Firm Net Entry = births – establishments leaving industry ("deaths"), as percentage of previous year establishments (Source: SBA)

Firm Gross Entry by size = births in size category as percentage of previous year establishments by category (Source: SBA)

Firm Net Entry by size = "births" in size category minus "deaths" in size category, as percentage of previous year establishments (Source: SBA)

Emplt Gross Entry = employment by "births" in 3-digit SIC industry as percentage of previous year employment (Source: SBA)

Broad Sector Import Share = value of imports as percentage of "apparent domestic consumption" (domestic shipments + imports – exports), for 1992 at 2-digit SIC level (Source: US Census Bureau)

M-Wt Real XR Change = annual percentage change in import-weighted real exchange rate index (varying by 2-digit SIC, 1st quarter to 1st quarter changes) (Source: NewYork Federal Reserve Board, Database on Industry-Specific Exchange Rates, http://www.ny.frb.org/research/economists/goldberg/papers.html)

Table 2. Mean Values of Entry Measures (Establishments) by Year and Industry Sector

	Gross Entry		Net Entry	
	Total	Under 500	Total	Under 500
1990	7.49	8.58	-1.10	-0.95
1991	7.77	9.18	-1.04	-0.75
1992	8.38	9.83	-0.48	0.09
1993	7.82	9.06	-0.58	-0.29
1994	8.01	9.79	-0.38	0.48
1995	7.62	8.93	-0.19	0.06
1996	8.88	10.35	0.39	1.10
1997	8.66	11.11	0.08	1.30
1998	8.11	9.68	-0.54	0.17
Food	7.33	8.92	-0.26	0.17
Tobacco	10.54	19.99	2.18	7.31
Textile	8.45	10.22	-0.20	0.11
Apparel	9.53	10.31	-4.06	-3.92
Lumber	10.36	10.82	-0.18	-0.21
Furniture	8.28	8.59	-2.01	-2.20
Paper	5.37	10.42	0.77	3.57
Printing	8.84	9.38	-0.64	-0.51
Chemicals	6.88	9.06	0.50	1.35
Petroleum Refining	6.21	8.55	-0.17	0.12
Rubber and Plastics	6.27	7.92	-0.03	0.21
Leather	7.48	8.09	-3.02	-2.63
Mineral Products	8.97	11.31	1.20	2.32
Primary Metals	6.43	7.93	0.08	0.45
Fabricated Metals	6.43	7.20	-0.53	-0.37
Machinery and Computers	7.79	8.43	0.29	0.45
Electronics and Electrical	8.52	9.61	0.22	0.68
Transportation Equipment	9.62	11.00	0.26	0.81
Measurement and Control Devices	7.28	7.87	-1.58	-1.41
Miscellaneous Manufacturing	10.19	10.46	-0.01	0.07

Table 3. Feasible Generalized Least Squares Results Explaining Annual Percentage Price Changes by Total Industry Entry, allowing for heteroscedasticity across industries and panel-specific autocorrelation (134 industries x 9 years)
(standard errors in parentheses below estimated coefficients)

Variables	Gross Entry – Establishments FGLS	Net Entry – Establishments FGLS
Mshr*RXR chg	-0.0018**	-0.0019**
	(0.0003)	(0.0003)
Entry	-0.063**	-0.032*
	(0.016)	(0.014)
N	1206	1206
Log likelihood	-2137.7	-2141.9
Wald Chi-squared	1619.7**	1365.9**

Not reported are a constant term and industry-varying impacts of annual changes in real GDP and the aggregate BLS employment cost index.
*Significant at 5%
**Significant at 1%

Table 4. Feasible Generalized Least Squares Results Explaining Annual Percentage Price Changes by Employment Size of Entry, allowing for heteroscedasticity across industries and panel-specific autocorrelation (133 industries x 9 years)
(standard errors in parentheses below estimated coefficients)

	(1) Gross Entry – Establishments		(2) Net Entry – Establishments	
Variables	(a)	(b)	(a)	(b)
Mshr*RXR chg	-0.0020**	-0.0018**	-0.0019**	-0.0019**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Entry by Firms <100	-0.031**	--	-0.036**	--
	(0.013)		(0.011)	
Entry by Firms <500	--	-0.049**	--	-0.047**
		(0.013)		(0.011)
Entry by Firms (100,500)	-0.042**	--	-0.019**	--
	(0.009)		(0.007)	
Entry by Firms >500	0.010	0.0001	0.029**	0.022**
	(0.013)	(0.0114)	(0.009)	(0.008)
N	1179	1197	1179	1197
Log likelihood	-2058.2	-2110.1	-2066.3	-2111.8
Wald Chi-squared	1329.1**	1538.8**	1334.6**	1563.7**

Not reported are a constant term and industry-varying impacts of annual changes in real GDP and the aggregate BLS employment cost index.
*Significant at 5%
**Significant at 1%