

EXPORT AND DOMESTIC SALES: THEIR INTERRELATIONSHIP AND DETERMINANTS

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We examine the interrelationship between export and domestic sales. Our expectation is that they are simultaneously determined, and as such should not be examined in isolation. We also investigate how firm factors—such as R&D and advertising investments—and external factors—such as market growth and exchange rate changes—impact export and domestic sales. Using a non-recursive system of equations, we test our arguments on a representative sample of Spanish manufacturing firms between 1990 and 1997. We find significant interrelationships between export and domestic sales with striking differences between Spanish-owned firms and foreign-owned firms operating in Spain. For Spanish-owned firms, domestic and export sales are complements. These firms appear to focus on the domestic market and strength in the domestic market drives their export sales. In contrast, domestic and export sales are substitutes for foreign-owned firms. These firms' export strategies appear subsumed under strategies of managing a multinational network in which the focus is sales outside of Spain. We discuss the importance of these findings for understanding and managing export strategies. Copyright © 2005 John Wiley & Sons, Ltd.

INTRODUCTION

Exporting is the most widely used firm strategy for international expansion. For example, total world trade in merchandise and commercial services totaled U.S \$7.8 trillion in 2002 (WTO press release April 22, 2003). However, from a strategic management perspective, we know relatively little about this strategy compared to other forms of international expansion such as direct investment and joint ventures. In this paper, we attempt a step toward deepening our understanding of firm exporting strategies.

Keywords: exporting; sales; export performance; international expansion

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The perspective that we take is that firms, not nations, engage in trade. Although goods flow between nations, it is generally firms that make the decision to export. Therefore, we consider exporting a firm strategy that will have important implications for performance.

Our paper makes three contributions. First, we examine firms' export sales and domestic sales in our hypothesis generation and empirical tests. We argue that export sales and domestic sales are simultaneously determined. By acknowledging their interdependence, we reach a more complete understanding of the relationship between export and domestic sales, in addition to a more precise understanding of their determinants. Moreover, this approach corrects for potential biases in much of the prevailing literature that implicitly assumes export and domestic sales are independent. Second, we examine how firm and external market

factors affect export and domestic sales. The firm factors that we examine include investments in advertising and R&D. The external factors that we examine include exchange rates and economy-wide growth (i.e., changes in gross domestic product). Third, we assess whether there are differences in what affects export sales for domestic firms and foreign firms (i.e., in our context Spanish-owned firms vs. foreign-owned firms operating in Spain). Because multinational firms operating subsidiaries in Spain manage their operations with a larger global network in mind, there might be very different patterns in their export behavior compared with Spanish-owned firms.

To test our arguments, we examine a stratified representative sample of the Spanish manufacturing sector between 1990 and 1997. These data provide a very comprehensive and detailed view of economic activity within a country. Moreover, the panel structure of the data allows us to better isolate how our hypothesized variables influence export and domestic sales, versus other sources of firm heterogeneity.

We find striking differences in what drives export and domestic sales for Spanish-owned firms vs. foreign-owned firms operating in Spain. Specifically, we find that domestic and export sales are complements for Spanish-owned firms. For these firms, export sales appear to be driven by preexisting strengths in the domestic market. For foreign-owned firms, domestic sales and export sales are substitutes; that is, domestic sales negatively affect export sales. It appears that foreign-owned firms, when managing their domestic sales in the larger context of the multinational network, make trade-offs between sales in Spain and sales outside of Spain. We find that both groups of firms' domestic sales are positively related to advertising expenditures. However, we find that R&D investments influence domestic and export sales in heterogeneous ways across the two groups of firms. For both sets of firms, growth in foreign economies affects export sales and growth in the Spanish economy affects domestic sales. The exchange rate results are mixed, although we generally find that a devaluation of the local currency leads to increased exports, especially for Spanish-owned firms.

In the next section, we review the existing research on exporting. We discuss how factors both internal and external to the firm affect exporting behavior. The third section generates hypotheses and the fourth section describes the data and

the methods we employ to test the hypotheses. The subsequent section presents the results from our analyses and discusses the findings. The final section concludes.

PREVIOUS RESEARCH

Scholars from disparate fields such as economics, management, and marketing have explored varied questions including: why exporting occurs, in which direction trade flows, how public policy affects export behavior, what generic export strategies entail, and what determines export performance. Moreover, exporting research has been conducted at both micro (i.e., firm) and macro (i.e., industry or country) levels. At the macro level, an abundant international trade literature addresses issues such as comparative advantage, patterns of trade, gains from trade, and government policy (for reviews see Helpman and Krugman, 1985; Gandolfo, 1987). Scholars in this tradition see trade flows and gains as a function of factor endowments, production technology, government policy, and size.

In contrast, the micro-level research points out that firms generally make export decisions; therefore, firm characteristics deserve greater attention than they have previously received because they stand to substantially influence export behavior. As a result, the factors that make a particular country's exports competitive might not equally influence all firms that make up those exports (Kravis and Lipsey, 1992). Rather, firm-specific characteristics can lead to variance in behavior and performance across firms from the same country in the same industry.

Although researchers have recognized the importance of studying export behavior at the firm level, this stream has not received nearly the attention devoted to macro level issues for two reasons. First, many research questions are predominantly concerned with macro factors—especially questions motivated by economic and legislative policy-makers. Second, the data necessary to examine micro-level trade phenomena have been difficult to obtain.

Although firm-level research lacks the depth of attention devoted to its macro counterpart, there is an established body of theoretical and empirical work. Much of this research investigates the following two issues: the export decision and export

performance. The former is defined as whether or not a firm is an exporter. The latter is defined as the level of export sales or the level of export intensity (i.e., export sales divided by total sales). Although the convention in this literature is to use the term 'export performance' when referring to 'export sales,' we prefer to use the term 'export sales' rather than 'export performance' because it better describes the phenomenon.

Scholars have identified numerous factors that are related to exporting behavior at the firm level. These include external determinants such as policy constraints, market growth, geographical proximity, and exchange rate fluctuations; and firm characteristics such as firm product attributes, managerial attributes, and firm capabilities.

External market characteristics

Scholars have pointed out that some of the same forces that affect the export behavior and competitiveness of nations should also impact individual firms (e.g., Dunning, 1993). For instance, exchange rate shifts affect individual firms. However, a large body of theoretical work suggests that the decision to export is affected by a sunk-cost hysteresis, which stems from the fixed costs of initiating export activity that cannot be recovered *ex post* (e.g., Baldwin, 1988; Baldwin and Krugman, 1989). As a result, firms do not immediately respond to small exchange rate fluctuations. Small fluctuations do not make exports sufficiently profitable to warrant assuming the sunk costs of entry. Therefore, substantial exchange rate shifts are required in order to induce a firm to enter an export market. The exit decision is similarly affected. Firms will often not cease exporting when faced with small exchange rate changes because firms that terminate export activity must incur the sunk costs to recommence exporting should an offsetting exchange rate shift occur in the future. Empirical evidence to date supports the hysteresis arguments (e.g., Campa, 2004; Roberts and Tybout, 1997).

By contrast, the effect of exchange rate shifts on the level of export sales, given that a firm is already an exporter, is more direct. For instance, Bernard and Jensen (2004) attribute increased export intensity of U.S. manufacturing plants to favorable exchange rate shifts. Similarly, Campa's (2004) results indicate that a currency depreciation increases the export volume of exporting

firms more so than it induces entry by non-exporters. Taken together these results indicate that an exchange rate hysteresis likely has a greater effect on the entry and exit decisions of firms than on the export volume of existing exporters.

Exporting behavior is also subject to policy constraints imposed upon firms by foreign governments. Export restrictions (voluntary or involuntary) encourage firms to forego entry (Yamawaki, 1986; Harrigan, 1993; Trefler, 1993; Brainard, 1993). Likewise, Cooper and Kleinschmidt (1985) and Brainard (1997) discover a negative relationship between the level of country-specific export restraints and export intensity. Finally, market growth and geographical distance are likely to influence a firm's export behavior. Although analyzed at the macro level, Brainard (1997) shows that the level of U.S. trade increases in foreign GDP and decreases in transportation costs.

Firm characteristics

In addition to the external factors just presented, the micro-level exporting literature addresses how firm characteristics influence exporting behavior. Firm characteristics include differential resources, technological orientation, marketing skills, firm strategies, human capital, and managerial attitudes or perceptions that provide firms with competitive advantage.

Prior studies have successfully linked technological intensity (i.e., R&D expenditure) with the decision to export (Cavusgil and Nevin, 1984; Benvignati, 1990). The implications drawn from the aforementioned results are that technologically endowed firms are exporters. When relating investment in R&D to export sales, the results are less consistent. Many researchers offer evidence that R&D positively influences export intensity or volume (Gruber, Mehta, and Vernon, 1967; Cavusgil, 1984; Benvignati, 1990; Braunerhjelm, 1996; Ito and Pucik, 1993). Others find no significant relationship between R&D and export intensity or volume (Cooper and Kleinschmidt, 1985; Kravis and Lipsey, 1992; Ito and Pucik, 1993).

Other studies that examine firm characteristics and exporting show that advertising investment does not significantly influence the export decision (e.g., Cavusgil and Naor, 1987). However, Benvignati (1990) and Kravis and Lipsey (1992) find that advertising is negatively related to export sales. In either case, these findings are consistent with

Caves' (1981) argument that advertising does not carry well across national boundaries. He surmised that firms that spend heavily on advertising do so with the intention of increasing domestic sales.

Another stream of empirical work addresses managerial influences on exporting. These include managerial expectations and aspirations (Cavusgil, 1984), attitudes toward risk (Wiedersheim-Paul, Olson, and Welch, 1978), attitudes toward foreigners, managerial language skills and experience in foreign countries (Dichtl *et al.*, 1983; Reid, 1983), and other related constructs (for a thorough review see Leonidou, Katsikeas, and Piercy, 1998). The argument put forth by these scholars maintains that managers initiate and develop export strategy and, as such, deserve to be the focal unit of interest. However, more than 20 years of empirical work has failed to produce a reliable relationship between managerial variables and export behavior (Leonidou *et al.*, 1998).

Summary

Empirical studies of firm-level export behavior are few compared to studies at the industry or country level. Moreover, there are few consistent research findings. These observations reflect several underlying causes.

First, many studies have analyzed exporting in isolation. That is, they consider export outcomes without explicit recognition that export and domestic sales are likely simultaneously determined, and interrelated. To the extent that studies have examined export and domestic sales, they have done so by examining export intensity (export sales/total sales) as a dependent variable (e.g., Tookey, 1964; Hirsch, 1970), but little attention has been directed to the fact that both the numerator and denominator are endogenous. Namely, many firm and external factors affect both export sales and domestic sales. Forces that affect both domestic and export sales concurrently influence both the numerator and denominator, making the net effect ambiguous. Thus, we estimate a system of equations that allow for simultaneous effects between export and domestic sales.

Second, due to the various research traditions in which these studies are based, many different independent variables have been considered. The macro literature has generally been interested in the effects of external characteristics on export outcomes (i.e., aggregate trade flows), while the micro

literature has focused predominantly on firm characteristics as determinants of export behavior (i.e., firm export sales/intensity). Independent variables have been introduced without considering effects found in other research, and few studies test the effects of micro and macro determinants simultaneously.

Third, firm-level data on exporting are often difficult to assess because they tend not to be publicly available. Numerous firm-level studies use small-scale, proprietary survey data in which they have sampled on the dependent variable—surveying only exporting firms to determine their characteristics and actions. Moreover, most of the studies (with the exception of Campa, 2004; Bernard and Jensen, 2004, 1999a, 1999b; and Clerides, Lach, and Tybout, 1998) have been cross-sectional in nature, making it difficult to do more than document associations between variables.

Finally, many existing studies treat exporting as an endeavor undertaken by small firms internationalizing for the first time. The implicit assumption is that firms are domestic-focused and then enter international markets incrementally. Multinational firms operate with a different logic from their small, domestic-focused counterparts; and little research examines the difference in export behavior across these types of firms.

In the subsequent sections we generate hypotheses and design the empirical investigation to explicitly account for these concerns.

HYPOTHESES

The interrelationship between domestic and export sales

We take the approach that firms maximize the sum of profits from export and domestic markets. As such, export sales and domestic sales cannot be analyzed in isolation. Moreover, our expectation is that exports and domestic sales can directly affect each other. The precise nature of the relationship between domestic and export sales is unclear *ex ante*, because there are arguments that would suggest both positive and negative effects.

There are compelling reasons to expect a positive relationship. For example, if firms export from a position of domestic strength (e.g., Bernard and Jensen, 1999a), and strength in the domestic market can be leveraged in international markets, then we would expect domestic sales to positively

impact export sales. Likewise, should firms benefit from their export sales in the form of learning that can be applied to domestic markets (e.g., Salomon and Shaver, 2005), then we would expect the reciprocal effect: export sales positively impact domestic sales. A mutually positive relationship would suggest that each complements the other. That is, domestic sales promote exports and vice versa.

There are also arguments to suggest trade-offs between domestic and foreign sales. For example, firms might produce goods for sale in domestic and export markets, and shift output between markets when it becomes profitable to do so. Such a trade-off will manifest as a negative relationship between domestic and export sales, because sales to one market deny sales to another. The nature of a trade-off between markets will also be a function of the extent to which firms produce goods that are targeted to domestic and export consumption. For example, if the goods that a firm exports have little demand in the domestic market, then increased sales in the export market would not reduce sales in the domestic market. Therefore, export sales would not negatively affect domestic sales. Likewise, if the goods that a firm that produces for the domestic market have little demand in export markets, then increased sales in the domestic market would not reduce sales in export markets.

Although theory elicits expectations of interdependence between export and domestic sales, it does not provide guidance if a positive or negative effect will dominate. This remains an empirical question. As such, we do not offer specific hypotheses with regard to the direction of such effects. In this respect, our findings can help inform theory.

Firm characteristics

With regard to firm characteristics, we first examine the impact of advertising investments on domestic and export sales. Firms invest in advertising for a variety of reasons that include information dissemination, product differentiation, and brand building. These efforts are intended to increase firm sales by stimulating demand (i.e., increasing volume), allowing firms to charge more per unit, or both. We therefore expect advertising investments to be positively related to domestic sales. We hypothesize:

Hypothesis 1: Advertising expenditures increase domestic sales, all else equal.

As Caves (1981) notes, advertising messages do not generally carry well across international borders. Moreover, advertising efforts, especially for domestically focused firms, are often targeted to the domestic market (Benvignati, 1990; Kravis and Lipsey, 1992). Under these conditions we would not expect advertising efforts to be related to export sales. Therefore, we do not expect advertising to affect export sales and do not offer a specific hypothesis.

The second firm characteristic that we examine is R&D investment. R&D expenditure has generally been used to measure firm investment in innovative effort that is expected to foster technological innovation (either product or process) and hence future sales (e.g., Buckley and Casson, 1976; Morck and Yeung, 1991). Thus, R&D is intended to benefit the firm either through increased revenue or decreased cost. We therefore hypothesize:

Hypothesis 2: R&D expenditures increase domestic sales, all else equal.

Whether R&D investments affect domestic sales only, or export sales as well, has been debated in the literature. Historically, firms have been argued to focus new product innovations in domestic markets before they adapt and apply them to foreign markets (Vernon, 1966). If firms direct their R&D efforts to develop new products for the domestic market, we would expect contemporaneous R&D spending to have a greater impact on domestic sales compared to export sales. However, it is possible that firms make R&D investments that are specifically targeted for export markets. More recently, scholars have argued that firms do invest in R&D in an attempt to innovate for the host market (Kuemmerle, 1999). As such, we expect R&D expenditures to be positively related to export sales. Formally stated:

Hypothesis 3: R&D expenditures increase export sales, all else equal.

External characteristics

With respect to external characteristics, we first examine the effect of market growth on firms' domestic and export sales. Specifically, we expect

growth in the domestic market to increase sales for firms in the domestic market. All things equal, growth stimulates demand and provides opportunities for all firms to amplify their sales volume. We therefore hypothesize:

Hypothesis 4: All else equal, growth in domestic GDP increases domestic sales.

The international trade literature has long stressed the connection between foreign GDP and export sales. As foreign markets grow, countries are more likely to engage in trade (Gruber and Vernon; 1970; Leamer and Stern, 1970). Although this effect has been tested empirically in the macroeconomic trade literature (see in particular Dearnorff, 1984; Thursby and Thursby, 1987), we anticipate the very same effect to hold for individual firms. That is, we expect opportunities for increasing foreign sales with growth in distant markets. We propose:

Hypothesis 5: All else equal, growth in foreign GDP increases export sales.

Similarly, we expect exchange rate fluctuations to influence the export behavior of firms. Specifically, a depreciation of a firm's home currency, relative to currencies in export markets, should increase the volume of exports. This is because currency depreciation makes goods from the home country less expensive in the export country without changing the home country currency price. Exporting firms, therefore, can increase export sales when their home country currency depreciates. Because our dependent variable of interest is sales, we do not explicitly focus on the exchange rate hysteresis. As Campa (2004) shows, most of the influence of exchange rate changes on export sales comes through changes in export levels, not entry or exit, which are more prone to the hysteresis effect. We therefore expect the effect of exchange rate changes to be more direct on export volume and we hypothesize:

Hypothesis 6: All else equal, home-country currency depreciation increases export sales.

Foreign-owned vs. Spanish-owned firms

Implicit in our hypotheses, as in most existing studies on exporting, is that a company produces, and then decides simultaneously how to

service domestic and foreign markets. Although this describes the majority of firms in our sample, foreign companies own some of the sample firms. Multinational companies operating in Spain might make decisions to allocate production and output very differently from their Spanish-owned counterparts if they manage their subsidiaries with a larger global network in mind (e.g., Rangan, 1998; Kogut, 1983, Feinberg and Keane, 2001). If multinational companies with production facilities in Spain predominantly focus on sales outside of Spain, then we might find relationships that differ for this set of firms. That is, the nature of the interrelationship between export and domestic sales and effects of the variables that we consider might vary across foreign-owned and Spanish-owned firms.¹ Based on this expectation, we split the sample into foreign-owned and Spanish-owned firms to examine whether the effects that we examine are contingent on foreign ownership.²

In the next section we describe the data and statistical approach that we use to test these effects.

DATA AND STATISTICAL APPROACH

Sample

The majority of the data we employ to test the hypotheses are from a yearly survey of Spanish manufacturing firms conducted by the Fundación Empresa Pública. With the financial support of the Spanish Ministry of Industry, the Fundación Empresa Pública surveys a stratified random sample of Spanish manufacturing firms to get a representative picture of the country's manufacturing sector. The data cover the population of Spanish manufacturing firms with 200 or more employees and include 4 percent of the population of firms with at least 10 employees but fewer than 200 employees. The data we examine include all observations between the years 1990 and 1997.

The 1990 data provided information on 2188 firms. Small firms that dropped out of the original sample were replaced every year by firms with similar characteristics from the population. Thus, the resulting base data set is an unbalanced panel

¹ We thank an anonymous referee for suggesting this approach.

² In these data there are only 11 Spanish-owned firms with any international production. Therefore, we do not analyze Spanish multinationals separately and we eliminate them entirely from the analysis.

of 3060 firms and 15,226 firm-year observations. Although the total available sample could have reached 17,504 firm-year observations (2188 firms over 8 years), 2842 observations were missing data.³ MINER (1993) provides a detailed description of the data collection efforts (see also <http://www.funep.es>).

The Fundación Empresa Pública expends substantial effort in collecting, cleaning, and maintaining the data. Based on our examination of the relevant data fields and after discussions with representatives from the Fundación Empresa Pública, we removed two firms from the entire panel and eliminated 39 observations due to data errors. This reduced the sample to 3058 firms and 14,607 firm-year observations.

Dependent variables

Because export intensity does not measure the effects that we wish to explore, we measure, and estimate simultaneous equations, using domestic and export sales. The survey collects data on total sales and export sales; we therefore calculate domestic sales by subtracting export sales from total sales. Both variables are measured in thousands of Spanish pesetas.

Consistent with our assertion that exporting is the most widely used firm strategy for international expansion, more than half of the firms engage in exporting. Table 1 summarizes the export status of the sample employed in this study. Approximately 45 percent of the domestic firms export and 88 percent of the foreign-owned firms export.⁴

³ Missing data were a result of non-response to particular survey questions.

⁴ We define a firm as foreign-owned if a foreign parent owns any equity in the focal firm. On average, foreign parents hold about 82 percent of the equity in their target investments, and equity stakes varied from 1 to 100 percent. Our definition for inclusion into the set of foreign-owned firms differs from that used by the

The export markets of these firms range from geographically proximal locations such as Europe and North Africa to more distant locations including the United States, Mexico, China, Japan, Taiwan, and Korea. By contrast, only 11 of the 3058 firms in our sample (0.36%) reported having manufacturing activities outside of Spain. We remove these 11 firms from the analysis to avoid any bias resulting from the existence of Spanish multinationals versus foreign multinationals operating within Spain. However, the contrast between numbers of exporting and investing firms highlights the predominance of exporting strategies versus other international expansion strategies in these data. Further, our analysis provides general insight into small firm behavior from an internationalizing economy such as Spain.

Independent variables

The survey collected company advertising and R&D expenditures. Both variables are measured at the firm level (i.e., at the Spanish subsidiary level if foreign-owned) and expressed in thousands of pesetas.

In order to test Hypothesis 4, we calculate firm-specific real exchange rates (e.g., Campa, 2004). Firm-specific exchange rates reflect exchange rate changes most applicable to a firm’s export portfolio. We favor this approach because it recognizes that not all firms have the same export markets and are, therefore, not equally affected by exchange rate movements. Because the measure is expressed as pesetas divided by the foreign currencies, increasing values indicate depreciation of the

U.S. government, which is when a firm takes an equity stake of 10 percent or more in a foreign facility (Graham and Krugman, 1995). However, the results presented are not sensitive to this definition. Similar results were obtained when we specify our cut-off at different levels of foreign ownership.

Table 1. Export status by subsample

	1990	1991	1992	1993	1994	1995	1996	1997
<i>Domestic firms</i>								
Non-exporters	1025	888	857	811	752	636	642	695
Exporters	667	613	627	597	641	612	660	792
<i>Foreign firms</i>								
Non-exporters	69	60	56	47	42	31	34	32
Exporters	304	351	346	329	348	342	329	372

peseta and decreasing values indicate appreciation of the peseta.

We calculate the firm-specific exchange rate index in the following manner. First, the destination markets were grouped into three broadly defined areas: OECD countries in the European Union, non-European OECD destinations, and the rest of the world. We then calculated a specific exchange rate applied to each of the destination regions as follows: peseta/euro for the European Union, peseta/U.S. dollar for non-European OECD members, and the effective nominal exchange rate for Spain (from the IMF) for other world export destinations. The bilateral exchange rates were then converted to a common index using U.S. dollar equivalents in order to compare the exchange rates across currencies. Using the World Development Indicators from the International Bank for Reconstruction and Development, we converted the nominal exchange rates into real rates by multiplying the nominal rates by the ratio of inflation between each destination region and Spain (see Kennedy, 2001).⁵ Finally, we converted the three individual destination measures into a unitary, firm-specific measure weighted by the proportion of firm export sales to each of the three destination regions.

Owing to data constraints, we made some trade-offs and assumptions in order to generate these firm-specific exchange rates. Ideally, we would have liked to identify all potential markets to which each firm considers exporting. However, these data are not possible to obtain. Therefore, for exporters, we considered the relevant markets as the ones they currently export to. For non-exporting firms, exchange rates were estimated using industry averages for the largest export destination markets. For instance, a non-exporter in the chemical products industry was assigned a weighted average of the exchange rates faced by exporters in that industry. The assumption is that the non-exporting focal firm is most likely to export to the largest industry destinations if it becomes an exporter. Finally, we only have access to data regarding the breakdown of export markets served at two points in the sample. Information about destination markets was only available for exporters in 1990 and 1994. It was only in these years, when an extended version

of the survey was sent out, that firms responded about their export markets.⁶

Finally, we collected GDP data published by the U.S. Department of Energy. The U.S. DOE publishes detailed real GDP data obtained from Global Insight for over 200 countries for the period 1990–99. From this source we calculated two such GDP measures. The first, DOMESTIC GDP, simply captures the GDP in Spain (reported in billions of U.S. dollars). The second measure, defined as FOREIGN GDP, represents a weighted average of foreign GDP in the three potential destination markets (in billions of U.S. dollars).

Statistical method

In order to test the hypotheses, we employ two-stage least squares (2SLS) with firm fixed effects to estimate the following non-recursive system of equations.

$$\text{Exports}_{it} = \beta_1 \text{Domestic Sales}_{it} + \Gamma_1' \mathbf{X}_{it} + \delta_i + \varepsilon_{it} \quad (1)$$

$$\text{Domestic Sales}_{it} = \beta_2 \text{Exports}_{it} + \Gamma_2' \mathbf{W}_{it} + \delta_i + \eta_{it} \quad (2)$$

In these equations, Exports_{it} refers to export sales for firm i at time t , $\text{DomesticSales}_{it}$ to domestic sales for firm i at time t , \mathbf{X}_{it} is a vector of internal and external characteristics that affect export sales, and \mathbf{W}_{it} is a vector of internal and external characteristics that affect domestic sales. The δ_i term represents a firm fixed effect meant to control for unobserved heterogeneity; ε_{it} is an error term that is uncorrelated with \mathbf{X}_{it} ; and η_{it} is an error term that is uncorrelated with \mathbf{W}_{it} . We allow ε_{it} and η_{it} to correlate.

In order to identify this system of equations, we must have explanatory variables that predict only exports and that predict only domestic sales (Kennedy, 2001; Greene, 2000). That is, there must exist some elements in vector \mathbf{X}_{it} that are different from those in \mathbf{W}_{it} and elements in \mathbf{W}_{it} that are different from those in \mathbf{X}_{it} . From our hypotheses, R&D appears in both equations. Advertising and domestic GDP predict only domestic sales. Our justification for this specification is that previous research argues that advertising is primarily

⁵ The regional inflation rates were calculated using weighted-averages of annual inflation rates across all countries in each destination region.

⁶ Due to the nature of the data, we cannot examine what drives export levels to different national markets.

directed at the domestic market and corroborating empirical evidence suggests that advertising is not consistently related with international business activity (e.g., Caves, 1981; Morck and Yeung, 1992; Caves, 1996).⁷ Moreover, we expect that changes in the domestic business cycle will more directly affect domestic sales rather than export sales. By contrast, foreign GDP and real exchange rates predict export sales but not domestic sales. We model foreign GDP as affecting only export sales for the same reason that domestic GDP affects only domestic sales. In addition, we expect exchange rates to more directly affect the sale of goods in foreign markets.⁸

The Appendix discusses in detail the motivation for choosing this econometric approach to

test the hypotheses, the trade-offs of using this approach versus alternatives, and the sensitivity of our results to using alternative approaches.

RESULTS

In Tables 2 and 3 we present summary statistics and product moment correlations for each of the subsample splits (Spanish-owned and foreign-owned). Although the summary statistics and correlations are generally as expected, we find some differences across subsamples. Notably, foreign-owned firms are larger than Spanish-owned firms. Likewise, foreign-owned firms spend more (in both absolute terms, and as a percentage of sales) on advertising and R&D. There are also similarities across the subsamples. With respect to the dependent variables of interest, export sales and domestic sales are significantly positively correlated ($r = 0.50, p < 0.001$ for the Spanish-owned firms and $r = 0.36, p < 0.001$ for the foreign-owned firms). These significant correlations lend

⁷ Confirming this notion, we find that advertising is unrelated to export sales in specifications in which we include it in both equations.

⁸ In the first stage of the estimation process we find that the variables we use to identify the system have significant effects on the dependent variables. This provides some indication of the appropriateness of the instruments.

Table 2. Descriptive statistics and product moment correlations: domestic firms

	1.	2.	3.	4.	5.	6.	7.
1. Domestic sales	1						
2. Export sales	0.50	1					
3. R&D	0.36	0.43	1				
4. Advertising	0.34	0.15	0.21	1			
5. Domestic GDP	0.03	0.06	0.03	0.03	1		
6. Foreign GDP	0.03	0.06	0.03	0.03	0.98	1	
7. Real exchange rate	0.07	0.07	0.07	0.05	0.56	0.65	1
Mean	2.10E6	6.34E5	2.84E4	5.52E4	516.16	23592.69	122.47
Standard deviation	7.30E6	3.41E6	1.76E5	2.93E5	20.91	1388.94	17.09
Minimum	0.00	0.00	0.00	0.00	491.96	21929.03	84.21
Maximum	2.82E8	1.02E8	4.68E6	6.24E6	557.25	26142.13	196.09

Table 3. Descriptive statistics and product moment correlations: foreign firms

	1.	2.	3.	4.	5.	6.	7.
1. Domestic sales	1						
2. Export sales	0.36	1					
3. R&D	0.26	0.59	1				
4. Advertising	0.58	0.57	0.36	1			
5. Domestic GDP	0.05	0.07	0.03	0.03	1		
6. Foreign GDP	0.05	0.08	0.03	0.03	0.98	1	
7. Real exchange rate	0.05	0.03	0.06	0.01	0.56	0.64	1
Mean	1.34E7	5.73E6	2.94E5	5.15E5	517.02	23652.40	121.24
Standard deviation	4.48E7	2.78E7	1.79E6	1.98E6	20.68	1372.81	17.63
Minimum	0.00	0.00	0.00	0.00	491.96	21929.03	84.21
Maximum	9.71E8	5.40E8	3.33E7	3.29E7	557.25	26142.13	195.40

Table 4. 2SLS fixed-effect estimates (*t*-values in parentheses)

	Domestic firms	<i>n</i> = 11, 515	Foreign firms	<i>n</i> = 3092
	Export sales (1)	Domestic sales (2)	Export sales (3)	Domestic sales (4)
Domestic sales	0.26*** (6.79)		-0.42*** (-8.72)	
Export sales		0.23 (0.67)		0.02 (0.07)
Advertising		3.31*** (8.44)		6.18*** (6.94)
R&D	5.17*** (28.07)	0.06 (0.03)	0.95*** (4.16)	1.01*** (3.41)
Domestic GDP		6298.80** (2.27)		74793.21** (2.12)
Foreign GDP	47.38*** (2.97)		1953.34*** (8.27)	
Real exchange rate	4443.74*** (3.38)		24997.67 (1.23)	
Constant	-1.72E6*** (-6.49)	-1.48E6 (-1.15)	-3.81E7*** (-9.42)	-2.89E7** (-1.79)

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (one-tailed tests)

support to our contention that domestic sales and export sales are not independent and as such cannot be analyzed in isolation.

Table 4 presents the results from the systems of equations that we estimate. Columns 1 and 2 present the results for the subsample of Spanish-owned firms. Columns 3 and 4 present the results for the subsample of foreign-owned firms.

We first examine the relationship between the exports and domestic sales. For the Spanish-owned firms, we find that domestic sales significantly influence export sales. The effect is positive, which is consistent with the pairwise correlation. We find that a 1 peseta increase in domestic sales increases export sales by 0.26 pesetas. In column 2, we find no relationship between export sales and domestic sales. These results suggest that domestic sales and export sales are complements. Moreover, the complementarity is such that only increases in domestic sales lead to increases in export sales, not vice versa.

Columns 3 and 4 show a different relationship for the firms with foreign ownership. In column 3 we find that domestic sales negatively affect export sales. A 1 peseta increase in domestic sales reduces exports by 0.41 pesetas. This was somewhat surprising, and inconsistent with the pairwise correlation. We find no evidence of a reciprocal relationship—exports do not affect domestic sales in this system of equations. Therefore, for firms with foreign ownership we find that exports and domestic sales are substitutes and that the substitution is such that increased domestic sales lead to decreased exports, not vice versa. This is consistent with the interpretation that the goods that the foreign-owned firms sell in Spain are similar to the ones that they export out of Spain. Namely,

for these firms, increased sales in Spain come at the expense of sales outside of Spain.⁹

Turning to the hypothesized variables, we find that advertising has a positive effect on domestic sales for both subsets of firms, which supports Hypothesis 1. A 1 peseta increase in advertising increases domestic sales by 3.31 pesetas for domestic firms and 6.18 pesetas for the foreign-owned firms. Our predictions are that the coefficient estimates on R&D expenditures would likewise be positive for domestic sales. For domestic firms we find that R&D does not have an effect on domestic sales. This was rather surprising, and for this group of firms Hypothesis 2 is not supported. By contrast, R&D expenditures have a positive and significant effect on the domestic sales of foreign-owned firms. The magnitude of the effect is such that a 1 peseta increase in R&D expenditure increases domestic sales by 0.95 pesetas.

When examining the results with respect to R&D and export sales, we find that R&D is positively related to export sales for both sets of firms. As such, Hypothesis 3 is supported. For Spanish-owned firms, the results suggest that an additional peseta in R&D expenditure increases exports by 5.17 pesetas. Coupled with the non-significant finding of R&D on the domestic sales of Spanish firms, these results suggest that firms

⁹ The difference in effect across the two groups of firms does not appear influenced by large differences in capacity utilization, which could potentially drive substitution versus complementarity. Approximately 10 percent of the foreign-owned firms have capacity utilization above 90 percent versus approximately 8 percent for the Spanish-owned firms. Moreover, we find no statistical difference in the mean capacity utilization across the two groups of firms.

might increase their R&D expenditures in preparation for entry into export markets. That is, they incur additional development expenditures to increase foreign sales. For the foreign-owned firms, R&D expenditures are likewise positively associated with export sales. For foreign-owned firms, a 1 peseta increase in R&D expenditure is associated with a 1.01 peseta increase in export sales.

At this point we raise two considerations when interpreting the results with respect to advertising and R&D. First, the coefficients for these effects are rather large in magnitude—namely a 1 peseta increase in R&D or advertising results in a multiple peseta increase in sales—and it begs the question of why firms would not increase such expenditures if they had effects of this magnitude. One important consideration is that these estimates are from specifications in which sales, rather than profits, is the dependent variable. We would expect coefficients of smaller magnitude with profits as the dependent variable.¹⁰ Second, because these effects are measured contemporaneously with sales, there is a concern of reverse causality. Namely, the extra cash flow from exports could facilitate increased R&D spending if firms alter products for those foreign markets. Likewise, the extra cash flow from domestic sales might encourage firms to invest in advertising.¹¹

With regard to the external variables of interest, we find support for Hypothesis 4. Domestic GDP affects domestic sales for both sets of firms. A \$1 billion increase in domestic GDP translates into a 6.30 million peseta increase in domestic sales for Spanish firms and a 74.79 million peseta increase in domestic sales for foreign firms. Given that the average domestic sales of foreign and Spanish firms in the sample are 2.10 billion and 13.4 billion respectively, as a percentage of sales, the domestic sales of foreign-owned firms are more sensitive to changes in domestic GDP.

¹⁰ In the data, the average gross margin divided by sales is 10.38 percent. Therefore, for every 9.63 pesetas in sales, 1 peseta represents margin. As a result, a 1 peseta increase in advertising or R&D expenditure on average increases sales by more than 1 peseta yet does not increase profits by more than 1 peseta.

¹¹ We considered including lagged values of the R&D and advertising expenditure variables to the specification; however, these measures are very highly correlated with the contemporaneous measures, thereby confounding their interpretation. When we included the lagged measures in lieu of contemporaneous values, we found results that were consistent in statistical significance, albeit slightly weaker in magnitude than those presented.

Foreign GDP positively impacts both foreign-owned and Spanish-owned firms' export sales. As such, Hypothesis 5 also receives support. These results suggest that a \$1 billion increase in the foreign GDP measure leads to a 47,380 peseta increase in the export sales of domestic firms and a 1.95 million peseta increase in export sales for foreign-owned firms. As with domestic GDP, the export sales of foreign firms (mean exports of 5.73 billion pesetas) are actually more sensitive to changes in foreign GDP than the export sales of domestic firms (mean exports of 634 million pesetas).

Our test of Hypothesis 6 appears in columns 1 and 3. We find that exchange rate changes affect the export sales of domestic firms, but not foreign firms. As such, Hypothesis 6 receives mixed support. The results suggest that although domestic firms increase their export sales in response to depreciation in the peseta, foreign firms do not. This implies that the export sales of foreign-owned firms are less sensitive to exchange rates fluctuations—perhaps because they are more likely to employ currency hedges, or to conduct business in a single currency across all markets; thereby reducing currency exposure. However, this result warrants some caution in interpretation due to the substantial correlation between foreign GDP and the exchange rate. In fact, when we eliminate foreign GDP from both equations, we find that the exchange rate has a positive and significant effect on the export sales of both Spanish and foreign-owned firms.

Sensitivity analyses

First, to account for the possibility that firms respond to exchange rate changes with some lag rather than immediately (i.e., the J-curve effect; Bahmani-Oskooee, 1985), we examined specifications that included lagged values of real exchange rate. The pattern of results with respect to the hypothesized variables, both in terms of magnitude and statistical significance, does not change substantially. Moreover, with respect to both sets of firms we find that the lagged exchange rate variable has a positive, although weak ($p < 0.05$), effect in the hypothesized direction.

Second, because the domestic GDP variable does not vary across firms for any given year, we could not include year fixed effects in the specification. We examined the sensitivity of our results

when we removed the GDP measures and included year effects. There were no material changes in the results.

Third, we split the sample by time in order to explore the stability of the parameters across time periods. For instance, during the early 1990s Spain experienced a severe economic downturn followed by a recovery in the mid to late 1990s. It could be that the effects of the independent variables differ depending upon the economic cycle. Therefore, we split each of the subsamples and ran separate regressions for two distinct periods: recessionary (1992–94) and recovery (1995–97). Although the results were generally consistent with those presented (especially with regard to the relationship between domestic and export sales), there were some informative contrasts. Specifically, both dependent variables (for both Spanish- and foreign-owned firms alike) were more sensitive to external market fluctuations (GDP and exchange rate changes) in the recessionary period. Because greater variation in external market characteristics exists during the recessionary period versus the recovery period and because each period is only 3 years in length, the different levels of variability in the data might drive these differences over time. Therefore, we do not want to draw strong conclusions based on these results.¹²

Limitations

At this point we draw two caveats that we discuss in the Appendix. First, we ignored the bounded nature of the dependent variables in favor of controlling for unobserved firm heterogeneity. Although we did check the robustness of the results across various specifications, we recognize that accounting for this factor might lead to more precise estimates and conclusions. As such, we encourage future work to reconsider such issues when more advanced methodological techniques become available.

Second, the influence of hysteresis, to the extent it is present in these data, might induce a sample bias that leads to inaccurate coefficient estimates. To the extent that hysteresis affects the results we present, the bias suggests that our estimates with respect to exchange rates would likely be underestimated. Because a hysteresis effect suggests that firms are more likely to respond to large exchange

rate changes rather than small changes, the true effect of exchange rates would actually be stronger than that measured. Given that we find a positive and significant effect of exchange rates on export volume, this implies a conservative estimate. Nevertheless, we acknowledge that such effects might be present in our data and we would encourage future research to investigate these issues further.

The aforementioned limitations notwithstanding, our results have implications for scholars and managers. Below we discuss the implications of such findings for both research and practice.

DISCUSSION

We find at least partial support for all of our predictions. Moreover, we find striking differences in many of these effects across Spanish-owned and foreign-owned firms operating in Spain. The support of our predictions combined with the often differing effect across the two groups of firms has important implications for guiding managerial actions, reconciling equivocal findings in previous research, and guiding future exporting research.

We find that for Spanish-owned firms exports and domestic sales are complements because domestic sales positively affect export sales. Their domestic sales are sensitive to changes in the growth of the Spanish economy and to changes in advertising spending. The export sales of Spanish-owned firms are influenced by changes in R&D expenditure and changes in external factors such as foreign GDP and exchange rates. The interpretation of these results in concert is that the Spanish-owned firms tend to focus on the domestic market and that strength in the domestic market drives their expansion into export markets—potentially with some investment in R&D to adapt their products to foreign markets. Therefore, export strength appears to be a benefit that many firms realize from domestic strength.

In contrast, domestic GDP, R&D investments, and advertising expenditures all influence local sales of foreign-owned firms. Moreover, export and domestic sales are substitutes for the foreign-owned firms operating in Spain because domestic sales negatively affect export sales. And although these firms' export sales are sensitive to growth in foreign markets (and, to a certain extent, exchange rate changes), it appears that these foreign firms operating in Spain are managed as part of a

¹² We thank an anonymous reviewer for suggesting this analysis.

network of manufacturing operations and that the sales focus of these operations tends to be outside of Spain. Therefore, the export strategies of these firms appear to be subsumed under broader strategies that include direct investments.

The implications of these findings for managers are consistent with findings in the literature that firms should undertake export strategies from positions of strength in the domestic market (e.g., Bernard and Jensen, 1999a). It appears that domestic strength encourages export sales. Moreover, should firms expand from strength and realize sales in the foreign market, this can facilitate other benefits such as potentially aiding innovation (Salomon and Shaver, 2005; Salomon, 2002) and helping mitigate liquidity constraints (Campa and Shaver, 2002). However, such implications would apply only for firms that do not have foreign production facilities. That is, exporting is the way that these firms participate internationally. For firms with direct investments, exporting is often the tool that allows for the realization of location advantages. For example, exporting allows firms to move production capacity around the world while selling in various domestic markets.

Our findings also provide insight into why many results in the firm-level exporting literature have been equivocal. First, many existing studies ignore the potential effects of domestic sales on export sales. Furthermore, many fail to control for unobserved firm heterogeneity when analyzing export sales.¹³ Failure to control for forces such as these that affect both domestic and export sales concurrently might have led to inconsistent, and potentially biased, results across various studies. Second, we find that firm and external characteristics are important determinants of export sales. Studies that do not account for both effects might suffer biases due to omitted variables. Third, we find that exports behave differently for firms with and without direct investments. Therefore, to the extent that previous samples had unequal weighting of these types of firms and did not explicitly control for these effects, this alone could account for the lack of consistent results. In summary, attention to all of these points can guide firm-level export research.

¹³ Not surprisingly, when we run our results without controlling for firm effects we find a positive and significant effect of domestic sales on exporting sales for both groups of firms (consistent with the pairwise correlations).

CONCLUSIONS

We examine how firm and external forces affect domestic and export sales while explicitly considering the interdependence between export and domestic sales. Specifically, we examined the influence of firm advertising investments, firm R&D investments, market growth, and exchange rate changes on domestic sales and export sales. In doing so, we add to a relatively small number of studies that examine firms' strategies with respect to exporting. Although exporting is the most prevalent form of international expansion, the firm-level study of this phenomenon—especially from a strategic management perspective—is rare.

Our findings have important implications for managers. First, the interdependence between domestic and export sales that we document implies that strategic decisions that focus on domestic or export sales in isolation can lead to suboptimal firm choices. A complicating factor in jointly considering these decisions is that for the domestic firms in our sample domestic sales positively influenced export sales, but not vice versa. This suggests that the path to firm growth, both for exports and domestic sales, involves exporting from a position of domestic strength. The implication is that effectively managing domestic operations aids exports. For the foreign-owned firms operating in Spain, the finding that domestic sales negatively affect export sales suggests that there exists a trade-off within foreign-owned firms' network of sales when sales increase in the market where goods are produced.

Second, we show that firm investments such as R&D affect export sales. This suggests that export sales are not solely driven by environmental factors, such as exchange rate changes and market growth, which are outside of the control of managers. Therefore, a firm's export strategy must involve more than simply scanning for and responding to changes in the macro business environment. Moreover, the interdependence between export and domestic sales suggests that managers must make investments in R&D and advertising, understanding that they can have both direct and indirect effects on domestic and export sales.

Finally, we emphasize the importance of considering domestic-owned and foreign-owned firms as entities with different internal logics. The Spanish-owned companies in our sample seem to resemble small, domestic-focused firms that are the implicitly assumed actor in much of the exporting

literature. Our results for this set of firms are consistent with the prevailing literature that suggests that firms should expand internationally from a position of domestic strength. By contrast, subsidiaries of foreign parents that are a part of multinational networks are managed with consideration to the overall network. This highlights the importance of a burgeoning literature examining whether foreign production and exporting are substitutes or complements (see Blonigen, 2001).

To conclude, we reiterate that exporting is the most widely used foreign expansion strategy. In this paper we document the interrelationship between export and domestic sales and highlight how both firm and external market characteristics are important determinants of export and domestic sales. Moreover, we find important differences in the exporting behavior of Spanish-owned and foreign-owned companies. These findings have important implications for effectively managing this important international expansion strategy.

ACKNOWLEDGEMENTS

We are grateful to the Fundación Empresa Pública for providing us with access to these data and to José Campa for providing us with the firm-specific exchange rate data. We appreciate helpful, detailed, and constructive comments from the anonymous reviewers, Associate Editor Will Mitchell, José Campa, Wilbur Chung, Bill Greene, Sevgin Eroglu, and Michael Lenox.

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APPENDIX: ECONOMETRIC APPROACH

In determining the appropriate econometric approach to test our hypotheses, we were faced with a number of trade-offs given the underlying question that we wish to examine and the nature of the data. We wish to simultaneously estimate domestic and export sales; nevertheless, our data have the following features: (a) we observe firms over multiple years—hence the concern of lack of independence in the error terms across observations for each firms (i.e., there exists unobserved firm heterogeneity); (b) the dependent variables are limited because we do not observe negative values for export or domestic sales; and (c) there might be persistence in export sales if exchange rate hysteresis is an important element of export sales.

Because the focal contribution of our paper is the consideration of the simultaneity of export and domestic sales, our primary approach is to estimate a non-recursive system of equations of

the following form:

$$\text{Exports} = f(\text{DomesticSales}, \text{R\&D}, \text{Foreign GDP}, \text{Real exchange rate}) \quad (\text{A1})$$

$$\text{DomesticSales} = g(\text{Exports}, \text{Advertising}, \text{R\&D}, \text{Domestic GDP}) \quad (\text{A2})$$

This system of equations is identified because we model Foreign GDP and Real exchange rates as direct determinants of export sales, but not domestic sales. Likewise, we model Advertising and Domestic GDP as direct determinants of Domestic sales and not export sales. The first step in our efforts to estimate this system of equations was to employ 2SLS on each equation. We then estimated 2SLS with firm random effects to assess whether unobserved heterogeneity was a concern. We found that the random effects were statistically significant, supporting our concern that there exists unobserved heterogeneity and that panel data techniques were appropriate. The assumption underlying the random effects estimator is that the unobserved heterogeneity is not correlated with the regressors. To assess this, we estimated a 2SLS fixed-effects specification, which does not assume that the unobserved heterogeneity is uncorrelated with the regressors. Using a Hausman test, we evaluated whether the random effects assumption was valid. The Hausman test rejected the null hypothesis that the random effect was uncorrelated with the regressors. Therefore, we favored the 2SLS fixed-effect approach.

We examined the sensitivity of our estimates to using a within-firm 3SLS estimator. The 3SLS results were entirely consistent with the 2SLS fixed effect results. The benefit of 3SLS is that the estimates are consistent and asymptotically efficient (a property that the 2SLS estimator does not have). However, a trade-off with 3SLS vs. 2SLS is that if one equation is misspecified then the entire system is misspecified. Given this trade-off we chose to present the 2SLS results. Results from any of the specifications that we describe in this Appendix are available upon request.

Limited dependent variables

As previously mentioned, a focal element of this paper is to account for the simultaneity of domestic and export sales. Because the dependent variables

in our system are limited, we explored the possibility of employing the simultaneous Tobit estimator of Blundell and Smith (1989). There were two complications in using this approach. First, the Blundell and Smith estimator is for a recursive system of equations and we have a non-recursive system of equations. Second, our data are panel in nature, which raises the concern about lack of independence across observations as we discussed previously in this Appendix. The Blundell and Smith estimator does not address non-independent observations.

The results that we present in the main body of the text show that export sales are a function of domestic sales and not vice versa. Therefore, although data-driven, we decided that we could 'overlook' the first issue and model a recursive system of equations. However, the second issue posed more of a problem given that the tests we describe above point to the existence of unobserved firm heterogeneity in the data.

Therefore, we found ourselves having to make a trade-off. Given that our results show the existence of unobserved heterogeneity we decided it was more appropriate to employ the 2SLS approach. We did, however, run some sensitivity analyses across recursive simultaneous equation models that did not account for firm effects or limited dependent variables using the Blundell and Smith estimator. We found that a recursive model without controlling for unobserved firm effects provided extremely consistent results (in terms of level of statistical significance and sign of coefficient estimates for all explanatory variables). Therefore, to the extent it exists, it appears that the limited nature of the exporting variable does not lead to qualitatively different interpretations of our results.

Another approach we considered was to ignore the simultaneity of the dependent variables and estimate a panel data (i.e., random effect) Tobit model for export sales. We did not choose this approach because (a) the simultaneity of domestic and export sales is a key element of our paper and (b) the Hausman test in the 2SLS specification indicates that the unobserved effects correlate with the regressors.

Persistence in exporting

In order to assess the potential bias induced by an exchange rate hysteresis effect, we estimated

a dynamic panel model of export sales using the Arellano and Bond (1991) estimator. The concern is that our results might be misleading should there exist persistence in export sales. Unfortunately, the Arellano and Bond (1991) estimator does not allow us to directly assess the simultaneity of export and domestic sales; however, we include domestic sales as an explanatory variable in the export sales equation.

With respect to the sign of coefficient estimates and level of statistical significance, the results from this estimator were consistent with those from

the 2SLS estimates that we present in the paper. With regard to export persistence, we found that lagged export sales were positively related to current export sales for the foreign firms but negatively related to contemporaneous export sales for the Spanish firms. Our interpretation is that hysteresis does not play a prominent role because persistence in export volume was not prevalent for domestic firms. We interpret these results to suggest that our findings would not change substantially if we were to more explicitly control for the possibility of hysteresis in the data.