Export Orientation, Foreign Production, and the Growth of Medium Sized and Large Manufacturing Firms

Michael Pfa¤ermayr¤

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Abstract

Using data on large and medium sized Austrian manufacturing …rms this paper analyzes empirically in which way a high degree of export orientation and foreign production abroad, as two modes of serving foreign markets, are related to the growth performance of domestic production. Robust median regressions do not suggest that foreign production adversely a¤ects …rm growth at the domestic location. Exports to non-EU countries, in combination with foreign production, especially contribute to growth at the domestic location.

Keywords: Growth of …rms, multinational …rms, exports
Jel.: L11, F23

1 Introduction

The increasing importance of foreign production by multinational …rms (MNEs) must be seen as part of a …rms's growth process. Especially, when exports are impeded by rising marginal costs of production or transportation the latter interpreted in a wide sense as the costs of lacking market proximity, tari¤ and non-tari¤ barriers, etc. (see Scherer et al., 1975; Buckley - Casson, 1981; Pfaffermayr, 1997), …rms tend to gradually shift part of their production to foreign countries over the course of their expansion.

¤Austrian Institute of Economic Research, PO-Box 91, A-1103 Vienna. Email: Michael.Pfa¤ermayr@wifo.ac.at.
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The positive correlation between the level of foreign production and exports (or home production) found in many studies suggests a static, complementary relationship between foreign investment (production) and exports (see Markusen, 1995, for an overview). Simply referring to a static relationship, however, does not bring out the whole story: Although positively correlated in levels with domestic activities, depending on the form of foreign direct investment (FDI), production abroad may exert an important - maybe negative - impact on the growth potential of MNEs at their domestic location. In a small panel of MNEs in Austrian manufacturing, for example, the median …rm reduced domestic employment by 3.1 percent (on average p.a.) between 1989 and 1997, but increased employment in foreign a¢liates by 9.8 percent on average p.a.[1]. A priori, this does not necessarily imply that domestic employment has been substituted by foreign a¢liate employment. To derive valid conclusions on the relationship between domestic (employment) growth and that of foreign a¢liates, one needs information on the counterfactual. The relationship could be de…ned as substitutional (complementary), if domestic employment c.p. were to have shrunk less (faster) or were to have grown faster (slower) in the absence of foreign production. One way to attain this information is to estimate an econometric model and test for the marginal impact of foreign production. To provide an estimate of such a counterfactual case is the main aim of the paper.

Summarizing the results, robust median regressions do not provide evidence that the large and medium sized Austrian manufacturing …rms engaged in both exporting and running foreign a¢liates, on average grow slower (or shrink faster) at their domestic location. In contrast, the econometric estimates suggest a positive e¤ect and thus no signi…cant substitution of domestic production from a dynamic point of view. Additionally, there is some evidence that the growth/size relationship is weaker for …rms with foreign production and that the growth potential at the domestic location is probably higher if …rms pursue a strategy based on both high export and foreign production (especially when exports to countries outside of Europe are concerned). However, the estimation results once more con…rm the random nature of …rm growth which makes it di¢cult to derive precise estimates, especially without detailed information on the form of the …rms' FDI.

The paper proceeds as follows: the next section speci…es the main hypothesis, discusses the econometric speci…cation which will be estimated, describes the data and shortly refers to the robust estimation method implemented. Section 3 presents the estimation results. Section 4 concludes and summarizes the main …ndings.

[1] See Dell'mour, Egger, Gugler, Pfa¤ermayr and Wolfmayr-Schnitzer (2000) for more details.

2 The econometric speci…cation, the data base and the estimation method

Econometric speci…cation: Theoretical and empirical studies examining the determinants of the growth of …rms (see, Geroski, 1998 for an overview) are mainly based on the observation that in many markets the distribution of …rm size is extremely skewed. According to Gibrat's law of proportionate growth, …rm size (measured in sales, employment or assets) grows according to a random walk. Geroski (1998) summarizes the empirical evidence by observing that "corporate growth is really very random". The theoretical work of Jovanovic (1992), Mitchell (2000) and others additionally suggests the importance of learning e¤ects in the early phase of new start-ups, implying that the age of …rms is inversely related to growth (see e.g. Evans, 1987 for empirical evidence).

Following the large body of empirical literature which tests Gibrat's law of proportionate …rm growth, this paper uses a cross-section of …rms and regresses the average log di¤erences in …rm size, here measured as employment at the domestic location, on initial size, export propensity, an indicator of foreign production and additional control variables. The age of …rms is not available for all …rms and could not be included.

The e¤ect of foreign activities on domestic …rm growth depends on the nature of FDI. Horizontal FDI saves transportation costs or compensates for lacking market proximity at the expense of additional …xed plant set-up costs. Generally, this form of FDI is based on a proximity/plant size trade-o¤ (see Brainard, 1983, Markusen - Venables, 1998) and substitutes for exports. Therefore, negative e¤ects on …rm growth at the domestic location (here in terms of employment) have to be expected from this source. Vertical direct investments in services and distribution, in contrast, generate intra…rm exports and foster domestic …rm growth. The same holds true if FDI induces additional headquarter services or aims at the fragmentation of the production process (Helpman - Krugman 1995). In the latter case, MNEs delocate some parts of the value added chain to foreign a¢liates to exploit comparative advantages and specialize in tasks more suited to the domestic location. Here, …rms are predicted to grow also at their domestic location, if fragmentation induces an increase in productivity and enables …rms to gain market shares.

In this paper, the nature of foreign production remains unobserved. Instead, the existence of foreign production is measured by a time invariant dummy F, taking the value 1 if a …rm operates a foreign a¢liate. Therefore, a reduced form aimed at identifying the average e¤ect of foreign production on domestic …rm growth is estimated. Following Wagner - Bernard (1997) and Lui et. al. (1999)[2] among others, the growth equations also include time invariant indicators of export orientation (split-up into exports to the EU and exports to - mainly Eastern European - countries outside the EU; $EXEU$, $EXNEU$). In the present context, the interest lies in the impact of exports vs. foreign pro-

[2] Note, both studies did not …nd signi…cant ex-post performance di¤erences between exporters and non-exporters.

duction, as two modes of serving foreign markets, on growth performance at the domestic location. In particular, the common in‡uence of both high export orientation and foreign production is tested by introducing interaction terms. Since especially fast growing …rms - e.g. if they are in the possession of …rm-speci…c assets - are likely to become direct investors over time, we look at the ex- post growth performance in the period following the measurement of foreign production and the propensity to export (i.e. at the beginning of the estimation period), in order to avoid endogeneity problems.

The inclusion of additional control variables is motivated by the large literature on …rm growth, although data-availability limits possible choices. The average investment to sales ratio controls for investment propensity which is hypothesized as one of the factors accounting for producer heterogeneity (INQ, Doms et al., 1995; Lui et al., 1999). In order to control for the characteristics and its changes in the …rms' market environment, such as industry speci…c growth patterns of demand (Geroski et al. 1997), a proxy for market growth[3] (GSAGG) de…ned below, as well as regional dummies ('Bundesländer'), are additionally included. The latter account for di¤erences in regional policies and also for varying forms of access to the foreign markets. For example, …rms located near the borders to Eastern Europe may develop di¤erently compared to those situated in the western part of Austria. Lastly, since foreign production is unlikely to be a substitute of production for the domestic market, growth in domestic sales additionally enters the growth equation as a control variable (GSHOME).

Using employment (B) as a measure of …rm size, the econometric speci…cation is formally based on:

$$¢ \ln B = ®_0 + ®_1 \ln B_0 + ®_2 ¢ \ln U_H + Z \qquad (1)$$

where U_H denotes sales in the domestic market and Z captures labor demand induced (or substituted for) by the two di¤erent modes of serving foreign markets and the other controls. Since the only available information on foreign involvement is export propensity and an indicator on the existence of foreign production, the following reduced form is postulated for Z:

$$Z = f(F; EXEU; EXNEU; INQ; GSAGG) \qquad (2)$$

Combining (1) and (2) gives the empirical speci…cation which is estimated below for a cross-section of large and medium sized Austrian manufacturing …rms:

$$\frac{¢ \ln B_{T_i} \; ¡ \; ¢ \ln B_{T_0}}{T_i \; ¡ \; T_0} = ®_0 + ®_1 \ln B_{T_0;i} + ®_2 GSHOME_i + \qquad (3)$$
$$®_3 F_{T_0;i} \ln B_{T_0;i} + ®_4 F_{T_0;i} + ®_5 EXEU_{T_0;i} + ®_6 EXNEU_{T_0;i} +$$
$$®_7 EXEU_{T_0;i} F_{T_0;i} + ®_8 EXNEU_{T_0;i} F_{T_0;i} + ®_9 INQ_i + ®_{10} GSAGG_j + R_k + ²_i$$

[3] Industry dummies are not introduced, in order to avoid multicollinearity. If they are included instead of GSAGG; the estimation results do not change much. However, the standard errors of the estimated coe¢cients tend to be higher.

Subscript i refers to the …rm, j indexes 18 two-digit industries, to which a …rm can belong and k their region (9 'Bundesländer'). $GSHOME_i$ measures average growth of sales in the domestic market and is de…ned as $\frac{¢\ln U_{H;T_i} ¡ ¢\ln U_{H;T_0}}{T_i ¡ T_0}$ with $U_H = U(1 ¡ EXEU ¡ EXNEU)$. $GSAGG_j$ and INQ_i are de…ned below. Since the underlying panel is not balanced, averages for each …rm are taken over 2-4 observations.

Data: The empirical investigation uses the Investment Surveys[4] covering the period 1996-1999, which WIFO conducts annually in co-operation with the EU DG-ECFIN (see European Commission, 1997, for details). The survey is not compulsory[5] and does not comprise a random sample of enterprises, but rather follows the development of a …xed 'test group' over the course of years. Due to the relatively small number of newly founded …rms in the survey, the unbalanced panel is not representative of the whole population; instead it mainly covers mature, medium sized and large …rms. In addition, it has not always been possible to obtain a clear picture of mergers and acquisitions, i.e. growth rates may re‡ect both internal and acquisition growth.

The survey provides information on employment (B), sales from domestic production (U), and investments (I), all for the domestic location. Exports into the EU (EXEU) and into countries outside the EU (EXNEU) are both measured as shares of sales from domestic production. They are evaluated according to 11 categories and are valued at the middle of the corresponding interval. This wording of the questions greatly increases the questionnaire's general acceptance by the …rms, with the disadvantage that some information is lost. The foreign production dummy (F) takes the value of 1; if the …rm operates a foreign af…liate. Information on the size classes of amount of foreign production is not used. The investment sales ratio is de…ned as $INQ = \frac{1}{T_i ¡ T_0} \ln(I=U)$. To control for overall demand growth, one ideally wants to include growth in apparent consumption in the foreign markets. Since this is not available, GSAGG is calculated as the median of the average growth rate of the …rm's sales over the period 1996-1999, in each two-digit industry. Note that this measure is based on all …rms in the sample and not only on those used for the regressions.

The sample is restricted according to several criteria. First, only those …rms can be analyzed which have provided information on all variables. Secondly, …rms which do not decide between exporting and foreign production are excluded, because they either do not export or are relatively small (< 100 employees). Additionally, a few severe outliers with implausibly high or low growth rates for sales and/or employment (average log di¤erences of employment above 0.5 or below -0.5), which most likely were the result of data-errors or due to

[4] Although the WIFO Investment Survey basically de…nes the plant (Betrieb) as its unit of measurement, most larger enterprises prefer to respond at the corporate level. All observations referring to the plant level, which cannot decide to setup an a¢liate abroad have been omitted. The survey asks for both realized values, which lag two years behind the survey date, as well as planned values. In the present study, the realized values are used; only the data for 1999 refer to planned values (4th plan, see European Commission, 1997).

[5] So some …rms dropped out of the sample not only because of an exit or takeover, but also because they no longer wished to participate.

signi…cant mergers and acquisitions or restructuring, have been skipped. This leaves us with a cross-section of 351 …rms from a total of 1144 …rms.

Table 1

Table 1 provides de…nitions and summary statistics. The median of average employment growth per annum is 0.26 percent, and there is considerable variation, as illustrated by the growth rates for the …rst and third quartiles. We observe that many …rms did not grow smoothly, but rather grew (or shrank) rapidly in short, intense phases with, jumps in growth rates. 38.5 percent of the observations refer to …rms with foreign production. The median share of exports to the EU in sales from domestic production amounts to 35 percent, the corresponding share to countries outside the EU is 15 percent.

Estimation method: The distribution of growth rates does not correspond closely to a normal distribution because of ‡at long tails; i.e. there are a few …rms, growing or shrinking at a very fast pace. So the panel includes a considerable number of extreme values, which would have to be classi…ed as outliers with OLS estimators. Thus, this study takes a robust approach and uses the LAD-estimator or median regressions. The LAD-estimator minimizes the sum of absolute errors and does not give extreme values as much weight as the OLS-estimator. It achieves almost the same e¢ciency as OLS in situations with independent, but non-normal errors (Hamilton, 1998; see Fiaggio - Konnigs, 1999 for a similar approach). In order to account for possible heteroscedasticity, which would lead to underestimated standard errors by the analytical estimates (Rogers, 1992), bootstrap resampling with 10000 replications is used.

3 The estimation results

The estimation results are provided in four speci…cations in Table 2. Since the interaction terms induce severe multicollinearity and do not permit the estimation of the full speci…cation (3), four restricted versions were estimated separately.

As found in many studies on the growth of primarily larger …rms (see Sutton, 1997, Geroski, 1998 for an overview), there is signi…cant regression to the mean, and Gibrat's law is rejected, indicating that larger …rms on average are growing slower in terms of employment. However, the implied speed of adjustment lies between 0.009 and 0.011. So, in line with many other investigations, one can hardly call this (conditional) convergence in size - the implied half-lives vary between 62 and 76 years in speci…cations I-IV[6]. Rather, during this short time period growth seems to be mainly random and the size di¤erences are persistent.

It is important to control for growth in domestic sales, since - as mentioned above - employment growth originating from domestic sales growth is unlikely to be a¤ected by foreign activities. The signi…cant coe¢cient of GSHOME indicates that a 1-percent increase induces employment growth of approximately

[6] The speed of convergence is calculated as $b = \frac{1}{T}[\ln(1 + \bar{T})]$, where $\bar{}$ is derived from the regressions in Table 2. Half-lives are given by $\ln 2 = b$:

0.41-0.46 percent. The impact of aggregate sales growth is of the same order and con…rms the hypothesis that …rms operating in growing markets on average exhibit better growth performance. In the present context, the indicator of market growth is rather crude and should be interpreted with care. Firm heterogeneity measured by the average investment sales ratio is also a signi…cant determinant in the all speci…cations reported in Table 2. Therefore, higher average investment propensity goes hand in hand with faster growth.

Table 2

From a dynamic point of view, the estimates do not suggest signi…cant substitution of domestic production (more precisely, employment embodied in exports) by foreign a¢liates, but rather, complementary growth of employment at home and abroad. First, the foreign production dummy is signi…cantly positive (at least at 10%) in Speci…cations I and II of Table 2; the marginal e¤ect of the foreign production dummy lies between 1.3 and 1.9 percentage points. Secondly, …rms which export a large share of their production both to EU-members and to countries outside the EU grow faster on average, according to the estimates of both Speci…cations II and III. Thirdly, …rms pursuing a strategy based on both exports and foreign production grow faster, as shown by the signi…cant interaction e¤ects with foreign production (Speci…cation III). If …rms with foreign production exhibit low export orientation, the e¤ect of foreign production is insigni…cantly negative, but turns positive if exports are su¢ciently high. However, estimating interaction terms is - as is often the case - a¤ected by multicollinearity, and thus the parameters could not be estimated precisely. Only the interaction term with exports to countries outside the EU is signi…cant at 10%. The fourth result refers to the persistence of …rm size (Speci…cation IV): interacting the foreign production dummy with the initial size of …rms results in a signi…cantly positive e¤ect; that is, …rm size at the Austrian location is more persistent when the …rms operate a¢liates abroad and the negative e¤ect of …rm size on growth is lower.

The positive relationship between domestic and foreign a¢liate employment is also a¤ected by the remaining explaining variables, if they di¤er systematically between multinational and non-multinational, exporting …rms. In particular, a …rm's initial size is a candidate here. For this reason, Table 3, compares the median predicted employment growth for several classes of export propensity and calculates the corresponding counterfactual. For …rms with no foreign af…liates the foreign production dummy is counterfactually set to one; the other way round is taken for …rms with foreign production.

Table 3

We de…ne three groups of exporters: Low export orientation is the category with an EU export share below 20% and a non EU-export share below 10%. To be in the class of high export orientation the corresponding export shares must be larger than 60% and 30%, respectively. The rest is allocated to the middle group.

The evidence seems quite clear: Although …rms with foreign production are larger on average [7], median predicted growth rates are higher by 0.4-0.5 percentage points. Furthermore, when going through the cells from 'low' to 'high' export orientation, the median predicted employment growth rate increases, especially from the 'low' to 'medium' class of exporters and less from the 'medium' to 'high' grouping (in Speci…cation and II it actually falls slightly). The counterfactuals show a clear, positive impact of running foreign a¢liates on domestic employment growth. If …rms with no foreign production are classi…ed counterfactually as MNEs, the median predicted growth rate is higher;it is lower if MNEs are classi…ed as pure exporters. With respect to the relationship between foreign and domestic production, it seems decisive that …rms achieve high export orientation, especially to countries outside the EU, and that they serve foreign markets according to a strategy, which is built on both high export orientation and foreign production. The substitution of domestic activities by foreign production only seems relevant when …rms concentrate solely on shifting production to more favorable foreign locations, stop or reduce exporting, and as a consequence achieve only average or (lower) rates of growth at home. However, even in this case, the counterfactual predictions show that growth rates would be even lower if …rms did not produce abroad.

There is not much empirical evidence available for comparison. Buckley et. al. (1984) analyze the world's largest …rms and …nd a positive relationship between …rm growth and the degree of multinationality (however none for non-US …rms). Siddhartan - Lall (1982) and Kumar (1984) estimate negative e¤ects for US and British …rms. In a more recent paper, Cantwell - Sanna-Randacchio (1992) report a partly contradictory result for the world largest …rms[8]. Firms which operate mainly domestically grow faster on average than MNEs because - as the authors argue - of their earlier stage in the internationalization process. In contrast, the degree of multinationality (which could not be tested here) exerts a positive impact on growth performance. However, they do not control for export propensity and contribute to the issue discussed here. Looking at the relationship between export orientation and ex-post growth, the available empirical evidence suggests that fast growing …rms are more likely to become exporters. Ex-post, the bene…ts of exporting are less clear: According to Bernard - Jensen (1999), the employment growth of exporting …rms is higher in US manufacturing. However, Wagner - Bernard (1997) and Lui et al. (1999) did not …nd signi…cant ex-post performance di¤erences between exporters and non-exporters. Concerning the evidence on the common impact of export propensity and foreign production, no evidence so far seems to be available.

4 Conclusions

Based on a cross-section of medium sized to large exporting Austrian manufacturing …rms, which participated in the WIFO-Investment Survey, this paper

[7] The Kruskal-Wallis test rejects the hypothesis of equal …rm sizes:Â(1) = 14:85; p = 0:0001.
[8] Note they are by far larger than the …rms in the present sample and not really comparable.

investigates in which way export orientation and foreign production are related to the average growth of …rms at their domestic location.

Robust median regressions con…rm signi…cant regression to the mean: the larger …rms grow more slowly on average in terms of employment. However, for …rms with production abroad, the negative size e¤ect is smaller. Generally, the e¤ect of …rm size on growth is small and one can hardly call this (conditional) convergence in size. Rather, growth seems mainly random and the size di¤erences are persistent

From a dynamic point of view, there seems to be no indication of a substitutional relationship between foreign production and domestic employment growth at the …rm level, once it is controlled for domestic sales growth in the regressions. On the contrary, the estimates, as well as the calculation of the counterfactuals, point to positive domestic growth e¤ects of foreign production. Despite their above average size, MNEs based in Austria maintain and sometimes even expand their growth potential at home. In particular, …rms which followed a strategy of both high exports (especially with respect to non EU-countries) and foreign production seem to preserve their high growth potential at the domestic location in Austria.

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Table 1: Variable definitions and summary statistics 1996-1999

Variable	Definition	Median	1.Quart.	3.Quart.
D ln(B)	Average growth in employment 1996-1999, 100*log differences	0.26	-3.63	3.25
B	Employment 1996	309.30	173.00	581.25
EXEU [a)]	Exports to the EU, as a share of sales from domestic production in 1996	0.35	0.15	0.65
EXNEU [a)]	Exports to countries outside the EU, as a share of sales from domestic production in 19	0.15	0.05	0.25
ln(INQ)	Average investment, as share of sales 1996-1999, both for the home location	5.08	2.71	7.61
D ln (SHOME)	Average growth of sales from domestic production*(1-EXEU-EXNEU), 1996-1999	0.55	-0.42	2.48
D ln (SAGG)	Average aggregate growth of sales from domestic production (median of the 2-digit industry) using the entire sample of 1144 firms, 1996-1999	3.34		
		Share in%	Number of firms	
F [a)]	1 if foreign affiliate sales in % of sales from domestic production >0 in 1996, otherwise	38.5	135	
I1 [b)]	Food, tabacco (15,16), base category	8.6	30	
I2	Textiles (17)	5.1	18	
I3	Apparel (18)	1.4	5	
I4	Leather (19)	1.7	6	
I5	Wood, products of wood (20)	2.9	10	
I6	Pulp, paper, paper products (21)	6.8	24	
I7	Publishing, printing and reproduction	1.7	6	
I8	Petroleum, chemicals, (23,24)	8.8	31	
I9	Rubber, plastics (25)	5.4	19	
I10	Non-metallic mineral products (26)	6.8	24	
I11	Basic (27)	8.6	30	
I12	Fabricated metal products (28)	10.3	36	
I13	Machinery and equipment (29)	11.1	39	
I14	Electrical machinery (31)	6.0	21	
I15	Radio , TV and and comminication equip. (32)	2.8	10	
I16	Medical and precision instruments, office machinery (31, 30)	1.4	5	
I17	Motor vehicles, other transport equipment (34, 35)	4.8	17	
I18	Furniture, manufacturing, n.e.c (36)	5.7	20.00	

Note: Firms with missing values in one of the variables, non-exporters, firms with less than 100 employees and 11 observations for firms with extreme growth rates have been excluded. The sample includes firms in NACE14-NACE36 (in Nace 37 there is only 1 firm which is skipped). The total sample the comprises 351 firms. All variables are from the WIFO-Investment Survey (in collaboration with the EU).

a) For a few firms values for 1997 have been imputed

b) A few NACE-2 digits are merged with others because they included only 1 firm.

Table 2: Robust regression (least absolute deviations) for firm growth at the domestic location in terms of employment

Dependent variable: $\Delta \ln(B)$	I		II		III		IV	
	ß	t[a)]	ß	t[a)]	ß	t[b)]	ß	t[a)]
$\ln(B_{1996})$	-0.009	-2.3 **	-0.011	-2.9 **	-0.010	-2.6 **	-0.010	-2.6 **
Implied Half-life	76.0		62.0		68.3		68.3	
$\ln(B_{1996})*F_{1996}$	-	-	-	-	-	-	0.002	2.3 **
F_{1996}	0.013	2.0 **	0.019	1.8 *	-0.009	-0.7	-	-
$EXEU_{1996}$	-	-	0.028	2.0 **	-	-	-	-
$EXNEU_{1996}$	-	-	0.038	1.9 *	-	-	-	-
$EXEU_{1996}*F_{1996}$	-	-	-	-	0.026	1.2	-	-
$EXNEU_{1996}*F_{1996}$	-	-	-	-	0.048	1.7 *	-	-
$\Delta \ln(SHOME)$	0.460	4.9 **	0.509	5.2 **	0.456	6.9 **	0.451	4.8 **
$\Delta \ln(SAGG)$	0.431	3.2 **	0.340	2.5 **	0.410	3.1 **	0.443	3.3 **
$\Delta \ln(INQ)$	0.013	2.6 **	0.015	3.1 **	0.016	3.6 **	0.015	2.9 **
N	351							
Goodness of fit- Pseudo R^{2} [c)]	0.17		0.18		0.17		0.17	
F-tests								
Regional-dummies (8, 321)	2.32	p=0.02	2.51	p=0.01	1.86	p=0.07	2.38	p=0.02
$EXEU_{1996}$, $EXNEU_{1996}$ =0 (2, 416)	-	-	3.46	p=0.03	-	-	-	-
$EXEU_{1996}*F_{1996}$, $EXNEU_{1996}*F_{1996}$ =0 (2, 416)	-	-	-	-	1.97	p=0.14	-	-

Note regional dummies (8) and the constant are not reported.

a) Based on the estimated variance covariance matrix obtained by bootstrapping with 10000 replications. Note analytic estimates tend to understate the standard errors in case of heteroscedasticity (Rogers, 1992).

b) Based on analytic estimates of the standard errors as bootstraping did not yield robust results.

c) Pseudo-R^2 calculated as 1-(sum of weighted deviations from estimated median)/(sum of weighted deviations from raw estimate

* significant at 10%

** signifcant at 5%

Table 3: Median of predicted growth rates in percent by type of firm and the counterfactual

	I		II		III		IV	
Export-Intensity	Pre-diction	Counter-factual	Pre-diction	Counter-factual	Pre-diction	Counter-factual	Pre-diction	Counter-factual
no foreign production								
low	-1.1	0.3	-2.1	-0.9	-1.1	-1.3	-1.2	0.2
medium	0.1	1.4	-0.3	0.9	0.3	0.8	0.0	1.4
high	0.0	1.3	0.7	1.9	0.0	1.9	-0.1	1.3
Total	-0.1	1.3	0.0	1.2	-0.1	1.3	-0.1	1.2
foreign production								
low	-0.1	-1.4	-1.3	-2.5	-1.9	-1.6	0.2	-1.8
medium	0.5	-0.8	0.3	-0.9	0.3	-0.9	0.6	-1.0
high	0.3	-1.5	0.7	-0.5	0.8	-1.1	0.3	-1.2
Total	0.3	-0.1	0.4	-0.8	0.3	-1.1	0.4	-1.1

Note: Exports are measured as the share in sales from domestic production. Exports are 'low' if the share of exports to the EU is lower than 20%, and that to non-EU countries is lower than 10%. Firms are allocated to the class of high exports, if the corresponding average-shares are above 60% and 30%, respectively. The rest is in the medium category. Each cell exhibits the median predicted values. The counterfactuals are the median predictions, which result from changing the foreign production dummy.