NBER WORKING PAPER SERIES

# IMPORT DIVERSION UNDER EUROPEAN ANTIDUMPING POLICY

Hylke Vandenbussche
Jozef Konings
Linda Springael

Working Paper 7340
http://www.nber.org/papers/w7340

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 1999

This paper benefited from presentations at a CEPR workshop in London, an NBER workshop in Boston, at the University of Leuven. Forthcoming in NBER-ISIT conference volume. We thank Filip Abraham, Jim Anderson, Damien Neven, Richard Baldwin, Rod Falvey, Wilfried Pauwels, Patrick van Cayseele, and Marno Verbeek for constructive comments on an earlier version. H. Vandenbussche is grateful for financial support provided by the Belgian Fund for Scientific Research (FWO). We are also grateful to the FWO project F41-U-P-DSE-PO2. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

Import Diversion under European Antidumping Policy
Hylke Vandenbussche, Jozef Konings, and Linda Springael
NBER Working Paper No. 7340
September 1999
JEL No. F13, L5, L13

## ABSTRACT

This paper is the first to study empirically the effects of European antidumping actions on import diversion from importers 'named' in an antidumping investigation, and potentially subject to protectionist measures, to countries 'not named' in the investigation. For this purpose we use a unique data set at the 8-digit product level. The amount of import diversion can be regarded as an indication of the *effectiveness* of antidumping policy which is used to protect the home industry from foreign imports. We find that -- in contrast to the US -- trade diversion in the European Union caused by antidumping actions is rather limited. This result holds even after controlling for selection-bias in the antidumping investigation procedure. We offer a number of explanations for the difference between Europe and the US regarding trade diversion.

Hylke Vandenbussche
Department of Economics
University of Leuven (KUL)
Naamsestraat 69
3000 Leuven
Belgium

Jozef Konings
Department of Economics
University of Leuven (KUL)
Naamsestraat 69
3000 Leuven
Belgium
Jozef.konings@econ.kuleuven.ac.be

Linda Springael
University of Antwerp
Department of Economics
Prinsstraat 13
B-2000 Antwerpen
Belgium
linda.springael@ufsia.ac.be

# I. Introduction

Consecutive multilateral trade talks at the level of the WTO have resulted in a general reduction of tariffs and VERs on trade between member countries. Coinciding with the fall in the traditional trade policy tools, a rise in new forms of protection has occurred. Especially the use of antidumping measures seems at least in part to have replaced the tariffs and VERs. One important distinction between the traditional and the new forms of trade protection is that the latter are generally felt to be more selective and less transparent (Ethier and Fischer, 1990).

Antidumping protection can only be imposed on products coming from countries 'named' by the import competing home industry as alleged dumpers. The purpose of this paper is to analyse empirically the pattern of import flows of 'named' versus 'non-named' importers in European (EU) antidumping cases that were initiated between 1985 and 1990. This paper is motivated by the relatively low number of empirical studies which stands in sharp contrast with the many theoretical contributions in recent years.

In particular, one class of theoretical models analyses the effects on trade flows as a result of strategic actions of firms induced by the threat of having an antidumping measure imposed on them. Fischer (1992), Reitzes (1993), Prusa (1994) and more recently Pauwels et al. (1997) have all used dynamic (two-period) duopoly models with a home and a foreign firm competing for the home market to show that a foreign firm can strategically *reduce* its first period exports to the home market to lower the probability of second period antidumping duties levied by the home country. This theoretical prediction has been empirically confirmed in a number of studies for the US (Moore,1992; Hansen and Prusa, 1997). In addition, Staiger and Wolak (1994)

have shown the existence of an 'investigation effect' where foreign firms already under investigation (but before the decision of protection is taken) significantly reduce their exports to the US.

A different class of model argues that an *increase* in foreign imports in anticipation of future protection is also possible. Anderson (1992, 1993), for example, shows that foreign firms will increase their dumped imports when there is a positive probability that dumping will give rise to a future quantitative restriction on exports (VER), allocated through licences. The increase in dumped imports are aimed at securing future export licences. Blonigen and Ohno (1998) argue that foreign firms can display diverse reactions when facing potential antidumping protection. They develop a two period model consisting of two foreign firms belonging to different countries exporting to the US market with the possibility to engage in foreign direct investment (FDI) in period two. The model shows the existence of a 'protection building equilibrium' where the foreign firm that intends to engage in second period FDI (while the other does not), increases its first period exports in order to increase the probability of protection facing the other foreign firm in period two. The other foreign firm will reduce its first period exports in an attempt to lower the second period probability of protection. Blonigen and Ohno (1998) report case evidence for the US consistent with this type of trade diversion from one foreign exporter to another.

The body of theoretical work described above suggests that antidumping measures have an effect on trade flows. However, relatively few models have looked at trade diversion from named to non-named firms *after* the initiation of a case. In most of the duopoly models discussed above, the second period is one where protection prevails or not depending on first period reactions by a home and a foreign firm. In the case of protection, the foreign firm reduces its exports, while in the absence of protection the

foreign firm's price and imports are the free trade ones[2]. Hence the foreign firm is *either* named or non-named which makes these models unsuitable for testing predictions on import diversion from named to non-named firms. The issue of import diversion is therefore still very much an empirical issue.

Staiger and Wolak (1994) find evidence of trade diversion for the US on SIC data (four digit) during the investigation period whereby overall imports are restricted by about one third to one half as much as imports from named countries are restricted. Prusa (1997) using more disaggregated data (TSUSA seven digit data) finds a larger amount of trade diversion for the US. When considering a period of six years after the year of initiation, Prusa (1997) finds that most of the protective effect of antidumping duties is offset by increased imports from non-named countries.

The purpose of this paper is a first attempt to measure – and contrast with the US – the effects of European antidumping measures on import flows. This is particularly useful as the European antidumping legislation deviates from the US one in a number of respects. First, the level of antidumping protection in the EU is limited to the injury margin provided it is smaller than the dumping margin. In the US, the duty is always based on the dumping margin which results in higher duty levels (Belderbos, 1997). Second, the EU besides duties often imposes price undertakings which can be compared to 'voluntary price restraints'[3] (Laird, 1999). Third, duties in the EU are levied prospectively, this means only after a positive dumping and injury finding. The US has a retrospective duty system where a bond has to be deposited before the

[2] A recent theoretical paper by Springael and Vandenbussche (1999) including a named and a non-named foreign firm shows that while antidumping protection both in the case of a duty and a price-undertaking reduces the import values of the named, can also raise the import values of the non-named firm.

[3] A price-undertaking is a commitment by the foreign importer to eliminate injury by pulling up its price in the European market. This commitment is imposed and closely monitored by the Commission

outcome of an investigation is known but which is paid back in case the alleged dumper is not found guilty[4]. Fourth, withdrawals by the complainants hardly ever occur in the EU. The majority of terminated cases in the EU are cases where 'no measures' are imposed because the accused is not found guilty[5]. Finally, the EU Sunset clause stipulates that antidumping measures automatically lapse after 5 years, in contrast to the US where measures only lapse if the foreign importer shows dumping has stopped.

This paper has also relevance for policy. In particular, by investigating the amount of trade diversion induced by antidumping we are able to assess the effectiveness of antidumping policy as a tool for protection. This may be important for competition and trade policy and future negotiations at the WTO level[6].

We find evidence that - in contrast to the US - import diversion in the European Union is low. This qualitative result holds irrespective of the estimation method and econometric model that we use. However, the *magnitude* of the effects of antidumping measures varies according to the method and model used and therefore caution is needed for interpreting the size of the estimated coefficients.

The rest of the paper is structured as follows. In section II we describe the data and show the pattern of trade flows for named and non-named countries. Section III discusses the econometric approach, section IV gives and discusses the empirical results. Section V is a concluding one.

---

and in case of violation heavily penalized. Price-undertakings are shown to be facilitating practices for home and foreign firms involved in EU antidumping cases (see Veugelers and Vandenbussche 1999).

[4] A refund of duty revenue in the EU is possible in principle but in practice very difficult to obtain. Refunds have only occurred in very few cases and may take up to ten years after the period of protection. Interest over this period is never refunded (Bellis, 1990).

[5] Over the period we considered (1985-90) of the 80 products for which the investigation was terminated, only 5 refer to withdrawals and only 2 are suspensions.

## II. Data

The data set we use consists of all European AD-investigations[7] initiated between 1985 and 1990. This resulted in 246 cases[8] of which 105 ended in the imposition of duties (42 %), 61 in price-undertakings (25%) and in 80 cases the investigation was terminated by the Commission (33%). For each investigated *product*, annual import trade data of the EU by source country were collected from the EUROSTAT trade statistics. Up to 1988 Eurostat reports data using the Nimexe 6 digit product codes, while after 1988 the 8 digit Harmonised System (HS) codes are used to identify products. In order to construct full time series for certain cases the Nimexe 6-digit and the HS 8-digit codes were correlated using correspondence tables. For each product, import values by country of origin were collected for nine consecutive years[9] starting two years before the initiation of an antidumping investigation by the European Commission[10]. The year of initiation is indicated by $t_0$. The period of investigation following the initiation of a case lasts on average twelve months and usually corresponds with time $t_1$ during which the outcome of an investigation is still uncertain. Antidumping protection in the EU is *prospective* in the sense that measures are imposed for five years if the investigation is concluded affirmatively. Hence , the period of protection usually runs from $t_1$ to $t_6$ [11]. In order to

---

[6] A new round of WTO talks is planned to start in the Fall of 1999.
[7] Source: various issues of the Official Journal of the European Community.
[8] Each case involves one product. After dropping cases for which no complete time-series could be constructed we were left with 246 products.
[9] A correction was applied to Eastern European countries that either stopped to exist after 1990 (German Democratic Republic) or that were split into separate countries or regions like Czechoslovakia, Yugoslavia and the Sovjet Union.
[10] Since we consider antidumping cases initiated between 1985-90, total data requirements run from 1983 to 1996.
[11] Exceptionally measures can already apply in $t_0$ and $t_1$.

compare the import values[12] over time, the time series were deflated using GNP-price deflators.

Between 1985 and 1990, a total of 48 countries were subject to European AD-investigations. Table 1 shows the geographical spread of countries accused of dumping in the EU market over this period. About 70% of all antidumping cases are against low cost countries (category 2 and 3). One potential reason for this phenomenon is that developing countries and non-market economies are less competitive and more monopolized than the European market. This makes these countries more prone to a violation of the dumping condition which stipulates that export prices should not be lower than prices in the country of origin (Bhagwati, 1989). Another plausible explanation for the high frequency with which low cost countries occur in the antidumping cases is that these countries violate the injury conditions more easily as shown by Veugelers and Vandenbussche (1999): in a differentiated duopoly model a cost advantage for an importer results in foreign price undercutting on the European market, which is an important determinant of injury.

The pattern of named countries described in table 1 is very similar to the US, where most antidumping cases are also initiated against low wage countries (Prusa, 1997). Messerlin and Reed (1995) and Belderbos (1997) point at the similarity of the EU and US in terms of the type of sectors and products occurring in antidumping cases. This suggests the absence of a country and sector bias specific to one of the two trade blocs.

In table 2 we list the European sectors (NACE 2 digit classification) most frequently filing dumping complaints to the EU Commission. Especially the chemical industry (magnesite, copper sulphate, urea), and to a lesser extent the Processing of

[12] Import values were used which involve the unit price times the quantity shipped to the EU.

Metals Industry (iron and steel and non-ferrous metals), Mechanical Engineering (transmission equipment like ball bearings and roller chains) and Electric engineering (typewriters, printers, copiers) seem to trigger AD-investigations.

In table 3 we show summary statistics on the import values and import growth that characterize our dataset. Both the mean and the median values for the named, non-named and overall import values at $t_0$, the year of initiation, are shown. First, it can be noted that the mean and median import size are lower in named than in non-named countries. Indeed, the average share of named countries' imports in total imports at $t_0$ is 26% while 74% for the non-named countries. In addition, named countries' import values often show very high import growth rates at the time of initiation as shown in the last two rows of table 3. The average growth for the named countries at $t_0$ is almost 2000%. This extremely high mean value is due to a number of outliers in the data. To give just one example. In 1985 the Commission started a dumping investigation against typewriters' imports from Taiwan. While Taiwanese import values were still zero two years prior to $t_0$, they rose from a 1000 ECU in the year before $t_0$ to 4 259 000 ECU in the year $t_0$. Cases like this one are an illustration that these outliers are often new importers entering the EU market aggressively with very high import growth rates. The median growth rate in the data is more representative however and is similar for named and non-named countries, 0 and –2% respectively.

A first indication of whether import diversion in response to European antidumping cases takes place can be found in figure 1, where we show the evolution of import values at the product level averaged over all AD-cases distinguishing between named and non-named countries (including outliers) imports' share. Observations above the horizontal axis reflect an increase in the share of import

values relative to $t_0$, while observations below the horizontal axis represent the opposite namely a reduction in the share of import values relative to $t_0$. The different effects on the named countries imports' share relative to the share of the non-named become immediately apparent from figure 1. All the lines that lie *below* the horizontal axis after $t_0$ show the evolution of the *named* countries' import share, while all the lines *above* the horizontal axis represent the *non-named* countries' import share relative to total imports. For the named countries, the effects of a duty and a price-undertaking on the imports share appear to be more negative than under a termination. However, even in the case of the latter, when the demand for protection is rejected, imports from named countries continue to be restricted. They do not rebound to the levels at the time of initiation. For the non-named countries, the share in total import values on average goes up relative to $t_0$. This increase appears to be stronger in duty and price-undertaking cases than in terminated cases. The distance between the upward sloping curves for the non-named and the downward sloping curves for the named countries gives us a first rough idea of the amount of import diversion from the named to the non-named countries which will be tested for more rigorously in the next section controlling for outliers, sector and business cycle effects. Based on figure 1, it seems that import diversion is not sufficient to mitigate the effects of antidumping actions.

## III. Econometric Approach

The main objective in this section is to test whether import diversion in Europe is sufficient to mitigate the effects of antidumping actions as it is the case in the US, after taking into account other factors which might influence import flows. To this end, we experimented with a variety of econometric methods and models, which allows us to assess the robustness of the estimates.

The basic econometric model we seek to estimate is a reduced form with the following general specification which allows us to test a number of hypotheses. In particular,

$$\ln import_{it} = \alpha_0 + \alpha_1 \ln imp_{it0-1} + \alpha_2 D_{it} + \alpha_3 U_{it} + \alpha_4 T_{it} + \alpha_5 D_{it} x N_i + \alpha_6 U_{it} x N_i + \alpha_7 T_{it} x N_i + \alpha_8 Num_i + \alpha_9 Num_i x N_i + \alpha_{10} N_i + \varepsilon_{it} \quad (1)$$

where $\ln import_{it}$ stands for the natural log of imports for case i (i =1,..246) at time t (t=0,...6). *D* is a dummy equal to 1 if there is a duty for case i at time t, *U* is a dummy equal to 1 if there is a price undertaking for case i at time t, *T* is a dummy equal to 1 if there is a termination for case i at time t. A dummy *N* is included for named countries (equal to 1 for named countries in case i and equal to 0 for non-named). This dummy is also used to interact with the policy variables to capture the effects of antidumping actions on the named countries (*DxN*, *UxN*, *TxN*). The variable *Num* proxies for the number of named countries in a case and is the log number of countries that are named in an investigation. *Num* captures the effect that trade diversion will be lower when many countries are named as in Prusa (1997). Finally, subscript $t_{0-1}$ refers to the year prior to $t_0$, the year of initiation. The import value for $t_{0-1}$ is included to control for initial import size effects and for the evolution of imports prior to an antidumping

investigation.This may be important as the average total import value for named countries is smaller than the one for non-named countries as shown in table 3.

In estimating equation (1) we also take into account year dummies to control for aggregate shocks[13]. This can be relevant as firms may have incentives to file a complaint in recessions when dumping and injury are more likely to be demonstrated (Das, 1992). In addition, we control for unobserved fixed effects by including 3-digit NACE-sector dummies. These sector dummies control for unobserved sector heterogeneity, such as sunk costs, the life cycle of the sector (mature versus young), etc. and hence these dummies can capture to some extent a possible selection bias . In particular, it might be the case that there exist certain sector charateristics which trigger antidumping investigations more easily than others. By controlling for narrowly defined sector dummies, we can control for these unobservable fixed characteristics.

The effects of import diversion can be read off by comparing the effects of duties (D), undertakings (U) and terminations (T) with the same variables interacted with a dummy equal to 1 for named countries (N), DxN, UxN and TxN. To illustrate how this equation should be interpreted, the effect of duties (D) on the import values of the non-named countries is measured by coefficient $\alpha_2$ and for the named countries by the sum of $\alpha_2$ and $\alpha_5$. Equation (1) implies that we impose some more restrictions on some variables in the model. For example, equation (1) assumes that the effects of the initial import levels are the same for named and non-named countries. We therefore also report the results based on split samples (named versus non-named), however, we found very similar qualitative results.

[13] We also experimented with interacting time dummies with the AD measures, in addition to intercept dummies, however, this imposes high multicolllinearity and we therefore do not report these results. Moreover, figure 1 suggests that the effects of AD-measures are linear which renders the inclusion of slope dummies useless.

There are some technical considerations to be made in estimating (1). A first consideration is that observations within a case, but over time, are not independent, while the observations across cases are. To take this into account we estimate the model with OLS white consistent standard errors in which clusters are considered based on the case under consideration[14]. In other words, the observations for each case are considered as one cluster, which is taken into account when estimating the standard errors.

A second consideration is related to the nature of the data. As already illustrated in the summary statistics of table 3 there are a number of outliers in terms of import growth in the sample, due to the fact that some importers are newcomers on the EU market. The number and position of the outliers are shown in figure 4 where we plot log imports in $t_{0-1}$ on the horizontal axis and log imports in $t_0$ on the vertical axis. The deviation from the 45°-degree line shows the growth rate in imports between $t_{0-1}$ and $t_0$. In view of the considerable number of outliers, which questions the normality assumption required for OLS and which can affect the average estimate in the regression analysis in a spurious way, we use a robust regression technique (Hamilton, 1991) to obtain a robust estimate of the average effect. The intuition behind this technique is that outliers are given a lower weight in the estimation relative to observations which are closer to the mean. In particular, observations with small residuals receive weights of 1, while observations with larger residuals receive gradually smaller weights. These are called Huber weights (Huber, 1964) and are implemented iteratively. We will report both the results based on OLS, adjusted for the clustering in the data, and the results based on robust regression techniques.

[14] An alternative is to use a random effects model for panel data, which imposes strong assumptions on the error term. We experimented with random effects models as an alternative, but the results were very similar, so we do not report them here.

A final consideration is related to a concern about selection bias. The fact that a country is named in an investigation might be triggered by high import growth prior to the initiation of a case. There may also exist other unobservable reasons (sector effects or other) which lead to a selection bias between named and non-named countries. We therefore also report results based on a Heckman two-step estimation method (Heckman, 1976; Greene, 1993) and test whether sample selection bias is important.

## IV. Results and Discussion

*Results*

In tables 4a,b and c we show the regression results of estimating equation (1) under the different specifications discussed above. The first column of table 4a shows OLS results with heteroscedastic consistent standard errors, based on clusters of the case numbers. The second column of table 4a shows the results of a robust regression which controls for outliers. In column 1 we find no statistically significant effect of antidumping actions on imports from the non-named countries. In contrast, imports for the named countries are reduced with 67% in case a duty is imposed and 53% in case a price undertaking is imposed. Since measures are imposed for a period of 5 years this is equivalent to an average annual reduction in imports from the named countries of about 13% and 10% respectively. The magnitude of these effects come across as rather high. Nevertheless, the negative sign of the duty and price undertaking measures on named countries' import values is the expected one since duties and price undertakings raise consumer prices on the European market which reduces demand for imports from the named countries. Based on the estimates in column (1) of table 4a we find that there is no statistically significant effect that

indicates a presence of import diversion from the named to the non-named countries. However, as noted earlier, there are a considerable number of outliers in the data, which might spuriously affect the results under OLS. It is therefore useful to compare the results in column (1) with those in column (2), where we properly control for outliers by using a robust regression technique.

Overall, the magnitude of the effects under robust regression are –as expected- smaller. In particular, we find that import values from the non-named countries are now increased by 13% when a duty is imposed, albeit at the 10% significance level. The imports from the named countries are reduced by 31% (-0.44+0.13) when a duty is imposed. This effect is almost half of the one found in column (1). In addition, a price-undertaking has a negative effect on import values of the named countries of 38% without significantly affecting the imports of the non-named. In contrast to the results in column (1), the coefficient on terminations for the named countries is –17% and statistically significant at the 10% level. This negative effect on named countries' imports, even when the demand for protection is rejected, could be an indication of how much 'being under investigation' restricts imports of the named countries. While Staiger and Wolak (1994) and Harrison (1991) for the US find that being named disciplines imports as much as imposing a duty, the coefficient on terminations suggests an investigation effect that is somewhat smaller than the effects of actual protection. It is interesting to note that the effect of terminations becomes statistically significant once we control for outliers. Since the outliers presumably capture new aggressive entrants in the EU market, the robust regression could be interpreted more as representative for the traditional importers. This suggests that if traditional importers are under investigation, they will behave in a more careful way to avoid

protection. In contrast, new and aggressive importers are not affected by being under investigation, perhaps because they anticipate protection in any case.

Based on the estimates of column (2) in table 4a we find that a duty increases imports from the non-named countries compared to $t_0$ on average per case with 8.7 Million ECU, while imports from the named ones decrease on average per case with 11.9 Million ECU. For price undertakings there is no statistically significant effect for non-named countries, while for named countries the estimates suggest an average decrease in imports of 14.6 Million ECU per case. Since 25% of all cases end in price undertakings, we may conclude that, as already suggested by the results of column (1), import diversion in the European Union is rather limited. This contrasts with the findings of Prusa (1997) for the US where import diversion is substantial enough to offset most of the negative effects on named countries.

In columns (1) and (2) of table 4b we report similar results, but for the split samples of named versus non-named countries, again we report both OLS adjusted for clusters and robust regression results. Irrespective of the estimation method we find only statistically significant effects of the antidumping measures for the named countries, while we find no statistically significant positive effect for the non-named ones. The split regressions suggest that antidumping measures are effective and that there is no import diversion taking place. The magnitude of the effects of antidumping measures is smaller than the magnitudes in table 4a. In the split regressions we allow all the variables in the regression to have different effects according to being named or not. The qualitative results, however, that import diversion is lower than in the US, persists.

In columns (1) and (2) of table 4c we test whether our results are subject to selection bias. In particular, we test whether 'being named' in an AD-investigation is

random or not. If it is the case that certain characteristics of the group of named countries trigger them into this category, the regression estimates will be biased. This calls for the use of a two step Heckman procedure to correct for selection bias (see also appendix). The key feature of this procedure is to use an observable variable which is likely to affect selection into the group of named versus non-named, but which is not included in explaining the regression of interest. For this purpose we selected the variable 'import growth of named (non-named) countries prior to the year of initiation', (import growth $t_{0-1}$) as well as the 'log of import value two years prior to the year of initiation' (ln(import) $t_{0-2}$). These variables are chosen because at $t_0$ the average import value of named countries is smaller than for non-named countries and by the fact that the outliers suggest that many of the named countries are new importers in the EU who enter aggressively and hence would have a high import growth rate prior to $t_0$.

In column (1) of table 4c we show the results for named countries, adjusted for potential selection bias, while column (2) shows the results for non-named countries. In the second part of the column (1) and (2) we also show the associated probit equation of estimating the probability of being named (non-named). After controlling for selection bias via the Heckman procedure in column (1), we find that duties reduce the import values of the named countries by 37% or an annual average reduction of 7%. The effect of price-undertakings is smaller, -23% or an annual average reduction of 5%. In column (2) we show the results for the non-named countries, controlling for potential selection bias. We find that only price-undertakings have a positive and statistically significant effect of 17% on the imports of non-named countries over the period of protection or an annual average increase of 4%. The effects of duties are not statistically significant. Again the magnitude of the

coefficients and standard errors is different than in the other specifications, however, our qualitative result of low import diversion still holds.

In the second part of columns (1) and (2) we report the results of the first step of the Heckman procedure, a probit equation estimating the probability of named. It can be noticed that import growth and the import value at $t_{0-2}$ are both statistically significant in explaining the probability of being named (non-named). In particular, import growth has a positive and statistically significant effect for named countries, but a negative effect for the group of non-named ones. Also import size has a negative effect for named countries, but a positive one for non-named. This means that if the growth rate of imports is high before a case is initiated there is a higher probability of being named. Likewise, if the total import value of countries is high before a case is initiated there is a lower probability of being named. For the non-named group we find, as expected the opposite result: the higher the import growth before a case is initiated, the lower the probability of being in the non-named group. Likewise, the higher the total import value at $t_{0-2}$, the more likely a country will belong to the non-named group. These findings are consistent with the fact that new aggressive importers, with relatively low initial levels of total imports are likely to end up in an AD investigation.

The results based on the Heckman correction model confirm our earlier results that import diversion in the European Union as a result of antidumping actions is rather limited compared to the US. This also suggests that the potential selection bias in the previous regressions is not very serious. Nevertheless, a test statistic is reported at the bottom of table 4c, $\lambda$, which tests for the correlation between the selection equation (step 1) and the actual equation of interest (step 2). This statistic, $\lambda$, gives an indication whether there is a statistical reason to believe selection bias is important

(appendix). We find that $\lambda$ is statistically significant, which suggests that selection bias is present. However, whether we control for selection bias or not yields qualitatively the same results, only the quantitative effects are slightly different.

*Discussion of the results*

One reason why import diversion in the EU is smaller than in the US could be the lower duty levels imposed by the EU as a result of injury margin protection which puts a limit on the potential benefits of antidumping protection for non-named importers. Another reason for the lower amount of import diversion in the EU could be the greater extent of uncertainty and information asymmetries surrounding the EU decision making process. Comparative political economy studies in this area have shown that antidumping decisions in the US are more of a 'technical nature' (Finger, Hall and Nelson, 1982; Baldwin and Steagall, 1994) while those in the EU are subject to greater political influence (Tharakan and Waelbroeck, 1994). The lower degree of transparency and predictability in the EU could be one of the possible explanations for the more prudent reaction of non-named importers in terms of increasing their import values[15].

A third reason could be related to the effects of AD-actions on decisions of firms to engage in foreign direct investment. Belderbos (1997) using firm level data of the Japanese electronics industry subject to European and American antidumping investigations, finds that Japanese firms are more likely to switch to tariff jumping

[15] For example the retrospective system in the US gives importers, both named and non-named, an idea of the magnitude of the duty that will have to be paid by the named countries in the case of an affirmative finding. With the prospective system in the EU, the uncertainty regarding the duty lasts longer in particular for the non-named countries. Moreover, when price-undertakings are imposed the extent to which named countries have to pull up their prices is never revealed by the Commission in the Official Journal reports.

FDI in response to European AD-actions than compared to the US. In the case of 'antidumping jumping ' FDI in Europe, imports from named countries are replaced by local production, which could explain the lower benefits to non-named countries through import diversion in Europe compared to the US.

Another possible explanation may be provided by the nature of competition as suggested by some theoretical models (Staiger and Wolak, 1992; Veugelers and Vandenbussche, 1999, Vandenbussche and Wauthy, 1999). The effects of import diversion in highly concentrated markets (or markets with imperfect competition) can go in different directions. First, in highly concentrated sectors we might expect entry barriers and oligopolistic reactions to be important. In this case, import diversion from named to non-named countries might be expected. On the other hand, in highly concentrated sectors we may also expect that import diversion is going to be less important since the elasticity of product demand is likely going to be low. Hence a price increase due to a duty or an undertaking will have small effects on the quantity sold. In this case, we might expect less import diversion in highly concentrated sectors and thus more in lowly concentrated ones. In addition, in lowly concentrated sectors, where there exists a lot of competition, we may expect that entry is easy so that non-named countries will find it easier to increase their imports in response to antidumping measures imposed on named countries, unless it is the domestic sector which fills the market niche. As an experiment we test whether market structure matters at all in explaining import diversion. In table 5 we report the results of import diversion in lowly versus highly concentrated industries. The split of highly versus lowly concentrated industries is based on the average C5 production concentration ratio for the EU, defined at the three digit NACE sector level (Davies and Lyons, 1996). Sectors with a concentration ratio higher than the average of 37% are classified

as highly concentrated sectors. It turned out that almost 50% of our sample was characterised by above average concentration and 50% below average. We also experimented with other cut-off levels, but the main results persisted.

The results of the OLS clustered technique reported in column (1) of table 5 indicate very large negative effects on imports from the named countries. These effects are somewhat reduced if we consider the robust regressions in column (2). In particular, from column (2) we find that in highly concentrated sectors duties increase imports from the non-named countries by 27% on average, while undertakings increase imports from the non-named countries by 34% on average. Duties reduce imports from named countries by 61% (-0.88+0.27), while undertakings reduce imports by 18% (-0.52+0.34). This suggests that in highly concentrated sectors there exists strong import diversion from named to non-named countries for both duties and price-undertakings. The average import value at $t_0$ in highly concentrated sectors for named countries is 60.7 Million ECU and for non-named ones 88.9 Million ECU. These figures and the estimated coefficients suggest that the effects of AD-actions on named countries are substantially, but not entirely, offset by increased imports from the non-named countries[16].

The results for highly concentrated industries stand in sharp contrasts with the results for the lowly concentrated sectors shown in column (3) and (4) of table 5. For lowly concentrated sectors under robust regression analysis in column (4), we find negative effects of antidumping protection in the named countries (-18% for duties

[16] Based on the estimates of column (2) duties increase imports from the non-named countries by 24 Million ECU on average per case, while imports from the named countries are reduced by 37 Million ECU on average per case. Undertakings increase imports from the non-named countries with 30.2 Million ECU on average per case and reduce imports from the named ones with 10.9 Million ECU on average per case. In this latter case the increase in imports from the non-named countries more than offsets the reduction in imports from the named ones, however, only 25% of the cases are affected by price undertakings.

and –23% for price-undertakings) but no significant increases in the import values of the non-named, hence no trade diversion is occurring.

As suggested before, a priori many things can happen in case of imperfect competition. The experiment that we reported in table 5 suggests that concentration might be an important factor in explaining import diversion. A possible explanation for strong trade diversion in highly concentrated sectors is that the effects of antidumping policy are offset by strategic rivalry, rendering antidumping policy largely ineffective in industries where the players are large and their number is limited. In particular, it has been shown by Sutton (1991), Lyons et al. (1999) among others that highly concentrated sectors are often associated with vertically differentiated products, i.e. products which are characterised by quality differences. European antidumping cases can involve imports where the foreign product is of a lower quality than the European 'like product' as was shown in a recent paper by Vandenbussche and Wauthy (1999) [17]. When antidumping cases involve vertically differentiated products and the Commission, through the imposition of a duty or a price-undertaking, does not allow the foreign products of lower quality to be sold at a lower price than the European price, it effectively denies foreign importers a positive market share in the EU. Injury margin protection, which is specific to the EU context, implies that the duty level or the price-undertaking imposed is aimed at forcing the foreign importer to meet the price set by the European industry. Vandenbussche and Wauthy (1999) argue that when the foreign importer is forced to sell its lower quality product at the higher price of the European product, the demand for the low quality foreign product will drop drastically. Hence, given that the equilibrium market

[17] Examples of Antidumping cases where vertically differentiated products are regarded as 'similar' by the Commission are the Standardized Electric Motors case against Central European importers (Official Journal L 83 p4, 27.3.1987), the Japanese dot matrix printers case (Official Journal L317 p33-

structure of vertically differentiated industries is one where the number of firms is limited (Sutton, 1991), we would expect antidumping protection in highly concentrated industries to result in large reductions of named countries' imports to the benefit of non-named countries.

The extent to which the larger amount of trade diversion for the US as reported by Prusa (1997), can be explained through concentration ratios seems worth investigating. In particular, as shown by Lyons et al. (1999), while the average C4 concentration level for Europe is estimated at 20%, the average for the US is 31%. One reason for the lower concentration level in Europe could be related to the fact that markets in Europe are more segmented than in the US, which leads to the potential of some firms to have a dominant market position in some countries, but not at the European level.

---

44, 24.11.1988) and the polyester yarn case from the US, Mexico, Taiwan and Korea (Official Journal L348 p49-55, 17.13.1988)

## V. Conclusion

This paper studied how European antidumping policy affects import flows into the EU at the 8-digit product level from countries that were under investigation and either faced a duty, price-undertaking or a termination versus countries that were also importing the same product but that were not under investigation. In contrast to findings for the US, our results do not show strong import diversion effects suggesting that antidumping policy is more effective in Europe. These results hold even after we control for potential sample selection bias. Depending on the estimation method and model that is used we estimate different magnitudes of the effects of antidumping measures on import values of named and non-named countries. Some of these effects come across as rather high, which might be due to a number of outliers. The key message, however, that there is little or no trade diversion in the European Union persists, irrespective of the estimation method that is used.

We also find European antidumping policy to be most effective in competitive sectors, characterised by low concentration levels, while in highly concentrated sectors we found that trade diversion is substantial and offsets the effects of antidumping measures on named countries to the benefit of non-named ones. Differences in concentration levels could be one explanation why trade diversion appears to be stronger for the US than for Europe. However, this result needs further investigation.

The lower amount of import diversion in Europe could also be due to the lower duty levels as a result of injury margin protection, as opposed to dumping margin protection for the US, which limits the benefits of protection for the non-named countries. An additional reason could be the lack of transparency and the

greater extent of uncertainty regarding the actual levels of protection in Europe in comparison to the US which could explain the relatively small effect on non-named countries' imports into the EU.

**Appendix:**

The Heckman selection model assumes that a potential observation j is observed if

$$z_j\gamma + u_{1j} > 0,$$

where $u_{1j}$ has a standard normal distribution. Simultaneously, there is another regression equation

$$y_j = x_j\beta + \sigma u_{2j}$$

where $u_{2j}$ also has a standard normal distribution, but is potentially correlated with the error term of the first equation, with correlation r. If this is the case, standard regression techniques applied to the second equation (which in our case is equation (1)) yield biased results. Heckman (1976) proses a solution to estimate such a model simultaneously with maximum likelihood (see Greene, 1993). One test statistic, which is often reported is $\lambda = \sigma r$. If $\lambda$ is statistically different from zero, then selection bias is important.

**References**


Anderson.J.E.1992. Domino dumping I: Competitive exporters. American Economic Review 82.65-83.

Anderson.J.E.1993. Domino dumping II: Antidumping. Journal of International Economics. 35.133-150.

Baldwin.R.E..Steagall.J.W.1994.An analysis of ITC decisions in antidumping.countervailing duty and safeguard cases.Weltwirtschaftliches Archiv.130.290-308.

Belderbos.R.1997.Antidumping and tariff jumping: Japanese DFI in the EU and US.working paper University of Sussex.

Bellis.J.F.1990.The EEC Antidumping System. In Jackson J.H..E.A.Vermulst (Eds.) Antidumping Law and Practice.Harvester Wheatsheaf.41-98.

Bhagwati.J.1989.Protectionism.MIT Press.145

Blonigen. B.A..Ohno.Y.1999. Endogenous Protection, foreign direct investment and protection-building trade. Journal of International Economics 46.205-227.

Das.S.1992. Market Uncertainties and cyclical dumping. European Economic Review. 36.

Davies, S. and Lyons.B.1996. Industrial Organization in the European Union, Oxford University Press.

Ethier.W.. Fischer.R.1987. The New Protectionism. Journal of Economic Integration 2. 1-11.

Feenstra.R.C.1995. Estimating the effect of Trade Policy. In Grossman G..K.Rogoff (Eds.).Handbook of International Economics.vol.III.North-Holland.1553-1595.

Finger.M..Hall.K..Nelson.D.1982.The Political Economy of Administered Protection.American Economic Review.vol 72. 1-26.

Greene, W. H. (1993). Econometric Analysis. Macmillan Publishing, New York.

Hamilton.L.C..1991.How robust is Robust Regression ?. Stata Technical Bulletin 2.21-26.

Hansen.W..Prusa.T.1996.Cumulation and ITC decision making:The sum of the parts is greater than the whole.Economic Inquiry.34.746-769.

Harrison.A.1991.The new trade protection: price effects of antidumping and countervailing measures in the US.World Bank Working Paper.Washington D.C.

Heckman (1976), J. The Common Structure of Statistical Models of Truncation, Sample Selection, and Limited Dependent Variables and a Simple Estimator for Such Models, Annals of Economic and Social Measurement, 5, pp. 475-492.

Huber.P.J..1964.Robust Estimation of a Location parameter.Annals of Mathematical Statistics 35.73-101.

Konings.J..Vandenbussche.H..Veugelers.R.1998. Union wage bargaining and European Antidumping Policy. CEPR discussion paper n° 1860. London.

Laird.S.1999.Patterns of Protection and Approaches to Liberalization,mimeo, CEPR conference 19/20 February 1999.

Lyons, B., Matraves, C. and Moffatt, P. (1999). Industrial Concentration and Market Integration in the European Union, mimeo University of East Anglia, Norwich.

Messerlin.P.A..Reed.G.1995. Antidumping policies in the United States and the European Community. The Economic Journal.105. 1565-1575.

Moore.M..1992.Rules or Politics ? An empirical analysis of ITC antidumping decisions.Economic Inquiry.30.449-466.

Fisher.R..1992.Endogenous Probability of Protection and firm behavior.Journal of International Economics.32.149-163.

Pauwels.W..Vandenbussche.H..Weverbergh.M.1998.Strategic Behavior under European Antidumping Duties.CEPR discussion paper n°1565.London.

Prusa.T.1994.Why are so many antidumping petitions withdrawn ? Journal of International Economics.33.1-20.

Prusa.T. 1997. The Trade Effects of US Antidumping Actions. In Feenstra R.C. (Ed.) The Effects of U.S. Trade Protection and Promotion Policies. University of Chicago Press. Chicago.II. 191-214.

Reitzes.J..1993. Antidumping Policy. International Economic Review.vol. 34.

Springael L..Vandenbussche. H. (1998). A model of trade diversion induced by European antidumping policy. mimeo University of Antwerp (UFSIA). Belgium.

Staiger.R.W..Wolak.F.A.1992.The effect of domestic antidumping law in the presence of foreign monopoly.Journal of International Economics 32.265-287.

Staiger.R.W..Wolak.F.A.1994. Measuring Industry-Specific Protection: Antidumping in the United States. Brookings Papers on Economic Activity: Microeconomics. 51-118.

Sutton.J.1991.Sunk Cost and Market Structure, MIT press.

Tharakan.P.K.M..Waelbroeck.J.1994. Antidumping and Countervailing duty decisions in the EC and in the US: an experiment in comparative political economy European Economic Review.38.171-193.

Vandenbussche.H..Wauthy.X.1999.European Antidumping Policy and Firms' Strategic choice of Quality.CORE-DP.9916. Université Catholique de Louvain.

Veugelers.R..Vandenbussche.H.1999.European Antidumping Policy and the Proditability of National and International Collusion. European Economic Review 43/1. 1-28.

</ref_section>

**Figure 1: Import Diversion from Named to Non-Named Countries Under EU Antidumping Policy**

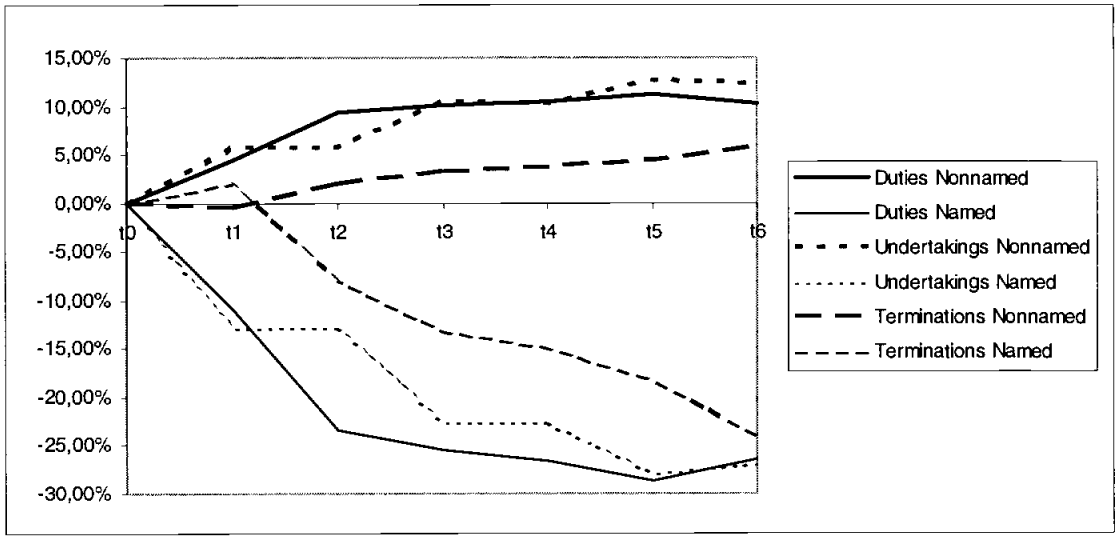

**Figure 2: Correlation between ln import values of $t_0$ and $t_{0-1}$**

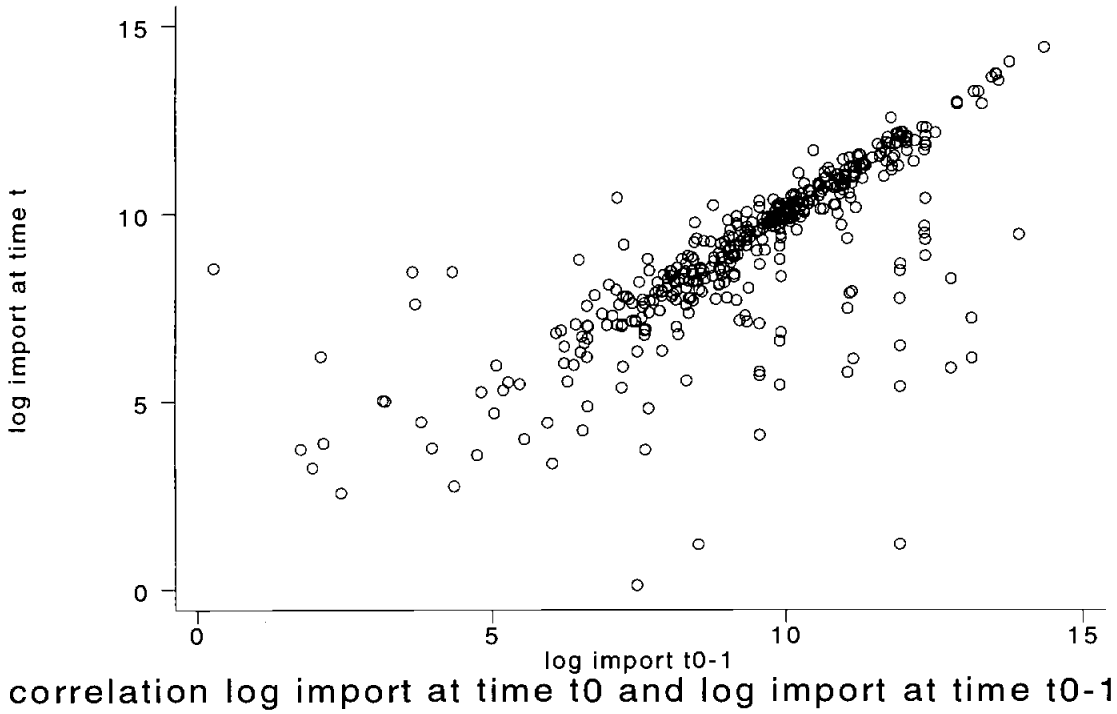

**Table 1: AD-cases by Economic Status of Country**

| *Type of country*[1] | *Number of cases (% of TOTAL)* |
|---|---|
| Industrialised countries (1) | 30.75% |
| Developing countries (2) | 29.33% |
| Non-Market economies (3) | 39.92% |

(1) Efta, Portugal, Spain, GDR, USA, Canada, Japan, Turkey, Austria, Finland, Russia, Sweden

(2) Hong-Kong, Korea, Taiwan, Thailand, Singapore, Argentina, Brazil, Mexico, OPEC, Egypt, India, Macao, Malaysia, South Africa, Trinidad, Tobago, Israel

(3) Belarus, Bulgaria, Czechoslovakia, Czech Republic, Former Jug. Republic, Hungary, Poland, Romania, Slovakia, Ukraine, USSR, Yugoslavia, China

**Table 2: EU sectors most frequently involved in AD-cases between 1985-90**

| Sector (NACE 2digit) | % of cases | Sector (NACE 2digit) | % of cases |
|---|---|---|---|
| Chemical industry | 26.54 | Manufacture of metal articles Instrument engineering | 3.09 |
| Production and preliminary processing of metals | 16.05 | Processing of rubber and plastics | 2.47 |
| Mechanical engineering | 12.35 | Manufacture of paper and paper products | 1.85 |
| Electrical engineering | 8.64 | Footwear and clothing industry | 1.85 |
| Manufacture of office machinery and data-processing machinery | 4.94 | Other manufacturing industries | 1.85 |
| Man-made fibres industry | 4.94 | Extraction of minerals other than metalliferous and energy-producing minerals | 1.23 |
| Manufacture of non-metallic mineral products | 4.94 | Extraction and preparation of metalliferous ores | 0.62 |
| Textile industry | 4.32 | | |
| Timber and wooden furniture industries | 3.70 | | |

**Table3: Summary Statistics on Import Values at $t_0$**

| Variable | Statistic | Overall | Named | Non-named |
|---|---|---|---|---|
| Import values at $t_0$ | Mean: | 53,941 | 38,487 | 67,259 |
| (x 1000 ECUs) | Median: | 12,127 | 6,228 | 18,258 |
| Import growth rates from $t_0$-1to $t_0$ | Mean: | 9.2 | 19.9 | -0.02 |
| | Median: | -0.01 | 0.005 | -0.02 |

**Table 4a: Effects of European AD-actions on imports**

| | (1) OLS | | (2) Robust | |
|---|---|---|---|---|
| Ln (import) $_{t0-1}$ | 0.75* | (0.05) | 0.85 | (0.01) |
| Duty *(D)* | 0.12 | (0.10) | 0.13** | (0.07) |
| Undertaking *(U)* | 0.17 | (0.13) | 0.10 | (0.08) |
| Termination *(T)* | 0.04 | (0.14) | -0.02 | (0.07) |
| Duty x Named *(DxN)* | -0.67* | (0.15) | -0.44* | (0.09) |
| Undertaking x Named *(UxN)* | -0.53* | (0.14) | -0.38* | (0.10) |
| Termination x Named *(TxN)* | -0.20 | (0.16) | -0.17** | (0.09) |
| Number *(Num)* | 0.10 | (0.10) | 8.02 | (0.04) |
| Number x Named *(NumxN)* | 0.25* | (0.10) | 0.19* | (0.05) |
| Named *(N)* | -0.32* | (0.11) | -0.29* | (0.08) |
| Year dummies | | yes | | yes |
| Sector dummies | | yes | | yes |
| F | | 255.5 | | 244.9 |
| $R^2$ | | 0.72 | | - |
| Number of observations | | 2997 | | 2997 |

Note: In brackets are heteroskedastic consistent standard errors, * denotes significant at the 5% level, ** at the 10% level.

**Table 4b: Effects of European AD-actions on imports**

| | (1) Named | | (2) Non-named | |
|---|---|---|---|---|
| | OLS | Robust | OLS | Robust |
| Ln (import)$_{t0-1}$ | 0.09*<br>(0.08) | 0.8*<br>(0.01) | 0.82*<br>(0.04) | 0.92*<br>(0.01) |
| Duty *(D)* | -0.44*<br>(0.15) | -0.19*<br>(0.1) | 0.04<br>(0.09) | -0.01<br>(0.06) |
| Undertaking *(U)* | -0.36*<br>(0.17) | -0.24*<br>(0.1) | 0.15<br>(0.14) | 0.01<br>(0.06) |
| Termination *(T)* | 0.33<br>(0.19) | -0.02<br>(0.1) | -0.09<br>(0.13) | -0.08<br>(0.06) |
| Number *(Num)* | 0.46*<br>(0.17) | 0.30*<br>(0.06) | 0.03<br>(0.10) | 0.04<br>(0.03) |
| Year dummies | | yes | | yes |
| Sector dummies | | yes | | yes |
| $R^2$ | 0.67 | - | 0.78 | - |
| F-test | 4442 | 89.54 | 352 | 180.3 |
| Number of observartions | 1351 | 1351 | 1646 | 1646 |

Note: In brackets are heteroskedastic consistent standard errors, * denotes significant at the 5% level, ** at the 10% level.

**Table 4c: Effects of European AD-actions on imports**

| | (1) Heckman Correction for named | | (2) Heckman Correction for non-named | |
|---|---|---|---|---|
| Ln $(import)_{t0-1}$ | 0.06* | (0.02) | 0.74* | (0.01) |
| Duty *(D)* | -0.37* | (0.11) | 0.07 | (0.07) |
| Undertaking *(U)* | -0.23* | (0.11) | 0.17* | (0.07) |
| Termination *(T)* | -0.13 | (0.11) | -0.03 | (0.07) |
| Number *(Num)* | 0.30* | (0.07) | 0.01 | (0.04) |
| Year dummies | | yes | | yes |
| Sector dummies | | yes | | yes |
| Probit: | | | | |
| Import growth (t-1) | 0.07* | (0.03) | -0.13* | (0.03) |
| Ln(import)t-2 | -0.30* | (0.01) | 0.28* | (0.01) |
| Year dummies | | yes | | yes |
| Sector dummies | | yes | | yes |
| $\lambda$ | 1.04* | (0.10) | -0.91* | (0.04) |
| number of observations | 2997 | | 2997 | |

Note: In brackets are heteroskedastic consistent standard errors, * denotes significant at the 5% level, ** at the 10% level.

**Table 5: Effects in Highly Concentrated versus Lowly Concentrated Sectors**

| | (1) High C5 OLS | (2) High C5 Robust | (3) Low C5 OLS | (4) Low C5 Robust |
|---|---|---|---|---|
| Ln $(import)_{t0-1}$ | 0.68* | 0.79* | 0.81* | 0.88* |
| | (0.08) | (0.01) | (0.05) | (0.01) |
| Duty *(D)* | 0.14 | 0.27** | 0.05 | -0.01 |
| | (0.17) | (0.15) | (0.12) | (0.07) |
| Undertaking *(U)* | 0.33 | 0.34* | -0.03 | -0.09 |
| | (0.24) | (0.15) | (0.13) | (0.08) |
| Termination *(T)* | -0.13 | -0.09 | 0.09 | 0.02 |
| | (0.19) | (0.15) | (0.16) | (0.08) |
| Duty x Named *(DxN)* | -0.87* | -0.88* | -0.56* | -0.17* |
| | (0.19) | (0.19) | (0.21) | (0.09) |
| Undertaking x Named *(UxN)* | -0.68* | -0.52* | -0.30** | -0.23* |
| | (0.21) | (0.20) | (0.20) | (0.10) |
| Termination x Named *(TxN)* | -0.24 | -0.27* | -0.27 | -0.09 |
| | (0.21) | (0.20) | (0.23) | (0.09) |
| Number *(Num)* | 0.26 | 0.10 | 0.01 | 0.07 |
| | (0.20) | (0.09) | (0.13) | (0.04) |
| Number x Named *(NumxN)* | 0.54* | 0.50* | 0.09 | 0.04 |
| | (0.18) | (0.13) | (0.12) | (0.04) |
| Named *(N)* | -0.46* | -0.43* | -0.20 | -0.20 |
| | (0.18) | (0.16) | (0.16) | (0.07) |
| Year dummies | yes | yes | yes | yes |
| Sector dummies | yes | yes | yes | yes |
| F | 80.67 | 131.8 | 130.9 | 222.02 |
| $R^2$ | 0.69 | - | 0.76 | - |

Note: In brackets are heteroskedastic consistent standard errors, * denotes significant at the 5% level, ** at the 10% level.