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Sourafel Girma
Holger Görg
Joachim Wagner

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Sourafel Girma
University of Nottingham

Holger Görg
Kiel Institute for the World Economy,
Christian-Albrechts-University Kiel and IZA

Joachim Wagner
Leuphana University Lueneburg
and IZA

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

Subsidies and Exports in Germany: First Evidence from Enterprise Panel Data*

We use newly available representative panel data for manufacturing enterprises in West and East Germany to investigate the link between production-related subsidies and exports. We document that only a small fraction of enterprises is subsidized, and that exports and subsidies are positively related. Using a matching approach to investigate the causal effect of subsidies on export activities we find no impact of subsidies on the probability to start exporting, and only weak evidence for an impact of subsidies on the share of exports in total sales in West Germany but no evidence in East Germany.

JEL Classification: F13, F14, H29

Keywords: subsidies, export, Germany, enterprise panel data

Corresponding author:

Joachim Wagner
Universität Lüneburg
Institut für Volkswirtschaftslehre
Postfach 2440
D-21314 Lüneburg
Germany
E-mail: wagner@leuphana.de

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1. Motivation

Most governments – in developing as well as in developed countries - maintain explicit export promotion policies ranging from lower tax rates for export earnings to direct subsidization of exporting activities. This is not surprising since exporting success is seen by many policy makers and the public alike as a key indicator of a nation's economic performance. What needs to be kept in mind, though, is that in general explicit export subsidization is illegal under WTO rules. Furthermore, whether or not such export promotion policies are successful in stimulating exports is still disputed. For example, Bernard and Jensen (2004) find that state level export promotion expenditures in the US do not have a significant effect on exporting at the firm level. By contrast, Volpe Martincus and Carballo (2009) and Helmers and Trofimenko (2009) find some positive effects of export subsidies using firm level data for Peru and Colombia, respectively.

Recent theory and evidence in heterogeneous firm type models find that only firms that are productive enough select to become exporters, due to sunk costs of exporting. This suggests an alternative strategy for governments interested in fostering exports, namely, help firms to improve production-related aspects to assist them to overcome these barriers to exporting. In this regard, a number of papers have investigated whether *production-related* subsidies have an impact on firms' export performance. Görg et al. (2008) report that while such production subsidies in the Republic of Ireland do not encourage firms to start exporting, they encourage previous exporters to export more. Girma et al. (2007) investigate the exporting effects of production subsidies in China and find positive effects that are more pronounced among firms that are in capital intensive industries and are already export active.

This paper contributes to this literature by presenting first evidence on the link between subsidies aimed at production-related aspects of firm activities, and exports for Germany, a leading actor on the world market for goods and services. Using newly available representative panel data for manufacturing enterprises in West and East Germany we document that only a small fraction of enterprises is subsidized, and that exports and subsidies are positively related. Applying a matching approach to investigate the causal effect of subsidies on export activities we find no impact of subsidies on the probability to start exporting, and only weak evidence for an impact of subsidies on the growth of the share of exports in total sales in West Germany but no evidence in East Germany.

The rest of the paper is organized as follows: Section 2 describes the enterprise-level data used in the empirical investigation. Section 3 reports descriptive evidence on subsidies in German manufacturing and their links to exports. Section 4 presents results from our econometric investigations of the causal effects of subsidies on exporting. Section 5 concludes.

2. Data

The data used in this study are merged from two surveys conducted by the German Statistical Offices. One source is a monthly report for establishments in manufacturing industries that covers all local production units that have at least 20 employees itself or that belong to an enterprise with a total of at least 20 employees. Information from the monthly surveys is either summed up for a year, or average values for a year are computed, and a panel data set is build from annual data. Furthermore, the information collected at the establishment level has been aggregated at the enterprise level. A detailed description of the information in these

data is given in Konold (2007). For this study we use the information on exports[1] and total sales of the enterprise to identify enterprises that are exporters in a year, and to compute the share of exports in total sales.

The second source of data used here is the cost structure survey for enterprises in the manufacturing sector. This survey is carried out annually as a representative random sample survey (stratified according to the number of employees and the industries) of around 18.000 enterprises. While all enterprises with 500 or more employees are included in each survey, a stratified random sample of smaller firms with 20 to 499 employees is drawn that remains in the survey sample for four years in succession and that is replaced by a new stratified random sample afterwards. Therefore, data from the cost structure survey can be used to build an unbalanced panel containing all enterprises with at least 500 employees (in a year) plus a sample of smaller firms with a rotating panel design. A detailed description of the cost structure survey can be found in Fritsch et al. (2004).

In the cost structure survey the enterprise has to report the amount of subsidies received in a year. Subsidies are defined as any unrequited payments received from federal, regional or local authorities, or from the European Communities, to lower costs of production and/or to lower the prices of goods produced and/or to allow sufficient payments for factors of production. Hence, we refer to this financial assistance as production-related subsidies; they are clearly not direct export promotion subsidies. This information is used to identify enterprises that are subsidized in a year, and to compute the amount of subsidies per employee received.

[1] Exports are deliveries to customers outside Germany or to a German wholesale company that sells the goods to a customer in a foreign country. Indirect exports – e. g., tyres that are sold to a German manufacturer of cars who exports some of these cars – can not be identified.

Data from the two sources are linked using the enterprise identifier available in both surveys. The resulting panel covers the years from 1995 to 2004. Due to the introduction of a new industry classification new samples for the cost structure survey were drawn after two years in 1997 and in 1999. Furthermore, a new sample was drawn in 2003. This leads to a highly unbalanced panel when data for 1995 to 2004 are used (see Brandt et al. (2008), p. 221). For the empirical investigation performed here, we focus on the sample covered in the cost structure survey from 1999 to 2002. These data are confidential but not exclusive. They can be used by researchers on a contractual basis via controlled remote data access inside the research data centres of the German Statistical Offices (see Zühlke et al. (2004) for details).

3. Descriptive evidence on subsidies and exports

Subsidized enterprises are a rare species in manufacturing industries in West Germany.[2] According to the figures reported in table 1 only 3.68 percent of all enterprises included in the cost structure survey sample received subsidies in 1999, and the share dropped to 3.02 percent in 2002. The figures for East Germany are much higher – 23.27 percent in 1999 and 20.87 percent in 2002. This shows that even more than ten years after re-unification in 1990 there are large differences between West and East Germany. Therefore, all investigations have to be performed for West and East Germany separately.

[Table 1 near here]

[2] For a comprehensive descriptive study (in German) on subsidies in German manufacturing enterprises based on a similar data set that, however, is based on information from the cost structure surveys only and, therefore, has no information on export activities, see Wagner (2009).

While on average subsidies per employee in subsidized enterprises tend to be somewhat higher in West than in East Germany (see table 1), the median value tends to be lower in West Germany. In both parts of Germany the median is much lower than the mean, pointing to a highly skewed distribution of subsidies. This is documented in figure 1 and figure 2, showing the distribution of subsidies per employee in subsidized firms in 2000.[3] Note that the maximum amount of subsidies per head is much larger in West Germany[4], but that the 90th decile of the distribution is about the same in both parts of Germany according to table 1.

[Figure 1 and figure 2 near here]

The status of whether a firm is subsidized or not is highly stable in West Germany over the period 1999 to 2002. Of the 11.124 enterprises that reported to the cost structure survey in each year in this period, 93.63 percent were never subsidized, and 1.2 percent received subsidies in each year, meaning that only about 5 percent of all firms switched in and/or out of subsidies (see table 2). Status switchers are more often found in East Germany, where 63.35 percent of all enterprises received no subsidies over the period, and 11.95 percent received subsidies in each year, so that about 25 percent of all enterprises switched their status at least once between 1999 and 2002 (see table 3).

[Table 2 and table 3 near here]

Subsidies and exports are positively related. Table 4 and table 5 report in column 1 the estimated coefficients from regressions with either the exporter status

[3] The pictures for other years look identical; graphs are available upon request.
[4] The exact figures of the maxima are confidential as they refer to a single enterprise.

or the share of exports in total sales as the endogenous variable and with a dummy variable for the status of being subsidized or not as explanatory variable for each year from 1999 to 2002 for West and East Germany.[5] All regression coefficients are positive and highly statistically different from zero according to the p-values, indicating that compared to non-subsidized enterprises in both parts of Germany subsidized enterprises are more often exporters and have a higher share of exports in total sales. In West Germany the same holds when industry fixed effects at the detailed 4digit-level are added (see table 4, column 2), while controlling for industry affiliation leads to only weakly statistically significant coefficients of the dummy variable for subsidized firms in the regression for the share of exports in total sales in East Germany in 1999 and 2001, and an insignificant coefficient in 2000.

[Table 4 and table 5 near here]

4. Effects of subsidies on exports

The positive relationship between subsidies and exports documented in table 4 and table 5 can not be interpreted in a causal way. On the one hand, subsidies may cause a firm to start to export, or to increase its share of exports in total sales, by helping to cover fixed costs associated with starting to export (e. g., the adaptation of the products to regulations in a foreign country) or by lowering variable costs of production or exporting. On the other hand, exporting may cause a firm to be subsidized when subsidies are aimed for exporting firms due to special government programs. The influence may run in one or both directions, and there might be other enterprise characteristics besides exports and subsidies that have an influence on

[5] The models for the share of exports in total sales are estimated by fractional logit to take care of the fact that the share of exports in total sales is a percentage variable with a probability mass at zero due to a large share of firms with no exports; see Papke and Wooldridge (1996) and Wagner (2001).

both – research and development activities for example may both foster exports due to more innovative products and subsidies due to targeted government programs. Regression analyses of the type performed in the previous section cannot reveal causal relationships.

If subsidies are not given to enterprises at random (and we have no reason to assume they are) the causal effect of subsidies on starting to export, or on the share of exports in total sales, cannot be calculated from comparing subsidized and non-subsidized firms. If subsidized firms have a higher probability to export (as documented in the last section) we can not say whether this is caused by the subsidies or not, because we can not observe whether a subsidized firm would have started to export without subsidies if it did receive subsidies. We simply do not have any information about the counterfactual situation. So how can we be sure that the higher probability to export of subsidized firms compared to non-subsidized firms is caused by subsidies (or not)?

This closely resembles a situation familiar from the evaluation of active labour market programs (or any other form of treatment of units): If participants, or treated units, are not selected randomly from a population but are selected (or self-select) according to certain criteria, the effect of a treatment cannot be evaluated by comparing the average performance of the treated and the non-treated. However, given that each unit (enterprise, or person, etc.) either participated or not, we have no information about its performance in the counterfactual situation. A way out is to construct a control group in such a way that every treated unit is matched to an untreated unit that has been as similar as possible (ideally, identical) at the time before the treatment. Differences between the two groups (the treated, and the matched non-treated) after the treatment can then be attributed to the treatment (for a comprehensive discussion, see Heckman, LaLonde and Smith 1999).

To investigate the causal effects of subsidies on the probability to export the matching approach is used as follows. We consider receiving subsidies in 2000 as the treatment[6], and an export start in 2000 or in 2001 (or not) as the outcome. The treatment group is made of all enterprises without subsidies in 1999 but with subsidies in 2000, and without exports in the years 1997 to 1999. The control group is made of all enterprises without subsidies in 1999 to 2002, and without exports in 1997 to 1999. Matching is done by nearest neighbour propensity score matching. The propensity score is estimated from a probit regression of a dummy variable indicating whether or not a plant is subsidized (treated) on the number of employees, output per employee (labour productivity), wages and salaries per employee (human capital intensity), spending on research and development over total sales (R&D intensity), and 4-digit industry dummy variables - all measured in 1999, the year before the treatment. For German manufacturing firms these variables are both linked to the probability to receive subsidies (see Wagner 2009) and to exports (see Wagner 2001).

In an analogous way subsidies in 2001 are considered as the treatment, and an export start in 2001 or 2002 (or not) as the outcome. The treatment group then is made of all enterprises without subsidies in 1999 and 2000 but with subsidies in 2001, and without exports in the years 1998 to 2000. The control group here is made of all enterprises without subsidies in 1999 to 2002 and without exports in 1998 to 2000. The variables used to compute the propensity score are from the pre-treatment year 2000.

[6] Alternatively, subsidies could be considered not as a binary treatment (an enterprise is subsidized or not in a year) but as a continuous treatment that varies between zero Euro per employee and some maximum amount. We experimented with this continuous treatment approach, but it turned out to be not computationally feasible due to the extremely skew distribution of subsidies per employee and the large share of non-subsidized firms (see section 3). For the method to investigate a continuous treatment see Imbens (2000) and Hirano and Imbens (2004); an application to the analysis of exports is Fryges and Wagner (2008).

The balancing property (that requires an absence of statistically significant differences between the treatment group and the control group in the covariates after matching) is tested by checking whether the difference in means of the variables used to compute the propensity score is never statistically significant between firms that started to become subsidized and the matched non-starters. The common support condition (that requires that the propensity score of a treated observation is neither higher than the maximum nor less than the minimum propensity score of the controls) is imposed by dropping subsidy starters (treated observations) whose propensity score is higher than the maximum or lower than the minimum propensity score of the non-subsidized firms (the controls). Matching is done using Stata 10.1 and the psmatch2 command (version 3.0.0), see Leuven and Sianesi (2003).

The difference in the share of export starters (the outcome variable) between the subsidy starters (the treated enterprises) and the matched non-subsidized enterprises (the non-treated firms) is the so-called average treatment effect on the treated, or ATT, the estimated effect of subsidies on the probability to export.

Results are reported in table 6 for West Germany and in table 7 for East Germany. Matching was successful in all cases (taking care of common support); there are no statistically significant differences in the mean values of the variables used for matching in the pre-treatment year. Note that the probit regressions that are used to compute the propensity score include a complete set of 4digit-industry dummy variables, so that all observations from an industry that has observations from either the control group or the treatment group only are dropped.

[Table 6 and table 7 near here]

The difference in the share of export starters (the outcome variable) between the subsidy starters (the treated enterprises) and the matched non-subsidized enterprises (the non-treated firms) is positive in both periods in West Germany, while it is positive in one period and zero in the other in East Germany. This effect, however, is estimated using very small numbers of firms in the treatment and the control group due to the fact that the cohorts of firms that are subsidized in 2000 or 2001 for the first time are very small (see table 2 and table 3), and that not all of these subsidy starters did not export during the three years before the treatment. The small number of cases means that the outcome variable for the group of treated and non-treated enterprises is extremely sensitive with regard to one or two more firms that start to export. For example, the outcome 0.0625 for the treated group in West Germany in the period 2000 to 2001 means that one enterprise from the treated group started to export – one more starter would have doubled the estimated ATT. Furthermore, the ATT is never statistically different from zero.[7] Therefore, from the empirical investigation performed here we have no evidence that subsidies cause enterprises to start to export.

In a second step the causal effect of subsidies on the growth in the share of exports in total sales is investigated. Here the matching approach is used as follows. We consider receiving subsidies in 2000 as the treatment, and the change in the share of exports in total sales from 1999 to 2001 as the outcome. The treatment group is made of all enterprises without subsidies in 1999 but with subsidies in 2000, and with exports in 1999. The control group is made of all enterprises without subsidies in 1999 to 2002, and with exports in 1999. Matching is done by nearest neighbours propensity score matching. As above, the propensity score is estimated

[7] Following the usual approach in the literature the test for the statistical significance of the ATT is based on a bootstrap with 500 replications. However, it is "unclear whether the bootstrap is valid in this context" (Leuven and Sianesi 2008, p. 1); see also Abadie and Imbens (2008).

from a probit regression of a dummy variable indicating whether or not a plant is subsidized (treated) on the number of employees, output per employee (labour productivity), wages and salaries per employee (human capital intensity), spending on research and development over total sales (R&D intensity), and 4-digit industry dummy variables - all measured in 1999, the year before the treatment. In an analogous way subsidies in 2001 are considered as the treatment, and the change in the share of exports in total sales between 2000 and 2002 as the outcome. The treatment group then is made of all enterprises without subsidies in 1999 and 2000 but with subsidies in 2001, and with exports in 2000. The control group here is made of all enterprises without subsidies in 1999 to 2002 and with exports in 2000. The variables used to compute the propensity score are from the pre-treatment year 2000. Again, the balancing property is tested, and the common support condition is imposed.

Matching is done using Stata 10.1 and the psmatch2 command (version 3.0.0), see Leuven and Sianesi (2003).The difference in the change of the share of exports in total sales (the outcome variable) between the subsidy starters (the treated enterprises) and the matched non-subsidized enterprises (the non-treated firms) is the so-called average treatment effect on the treated, or ATT, the estimated effect of subsidies on the share of exports in total sales.

Results are reported in table 8 for West Germany and in table 9 for East Germany. Matching was successful in all cases (taking care of common support) – there are no statistically significant differences in the mean values of the variables used for matching in the pre-treatment year.

[Table 8 and table 9 near here]

The difference in the change in the share of exports in total sales (the outcome variable) between the subsidy starters (the treated enterprises) and the matched non-subsidized enterprises (the non-treated firms) is positive in both periods in West Germany, and it is both large (four percentage points) and statistically significant for the second period considered here. Again, the number of firms in the groups of treated and non-treated enterprises is small. However, we have at least some weak evidence for a positive causal effect of subsidies on the share of exports in total sales in West German manufacturing enterprises. This is in contrast to the results for East Germany, where the computed ATT is negative in one period and never statistically different from zero.

5. Conclusions

This paper uses newly available representative panel data for manufacturing enterprises to investigate the link between subsidies and exports in Germany for the first time. While exports and subsidies are positively related, a matching approach applied to uncover any causal effect of subsidies on export activities finds no impact of subsidies on the probability to start exporting. Furthermore, we find some evidence for a positive impact of subsidies on the share of exports in total sales in West Germany but not in East Germany.

Our finding of a lack of a robust relationship between subsidies and exporting is consistent with results reported in the context of other western economies using either export (Bernard and Jensen, 2004) or production-related assistance (Görg et al. (2008). The latter paper, using data for Ireland, also finds no evidence that production subsidies encourage firms to start exporting but that they have a positive effect on export quantities for those firms that already export. This perhaps suggests, that this kind of financial assistance is less useful in allowing firms to prepare

themselves for overcoming the initial barriers to exporting. Rather, it seems likely that firms use these grants to improve their production processes, increase the quality and/or lower the price of their products to remain competitive in export markets. What exactly the mechanisms are by which subsidies allow firms to improve their competitiveness, remains an important issue for further research.

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Table 1: Subsidies in German manufacturing enterprises, 1999 – 2002

Year			West Germany	East Germany
1999	Number of enterprises		13,980	2,729
	Share of enterprises with subsidies (%)		3.68	23.27
	Subsidies per employee (€) in enterprises with subsidies	mean	2,789	2,121
		median	403	749
		90th decile	4,602	4,490
2000	Number of enterprises		13,876	2,635
	Share of enterprises with subsidies (%)		3.24	22.35
	Subsidies per employee (€) in enterprises with subsidies	mean	2,247	1,491
		median	314	582
		90th decile	3,162	3,161
2001	Number of enterprises		13,122	2,455
	Share of enterprises with subsidies (%)		3.18	21.71
	Subsidies per employee (€) in enterprises with subsidies	mean	1,983	1,458
		median	328	592
		90th decile	3,481	3,198
2002	Number of enterprises		12,592	2,314
	Share of enterprises with subsidies (%)		3.02	20.87
	Subsidies per employee (€) in enterprises with subsidies	mean	1,639	1,239
		median	268	508
		90th decile	3,160	2,853

Table 2: Patterns of participation in subsidies
Manufacturing enterprises in West-Germany, 1999 – 2002

Pattern	Freq.	Percent	Cum.
0000	10,415	93.63	93.63
0001	96	0.86	94.49
0010	47	0.42	94.91
0011	45	0.40	95.32
0100	55	0.49	95.81
0101	7	0.06	95.87
0110	20	0.18	96.05
0111	23	0.21	96.26
1000	134	1.20	97.46
1001	4	0.04	97.50
1010	6	0.05	97.55
1011	11	0.10	97.65
1100	56	0.50	98.16
1101	10	0.09	98.25
1110	61	0.55	98.80
1111	134	1.20	100.00
Total	11,124	100.00	

Note: A pattern 0000 (1111) indicates that the enterprises received subsidies in no year (all years) between 1999 – 2002; a pattern 0101 indicates that the enterprise received subsidies in the second and fourth year (2000 and 2002), etc.

Table 3: Patterns of participation in subsidies
Manufacturing enterprises in East-Germany, 1999 – 2002

Pattern	Freq.	Percent	Cum.
0000	1,272	63.35	63.35
0001	69	3.44	66.78
0010	46	2.29	69.07
0011	35	1.74	70.82
0100	35	1.74	72.56
0101	5	0.25	72.81
0110	15	0.75	73.56
0111	50	2.49	76.05
1000	83	4.13	80.18
1001	12	0.60	80.78
1010	5	0.25	81.03
1011	11	0.55	81.57
1100	53	2.64	84.21
1101	12	0.60	84.81
1110	65	3.24	88.05
1111	240	11.95	100.00
Total	2,008	100.00	

Note: A pattern 0000 (1111) indicates that the enterprises received subsidies in no year (all years) between 1999 – 2002; a pattern 0101 indicates that the enterprise received subsidies in the second and fourth year (2000 and 2002), etc.

Table 4: Subsidies and Exports, West Germany manufacturing firms, 1999- 2002[1]

Model		1	2
1999			
Exports (Dummy; 1 = yes)	ß	0.938	0.868
	p	0.000	0.000
Share of export in total sales	ß	0.545	0.373
	p	0.000	0.000
2000			
Exports (Dummy; 1 = yes)	ß	0.890	0.704
	p	0.000	0.000
Share of export in total sales	ß	0.617	0.430
	p	0.000	0.000
2001			
Exports (Dummy; 1 = yes)	ß	0.603	0.400
	p	0.000	0.012
Share of export in total sales	ß	0.494	0.306
	p	0.000	0.000
2002			
Exports (Dummy; 1 = yes)	ß	0.729	0.538
	p	0.000	0.002
Share of exports in total sales	ß	0.527	0.342
	p	0.000	0.000

[1]Estimated coefficients are from a regression of either a dummy for the exporter status, or the share of exports in total sales, on a constant and a dummy variable that takes the value one for subsidized firms and zero otherwise in model 1. In model 2 industry fixed effects at the 4digit level are added. The models for the exporter dummy variable are estimated by ML logit. The models for the share of exports in total sales are estimated by fractional logit to take care of the fact that the share of exports in total sales is a percentage variable with a probability mass at zero (due to a large share of firms with no exports). p is the prob-value for a test of the null-hypothesis that the estimated regression coefficient is zero.

Table 5: Subsidies and Exports, East Germany manufacturing firms, 1999- 2002[1]

Model		1	2
1999			
Exports (Dummy; 1 = yes)	ß	0.684	0.429
	p	0.000	0.000
Share of export in total sales	ß	0.469	0.164
	p	0.000	0.060
2000			
Exports (Dummy; 1 = yes)	ß	0.630	0.436
	p	0.000	0.000
Share of export in total sales	ß	0.378	0.093
	p	0.000	0.271
2001			
Exports (Dummy; 1 = yes)	ß	0.605	0.375
	p	0.000	0.003
Share of export in total sales	ß	0.407	0.150
	p	0.000	0.085
2002			
Exports (Dummy; 1 = yes)	ß	0.610	0.582
	p	0.000	0.000
Share of export in total sales	ß	0.461	0.316
	p	0.000	0.000

[1]Estimated coefficients are from a regression of either a dummy for the exporter status, or the share of exports in total sales, on a constant and a dummy variable that takes the value one for subsidized firms and zero otherwise in model 1. In model 2 industry fixed effects at the 4digit level are added. The models for the exporter dummy variable are estimated by ML logit. The models for the share of exports in total sales are estimated by fractional logit to take care of the fact that the share of exports in total sales is a percentage variable with a probability mass at zero (due to a large share of firms with no exports). P is the prob-value for a test of the null-hypothesis that the estimated regression coefficient is zero.

Table 6: The causal effect of subsidies on starting to export in West German manufacturing firms, 2000 - 2002[1]

Treatment	Subsidies in 2000
Outcome	Export start in 2000 or in 2001
Treatment group	Enterprises without subsidies in 1999 but with subsidies in 2000, and without exports in 1997 to 1999
Control group	Enterprises without subsidies in 1999 to 2002, and without exports in 1997 to 1999
Number of cases	16

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 1999	93.135	114.16	0.607
Labour productivity 1999	2.0e+5	1.8e+5	0.761
Human capital intensity 1999	29128	28212	0.668
R&D intensity 1999	0.00036	0.00041	0.915

Outcome	Treated	Control	ATT	p-value (500 repl.)
	0.0625	0.000	0.0625	0.570

Treatment	Subsidies in 2001
Outcome	Export start in 2001 or in 2002
Treatment group	Enterprises without subsidies in 1999 and 2000, but with subsidies in 2001, and without exports in 1998 to 2000
Control group	Enterprises without subsidies in 1999 to 2002, and without exports in 1998 to 2000
Number of cases	19

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 2000	87.202	55.325	0.170
Labour productivity 2000	98465	76489	0.316
Human capital intensity 2000	25939	23328	0.428
R&D intensity 2000	0.00079	0.000	0.324

Outcome	Treated	Control	ATT	p-value (500 repl.)
	0.10526	0.000	0.10526	0.268

[1] ATT is the average treatment effect on the treated; the p-value is based on a bootstrap with 500 replications

Table 7: The causal effect of subsidies on starting to export in East German manufacturing firms, 2000 - 2002[1]

Treatment	Subsidies in 2000
Outcome	Export start in 2000 or in 2001
Treatment group	Enterprises without subsidies in 1999 but with subsidies in 2000, and without exports in 1997 to 1999
Control group	Enterprises without subsidies in 1999 to 2002, and without exports in 1997 to 1999
Number of cases	33

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 1999	73.733	77.641	0.819
Labour productivity 1999	82733	71261	0.510
Human capital intensity 1999	18896	18904	0.996
R&D intensity 1999	0.00572	0.00465	0.818

Outcome	Treated	Control	ATT	p-value (500 repl.)
	0.0606	0.0303	0.0303	0.734

Treatment	Subsidies in 2001
Outcome	Export start in 2001 or in 2002
Treatment group	Enterprises without subsidies in 1999 and 2000, but with subsidies in 2001, and without exports in 1998 to 2000
Control group	Enterprises without subsidies in 1999 to 2002, and without exports in 1998 to 2000
Number of cases	24

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 2000	64.743	108.28	0.103
Labour productivity 2000	91850	95486	0.879
Human capital intensity 2000	18797	18582	0.898
R&D intensity 2000	0.000	0.000	1.000

Outcome	Treated	Control	ATT	p-value (500 repl.)
	0.08333	0.08333	0.000	1.000

[1] ATT is the average treatment effect on the treated; the p-value is based on a bootstrap with 500 replications

Table 8: The causal effect of subsidies on the share of exports in total sales in West German manufacturing firms, 1999 - 2002[1]

Treatment	Subsidies in 2000
Outcome	Change in share of exports in total sales (2001 – 1999)
Treatment group	Enterprises without subsidies in 1999 but with subsidies in 2000, and with exports in 1999
Control group	Enterprises without subsidies in 1999 to 2002, and with exports in 1999
Number of cases	89

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 1999	345.88	229.01	0.286
Labour productivity 1999	1.6e+5	1.6e+5	0.970
Human capital intensity 1999	32069	31848	0.860
R&D intensity 1999	0.01748	0.01493	0.627

Outcome	Treated	Control	ATT	p-value (500 repl.)
	2.092	1.939	0.154	0.941

Treatment	Subsidies in 2001
Outcome	Change in share of exports in total sales (2002 – 2000)
Treatment group	Enterprises without subsidies in 1999 and 2000, but with subsidies in 2001, and with exports in 2000
Control group	Enterprises without subsidies in 1999 to 2002, and with exports in 2000
Number of cases	71

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 2000	280.12	239.78	0.577
Labour productivity 2000	1.6e+5	1.5e+5	0.445
Human capital intensity 2000	31882	32453	0.630
R&D intensity 2000	0.02119	0.02002	0.871

Outcome	Treated	Control	ATT	p-value (500 repl.)
	2.652	-1.356	4.008	0.044

[1] ATT is the average treatment effect on the treated; the p-value is based in a bootstrap with 500 replications

Table 9: The causal effects of subsidies on the share of exports in total sales in East German manufacturing firms, 1999 – 2002[1]

Treatment	Subsidies in 2000
Outcome	Change in share of exports in total sales (2001 – 1999)
Treatment group	Enterprises without subsidies in 1999 but with subsidies in 2000, and with exports in 1999
Control group	Enterprises without subsidies in 1999 to 2002, and with exports in 1999
Number of cases	53

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 1999	140.07	202.41	0.426
Labour productivity 1999	94067	94687	0.947
Human capital intensity 1999	21361	21961	0.635
R&D intensity 1999	0.01045	0.01254	0.599

Outcome	Treated	Control	ATT	p-value (500 repl.)
	1.529	2.744	-1.215	0.712

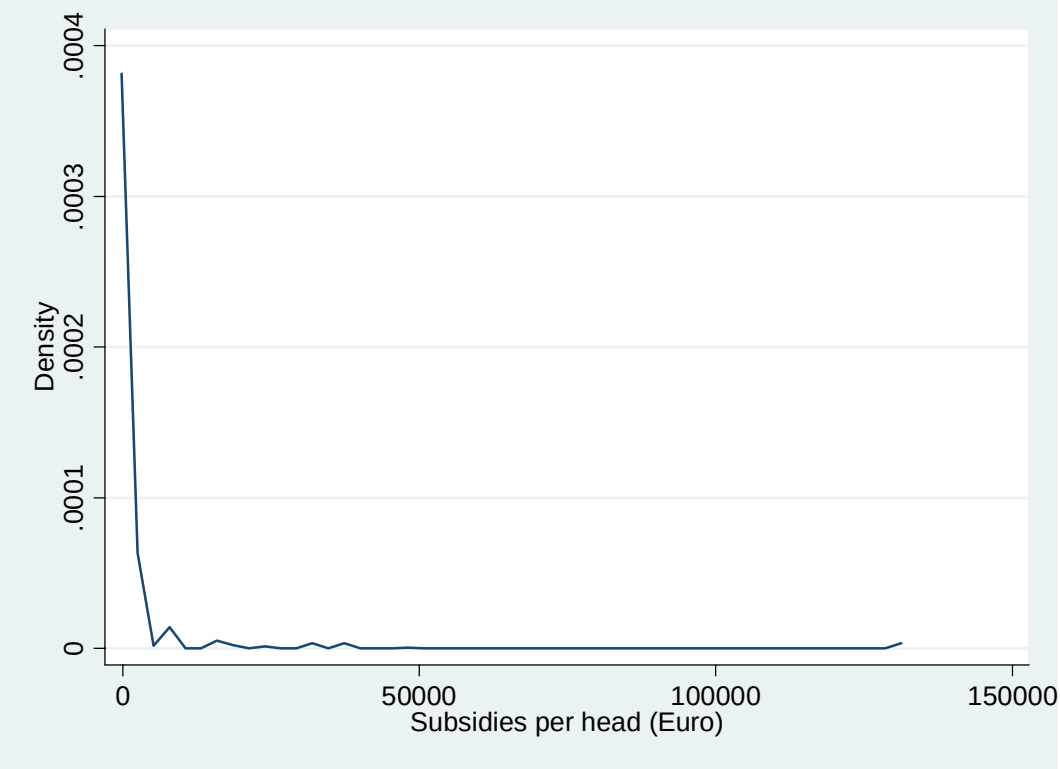
Treatment	Subsidies in 2001
Outcome	Change in share of exports in total sales (2002 – 2000)
Treatment group	Enterprises without subsidies in 1999 and 2000, but with subsidies in 2001, and with exports in 2000
Control group	Enterprises without subsidies in 1999 to 2002, and with exports in 2000
Number of cases	45

Mean of variables used for matching after matching	Treated	Control	p-value
Number of employees 2000	114.41	108.93	0.824
Labour productivity 2000	1.6e+5	1.8e+5	0.642
Human capital intensity 2000	23080	22094	0.507
R&D intensity 2000	0.01486	0.01232	0.681

Outcome	Treated	Control	ATT	p-value (500 repl.)
	4.319	0.237	4.082	0.274

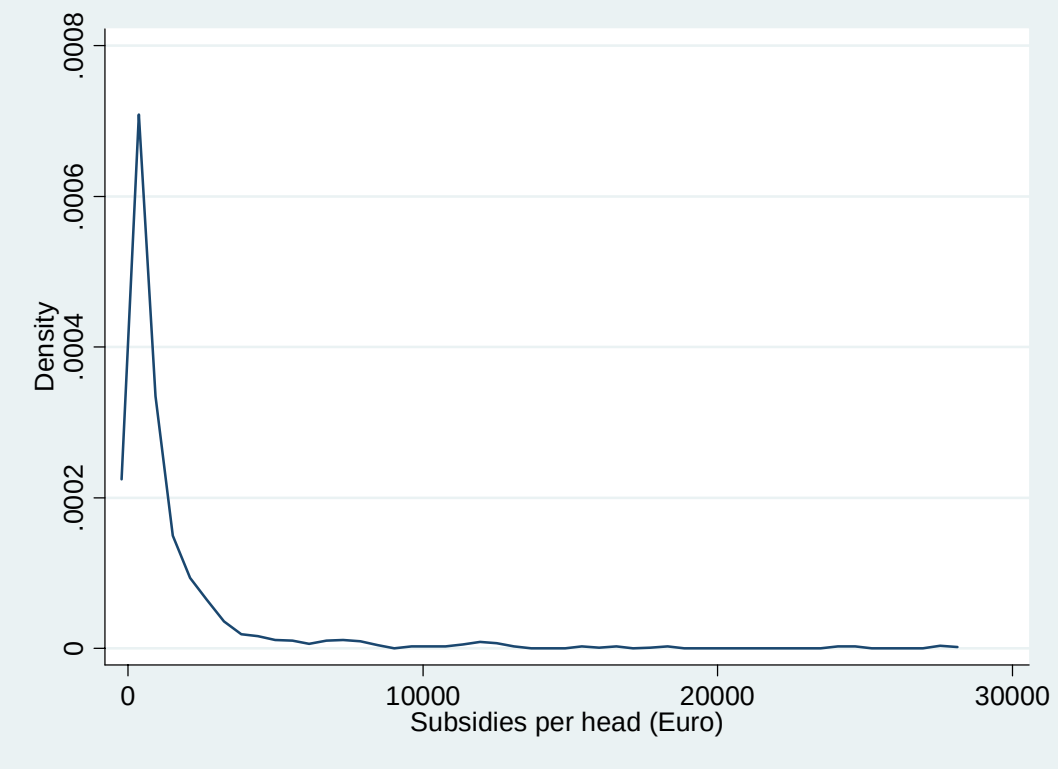
[1] ATT is the average treatment effect on the treated; the p –value is based on a bootstrap with 500 replications

Figure 1: Subsidies per head in West German Manufacturing Enterprises, 2000[1]



[1] Kernel density estimate (epanechnikov kernel, bandwith = 228.95); included are all manufacturing enterprises with subsidies in 2000

Figure 2: Subsidies per head in East German Manufacturing Enterprises, 2000[1]



[1] Kernel density estimate (epanechnikov kernel, bandwith = 221.47) ; included are all manufacturing enterprises with subsidies in 2000