

Do Firms Learn by Exporting or Learn to Export?

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1. Introduction

1) Self-selection

→ future exporters have significantly higher productivity than non-exporters before they start exporting (higher ex ante productivity)

2) Learning-by-exporting

→ should result in superior post-entry productivity performance in new export entrants relative to non-entrants

1. Introduction

3) **Learn-to-export (conscious self-selection)**

→ pre-entry improvements in productivity in
future export entrants

An important aim of the paper is to distinguish between learning-by-exporting and learning-to-export in new export entrants

1. Introduction

Learning-by-exporting:

The effect of exporting on productivity should occur at the time firms enter international markets and then give rise to a widening productivity gap between export entrants and continuing non-exporters

Learning-to-export:

Preceding the entry on the export market the productivity hikes in new export entrants relative non-exporters

1. Introduction

Previous studies on Swedish data include only firms with 50 employees or more

“In Sweden productivity growth of exporters does *not* appear to differ significantly from non-exporters either in the periods leading up to or after entry” (Greenaway et al. 2005)

The outcome differs considerably for smaller, and from a policy perspective more interesting, firms



Preview of findings

We observe an instantaneous productivity hike at export entry among the entering firms relative to non-entering firms, and thereafter, in subsequent periods the productivity gap is constant

If we allow for different productivity trajectories before export entry of future export entrants and of firms not entering the export market we notice a significant productivity differential between them even before export entry

2. Data and description

Exporter: a firm with an export value larger than 1.5 million SEK

Balance sheet information: sales, value added (deflated by PPI on industry level), employment and book value of capital

Link data on exports on firm level to balance sheet information for firms with at least one employee in Swedish manufacturing sector (NACE 15-36)

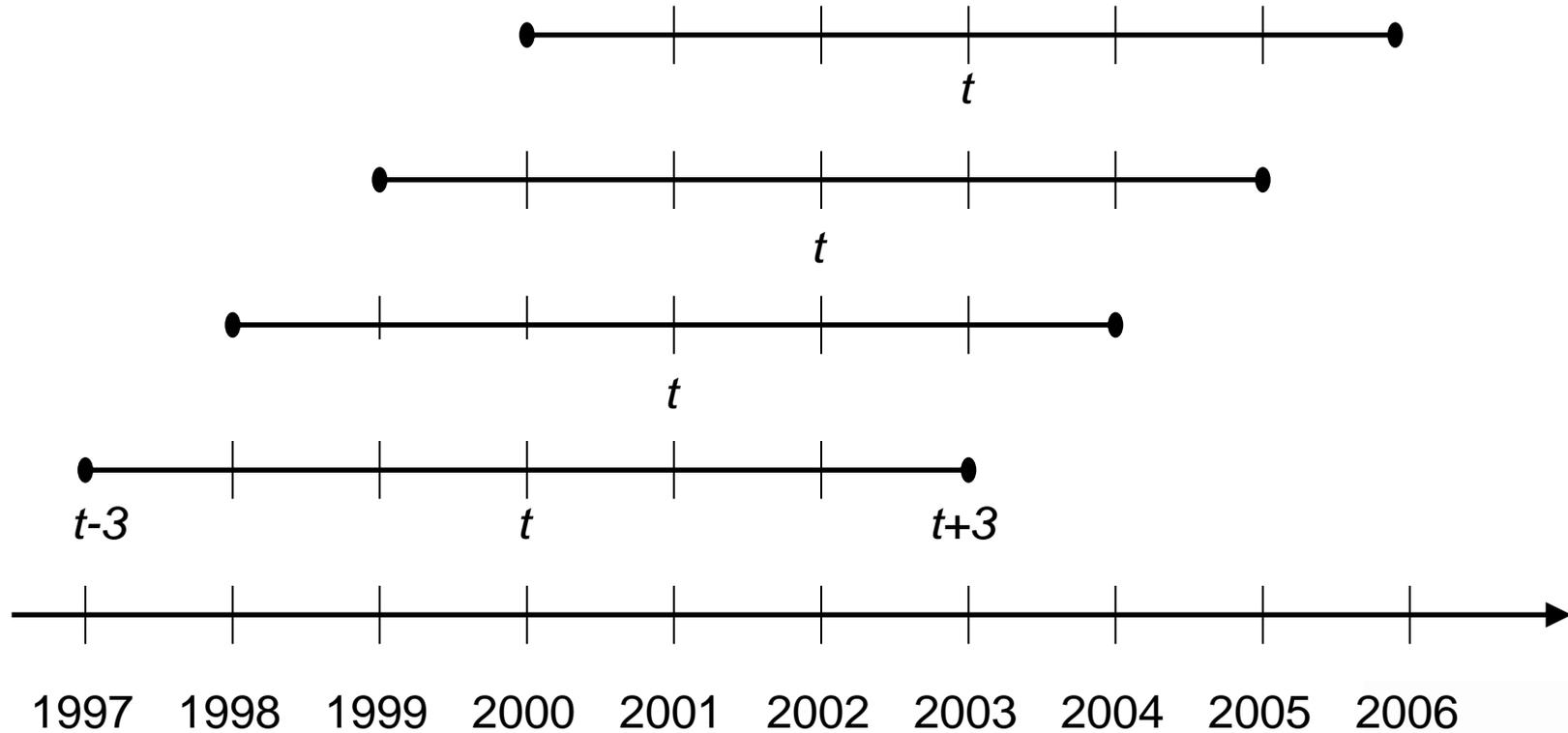
Labor productivity is our productivity indicator

2. Data and description

Investigate the productivity trajectories of firms that start exporting before and after they enter the export market and compare them with trajectories of firms not entering the export market

Construct a balanced panel of export entrant and non-export entrant firms which are observed every year during a seven year time window

The balanced panel



Sample means for export-entrants and non-entrants

All firms (1-∞ employees)							
Variable	Entrants	Non-entrants	Difference	Variable	Entrants	Non-entrants	Difference
$(K/L)_{t-1}$	298	204	95***	LP_{t-3}	483	416	67***
$(H/L)_{t-1}$	0.15	0.11	0.04***	LP_{t-2}	488	427	62***
EMP_{t-1}	32.1	8.6	23.5***	LP_{t-1}	502	429	73***
MNE_{t-1}	0.12	0.02	0.09***	LP_t	531	432	99***
				LP_{t+1}	541	427	114***
No obs	724	44,120		LP_{t+2}	541	428	113***
No unique	724	14,483		LP_{t+3}	539	430	109***

3. Econometric strategy

One main purpose is to estimate the causal effect on firm productivity of starting to export by using matching methods

- 1) Matching does not rely on the type of functional form assumptions that regression typically does
- 2) Matching is more explicit in assessing whether or not comparable untreated observations are available for each treated observation

3. Econometric strategy

Average treatment effect on the treated ATT

$$ATT_{CS} = \frac{1}{n_1} \sum_{i \in \{D_{t_0}=1\}} \left[LP_{1t+i} - \sum_{j \in \{D_{t_0}=0\}} w(i, j) LP_{0t+j} \right]$$

$$ATT_{DID} = \frac{1}{n_1} \sum_{i \in \{D_{t_0}=1\}} \left[(LP_{1t+i} - LP_{1t-i}) - \sum_{j \in \{D_{t_0}=0\}} w(i, j) (LP_{0t+j} - LP_{0t-j}) \right]$$

3. Econometric strategy

The learning-to-export hypothesis

The effect of exporting on productivity can occur before firms actually enter international markets, *i.e.* the causal effect may in fact precede the treatment

A test of the learning-to-export hypothesis requires a matching strategy where the base line for the pre-export productivity (and other covariates) is set some time before the period of export entry

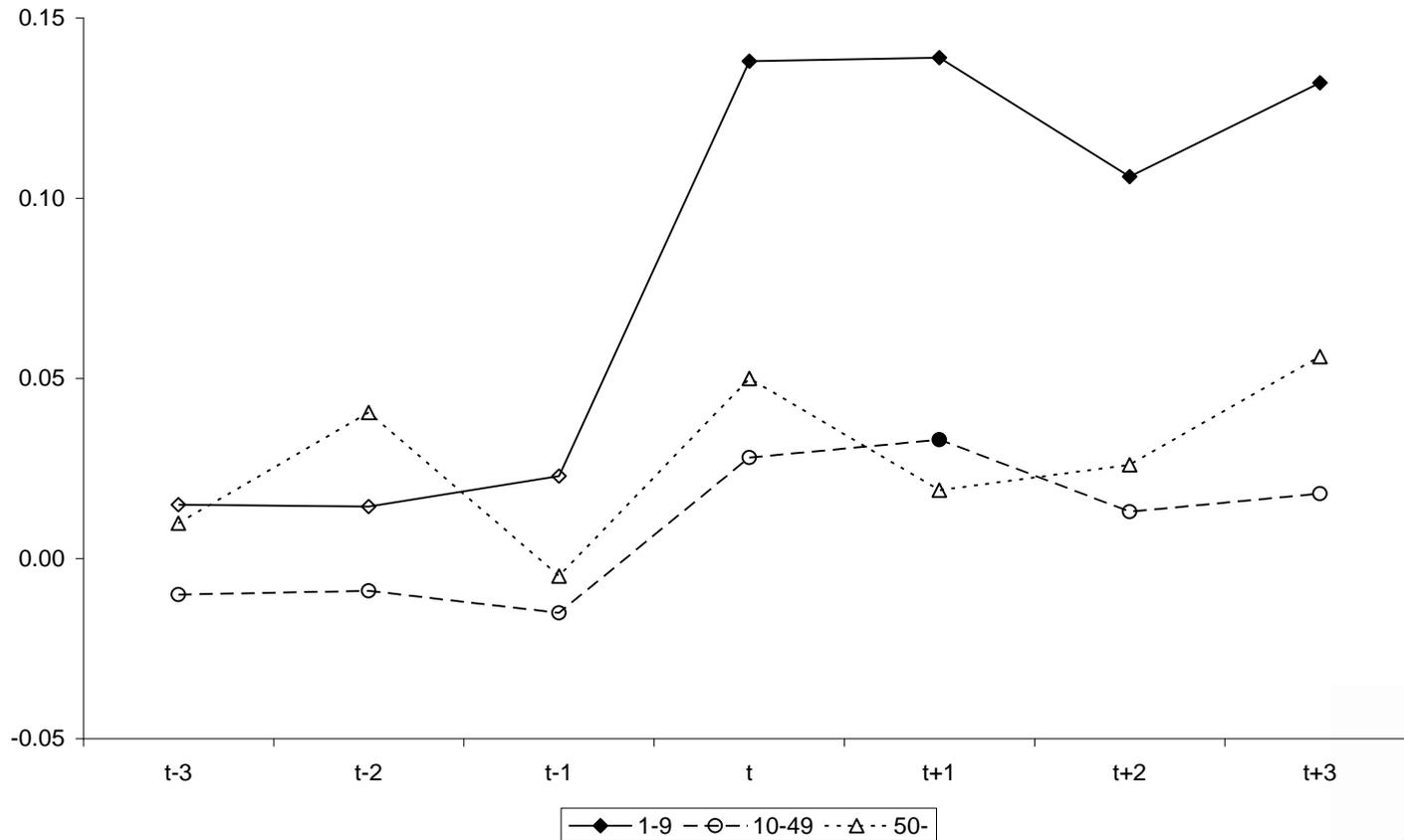
3. Econometric strategy

In the empirical work the model specifications will consider where:

- i) Export is allowed to affect productivity at the time of firms export entry and thereafter
- ii) Export is permitted to influence productivity even before firms enter international markets

Cross-sectional matching estimates of the effects of export entry on labor productivity

Learning-by-exporting specification



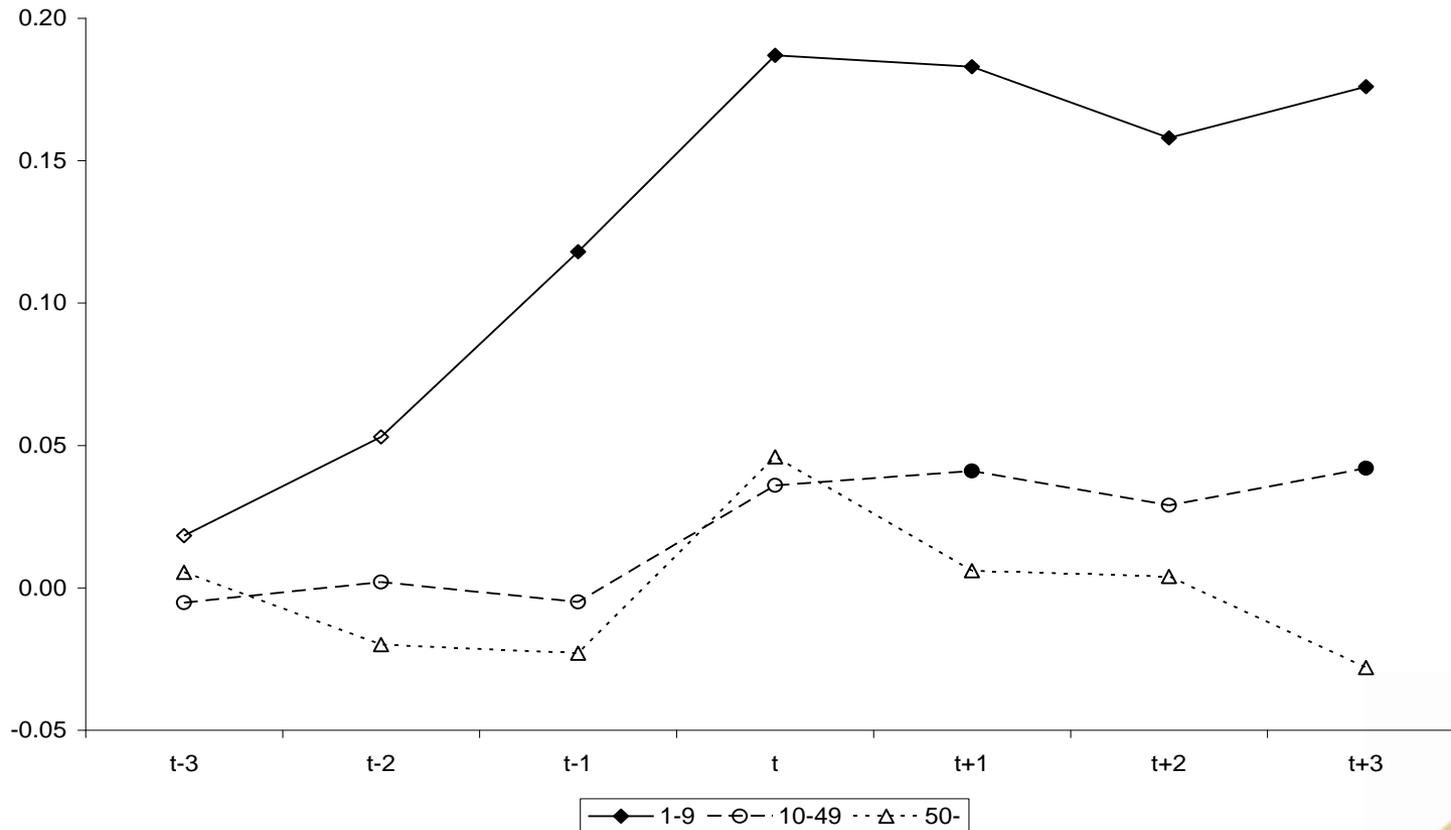
Note: Filled data marker indicates effect significant at the 10 percent level or lower

4. Empirical results (Learning-by-exporting)

- Positive impact on productivity in smaller firms entering the export market at the time of entry
- With reservation for that the post-export period is rather short (three years), no evidence for continuous learning through export
- The pre-export productivity differentials tend to be close to zero and are statistically insignificant for all firm sizes
 - support for actually comparing comparable export-entrant and non-entrant firms

Cross-sectional matching estimates of the effects of export entry on labor productivity

Learning-to-export specification



Note: Filled data marker indicates effect significant at the 10 percent level or lower

4. Empirical results (Learn-to-export)

- Obviously, there is a considerable labor productivity differential before export entry between small export-entrants and small non-entrants. The productivity gap continues to widen until t and remains constant thereafter
- At least smaller firms appear to prepare themselves for entering the export market by improving their productivity before entrance

5. Conclusions

- The exporter productivity premia in Swedish manufacturing is larger in smaller firms, and while the export participation rate in general is high, still it is fairly low among the smaller firms
- There is an instantaneous productivity increase in smaller firms at the time of the entry firms, but the productivity gap between entrants and non-entrants appears to be constant in the periods subsequent to entry

5. Conclusion

- The ex ante (before export entry) labor productivity is significantly higher in smaller future exporters than in firms that do not enter the export market (*self-selection*)
- Allowing for different productivity trajectories before export entry there is a significant productivity differential, at least in smaller firms, between future exporters and matched non-entrants even before export entry (*learning-to-export*)

3. Econometric strategy (Matching methodology)

The average treatment effect on the treated *ATT*:

$$ATT = E(LP_{1t^+} - LP_{0t^+} | D_{t^0} = 1) = E(LP_{1t^+} | D_{t^0} = 1) - E(LP_{0t^+} | D_{t^0} = 1)$$

Fundamental evaluation problem:

We only observe LP_{1t^+} or LP_{0t^+} for each firm, but never both

$E(LP_{1t^+} | D_{t^0} = 1)$ estimated directly from the observed data

$E(LP_{0t^+} | D_{t^0} = 1)$ counterfactual outcome not available

3. Econometric strategy (Matching methodology)

If export entry is non-random and the unobservable $E(LP_{0t^+} | D_{t^0} = 1)$ is substituted by the observable $E(LP_{0t^+} | D_{t^0} = 0)$ when estimating *ATT*

→ selection bias equal to $E(LP_{0t^+} | D_{t^0} = 1) - E(LP_{0t^+} | D_{t^0} = 0)$

In experimental studies, randomization makes the counterfactual a factual. In observational studies, some assumptions must be made to eliminate the selection bias

Assume that, conditional on X_{t^-} , LP_{0t^+} is independent of D_{t^0}

3. Econometric strategy (Matching methodology)

The cross-sectional matching estimator assumes that conditioning on the set of observed covariates X_{t-} is sufficient to remove selection bias

If there are unobserved characteristics affecting the treatment assignment and outcomes this will violate the identification conditions that justify cross-sectional matching

3. Econometric strategy (Matching methodology)

By using a conditional difference-in-differences (DID) matching estimator the time invariant portion of the remaining selection bias can still be eliminated

The *cross-sectional matching estimator* assumes that conditioning on the observed covariates is sufficient to remove bias in the post-treatment period

The *conditional DID matching estimator* assumes the same cross-sectional bias in the pre- and post-treatment period so by differencing the before-after differences for export entrants and non-export entrants the time invariant bias will be removed

3. Econometric strategy (Matching methodology)

Common support or overlap condition :

For every X_{t-} , there are firms choosing to start to export and firms choosing not to start to export, which means that for every X_{t-} , we will be able to construct the counterfactual outcome

If matching on X_{t-} is valid, so is matching on the conditional probability of receiving treatment, referred to as the propensity score

4. Empirical results (propensity scores)

- The covariates included in the propensity scores are standard variables suggested by theory and previous empirical literature to affect both export entry and future productivity
- The propensity scores for the CS specifications include pre-export labor productivity (LP). For the conditional DID specifications it is instead used to construct the before-after potential export entry differences

4. Empirical results (propensity scores)

Learning-by-exporting:

Seeking to find export entrants and non-export entrants that are as similar as possible all the way up to the period of potential export entry ($t-1$)

Learning-to-export:

All covariates refer to the third year prior to potential export entry ($t-1$). Allows for export entrants and non-export entrants to have divergent development of labor productivity and other firm attributes during the years up to potential export entry

4. Empirical results (propensity scores)

To avoid the problem with multicollinearity we have a specification that include the average labor productivity over the years $t-3$ to $t-1$. The highly significant and positive effect of pre-export labor productivity on the probability of export entry are in line with the self-selection hypothesis

If we look at the results for firms of different sizes the positive effect of pre-export labor productivity on the probability of becoming an exporter appears to be valid only for micro firms (firms with less than 10 employees)

4. Empirical results

(Robustness to dynamics in export status)

Entrant-stayers:

Export-entrants that continue to export throughout the period $t+1$ to $t+3$

Entrant-stoppers:

Export-entrants that leave the export market during at least one of the years $t+1$ to $t+3$

Never-entrants:

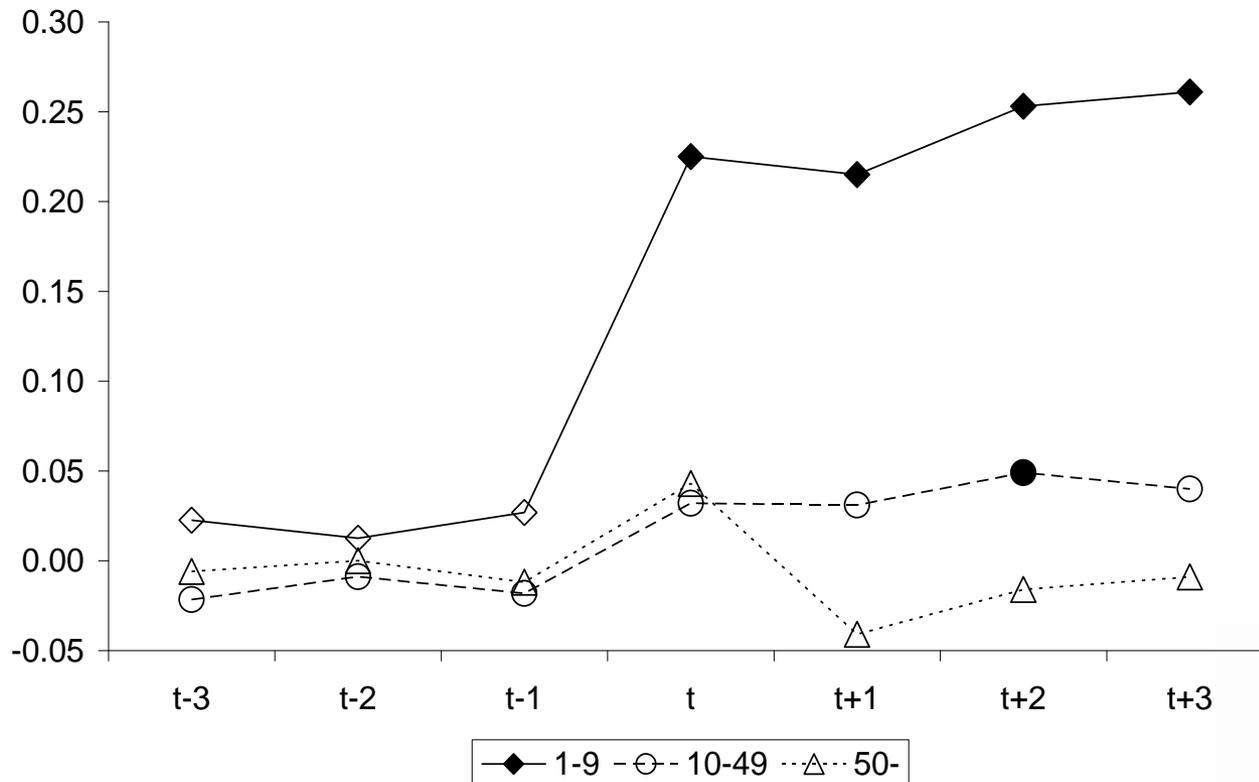
Non-entrants that continue to stay out of the export market throughout the period $t+1$ to $t+3$

Not-yet-entrants:

Non-entrants that eventually enter the export market during the period $t+1$ to $t+3$

CS matching estimates of the effects of export entry on labor productivity

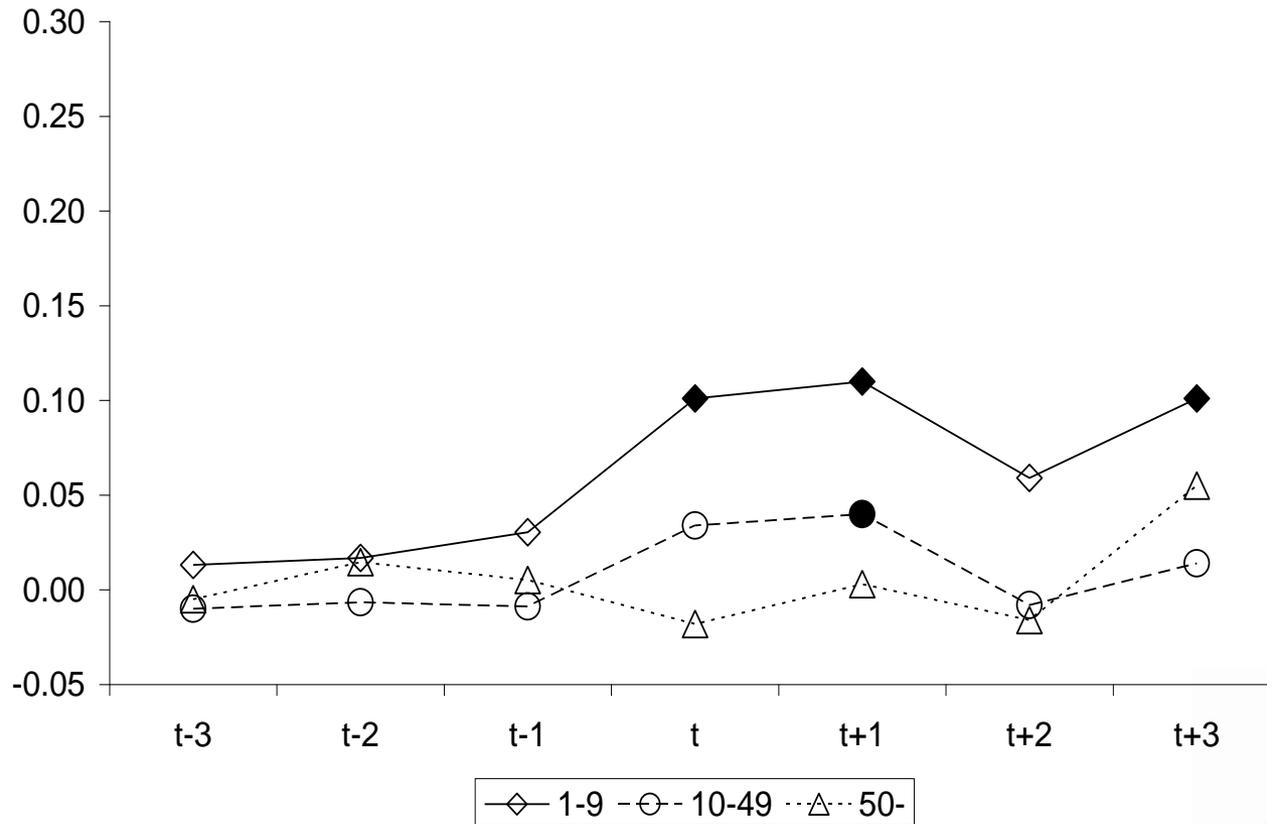
Entrant-stayers/Never-entrants



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CS matching estimates of the effects of export entry on labor productivity

Entrant-stoppers/Non-entrants



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