
Hochschule Niederrhein
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Niederrhein Institut für
Regional- und Strukturforschung
Niederrhein Institute for
Regional and Structural Research

Offshoring and its Impact on SMEs in Germany- Examining the Potential Positive and Negative Effects

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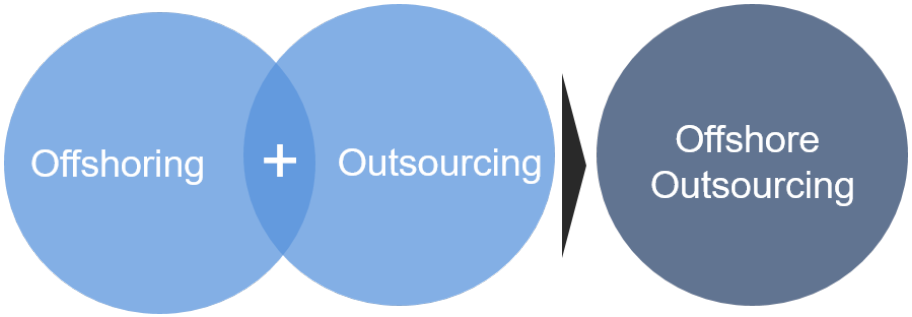
Agenda

- **Introduction/ Motivation**
- **Conceptual Evaluation**
- **Empirical Analysis**
- **Conclusion**

Introduction

- **No official definition for offshoring**
- **Chosen definition:**



- **Offshoring outsourcing:** Relocation of production or services to a foreign supplier
- This study will not differentiate between offshoring and offshore outsourcing
- Small and medium sized companies employ less than 250 employees

Introduction – Special Role of SMEs in Germany

- **SMEs play an important role in Germany**
- **Account for 60 percent of all employees**
- **Are responsible for 38 percent sales in Germany**
- **Employ most of the "Auszubildende"(Apprentices) in Germany**

→ But Offshoring of SMEs has not been analyzed *(Di Gergoria et al. (2009), Canham and Hamilton (2013) for New Zealand,* Mohiuddin und Su (2013) Case Study Canada)

Motivation

- **SMEs differ in several ways from MNEs**
  - They have to deal with restrictions of various resources (financial, and human capital), these impediments could limit the internationalisation efforts: *lower incentive to offshore*
- **However, Offshoring can help overcome some of these barriers: *higher incentive to offshore***
- **Advantages from foreign relations could be used without founding expensive foreign facilities**
- **Costs can be reduced while global talents and partner innovations can be used**

Motivation

Globalisation of Value-Added Processes Change Basic Requirements for Companies, Regions & Nations

”Made in Germany” versus ”Made by Germany” ?

Conceptual Evaluation

„Productivity isn't everything, but in the long run it is almost everything" (Krugman, 1990, S. 9)

Competitiveness of a Company is Decisively Determined by its Ability to Innovate

- Continuous innovation in (high-tech and knowledge-based) fields is necessary to survive in highly globalised environments
- Influence of location choice on R&D activities in the domestic market is of particular interest

The choice to relocate is simultaneous with regard to organisational and spatial criteria

Conceptual Evaluation

Theoretical literature separates static (+) and dynamic (+/-) achievements of „Offshoring“

No clear findings in empirical literature:

- Görg and Hanley (2005), Dachs et al. (2015) detect a positive correlation between offshoring and spending on R&D
- Negative and non-linear effects are found in Cusmano et al. (2010), Karpaty and Gustavsson-Tingvall (2011), Mihalache et al. (2012)

- Studies show ambivalent effects of international relocation on business and/or company success, especially concerning innovation

Empirical Analysis

Sources:

- IAB - Establishment Panel
- Representative survey in Germany → 16.000 firms interviewed every year
- Offshoring firms can be identified in the years 2007, 2008 and 2010
- Panel data from 1999-2014

Data Precision

- **All firms which have hived off, spin-off, or shut down parts before 2007 were excluded from the panel**

- **Otherwise we could not guarantee that a firm in the treatment or the control group has practiced offshoring in the past years**

Quasi Experimental Approach

- **Why natural or quasi-experiment?**
- **As in natural sciences, economists try to use this combination of methods in order to replicate a lab experiment and…**
- **… get an answer to the counterfactual question for real world applications in social sciences:**

What would have happened over time to the observed individuals if everything else was the same, but no offshoring took place?

Quasi Experimental Approach

- **Unfortunately, we cannot observe such an alternative world**

- **This is where the control group comes in:**

  As a reference (or in other words: “quasi”) case for this alternative world scenario and to exclude all other influences

  Estimation strategy:

  - **[Conditional] Difference-in-Difference (DiD) Estimator**
  - **Binary und Multiple Treatment Assessment**
  - **Instrumental Variable (IV) Estimator (do be done…)**

Difference in Difference

- **Treatment and Control group can differ also in non-observable characteristics**
- **Time shocks and non observable characteristics could be neutralized or at least reduced with a Difference in Difference approach of the outcome variable**
- **With the help of the Kernel Algorithm the DID estimator could be designed in a way that it uses the results of the PSM as the basis for the weighting**

$$y_{i,d,t} = \alpha + \gamma D + \tau T + \delta(D \times T) + \mathbf{X}_{i,d,t}\beta' + \varepsilon_{i,d,t}$$

whereby:

D is the binary variable for the observed group with d ∈ (0,1)

T is the binary variable for the observed period with t ∈ (0,1)

- **Neighbours which are very similar get a higher weight, while neighbours which are quite different get a weight close to zero**
- **The value of the estimation is higher because the control group is bigger than the treatment group**

Data and Methods of Estimation

Product Innovation:

- ***Have you incorporated a completely new product or service into your assortment in the last fiscal year, for which a new market had to be created?***

Process Innovation:

- ***Have you developed or introduced procedures in the last fiscal year that have significantly improved the production processes or the provision of services?***

Difference in Difference Estimation Results of the Causal Effects of Offshoring

SME	Product Innovation	Product Improvement	Process Innovation	Labor Productivity (Levels)	Labor Productivity (Growth)
Model 1	-0.132***	-0.131**	-0.099*	7.8e+04**	-0.065*
(S.E.)	(0.066)	(0.066)	(0.056)	(3.4e+04)	(0.036)
Model 2	-0.106***	-0.107***	-0.083***	8.0e+04***	-0.067***
(S.E.)	(0.015)	(0.015)	(0.017)	(2.4e+04)	(0.008)
Model 3	-0.103***	-0.098***	-0.077***	7.5e+04***	-0.066***
(S.E.)	(0.016)	(0.016)	(0.018)	(2.4e+04)	(0.008)
Model 4	-0.109*	-0.108**	-0.078	7.8e+04	-0.068***
(S.E.)	(0.065)	(0.054)	(0.069)	(1.4e+05)	(0.024)

Modell I: DiD Schätzung mit Kontrollvariablen.
Modell II: CDiD Schätzung auf Basis einer Kernel-basierten PS Matching Routine.
Modell III: CDiD Schätzung auf Basis einer Kernel-basierten PS Matching Routine plus Common Support Restriktion.
Modell IV: CDiD Schätzung auf Basis einer Kernel-basierten PS Matching Routine plus Common Support Restriktion und bootstrapped S.E

Detailed Analysis- Process Innovation

Pre-Treatment Period			Post-Treatment Period			ATT
Comparison	Treated	Diff	Comparison	Treated	Diff	Diff-in-Diff
0.260	0.616	0.357***	0.303	0.534	0.245***	-0.099**
(0.005)	(0.039)	(0.039)	(0.005)	(0.041)	(0.042)	(0.054)

Work in progress

How significant is the geographical extent of decisions to relocate when considering short- or medium-term innovative success?

- Rarely examined in previous empirical literature
- Methodical expansion through a “multiple treatment” approach
- Application of a “doubly robust” conditional DiD estimator
- Enables more precise statements about the cost-benefit relation

How diverse is the identified effect of relocation decisions on innovative success in regards to companies with different sizes?

- SME’s often confronted with resource-restrictions
- Offshoring as an opportunity but also a risk (for process procedures, among other things)
- Identification of innovative effects on subsamples

Result of National and International Relocations

Table 1: Effects of spatial relocation strategies on innovation performance and productivity growth

	Obs.	Domestic Relocation (ATT_1)			Offshoring (ATT_2)		
	(Firms)	RA	IPTW	Doubly Robust	RA	IPTW	Doubly Robust
Product Innovation	52187	0.055*	0.137**	0.139**	-0.195***	0.118	0.115
	(15044)	(0.0322)	(0.0655)	(0.0644)	(0.0701)	(0.1481)	(0.1547)
Product Improvement	52168	0.013	-0.012	-0.008	-0.166	-0.316***	-0.330***
	(15043)	(0.0477)	(0.0571)	(0.0565)	(0.1039)	(0.1136)	(0.1031)
Process Innovation	40254	0.007	-0.009	0.001	-0.387***	-0.527***	-0.523**
	(11553)	(0.0462)	(0.0694)	(0.0701)	(0.1036)	(0.1859)	(0.1889)
Productivity Growth	53925	-0.012	0.007	-0.014	-0.227**	-0.182**	-0.367***
	(12557)	(0.0475)	(0.0352)	(0.0361)	(0.0993)	(0.0671)	(0.0799)
Time Dummies		Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies		Yes	No	Yes	Yes	No	Yes
Included Covariates		Yes	No	Yes	Yes	No	Yes

Note: ***, **, * = statistical significance at the 1, 5 and 10% level; standard errors are given in brackets. Obs. = Total number of observations; RA = Regression-adjusted Difference-in-Difference (DiD) estimation, IPTW = Inverse-probability-of-treatment weighted, conditional DiD estimation; Doubly Robust = combination of RA and IPTW estimation. Details on included covariates are given in the appendix.

Conclusion

- **Results tend to show a pessimistic view on the link between offshoring and innovative success**
- **Data enables identification of short-to medium-term effects**
- **Estimated period comprises global economic- and financial crisis**

- **Possible explanations for negative effect:**
  - Offshoring binds resources (esp. SME), costs for communication
  - Loss of creative potential, learning-by-doing, investments in R&D
  - Primary starting point for foreign trade- and regional policy
  - Targeted support especially for foreign affairs of SMEs
  - Position regions in international competition

  - Open Research Question: What influence do regional location factors have on decisions about business relocation and the resulting economic output (productivity, innovative capacity)?

Thank you for your attention

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