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UNIVERSITY OF NOTTINGHAM

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GROUP PROJECT A

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Contents

1	Introduction	1
2	Theoretical Background/Literature Review	1
2.1	FDI	1
2.2	PSM	1
3	Data and Descriptive Analysis	2
4	Empirical Specification	2
4.1	Effect of FDI on TFP	2
5	Analysis by Type	2
6	Discussion/Conclusion	2
	References	iii

List of Tables

1	Impact of FDI on TFP-Standardized	3
2	Impact of FDI on TFP	3
3	Types of FDI	3
4	Multinomial Logits	3
5	Seperate Logits for FDI Type	4

1 Introduction

2 Theoretical Background/Literature Review

2.1 FDI

2.2 PSM

Since (I guess) we will be focussing on ATE rather than ATT, we need to satisfy the following two assumptions:

1. Assumption: **Unconfoundedness (CIA)**

"[G]iven a set of observable covariates X which are not affected by treatment, potential outcomes are independent of treatment assignment" (Imbens, 2004, p. 35)

2. Assumption: **Overlap**

"persons with the same X values have a positive probability of being both participants and nonparticipants" (Imbens, 2004, p. 35)

→ if Assumption 1 holds, all biases due to observable components can be removed by conditioning on the propensity score (Imbens, 2004).

Binary Treatment

Difference between logit and probit lies in the link function. Logit assumes a log-distribution of residuals, probit assumes a normal distribution. Heteroskedastic probit models can account for non-constant error variances → Check for heteroskedasticity?

Multiple Treatments

The multinomial probit model is the preferable option compared to logit. Alternatively, just run several binary ones (more complicated but also more robust to errors).

Variable selection

- outcome variable must be independent of treatment conditional on the pscore (CIA)
- Only variables that influence simultaneously the participation decision and the outcome variable should be included (based on theory and empirical findings)
- variables should either be fixed over time or measured before participation (include only variables unaffected by participation)

- choice of variables should be based on economic theory and previous empirical findings

Tests for variable selection

Strategies for the selection of variables to be used in estimating the propensity score:

3 Data and Descriptive Analysis

Our analysis is based on observational firm-level data. The dataset comprises 11,323 firms, of which 4,460 received FDI in 2016. The FDIs are categorized into three different types: Exports-oriented, technology intensive and domestic market seeking FDI. The outcome variable TFP was measured in 2017. The baseline variables were measured in 2015 (one year prior to receiving FDI) and comprise information on:

- Ownership (listed company, subsidiary, independent or state owned)
- Technology intensity (low, medium low, medium high or high-tech industries)
- Access to a port
- Wages (as log variable)
- Total Factor Productivity (TFP)
- Firm size (measured in number of employees, log variable)
- Debt (as log variable)
- Export intensity
- Whether the firm has invested in Research and Design

4 Empirical Specification

4.1 Effect of FDI on TFP

5 Analysis by Type

6 Discussion/Conclusion

For citation:

you have to add your reference firstly in bibCG. After having done so you can always

Table 1: Impact of FDI on TFP-Standardized

VARIABLES	NN1 ATE	NN1 ATT	NN5 ATE	NN5 ATT	IPW ATE	IPW POMean	IPW ATET	IPW POMean	AIWP ATE	AIWP POMean
r1vs0.FDI2016	0.125*** (0.019)	0.147*** (0.020)	0.119*** (0.013)	0.133*** (0.011)	0.119*** (0.006)		0.179*** (0.006)		0.142*** (0.003)	
0.FDI2016						-0.071*** (0.010)		-0.199*** (0.016)		-0.057*** (0.009)
Observations	11,323	11,323	11,321	11,321	11,323	11,323	11,323	11,323	11,323	11,323

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Impact of FDI on TFP

VARIABLES	NN1 ATE	NN1 ATT	NN5 ATE	NN5 ATT	IWP ATE	IPW ATT	AIWP ATE
r1vs0.FDI2016	0.257*** (0.038)	0.302*** (0.040)	0.246*** (0.028)	0.273*** (0.022)	0.245*** (0.013)	0.367*** (0.013)	0.292*** (0.006)
0.FDI2016 PO Means					3.510*** (0.020)	3.247*** (0.033)	3.540*** (0.020)
Observations	11,323	11,321	11,321	11,323	11,323	11,323	11,323

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Types of FDI

FDI type	No.
No FDI	6,863.0
Exports-oriented FDI	940
Technology intensive FDI	1,555
Domestic market seeking FDI	1,965
Total	11,323.0

Table 4: Multinomial Logits

VARIABLES	(1) AIPW	(2) IPW
Exports oriented FDI	0.141*** (0.006)	0.155*** (0.028)
Technology intensive FDI	0.139*** (0.005)	0.114*** (0.016)
Domestic market seeking FDI	0.143*** (0.004)	0.123*** (0.010)
PO Means	-0.057*** (0.009)	-0.071*** (0.010)
Observations	11,323	11,323

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Seperate Logits for FDI Type

VARIABLES	Export AIPW	Export IPW	Technology AIPW	Technology IPW	Domestic AIPW	Domestic IPW
ATE	0.136*** (0.007)	0.110*** (0.037)	0.139*** (0.005)	0.078*** (0.020)	0.143*** (0.004)	0.095*** (0.012)
PO Mean	-0.013 (0.011)	-0.014 (0.011)	-0.025** (0.011)	-0.028*** (0.011)	-0.017 (0.011)	-0.022** (0.011)
Observations	7,803	7,803	8,418	8,418	8,828	8,828

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

include the reference in the actual file as follows:

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(?, p. 35)

Thoughts on what we could write for discussion/limits of our study:

1. Do not know much about the context of the treatment (so cannot really rule out anticipation-effects?)
2. Would have been interesting to extend the study to several years after the treatment. Do effects persist? Do they vanish?
3. Might depend on firm size (see Aitken & Harrison 1999 → will include citation): find positive within-plant effects and spillover effects on TFP for small firms only (less than 50 employees)
4. Do not measure spillovers on plants that have not received FDI
5. Do not have sector-specific data → TECH variable has only 4 categories; e.g. in order to measure spillover effects from other firms in sector this would be necessary (i.e. if a foreign firm is more innovative)
6. Propensity Score matching might not be the best approach for given data as CIA could be violated

Appendix