



# **Effects of foreign acquisitions on R&D and high-skill activities**

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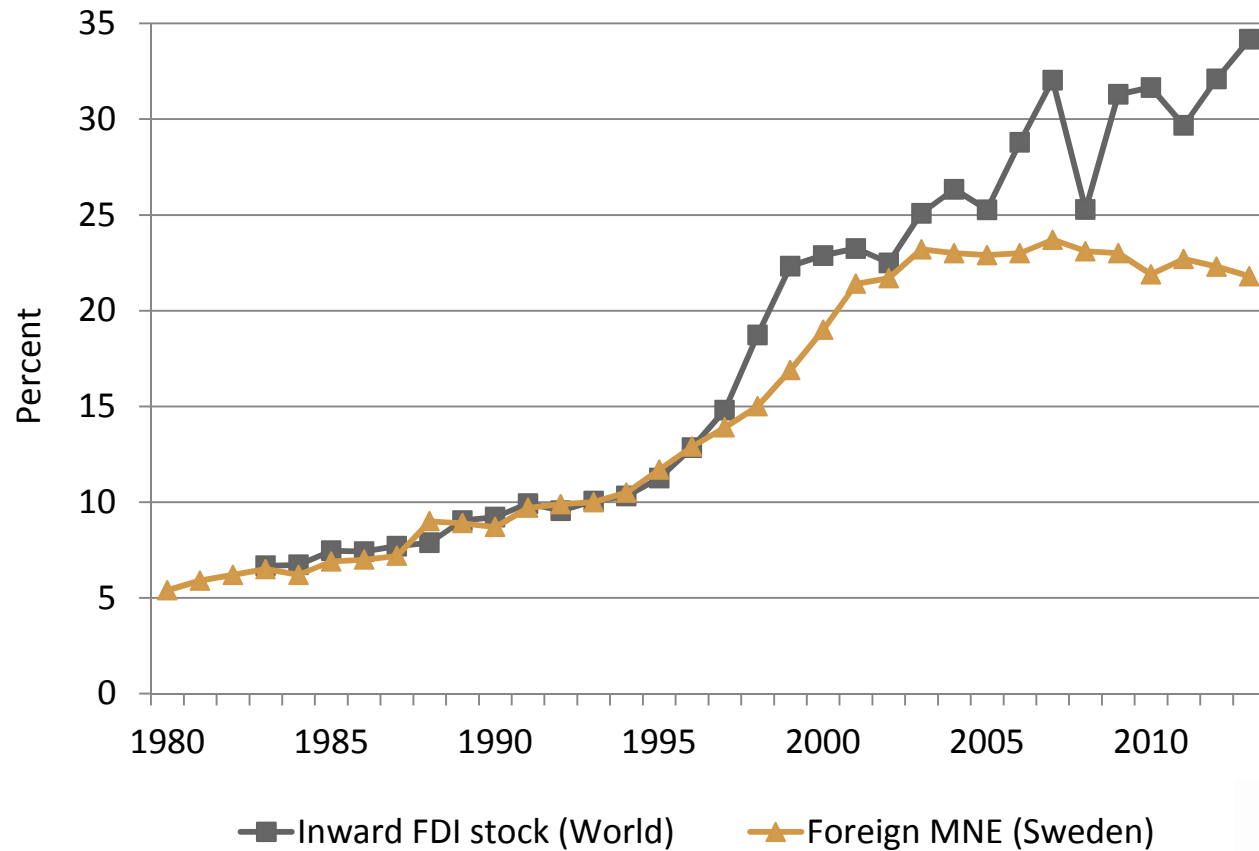
## Background

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- Multinational enterprises (MNEs) play a leading role when it comes to R&D and other high-skill activities carried out in the business sector
- Where do Swedish MNEs and foreign MNEs operating in Sweden locate their R&D?
- What happens to R&D and other high-skill activities in Swedish firms that become foreign owned?



# Foreign ownership in Sweden and inward FDI stock in the world



Source: Growth Analysis and UNCTAD



## Theoretical consideration

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The effect of an acquisition on R&D in the targeted firm is ambiguous

- The acquirer and the acquired firm doing similar R&D (substitutes). Exploit scale economies in R&D.
- Avoid duplication and coordination costs
- + Complementary activities in the acquired firm
- + Access, exploit and develop existing knowledge in the acquired firm



*Bertrand (2009)*

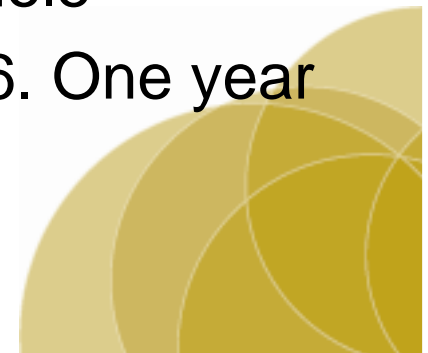
French innovative manufacturing firms 1995 to 2001. One year before and three years after.

*Bandick, Görg and Karpaty (2014)*

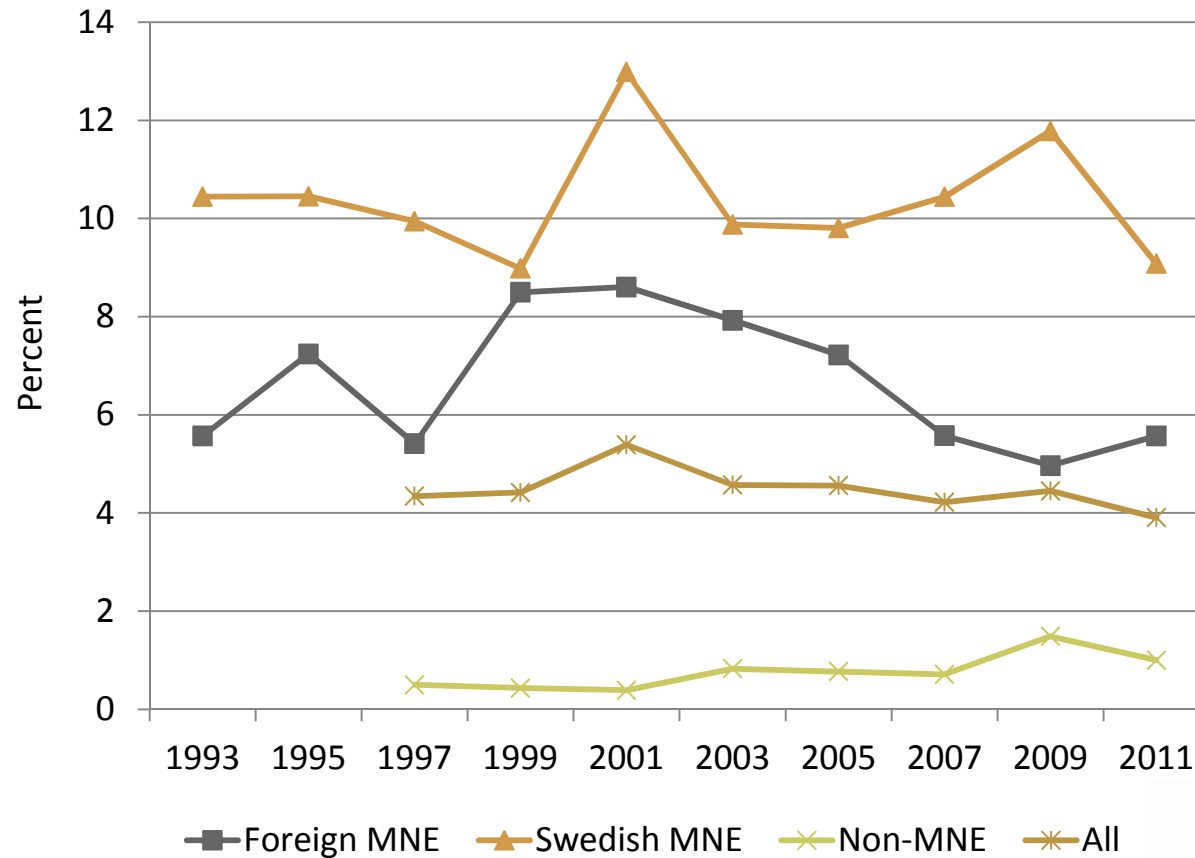
Swedish manufacturing firms,  $\geq 50$  employees, 1994 to 1999. One year before and three years after.

*Eliasson, Hansson and Lindvert (2015)*

Foreign acquisitions of Swedish firms in the whole business sector  $\geq 50$  employees, 2000 to 2006. One year before and five years after.



# R&D intensities in Swedish MNEs, foreign MNEs and non-MNEs



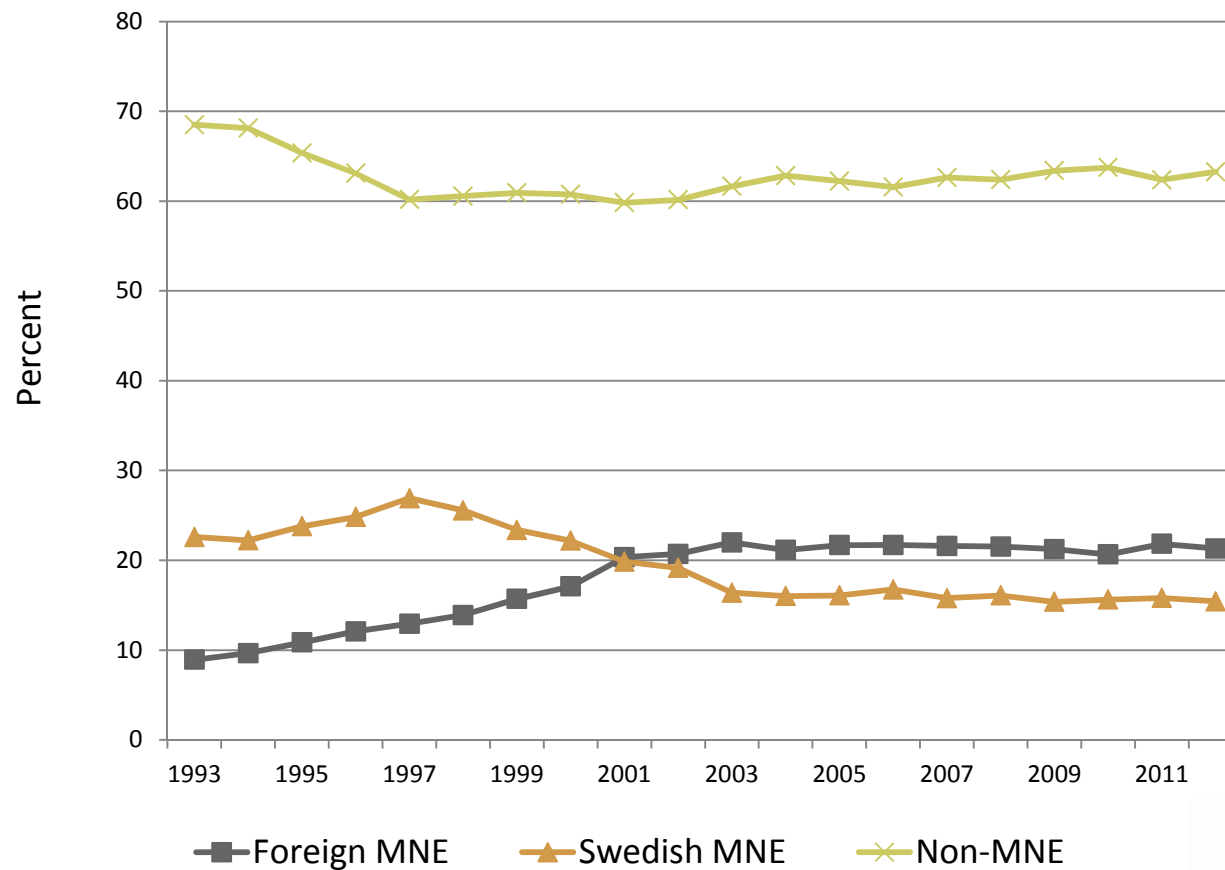
Source: Statistics Sweden

## Foreign acquisitions and high-skill activities

- Many firms have no R&D expenditure and firms with less than 50 employees are not surveyed before 2005.
- Foreign acquisitions is a fairly rare event among firms  $\geq$  50 employees
- Alternative outcome variable: share of high-skilled labor (employees with three years or more of post-secondary education).
- In the debate and in the academic literature less interest directed towards the impact of foreign acquisitions in smaller firms
- Include all firms  $\geq$  1 employees.



# Employment shares in Swedish MNEs, foreign MNEs and non-MNEs

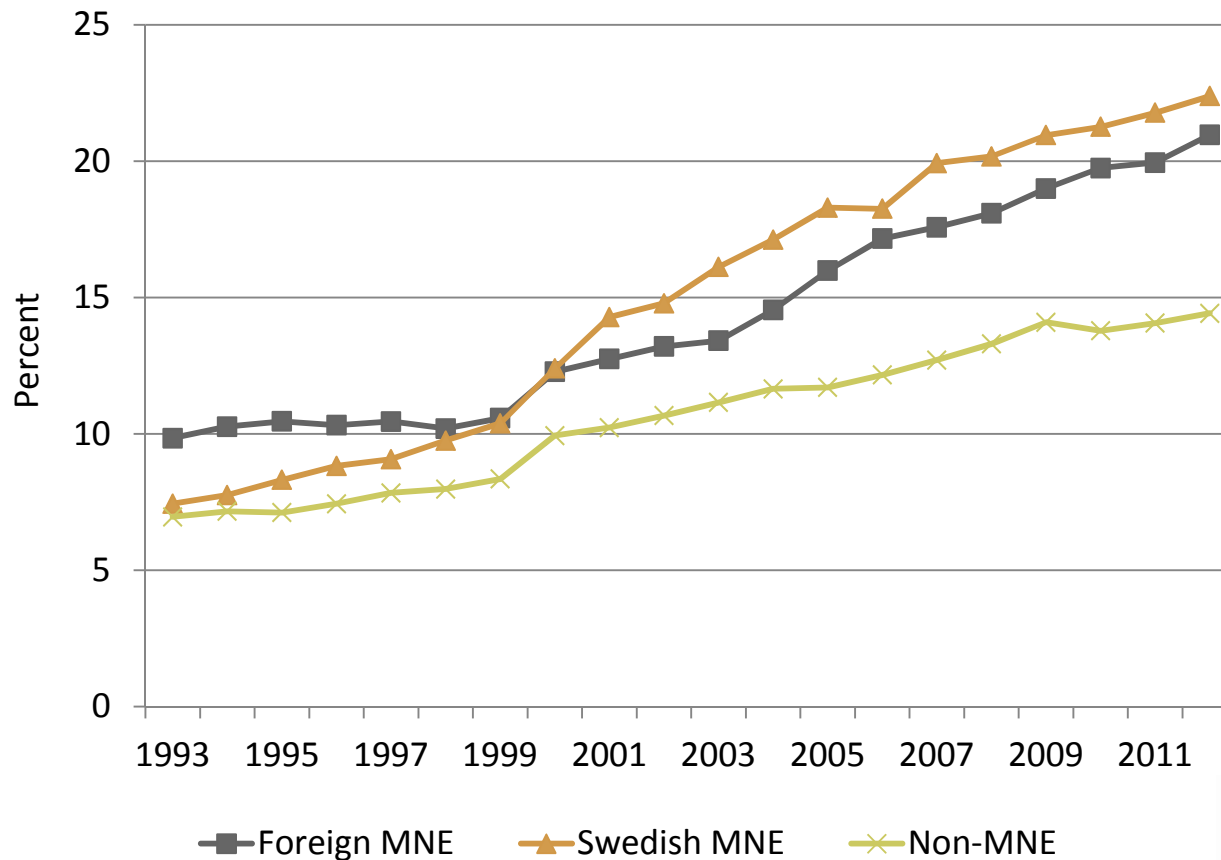


Statistics Sweden: RAMS





# Shares of highly skilled labor in Swedish MNEs, foreign MNEs and non-MNEs

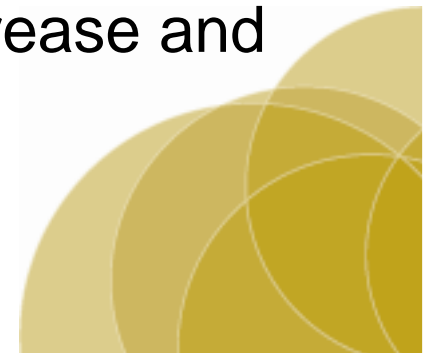


Statistics Sweden: RAMS



# Hypotheses

- As a result of foreign acquisitions headquarters and other high-skill activities are located abroad.
- + Tap into the expertise of the host country (technology sourcing).
- + Technology and knowledge transfers from acquiring foreign MNE to acquired smaller firms (non-MNEs). Leads to technical change in targeted firm, and if skilled biased, demand for skilled labor increase and skill upgrading arise.



## Dataset of analysis I

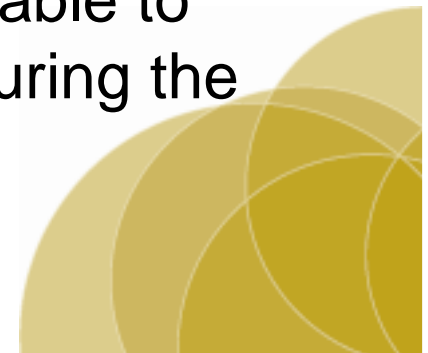
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- Unique identification numbers of firms enable us to link data on financial account, R&D expenditure, and register-based labor statistics (education levels of employees).
- We can divide firms into foreign MNE, Swedish MNEs and non-MNEs.
- Include all firms in the Swedish business sector with  $\geq 1$  employees over the period 1999 to 2011.
- We require that a firm can be observed in the data each year during a seven-year window.

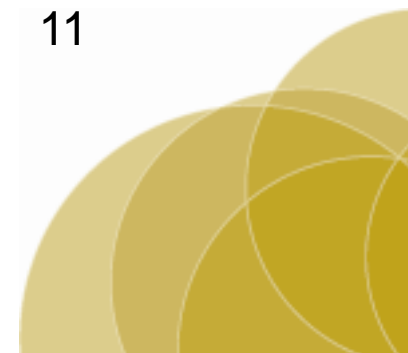
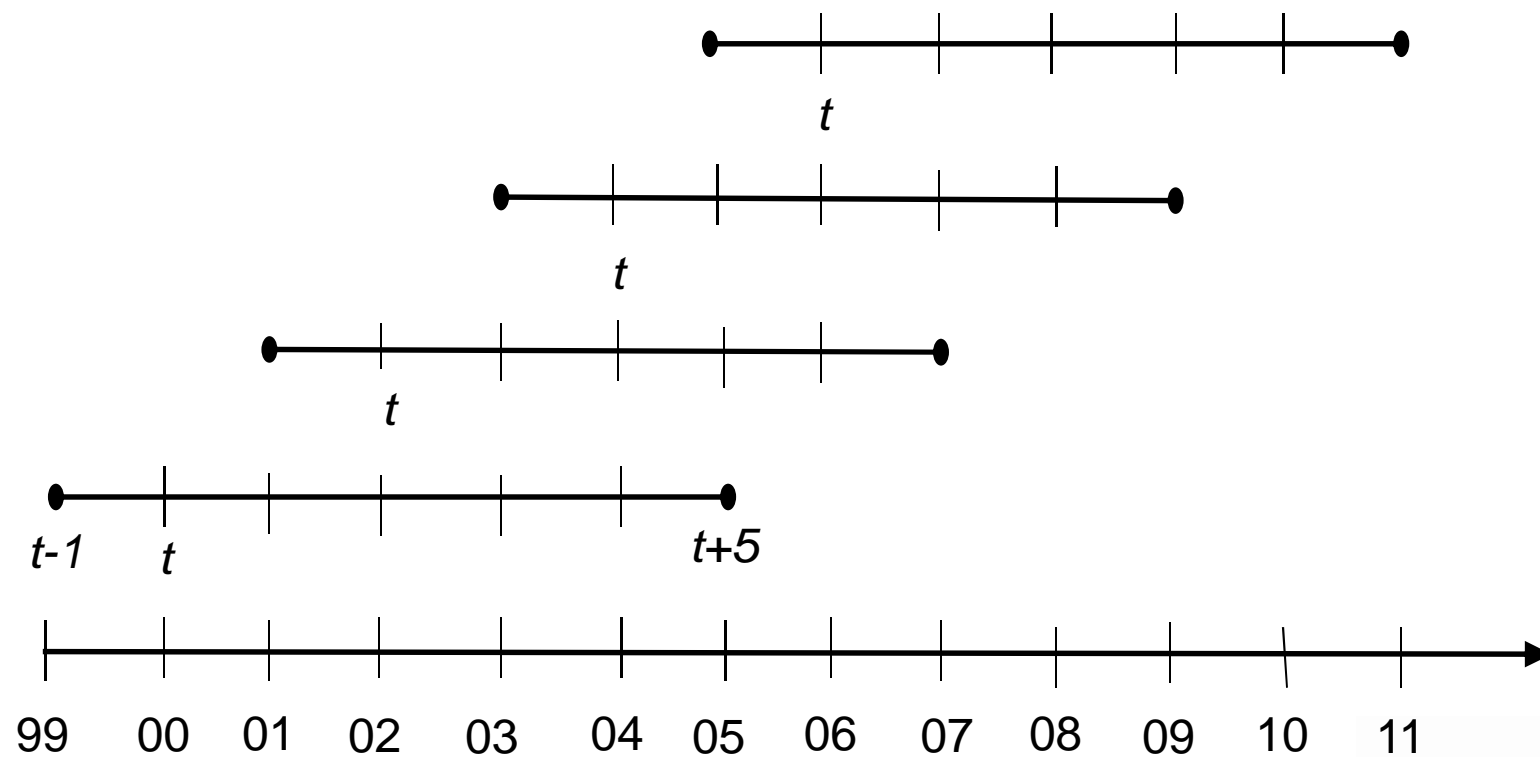


## Dataset of analysis II

- Foreign acquisition of a domestic firm (Swedish MNE or non-MNE) is defined as a change in ownership status from domestic to foreign between years  $t-1$  and  $t$ .
- In the econometric analysis acquired firms are compared to non-acquired firms, the latter being firms classified as domestically owned in both year  $t-1$  and  $t$ . Both groups of firms are observed each year over the interval  $t-1$  to  $t+5$ .
- Given that our data cover the period 1999-2011 and that R&D data is available for odd years only we are able to construct four cohorts of firms which we follow during the seven-year window.



# The balanced panel



## Frequencies of foreign acquisitions by cohort, firm type and size

	Non-MNEs		Swedish MNEs		Total	
	1-49	50+	1-49	50+	1-49	50+
2000	762	55	7	18	769	73
2002	492	74	7	7	499	81
2004	317	46	2	4	319	50
2006	426	81	26	9	452	90
2000-06	1,997	256	42	38	2,039	294
	(0.4)	(2.1)	(0.6)	(1.0)	(0.4)	(1.8)

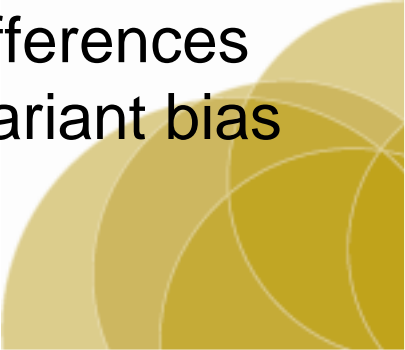


## Econometric strategy

Our main purpose is to estimate the causal effect of foreign acquisition on R&D activity and skill intensity in targeted domestic firms.

Choose a comparable untreated (non-acquired) firm for each treated (acquired) firm and use these pairs to calculate the effect of the treatment (foreign acquisition) on the outcome of interest (R&D activity and skill intensity)

The conditional DID matching estimator assumes the same cross-sectional bias in the pre- and post-treatment period, so that by differencing the before–after differences for acquired and non-acquired firms, the time-invariant bias will be removed.



## Advantages with matching

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





## Probability of foreign acquisition (all sectors)

	1-49	50+
R&D intensity		-0.656
Skill intensity	0.198***	0.207
Labor productivity	0.035***	0.235
Capital intensity	0.002	0.003
Size	73.198***	0.418***
Size squared	-1,191.931***	-0.050*
Age	-0.123***	-0.117***
Age squared	0.004***	0.004***
Swedish MNE	-0.403***	-0.864***
Foreign presence	-0.603***	-0.661
Pseudo R <sup>2</sup>	0.180	0.166
Number of firms	515,487	9,145

## Results: propensity scores

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- In particular among smaller firms, foreigners are inclined to acquire high-productive firms that appear to carry out advanced activities (cherry-picking).
- The targeted firms tend to be relatively large and fairly young.
- Unlike in the late 1990s, in the 2000s – our period of study – foreign takeovers have not been directed towards R&D intensive, Swedish MNEs.



# Effects of foreign acquisitions on R&D intensity

	All sectors		Manufacturing	
	Estimate	%	Estimate	%
t+1	-0.0002	-3.8	0.0012	14.8
	(0.0027)		(0.0075)	
t+3	-0.0024	-45.1	-0.0016	-19.7
	(0.0019)		(0.0034)	
t+5	-0.0016	-30.1	-0.0005	-6.1
	(0.0023)		(0.0049)	
Untreated	8,312		3,386	
Treated	255		109	

## Effects of foreign acquisitions on skill intensity (all sectors)

	1-49		50+	
	Estimate	%	Estimate	%
t+1	0.0089***	4.9	0.0015	1.2
t+2	0.0140***	7.7	-0.0015	-1.2
t+3	0.0172***	9.5	-0.0010	-0.8
t+4	0.0154***	8.5	-0.0043	-3.4
t+5	0.0149***	8.2	0.0003	0.2
Untreated	383,549		7,922	
Treated	1,608		250	





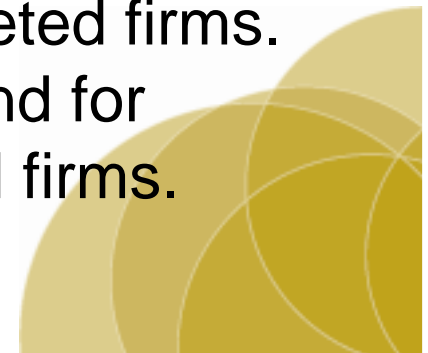
# Effects of foreign acquisitions on skill intensity (non-MNEs and MNEs)

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## Results: matching estimates

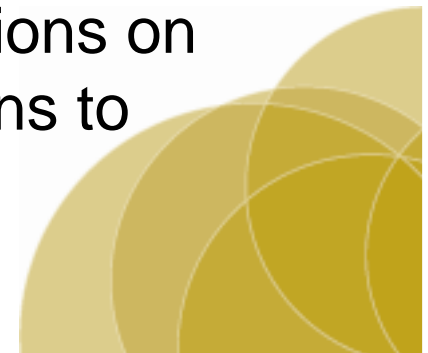
- The matching estimates on R&D and skill intensity give no evidence for that high-skilled activities are being relocated to the home countries of acquiring firms.
- On the contrary, acquiring firms seem to develop and benefit from the knowledge base in acquiring firms, particularly in small (non-MNE) firms.
- The fact that the positive effect on skill intensity appears in small (non-MNE) firms might be a result of technology and knowledge transfers from acquiring to targeted firms. Transfers that in turn leads to increased demand for skilled labor and skill upgrading in the acquired firms.



## Concluding remarks

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- Foreign acquisitions seem to boost skill intensities, and probably the level of technology and knowledge, in small (non-MNE) targeted firms.
- In a period with no spectacular increase in foreign ownership (the 2000s) we find no effect on R&D expenditures in firms acquired by foreign MNEs.
- No grounds to be anxious about the impact of foreign acquisitions on R&D and other high-skilled activities.
- No need for policy makers to consider restrictions on foreign ownership, if anything there are reasons to welcome foreign acquisitions.



# Register data 2000, the cohort 1999-2005, and Survey of wages and salaries 2000

Firm size employees	Register	Cohort		Survey	
	number	number	share	number	share
1-19	196,625	139,281	0.71	4,055	0.02
20-49	8,968	6,178	0.69	973	0.11
50-99	2,606	1,880	0.72	893	0.34
100-199	1,305	912	0.70	489	0.37
200-499	739	532	0.72	484	0.61
500+	458	346	0.76	419	0.91
Total	210,701	149,129	0.70	7,313	0.03

