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Export behaviour of SMEs
in the Swedish computer service industry

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wiiw seminar

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Conducted as one of the background studies on "internationalisation of SMEs" for the European Competitiveness report 2014

Summary report chapter 3:

http://ec.europa.eu/enterprise/policies/industrial-competitiveness/competitiveness-analysis/european-competitiveness-report/index_en.htm

Project team

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Internal reviewer: Heinz Hollenstein

Motivation

- Few SMEs export

- Tradability of services increased rapidly in recent years

- Export participation of SMEs in Swedish computer services increased rapidly between 2001-2010

  - Micro enterprises: from 6 to 11 percent

  - SMEs 10-249: from 62 to 73 percent.

Aim of the paper

- New empirical evidence on the determinants of the export decision
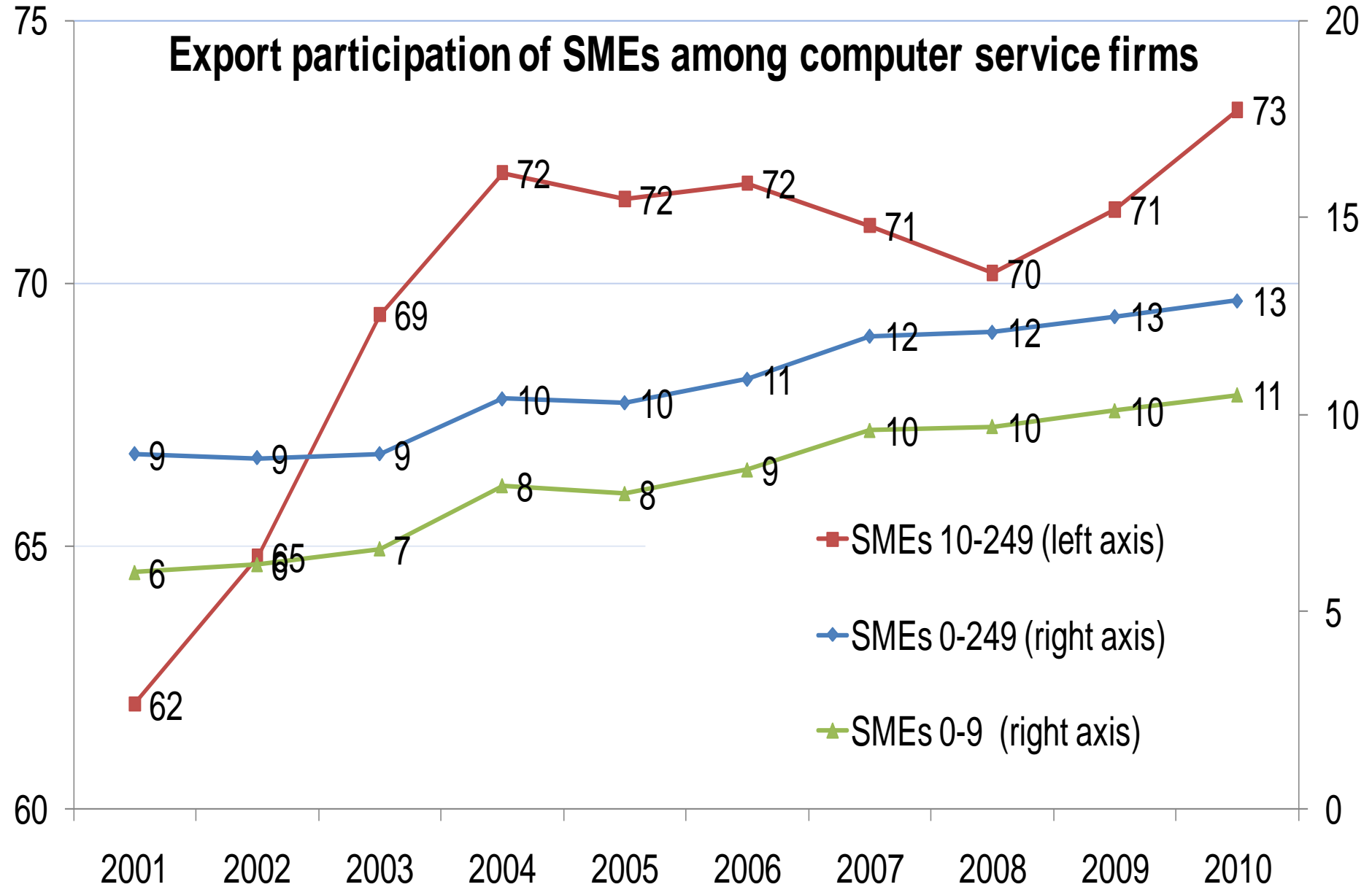
Contribution:

- Unique data of the total population of firms

- full coverage of micro enterprises

- no reporting threshold for intra and extra EU exports

Motivation

- Why studying the determinants of the export decision of SMEs in computer services?
  - Tradability of software increased due to internet
  - provision of a service can be geographically separated from its consumption
  - Export participation increased unlike in remaining service industries
  - Computer services one of fastest growing industry
  - Previous studies on ICT/software companies are often based on small surveys (see Bell 1995, 1997; Coviello and Munro 1997; Garvey and Brennan 2006; Ojala and Tyrväinen 2007; Terjesen et al. 2008)
  - Still few studies for service firms

Motivation

Export participation of SMEs among computer service firms

- SMEs 10-249 (left axis)
- SMEs 0-249 (right axis)
- SMEs 0-9 (right axis)

SMEs 10-249 (left axis): 62, 65, 69, 72, 72, 72, 71, 70, 71, 73

SMEs 0-249 (right axis): 9, 9, 9, 10, 10, 11, 12, 12, 13, 13

SMEs 0-9 (right axis): 6, 6, 7, 8, 8, 9, 10, 10, 10, 11

Motivation

Evolution of export participation of SMEs in services over time
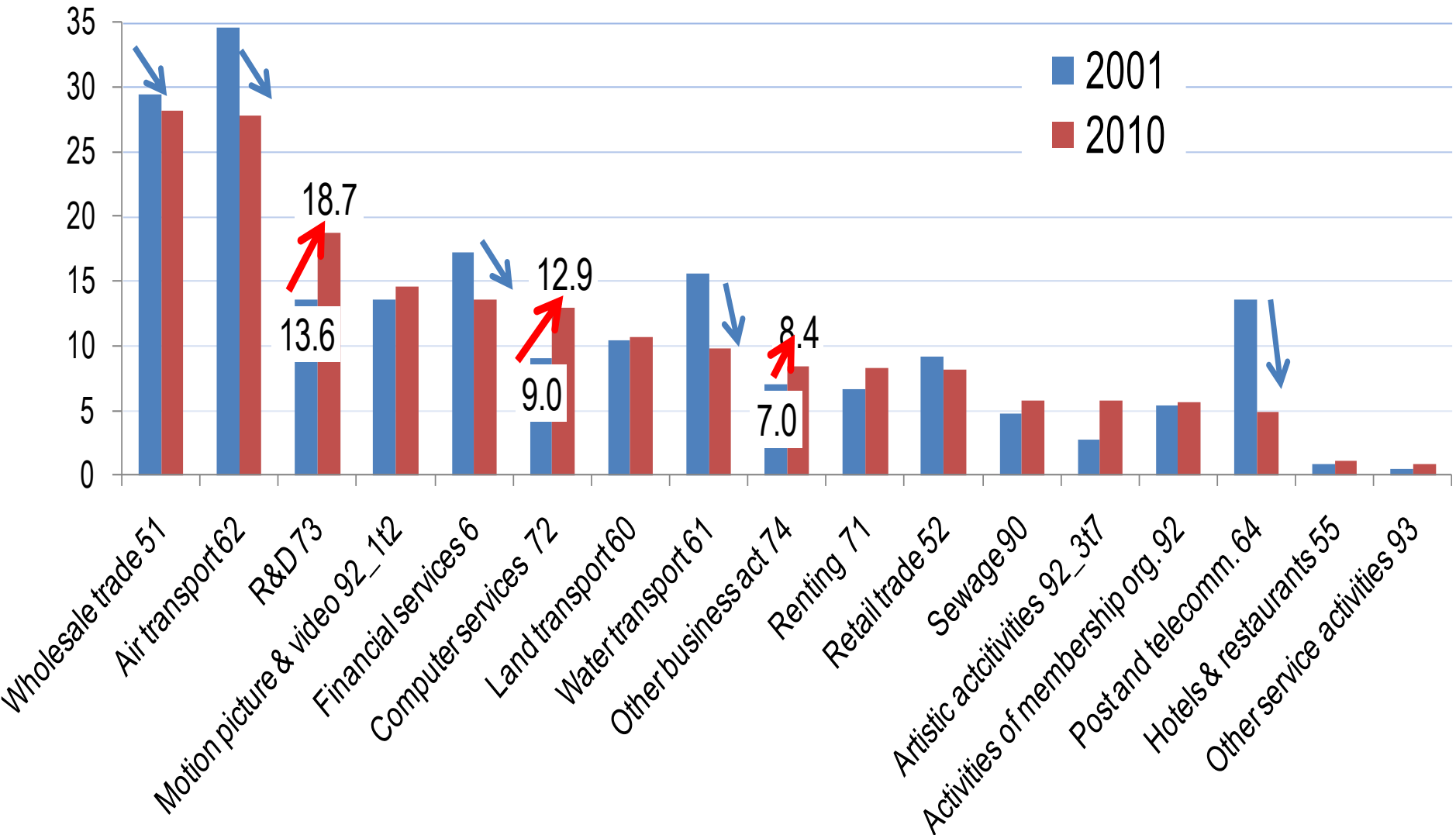
Theoretical background and previous literature

- Size, labour productivity, innovation activities, skills are as key determinants of export participation (Greenaway and Kneller 2007 or Wagner 2007)

- Self-selection of high productivity firms in exporting

- Schott (2004) importance of highly skilled employees in determining the export activities of a firm

Studies for SMEs

- Hollenstein (2005): availability of human and physical capital, other firm-specific assets in fields like marketing, organisation and access to finance

- Gashi, Hashi and Pugh (2014): human capital and technology-related factors, industry linkages, firm size, foreign capital share, sector of activity, availability of external finance, and membership in business associations

- Hauser et al 2013. export scope and innovation activities

Theoretical background and previous literature

- Limitations of previous studies
  - micro enterprises are often partly covered
  - Exports of goods and services are collected by separate institutiions
  - reporting thresholds for intra and extra EU exports in the trade statistics
  - Reporting thresholds for intra EU exports very high
    - 150,000 for FR, 250,000 for D, more than 500,000 for IE
  - Subjective self reported information on exports in some surveys
- Previous studies based on Swedish firm level data
  - limited to manufacturing firms (see Hansson and Lundin 2004; Greenaway, Gullstrand and Kneller 2004; Andersson and Lööf 2009; Andersson, Lööf, and Johansson 2008; Eliasson, Hansson and Lindvert 2012).

Theoretical background and previous literature

Export participation based on trade and VAT statistics in the Swedish business enterprise sector, 2010 (in percent)

Firm size	number of firms	number of exporters (goods & services)		export participation in percent	
(employees)	SBS/ER	trade statistics	VAT data	trade statistics	VAT data
0	740,840	7,404	20,489	1.0	2.8
1-9	226,967	19,086	34,433	8.4	15.2
0-9	967,807	26,490	54,922	2.7	5.7
0-249	1,001,049	37,231	69,228	3.7	6.9
1-249	260,209	29,827	48,739	11.5	18.7
10-249	34,240	11,444	15,087	33.4	44.1
250+	998	703	781	70.4	78.3
total	1,002,047	37,934	70,009	3.8	7.0

source: statistics Sweden

Empirical model

Specification of the export decision

$$XD_{it}^* = \beta_0 + \beta_1 ln\left(\frac{Y}{L}\right)_{it-1} + \beta_2 HK_{it-1} + \beta_3 FOROWN_{it.1} + \beta_4 Size_{it} + \beta_5 Age_{it} + \varepsilon_{it}$$

Dependent variable

$$XD_{it} = \begin{cases} 1 \\ 0 \end{cases} if \begin{matrix} XD_{it}^* > 0 \\ \text{otherwise} \end{matrix}$$

XD   dummy exports of goods or services based on VAT

Independent variables

(Y/L)t-1   gross output per worker (requires L>1)

HK   proportion of highly skilled workers

FOROWN   foreign ownership (50 per cent +foreign equity)

SIZE   Firm size class or number of workers

AGE   dummy variable for young firms (<=5yrs)

Empirical model

- fixed or random effect logit model can be used

$$XD_{it}^{*} = Y_{it}\beta + e_{it} \qquad e_{it} = \delta_i + d_t + \varepsilon_{it}$$

- Use of the conditional (fixed effects) logit model
- Two estimation samples: SMEs with 0-249 and 10-249 employees
- Alternative estimators:
  - Dynamic probit model (Wooldridge, 2005)
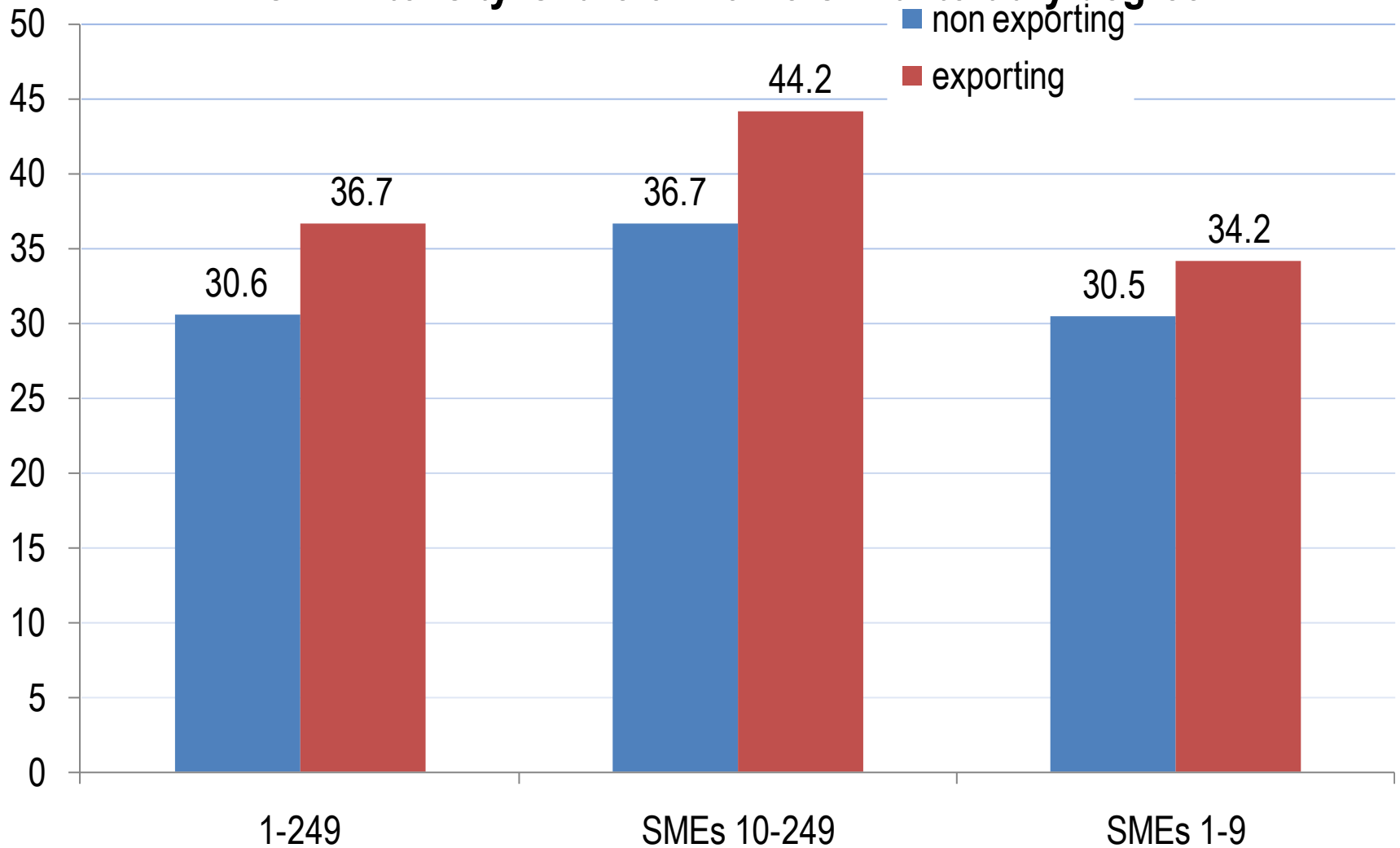 - Dynamic RE probit model (MSL estimator) (Stewart, 2007)

Data source

- Linked firm level data
  - Total population of firms in computer services (Nace rev. 1.1 72)
  - Business register/structural business statistics: output, employment
  - VAT database: exports of goods and services
  - employment register: education

- Swedish firm-level data are and are not publicly available and protected by secrecy legislation, data access possible for research projects via MONA system
- Number of observations used in the conditional logit: 45000 on 7000 firms
- Inclusion of labour productivity reduce the sample

Data source

- Micro data online access for external users
    - Application needed (research project)
    - Administration fee
    - Original firm ID replaced by a running number
    - Linking is done by SCB
    - Confidential agreement
    - Results are not checked by SCB
    - Remote access (results can be lifted output)
    - Software: STATA, SAS, R, Geodata, server version
- Source
http://www.scb.se/Grupp/Produkter_Tjanster/Forskare/_Dokument/MONA/Produktblad-Eng.pdf
- Access is provided to researchers affiliated to higher education or research institutions in Sweden.
- Access is restricted to certain datafiles for EU researchers

Descriptive statistics:

skill intensity: share of workers with tertiary degree

Legend: non exporting, exporting

Values:
- 1-249: non exporting 30.6, exporting 36.7
- SMEs 10-249: non exporting 36.7, exporting 44.2
- SMEs 1-9: non exporting 30.5, exporting 34.2

Source: Statistics Sweden

Descriptive statistics:

Output per employee

(in 1000 SEK)

Legend: non exporting, exporting

Categories: 1-249, SMEs 10-249, SMEs 1-9
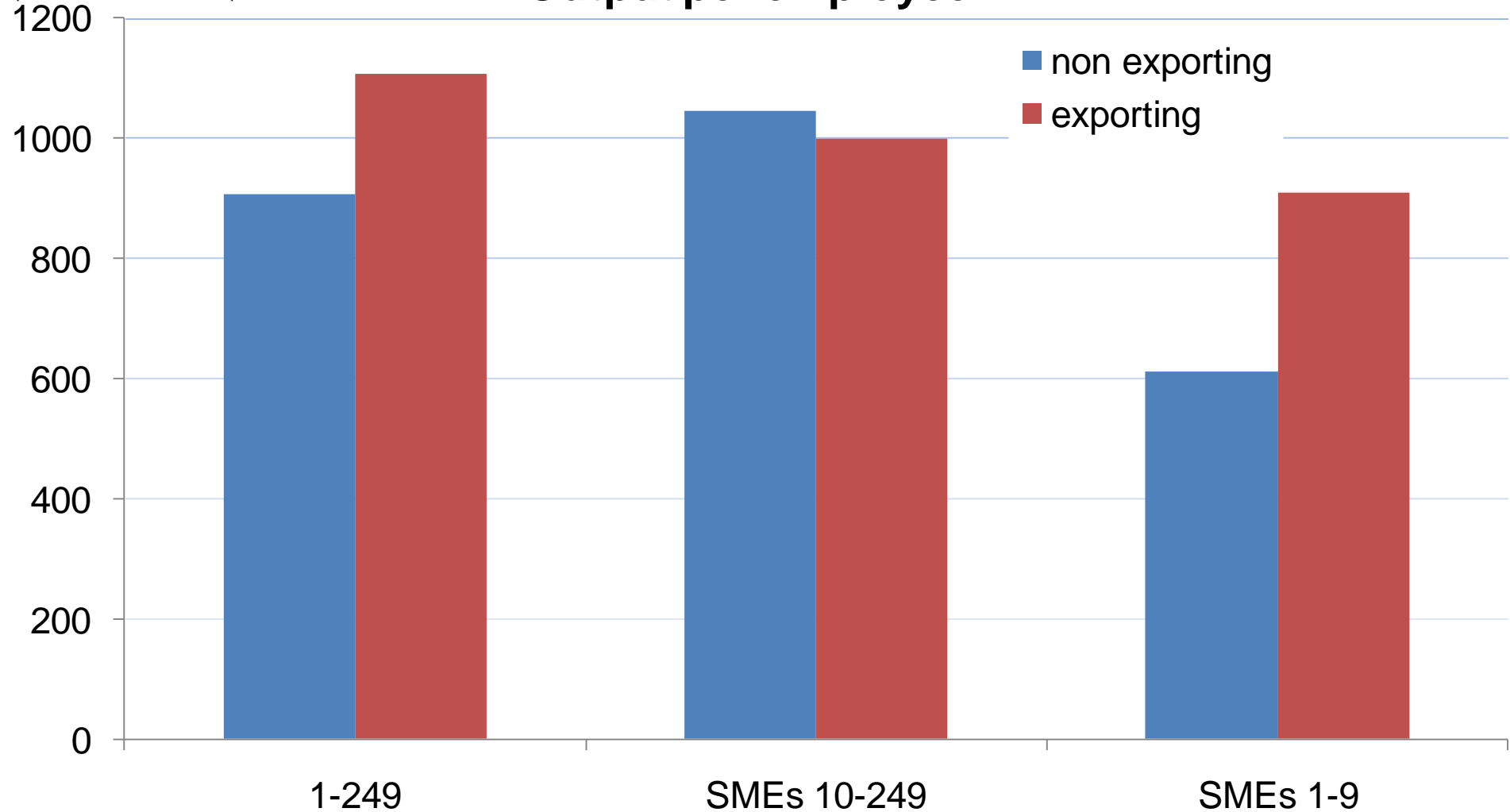
Source: Statistics Sweden

Empirical results

- firm size, skill intensity and labour productivity are all significantly positively related with the probability of exporting of goods and/or services

- Impact of skill intensity decreases in magnitude and significance when labour productivity is included

  => labour productivity more important than skill intensity

- Magnitude of the impact of labour productivity is rather small
  - increase in labour productivity by 10 percent => increase in the probability of exporting by 0.23 percent

- Foreign ownership and firm age are not relevant

- Time effects are significant=> increase in export participation during the economic and financial crisis

- During 2002-2010 60 % of the increase in export participation is due to time effects

Empirical results

Conditional logit model of the determinants of exporting of Swedish SMEs (1-249) in computer services

	coef		z	m.e.		z
size 10-49	1.45	***	20.35	0.276	***	25.41
size 50-249	2.55	***	14.14	0.347	***	26.24
young SMEs	-0.17	***	-4.17	-0.040	***	-4.04
foreign-owned t-1	-0.10		-0.96	-0.023		-0.95
share of tertiary graduates t-1	0.18	***	3.06	0.044	***	3.08
year dummies	yes					
number of obs	45180					
number of firms	6731					

Empirical results

Conditional logit model of the determinants of exporting of Swedish SMEs (1-249) in computer services
Inclusion of labour productivity

	coef		z	m.e.		z
size 10-49	1.17	***	15.66	0.094	***	7.02
size 50-249	2.12	***	11.17	0.109	***	6.73
young SMEs	-0.21	***	-3.81	-0.022	***	-3.08
foreign-owned t-1	-0.09		-0.79	-0.010		-0.77
share of tertiary graduates t-1	0.15	*	1.80	0.016	*	1.80
log output per employees t-1	0.24	***	10.35	0.026	**	17.40
year dummies	yes					
number of obs	24338					

Empirical results

Conditional logit model of the determinants of exporting of Swedish SMEs (1-249) in computer services
Inclusion of labour productivity

	coeff		z	marg eff		z
time effects (ref 2002)						
2003	0.045		0.70	0.005		0.72
2004	0.241	***	3.70	0.024	***	4.02
2005	0.008		0.11	0.001		0.11
2006	0.141	**	2.06	0.014		2.25
2007	0.256	***	3.67	0.025	***	4.03
2008	0.169	**	2.37	0.017	**	2.59
2009	0.207	***	2.80	0.021	***	3.06
2010	0.254	***	3.33	0.025	***	3.68

Conclusions

- Detailed study for export decision of SMEs in computer/software services
- Lagged level of labour productivity, share of workers with a tertiary degree, firm size, time effects are main determinants of exporting of SMEs in computer services
- size of the labour productivity effect is small
- increase in exporting cannot be explained by productivity and skill intensity alone => time effects , macro factors

Future work:
- estimation of both export decision and export intensity given exporting=> two part models (Mundlak/Wooldridge approach)
- determinants of SME exporting beyond Europe
- inclusion of other determinants: innovation activities etc
- Exporting and firm growth =>moderating factors