# Competing internationally: Belgian firm-level evidence on the importance of R&D for export activity

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## Literature

**International Trade Theories**

- **Product Life Cycle of international trade**
  (Vernon, 1966; Krugman, 1979)
  - Innovation ➔ competitive advantage necessary to compete on the international market
- **Endogenous growth models**
  (Grossman and Helpman, 1989)
  - Innovation ➔ entering foreign market
  OR
  - Entering foreign market ➔innovation: "learning by exporting"

**Analyses at the Firm Level**

- **Wakelin (1998), Roper and Love (2002) and Bleaney and Wakelin (2002):**
  - Different determinants of exports for innovators and non-innovators
- **Belderbos et al. (2009), Cassiman and Martinez-Ros (2007):**
  - Product innovation improves export
- **Hirsch and Bijaou (1985), Ito and Pucik (1993), Barrios et al. (2003) and Kirbach and Schmiedeberg (2008):**
  - Positive effect of R&D intensity on export performance
- **Lachenmaier and Wössmann (2006) and Van Beveren and Vandenbussche (2010): IV**
  - Positive effect of innovation on export

## Contribution

- **Effect of R&D on export?**
- **Reverse causality?**
  ➔ IV estimation using R&D subsidy information
  - Direct effect between R&D subsidies and R&D (David et al., 2000; Czarnitzki et al., 2007; Hussinger, 2008)
  - Indirect effect of innovation policy on exports through R&D
- **Take MNE behavior into consideration while investigating the relationship between R&D and export**
  ➔ Split sample: Domestic firms VS MNEs

**Domestic firms:**

➔ *Positive effect of R&D on export*

**MNEs:**

- International intra-group transfer (not depending on R&D success of firm)
- Effect depending on concentration and location of R&D facilities
  - Belgium: hosts some important R&D subsidiaries for large MNEs (Barco, Van de Velde, Alcatel-Lucent)

➔ *Positive effect of R&D on export*

## Data

- **Data Sources**
  - Flemish Community Innovation Survey (2005 & 2007): info on innovation
  - BELFIRST database: info on balance sheets
  - ICAROS database: info on R&D project subsidies
- **Data**
  - 2131 observations (Pooled cross section)
- **Variables**
  - Dependent variable: export intensity
  - Independent variables: R&D personnel/ employment
  - Control variables: productivity, skill level, capital intensity, size, age, MNE, year, industry dummies.
  - Instrumental variable: number of subsidized R&D projects ended in the past 3 years and the amount of subsidized R&D projects / number of R&D projects ended in the past 3 years

| | Full Sample (2131 observations) | | Domestic Owned firms (1485 observations) | | MNEs (646 observations) | |
|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| EXPINT | 34.58 | 36.41 | 26.50 | 32.13 | 53.16 | 38.80 |
| RNDEMP | 0.05 | 0.11 | 0.05 | 0.11 | 0.05 | 0.10 |
| SIZE | 107.16 | 205.14 | 59.62 | 109.47 | 216.42 | 306.99 |
| AGE | 31.11 | 25.63 | 30.11 | 25.24 | 33.41 | 26.36 |
| PROD | 67.82 | 46.74 | 59.43 | 34.40 | 87.12 | 62.89 |
| SKILLS | 42.73 | 16.67 | 38.25 | 12.87 | 53.04 | 19.59 |
| CAPINT | 39.21 | 84.27 | 34.95 | 53.93 | 49.01 | 128.92 |
| Number of subsidized projects | 0.19 | 0.75 | 0.15 | 0.50 | 0.29 | 1.12 |
| Average size of subsidized projects | 15.08 | 80.04 | 6.67 | 32.24 | 34.43 | 135.01 |

## Results and conclusion

| TOBIT | full sample | domestic | MNE |
|---|---|---|---|
| | log(expint) | log(expint) | log(expint) |
| RNDEMP | 8.892*** | 9.761*** | 7.070*** |
| | (0.969) | (1.265) | (1.440) |

| first stage OLS | full sample | domestic | MNE |
|---|---|---|---|
| | RNDemp | RNDemp | RNDemp |
| number of sub. proj. | 0.029*** | 0.035*** | 0.023*** |
| | (0.006) | (0.008) | (0.008) |
| average size of subs. Proj. | 0.136*** | 0.299* | 0.132*** |
| | (0.136) | (0.156) | (0.050) |

| IV TOBIT | full sample | domestic | MNE |
|---|---|---|---|
| | log(expint) | log(expint) | log(expint) |
| RNDEMP | 16.552*** | 32.281*** | 8.636** |
| | (3.334) | (5.687) | (3.669) |

- R&D is important for the export activity of a firm
- Policies targeted towards R&D may indirectly help to increase the export performance of the economy
- Domestic firms vs MNEs:
  - Positive effect of R&D on export for both domestic firms and MNEs
  - Once accounting for possible endogeneity of R&D, the marginal effect of domestic firms is larger than for MNEs