

**Inventory investment, global engagement and
financial constraints in the UK:
evidence from micro data**

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Outline

- 1. Introduction*
- 2. Baseline specification and estimation methodology*
- 3. The data*
- 4. Empirical results*
- 5. Conclusions*

1. Introduction

Can global engagement (GE) shield firms from liquidity constraints?

Two dimensions of GE: - exporters

- foreign owned firms

Previous literature:

Exports:

- liquidity constraints are less binding for Spanish exporters (Campa and Shaver, 2002);
- export-oriented Mexican firms faced higher financial constraints before the 1995-2000 financial paralysis (Castañeda, 2002)

Foreign ownership:

- foreign owned firms face lower financial constraints (Harrison and McMillan, 2003, and Mickiewicz et al., 2004)
- De Brun et al. (2002) find no evidence for Uruguay.

Contribution to the literature:

1. links between firms' GE and their financial health in the context of inventory investment regressions.
2. effects of GE on firms' financial health in the UK.

Inventory investment analysis:

- less likely to suffer from misspecification due to the inappropriate control for investment opportunities.
- more sensitive to financial variables than investment in fixed capital (Carpenter et al., 1994).
- plays a crucial role in business cycle fluctuations (Blinder and Maccini, 1991).

2. Baseline specification

$$\Delta I_{it} = \alpha + \beta_0 \Delta I_{i,t-1} + \beta_1 \Delta S_{it} + \beta_2 \Delta S_{i,t-1} \\ + \beta_3 (I_{i,t-1} - S_{i,t-1}) + \beta_4 FIN_{it} + v_i + v_t + v_{jt} + e_{it}$$

i - firms; j - industries; t - time, $t = 1995 - 2003$

I and S - logarithms of inventories and sales

FIN - financial variable

$(I_{i,t-1} - S_{i,t-1}) \Rightarrow$ long-run target inventory level

$\Delta S_{it}, \Delta S_{i,t-1} \Rightarrow$ short-run dynamics

Control for v_i by estimating first-differences; for v_t by including time dummies; and for v_{jt} by including industry dummies interacted with time dummies.

Three financial variables:

- $MIX1 = \text{short-term debt} / (\text{short-term debt} + \text{trade credit})$
- $MIX2 = \text{short-term debt} / \text{current liabilities}$
- $LEV = \text{short term debt} / \text{total assets}$

=> positive relationship between $MIX1$ / $MIX2$ and firms' inventory investment (Oliner and Rudebush, 1996)

=> expect financial leverage to significantly affect the inventory investment at financially constrained firms

Estimation methodology

First-difference GMM approach

Instruments: two or more lags of each of the regressors.

Tests for correctly specified model: Sargan and the test for second-order serial correlation of the residuals ($m2$).

3. Data

Sample from the FAME database:

- 9,381 British manufacturing firms
- period 1993 – 2003
- 40,949 annual observations

Unbalanced panel allowing for both entry and exit, partially mitigates potential selection and survivor bias.

Some characteristics:

- large number of observations
- both quoted and unquoted firms

=> ideal for testing the implications of different GE status on different categories of firms

Sample separation criteria

1) Firms more /less likely to face financing constraints

$CONS_{it} = 1$ if firm i 's sales are in the lowest 75% of the distributions of sales of all firms in the same industry as firm i in year t and 0, otherwise.

Robustness:

$CONS_{it} = 1$ if firm i 's age/ quiscore are in the lowest 75% of the distribution of age/ quiscore of all firms in the same industry as firm i in year t , and 0, otherwise.

2) Firms' global engagement

$GE_{it} = 1$ if firm i exports in year t and 0, otherwise.

Robustness:

$GE_{it} = 1$ if firm i is foreign-owned and 0, otherwise.

4. Empirical results

Table 1: Inventory investment and financial variables

	$MIX1_{it}$	$MIX2_{it}$	LEV_{it}
ΔI_{it-1}	-0.084*** (0.020)	-0.083*** (0.019)	-0.088*** (0.020)
ΔS_{it}	0.801*** (0.178)	0.792*** (0.172)	0.826*** (0.180)
$\Delta S_{i,t-1}$	0.040*** (0.013)	0.041*** (0.013)	0.042*** (0.013)
$I_{i,t-1} - S_{i,t-1}$	-0.506*** (0.053)	-0.497*** (0.051)	-0.497*** (0.050)
FIN_{it}	0.191*** (0.058)	0.193*** (0.055)	0.179*** (0.063)
<i>Observations</i>	40417	40949	40949
<i>No of firms</i>	9289	9381	9381
<i>m1 (p)</i>	0.00	0.00	0.00
<i>m2 (p)</i>	0.57	0.54	0.63
<i>Sargan (p)</i>	0.19	0.25	0.16

Notes: All specifications were estimated using a GMM first-difference specification. Test statistics and standard errors (in parentheses) are asymptotically robust to heteroskedasticity. *m1* (*m2*) is a test for first- (second-) order serial correlation in the first-differenced residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. The *J* statistic is a test of the overidentifying restrictions, distributed as chi-square under the null of instrument validity. Instruments include $\Delta I_{i,t-2}$; $\Delta S_{i,t-2}$; $(I_{i,t-2} - S_{i,t-2})$; $FIN_{i,t-2}$; and further lags, where $FIN_{i,t-2}$ indicates in turn $MIX1_{i,t-2}$, $MIX2_{i,t-2}$, and $LEV_{i,t-2}$. Time dummies and time dummies interacted with industry dummies were always included as regressors and as instruments. *, **, *** indicates significance at the 1%, 5%, 10% level.

Table 2: Inventory investment and financial variables: firm-years more or less financially constrained

	Sales	Age	Risk
ΔI_{it-1}	-0.061*** (0.023)	-0.079*** (0.017)	-0.059*** (0.017)
ΔS_{it}	0.501** (0.224)	0.779*** (0.146)	0.546*** (0.131)
$\Delta S_{i,t-1}$	0.034** (0.015)	0.038*** (0.013)	0.028** (0.013)
$I_{i,t-1} - S_{i,t-1}$	-0.425*** (0.059)	-0.511*** (0.050)	-0.473*** (0.047)
$MIX1_{it} * CONS_{it}$	0.349** (0.163)	0.243*** (0.090)	0.148*** (0.053)
$MIX1_{it} * (1 - CONS_{it})$	-0.379 (0.348)	0.035 (0.174)	0.196* (0.119)
<i>Observations</i>	40417	40412	38868
<i>Number of firms</i>	9289	9288	9040
<i>m1 (p)</i>	0.00	0.00	0.00
<i>m2 (p)</i>	0.71	0.57	0.64
<i>Sargan (p)</i>	0.27	0.23	0.31

**Table 3: Inventory investment and financial variables
(global engagement status)**

	Export	Foreign
ΔI_{it-1}	-0.054** (0.021)	-0.073*** (0.018)
ΔS_{it}	0.771*** (0.163)	0.717*** (0.147)
$\Delta S_{i,t-1}$	0.028* (0.015)	0.036*** (0.014)
$I_{i,t-1} - S_{i,t-1}$	-0.553*** (0.059)	-0.496*** (0.056)
$MIX1_{it} * GE_{it}$	0.468*** (0.149)	0.229** (0.115)
$MIX1_{it} * (1 - GE_t)$	0.040 (0.081)	0.107 (0.104)
<i>Observations</i>	26921	30064
<i>Number of firms</i>	6927	6605
<i>m1 (p)</i>	0.00	0.00
<i>m2 (p)</i>	0.85	0.29
<i>Sargan (p)</i>	0.19	0.15

Table 4: Inventory investment and financial variables

	Sales	Age	Risk
ΔI_{it-1}	-0.050** (0.020)	-0.056*** (0.019)	-0.042** (0.018)
ΔS_{it}	0.672*** (0.148)	0.787*** (0.142)	0.695*** (0.129)
$\Delta S_{i,t-1}$	0.030** (0.015)	0.029* (0.015)	0.022 (0.015)
$I_{i,t-1} - S_{i,t-1}$	-0.509*** (0.055)	-0.551*** (0.056)	-0.553*** (0.056)
$MIX1_{it} * CONS_{it} * (1 - GE_{it})$	0.378** (0.188)	0.478*** (0.180)	0.447*** (0.151)
$MIX1_{it} * CONS_{it} * GE_{it}$	0.005 (0.129)	0.075 (0.104)	0.041 (0.076)
$MIX1_{it} * (1 - CONS_{it})$	0.113 (0.211)	0.041 (0.197)	0.209 (0.128)
<i>Observations</i>	26921	26916	25840
<i>Number of firms</i>	6927	6926	6726
<i>m1 (p)</i>	0.00	0.00	0.00
<i>m2 (p)</i>	0.93	0.84	0.92
<i>Sargan (p)</i>	0.33	0.22	0.14

Table 5: Inventory investment and financial variables

	Sales	Age	Risk
ΔI_{it-1}	-0.077*** (0.018)	-0.070*** (0.017)	-0.049*** (0.015)
ΔS_{it}	0.724*** (0.149)	0.719*** (0.128)	0.590*** (0.084)
$\Delta S_{i,t-1}$	0.041*** (0.014)	0.038*** (0.014)	0.023* (0.013)
$I_{i,t-1} - S_{i,t-1}$	-0.476*** (0.057)	-0.505*** (0.054)	-0.531*** (0.046)
$MIX1_{it} * CONS_{it} * (1 - GE_{it})$	0.507* (0.259)	0.627** (0.243)	0.243*** (0.083)
$MIX1_{it} * CONS_{it} * GE_{it}$	-0.041 (0.306)	-0.080 (0.203)	0.090 (0.075)
$MIX1_{it} * (1 - CONS_{it})$	-0.010 (0.245)	-0.049 (0.167)	0.142 (0.089)
<i>Observations</i>	30064	30059	28838
<i>Number of firms</i>	6605	6604	6426
<i>m1 (p)</i>	0.00	0.00	0.00
<i>m2 (p)</i>	0.26	0.39	0.29
<i>Sargan (p)</i>	0.16	0.27	0.16

5. Conclusions

Our results suggest:

=> financial variables only affect inventory investment at firms financially constrained in a traditional sense (small, young, and risky firms).

=> inventory accumulation at purely domestic firms is sensitive to financial variables

=> financial variables influence only the inventory investment of the purely domestic financially constrained firms.

=> global engagement associated with a lower degree of financial constraints.

Greenaway, et al. (2005)

=> financially constrained firms less likely to export

=> balance sheet variables influence firms' decisions to enter foreign markets

Bi-directional relationship between financial constraints and exporting decisions:

⇒ only relatively financially healthy firms can afford to enter the export markets;

⇒ participating in foreign markets allows firms to dampen their financial constraints

Two policy implications:

1. export promotion policies beneficial to the economy since they are likely to reduce financial constraints for firms and indirectly enhance their investment spending and productivity.

2. policies ensuring an efficient intermediation of funds to the small, financially constrained firms might allow them to enter export markets.

Governments should aim the right mix of the two policies.