Firm Growth in Multinational Corporate Groups

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4th FIW Workshop

Vienna

March 7, 2008

Outline

Introduction

- Empirical firm growth literature until now tests several theories under the assumption of independent firms
- Corporate networks become more important due to increasing mergers and acquisitions
- Increasing shares of MNEs in world production
- Higher returns on R&D investment in MNEs (Caves 1996)
- Resource competition within MNEs leads to negative externalities (Feinberg and Phillips 2004)
- This paper:
  - Develops and tests an econometric firm growth model which explicitly accounts for within corporate group interdependence
  - And distinguishes between national and multinational corporate groups

Related Literature

Corporate Networks:

- Variyam and Kraybill (1992): Independent, single establishment firms exhibit slower employment growth

Multinationality:

- Buckley et. al (1984): Nationality of owners can explain variations in firm growth, the degree of multinationality does not drive growth differences
- Cantwell and Sanna-Randaccio (1993): Large domestic firms grow faster than their multinational counterparts
- Bloningen and Tomlin (2001): Japanese-owned plants in the US are larger and grow faster than their domestically owned counterparts

Model:

Generalized Firm Growth Equation:

$$g_{ir} = \alpha_{ir} + (\beta_0 + \beta_1 A_{ir})S_{0ir} + \lambda \frac{1}{m_r - 1} \sum_{\substack{j=1 \\ i \neq j}}^{m_r} g_{jr}$$

$$+ \mathbf{x}_{ir}\boldsymbol{\gamma}_1 + \frac{1}{m_r - 1} \sum_{\substack{j=1 \\ i \neq j}}^{m_r} \mathbf{x}_{ir}\boldsymbol{\gamma}_2 + \epsilon_{ir}$$

- Endogenous Corporate Group Effect: $\frac{1}{m_r - 1} \sum_{\substack{j=1 \\ i \neq j}}^{m_r} g_{jr}$

- Contextual Effects: $\frac{1}{m_r - 1} \sum_{\substack{j=1 \\ i \neq j}}^{m_r} \mathbf{x}_{ir}$

- $\mathbf{x}_{ir}$ contains log Age^2, firm and group specific productivity, and other industry characteristics like market growth

Between and Within Equation

Between Equation:

$$\overline{g}_r = \frac{1}{1-\lambda}\left(\beta_0 \overline{S}_{0r} + \beta_1 \overline{AS}_{0r} + \overline{\mathbf{x}}_{r,1}\boldsymbol{\gamma}_1 + \overline{\mathbf{x}}_{r,2}\boldsymbol{\gamma}_2 + \mu_r + \overline{\epsilon}_r\right)$$

Within Equation

$$\left(1 + \frac{\lambda}{m_r - 1}\right)(g_{ir} - \overline{g}_r) = \beta_0(S_{0ir} - \overline{S}_{0r}) + \beta_1(AS_{0ir} - \overline{AS}_{0r})$$

$$+(\mathbf{x}_{ir,1} - \overline{\mathbf{x}}_{r,1})\boldsymbol{\gamma}_1 + \left(\frac{1}{m_r - 1}\right)(\mathbf{x}_{ir,2} - \overline{\mathbf{x}}_{r,2})\boldsymbol{\gamma}_2 + (\epsilon_{ir} - \overline{\epsilon}_r)$$

Persistence in Firm Size:

Between Corporate Groups:

$$\frac{1}{m_r} \sum_{i=1}^{m_r} \frac{\delta \overline{g}_r}{\delta S_{0ir}} = \frac{1}{1-\lambda}(\beta_0 + \beta_1 \overline{A}_r)$$

- If $\lambda < 0$, slower adjustment as a single firm

Within Corporate Groups:

$$\frac{\delta(g_{ir} - \overline{g}_r)}{\delta S_{0ir}} = \frac{m_r - 1}{mr - 1 + \lambda} \left(\frac{m_r - 1}{m_r}\right)(\beta_0 + \beta_1 A_{ir})$$

- if $\lambda < 0$, faster adjustment within corporate groups

Data

- Manufacturing firms from AMADEUS database
- Organizational structure:
    - Common shareholder
    - Common ultimate owner
- Multinational and national corporate groups
- Samples for all groups and purely multinational groups
- Firm growth measured in terms of:
    - Employment
    - Operating Revenues
    - Total Assets

Annual Growth Rates

All Shareholder Groups			
Annual Growth	No. of obs.	Mean	Std. Deviation
Employment	17,446	0.021	0.124
Operating Revenues	13,881	0.084	0.175
Total Assets	14,116	0.078	0.141
Only Multinational Shareholder Groups			
Employment	5,698	0.021	0.120
Operating Revenues	4,742	0.083	0.165
Total Assets	4,955	0.073	0.137
All Global Owner Groups			
Employment	9,798	0.014	0.128
Operating Revenues	8,069	0.077	0.176
Total Assets	8,201	0.071	0.147
Only Multinational Global Owner Groups			
Employment	7,110	0.014	0.124
Operating Revenues	5,897	0.076	0.171
Total Assets	5,985	0.069	0.146

Econometric Issues

Estimation:

$$(g_{ir} - \overline{g_r}) = -\lambda \frac{(g_{ir} - \overline{g_r})}{(m_r - 1)} + \beta_0 (S_{0ir} - \overline{S}_{0r}) + \beta_1 (AS_{0ir} - \overline{AS}_{0r})$$
$$+ (\mathbf{x}_{ir,1} - \overline{\mathbf{x}}_{r,1}) \boldsymbol{\gamma}_1 - \frac{(\mathbf{x}_{ir,2} - \overline{\mathbf{x}}_{r,2}) \boldsymbol{\gamma}_2}{m_r - 1} + (\epsilon_{ir} - \overline{\epsilon}_r)$$

- IV- Estimation Procedure proposed by Lee(2007)
- Proper Set of Instruments: Exogenous Variables multiplied by $\frac{1}{(m_r - 1)}$
- Differences in Group Size are crucial for identification of λ

Estimation Results - Employment Growth

Variable	(1)	(2)	(3)	(4)
Corporate Group Effect	-0.118^{**}	-0.268^{***}	-0.218^{***}	-0.322^{***}
Initial Size	-0.049^{***}	-0.040^{***}	-0.047^{***}	-0.042^{***}
Age	-0.056^{***}	-0.062^{***}	-0.055^{***}	-0.052^{***}
Age^2	0.002^{***}	0.004^{***}	0.001	0.001
Initial Size * Age	0.007^{***}	0.005^{***}	0.008^{***}	0.007^{***}
Firm Productivity	0.003	-0.002	0.008^{***}	0.008^{***}
Av. Group Productivity	-0.002	-0.000	-0.003	0.005
Industry Dummys	yes	yes	yes	yes
Country Dummys	yes	yes	yes	yes
Within R^2	0.248	0.298	0.216	0.202
Observations	17,446	5,698	9,798	7,110

Between Convergence

Age Distribution	Employment	Operating Revenues	Total Assets
All Shareholder Groups			
25% Percentil	-0.028^{***} (180.55)	-0.052^{***} (397.63)	-0.046^{***} (350.81)
50% Percentil	-0.026^{***} (181.38)	-0.046^{***} (349.99)	-0.041^{***} (350.13)
75% Percentil	-0.023^{***} (177.71)	-0.041^{***} (380.23)	-0.037^{***} (341.22)
Only Multinational Shareholder Groups			
25% Percentil	-0.020^{***} (87.51)	-0.041^{***} (169.29)	-0.042^{***} (138.43)
50% Percentil	-0.019^{***} (86.72)	-0.038^{***} (163.40)	-0.038^{***} (136.18)
75% Percentil	-0.017^{***} (83.19)	-0.034^{***} (153.49)	-0.034^{***} (130.57)
All Global Owner Groups			
25% Percentil	-0.021^{***} (136.41)	-0.049^{***} (167.07)	-0.085^{***} (30.29)
50% Percentil	-0.019^{***} (135.54)	-0.046^{***} (166.17)	-0.078^{***} (30.31)
75% Percentil	-0.018^{***} (131.25)	-0.043^{***} (163.39)	-0.073^{***} (30.26)
Only Multinational Global Owner Groups			
25% Percentil	-0.018^{***} (95.59)	-0.042^{***} (120.06)	-0.084^{***} (16.53)
50% Percentil	-0.016^{***} (93.45)	-0.039^{***} (117.59)	-0.078^{***} (16.46)
75% Percentil	-0.015^{***} (88.77)	-0.036^{***} (113.82)	-0.072^{***} (16.35)

Within Convergence

Distribution	Corporate Groupsize	Firm Age	Overall Effect
All Shareholder Groups			
25% Percentil	0.562^{***} (208.03)	-0.051^{***} (450.55)	-0.029^{***} (561.64)
50% Percentil	0.705^{***} (268.84)	-0.049^{***} (483.46)	-0.034^{***} (871.99)
75% Percentil	0.823^{***} (303.80)	-0.046^{***} (524.32)	-0.038^{***} (766.16)
Only Multinational Shareholder Groups			
25% Percentil	0.682^{***} (18.54)	-0.042^{***} (141.29)	-0.029^{***} (101.90)
50% Percentil	0.823^{***} (54.88)	-0.040^{***} (159.02)	-0.033^{***} (210.03)
75% Percentil	0.910^{***} (71.28)	-0.037^{***} (181.94)	-0.034^{***} (213.40)
All Global Owner Groups			
25% Percentil	0.749^{***} (70.93)	-0.051^{***} (303.28)	-0.038^{***} (355.82)
50% Percentil	0.903^{***} (104.44)	-0.047^{***} (337.11)	-0.042^{***} (393.85)
75% Percentil	0.966^{***} (115.33)	-0.043^{***} (383.77)	-0.041^{***} (407.71)
Only Multinational Global Owner Groups			
25% Percentil	0.870^{***} (32.10)	-0.046^{***} (202.65)	-0.040^{***} (219.59)
50% Percentil	0.949^{***} (42.73)	-0.042^{***} (230.92)	-0.040^{***} (246.29)
75% Percentil	0.982^{***} (46.79)	-0.038^{***} (270.71)	-0.038^{***} (278.55)

Conclusions

- Firm growth results are in line with previous findings
- Competition within MNE corporate groups is more pronounced than in national corporate groups
- Between Convergence is highest in the size of the capital stock
- In large corporate groups size differences are less persistent even if firms are old
- Empirical firm growth literature seems to overestimate speed of adjustment for young firms