

# BIS MSB Research: Note on Regressions

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## Introduction

1. We use the 'platform' of the econometric work we have recently undertaken for UKTI regarding an understanding of the relationship between internationalisation and High-Growth Firms/top performing firms. All we are doing here is adding in two additional lines of enquiry – MSBs and Family-owned firms – into a set of equations for the 2005-08 period. We use this 3-year period to relate to the period over which the OECD developed their HGF metric. All models have region and sector dummies as well as other controls regarding intangible assets; exporting behaviour and foreign ownership. The key for this exercise is that all these variables act as controls as we seek to investigate the effect of MSBs on performance.
2. We adopt a quantile regression approach to understand the impact of the variety of definitions of MSB across the distribution of performance. Dependent variable – log of operating revenue. The output should be read from left to right – highest performing quintiles of firms are in the last column on the right.
3. Range of definitions of MSB:
  - a. 'broad' MSB dummy (£25-500m)
  - b. MSB dummies for each of 4 categories (£25-50m; £50-100m; £100-250m; £250-500m)
4. Two definitions of Family-owned firms:
  - a. Narrow Family – one shareholder has at least 50% of shareholding and UK owned
  - b. Broad Family – less than 5 shareholders and UK owned

## Results

We present a number of quantile regression equations which provide insights into the effect of MSB and family-owned firms.

1. We include the 'broad' MSB dummy - £25-500m and include the narrow family-owned dummy [**Aston Regression One.xlsx; first worksheet**].
  - a. The MSB dummy is negatively and significantly associated with growth (consistent with original size variable in the original equations) – and this strengthens (coefficient rises) towards the highest quantile firms – especially the top 10%.
  - b. The narrow family-owned dummy is also negatively and significantly associated with the highest quantile firms – implying that once we control for family ownership then the MSB dummy is still negatively associated with the highest performing private sector firms.
  - c. If we now include the broad family-owned dummy in the regressions the same result holds [**Aston Regression One.xlsx; second worksheet**].
  
2. We now change the specification of the MSB dummy – we use the 4 categories that we defined above, and again using the two definitions of a family-owned business. The reference category is £1-25m [**Aston Regression One.xlsx; third worksheet**].
  - a. If we concentrate on the highest quantile (top 10%) – we note that there are three MSB categories negatively and significantly associated with the highest performing firms: £25-50m; £50-100m and £100-250m – the other category of MSB is negative but not significant. This is consistent with the original finding that size is negatively associated with growth.
  - b. The narrow family-owned dummy is still negatively and significantly associated with the highest quantile firms in this model specification – implying that once we control for family ownership then all but the largest MSBs are still negatively associated with the highest performing private sector firms.
  - c. If we now include once again the broad family-owned dummy in the regressions there is a change to the performance of the MSB size dummies in the model of the top 10% performers. Now only the smallest MSBs (£25-50m) are negatively and significantly associated with the top performing firms in the private sector. However, the family-owned dummy (broad) is still negatively and significantly associated with the highest quantile firms. [**Aston Regression One.xlsx; fourth worksheet**].

- d. Indeed, the narrow and broad definitions of family-owned firms (independent of size) are positively and significantly associated with the lowest quantile firms along with the broad MSB dummy. **[Aston Regression One.xlsx; first and second worksheets].**
- e. When we use the four MSB size categories and examine the performance of the family-owned dummy variables (narrow and broad) in the lowest quantile firms we note that, although the coefficients of the MSB categories are negative they are not significant, the two definitions of family-owned firms are again negatively and significantly associated with the poorest performers in the private sector. **[Aston Regression One.xlsx; third and fourth worksheets].**

### **Overall summary points:**

- MSBs are negatively associated with growth and in particular the top 10% of performers in the UK economy in the 2005-08 period.
- Further, it would appear to be that 'smaller' MSBs are less likely to be associated with the highest quantile of firms.
- This conclusion also holds when we control for family ownership (narrow and broad).