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“Measuring Intangible Assets and Their Contribution to Growth”

What is productive investment? Insights from firm-level data for the United Kingdom

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In this paper, we study the effects of corporate investment and levels of debt on productivity in the UK, using firm-level data. At the aggregate level, UK data suggests a strong positive correlation between corporate debt and investment, whereas the correlation between debt and productivity is more tenuous. However, at the firm level, there is strong evidence in the literature suggesting that high corporate debt leads to lower investment, especially in times of crisis, with negative subsequent effects on productivity. In particular, in the existing literature, high corporate leverage has been identified as one of the leading indicators of firm vulnerability. Typically, leverage is assumed to be "good" in the boom phase, as it allows firms to invest in their productive capacity. Debt then becomes "bad" in a downturn owing to debt overhang reasons.

We take a somewhat different approach in our analysis. We hypothesise that one can distinguish between “good” and “bad” leverage more generally, by means of analysing the types of investments and uses of funds that firms undertake. We analyse firms’ investment and debt finance decisions to see how well they explain their productivity (measured by total factor productivity (TFP)). In other words, the mechanism through which firm debt should affect firm level TFP is through the investments firms undertake.

Methodologically, we first set up a stylised structural model to illustrate the theoretical channels that we study. We show how different types of investment can have different effects on TFP, and how higher TFP can be associated with higher indebtedness. The structural model we use builds on existing literature, but incorporates a novel way of using external debt financing for different types of investment. The model is used for illustrative purposes only, and is necessarily a partial equilibrium model, but it is useful in defining the channels through which investment and debt can effect TFP of a profit-maximising firm, with underlying assumptions that are standard in the literature.

In terms of the empirical analysis, we use a fairly large panel of financial accounts data for listed firms in the UK from 1990 to 2018. We apply standard panel regressions with firm and year fixed effects to study the relationship between TFP and a selection of relevant explanatory variables. We also introduce an interaction term between different types of investment and debt to analyse whether debt is always "bad" for TFP. However, endogeneity is likely to be an issue in the types of models we use; ex ante, it is not obvious whether investment and finance structure causes productivity, or the other way round. We mitigate this problem with, first, using

lagged values of the explanatory variables and second, using a system-GMM approach with appropriate instruments.

Our main contribution to the literature is in showing that high levels of debt are not necessarily bad for TFP, if the debt is accompanied by high levels of productive investment. Our evidence suggests that a particular type of investment, namely intangible investment, is a good proxy for productive investment. We show its positive effects on TFP. We also show that a combination of high debt and high intangibles investment can be conducive to high TFP. On the other hand, we find no consistent evidence of positive TFP effects for other uses of funds, like tangible capital expenditure or dividends and equity buybacks.

The characteristics of firms with high level of intangibles investment is of special interest to our analysis, and so we detail some of these more broadly. Simple contemporaneous correlations in our sample suggest that intangibles stocks (and flows) are higher in firms that are less indebted, younger, smaller, more cash rich and less profitable than those with less intangibles. In terms of industry decompositions, high intangibles' firms are heavily concentrated in the manufacturing and ICT sectors.