The Relationship between Financial Structure and Productivity of Select Indian Firms

Abstract Submitted to the University of Delhi for the Award of the Degree of
Doctor of Philosophy

Research Supervisor
Prof. K.V. Bhanu Murthy

By
Meetakshi Pant

Department of Commerce
Delhi School of Economics
University of Delhi
Delhi-110007
August, 2012
ABSTRACT

I. INTRODUCTION

Traditionally financial structure has been seen as a purely financial problem without any reference to production theory. In as much as all the firms are responsible for economic activity which involves production of goods and services, it should be obvious that there would be some relationship between production theory and finance theory. While firms needs to be financially viable for continuing production, it is equally true that economic activity, production and real variables, including productivity, would contribute to this financial viability. For a continued existence and growth, firms have to undertake decisions in relation to financing of growth.

The contention of this thesis is that such a financing decision and consequent financial structure would be integrally linked to production activity, production theory, productivity, efficiency and growth.

It needs to be understood that finance is not an end in itself; rather it is a means for the continued existence of the firm. Productivity, innovation, technological progress and efficiency contribute to the growth of the firm.

In an accounting sense, this related to the ‘Going concern concept’. Each ‘going concern’ aims at continued production activity. This is clear cut indication of the integral relationship. The ‘going concern’ cannot survive unless this relationship exists.

The primary interest in this topic arises out of Nucci, Pozzolo and Schivardi (2005) study. However our approach and understanding is quite contrary to their assertion that “A major achievement of this renewed research effort is a conclusive answer to the question of causality”. This is because the direction of causality is purported to be from financial structure to productivity, in the above study. Our main question is whether debt equity ratio causes productivity or productivity causes debt equity ratio.

Total factor productivity growth (TFP) is the best known measure of productivity. We argue that TFP growth is disembodied technological progress, therefore, it has three characteristic:
i. It cannot be attributed to any single factor of production.
ii. It is dynamic because it arises over a period of time.
iii. It is real.
iv. It leads to residual profit which is unanticipated.

Nucci, Pozzolo and Schivardi (2005) said that higher productivity is a consequence of opaque activity. They refer to R&D activity as opaque activity. Opaqueness is a characteristic whose effect is not clearly known. On the other hand it can be argued that TFP growth is unobservable. The factors of production are paid to their contribution in real terms. Any residual growth, in real terms, is over and above the contribution that is accounted for. Therefore it is not observable. Therefore it is unrelated to the capital of the firm. Capital is clearly a result of anticipated changes in the structure of the firm (e.g., ownership structure). All of the above decisions are conscious decisions.

On the other hand it can be argued that productivity affects financial structure differently through single factor productivity and through total factor productivity (TFP). So, if single factor productivity is increasing it is because capital input is increasing and which is because of a conscious decision to invest. Such productivity affects financial structure directly whereas, TFP growth affects financial structure indirectly.

II. OBJECTIVES OF THE STUDY

The objectives of the thesis are as under:

i. To study the financial structure theories and production theories.
ii. To measure productivity growth and financial structure.
iii. To examine the linkages between financial structure and productivity theory.
iv. To study and measure the nominal and real determinants of financial structure.
v. To estimate productivity and financial structure of cement, pharmaceutical and steel industry.
vi. To study the relationship between financial structure and productivity in cement, steel and pharmaceutical industry.
III. METHODOLOGY

The methodology will be divided into two parts:

i. Time series analysis

ii. Cross sectional analysis

First of all we have framed our variables required for the study. The variables are of two types, i.e. the real variables and the financial variables. We have used time series analysis for the computation of total factor productivity (TFP), which is a real variable. And for our final model, we have used cross sectional analysis. Through this, we have tried to find out the relationship between financial structure and productivity; the real and financial determinants of financial structure.

IV. RESULTS

On the basis of the results of cement, pharmaceutical and steel industries, we can conclude that productivity and financial structure are interrelated. Productivity also affects financial structure. Besides financial variables, financial structure also depends upon the real variables. We have also noticed productivity growth in cement and pharmaceutical industry but not in steel industry. Also, the significant determinants of financial structure were found to be different across industries. From all the findings in this thesis, the results of our hypothesis are as under:

i. H10: There is no productivity growth in industries.
   Null hypothesis is rejected, as there is productivity growth in industries.

ii. H20: Financial structure does not depend upon real factors.
   Null hypothesis rejected as we can clearly interpret from the results that financial structure depends upon real factors like NFA, TFE, K, and Sales etc.

iii. H30: Productivity does not cause financial structure.
   Null hypothesis rejected as productivity causes financial structure. The TFP coefficients were significant for cement and pharmaceutical industries.

Null hypothesis rejected as the determinants of financial structure were different across industries. As TFP, NFA, TFE, K, CR, FE, IMP were the significant determinants of financial structure for cement industry. TFP, NFA, K, CR, Sales, FB and dividend were the determinants of financial structure for pharmaceutical industry. Finally TFP, NFA, CR, FE and Div were the determinants of financial structure of steel industry.

V. CONTRIBUTION OF THE STUDY

With the help of this thesis, we have been able to raise certain new questions in respect of financial structure:

i. Are there limited determinants of financial structure as suggested by the financial structure theories?
ii. What are the linkages between productivity and financial structure?
iii. Do real factors affect financial structure?
iv. What is the direction of relationship between financial structure and productivity (TFP growth)?
v. What are the financial and real determinants of financial structure?
vi. How do the determinants of financial structure differ across industries (cement, pharmaceutical and steel)?

The results of our thesis clearly establish all of the new aspect of financial structure and demonstrate the relationship between productivity and financial structure. There were many sub themes like:

i. What is the relationship between nature of industry and financial structure?
ii. What is the relationship between nature of industry and TFP growth?
iii. What is the differential impact of determinant of financial structure as between different industries?
VI. POLICY RECOMMENDATIONS

i. If the business environment favours disembodied technological progress, it allows the opportunity for costless growth because TFP is a residual which arises over a period of time without any investment, either physical or financial. An accounting approach can never arrive at such a conclusion.

ii. The firms need to recognize that the choice of financial structure is not uniquely determined by the financial variables. It is determined by a combination of financial and real variables.

iii. The residual growth due to TFP is a source of finance which has hitherto not been recognized. It leads to synergies between financial management, organisational efficiency, technical efficiency, diffusion of technology, best practices in technology etc. that could then be linked to long term finance. Although all of these factors are given and are found in certain firms but finance theory has never recognized such synergies.

iv. One lesson learned is that the emphasis on cost of capital in financing decision is over emphasized, by which the integration of finance with productivity, efficiency and growth is less understood.

v. The relationship between determinants of financial structure and debt to equity ratio is not straight forward. From our analysis it is apparent that the same determinants could behave differently by either increasing debt or decreasing equity. Similarly the same determinants could have different implications in different industries.

vi. Through the particular estimations of steel industry, certain policy recommendations emerged as under:
   - The malleability of technologies needs to be kept in mind. It is on account of the rigidities in the case of steel industry arising out of imported capital goods that real factors have not shown up as significant determinants.
   - It also appears that under such circumstances even the costless growth alternative of TFP is not available because TFP is the practice of technology but if the technology is rigid, it is not possible to have TFP growth.
   - By contrast, heavy industries such as pharmaceutical and cement have shown how it is possible to achieve costless growth and have experienced synergies.