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Financial Considerations in Investment Decisions: A Literature Review ^{♦,*}

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We offer a short review of the voluminous literature on the role of cash flow for investment decisions under the presence of capital market imperfections. We discuss the relevant theoretical literature that provides the basis for such a role, which builds on informational asymmetries. Then we cover the empirical literature that has attempted to investigate the validity of the theory by testing the resulting testable hypotheses. **JEL: G10, G30.**

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1. Introduction

An extensive body of the empirical literature on business fixed investment spending has focused on the effects of deviating from the paradigm of perfect capital markets. This deviation is characterised by *ex ante* and *ex post* asymmetries of information between lenders and borrowers, leading to an equilibrium outcome where the assumed perfect substitutability between internal and external sources of finance breaks down (Greenwald, *et al.* 1984; Myers and Majluf, 1984). A large number of studies have investigated the properties of such equilibrium in situations where lenders (principals) cannot costlessly obtain information about the opportunities, characteristics or actions of borrowers (agents) (Townsend, 1979; Stiglitz and Weiss, 1981; Greenwald, *et al.* 1984; Myers and Majluf, 1984; Bernanke and Gertler, 1990; Gertler, 1992; Kiyotaki and Moore, 1997). Although these studies have quite diverse features, they produce a set of predictions which seem to be robust across alternative theoretical setups: (i) under asymmetric information and not fully collateralized loans, external funds are more expensive than internal funds, and (ii) this cost differential varies inversely with borrower's net worth.

As a consequence, the otherwise irrelevant, financial profile of firms becomes a criterion of their ability to repay externally provided loans. Furthermore, internally generated funds emerge as the primary choice of funding investment plans either due to firms' inability to access the capital market or due to the higher associated

cost when accessing it¹. In particular, the effects of information asymmetries on firm's investment decisions have been at the core of research interest. Empirically, the question whether or not investment depends on corporate liquidity has drawn considerable attention since the seminal paper by Fazzari *et al.* (1988). This is an important issue, since the way investment responds to cyclical variations in profits relies on whether availability of internal funds acts as a constraint to capital expenditure (Bond and Meghir, 1994).

At the other end of the spectrum, under perfect capital markets firms are indifferent to funding their investment programmes with internal or external funds, since external funds are a perfect substitute for internal capital. Therefore, funding an investment project should solely depend on the project's net present value.

This study provides a brief – and clearly not an exhaustive discussion – literature review that concentrates on firms' liquidity on investment spending. The remainder of the paper is organized as follows: Section 2 discusses the relevant literature, Section 3 illustrates limitations of the existing literature and, finally, Section 4 concludes.

¹ Both phenomena are different versions of Credit Rationing. The former describes the case where lenders deny credit, while the latter describes the so-called External Finance Premium.

2. Literature Review

2.1 Perfect Capital Markets

Most of the studies since the mid 1960s have isolated real firm decisions from financial factors with Modigliani and Miller (1958) characteristically demonstrating the so-called Irrelevance Theorem. The main conclusion being that a firm's financial structure will not affect its market value in perfect capital markets. Applied to capital expenditure, a firm's financial status is irrelevant for real investment decisions in a world of perfect and complete capital markets. In particular, the neoclassical theory of investment developed by Jorgenson (1963) and Hall and Jorgenson (1967) advocates that a firm's optimization problem could be solved without reference to financial factors, qualifying the user cost of capital as the sole determinant of investment. In a world without frictions (i.e. symmetric information, no taxes, no transaction costs) investment decisions would solely depend on whether the project at hand had a sufficiently positive net present value, and could therefore be financed by any combination of equity and/or debt capital.

The relevant economic theory was further enhanced by the development of the q model of investment (Brainard and Tobin, 1968; Tobin, 1969). Tobin (1969) defines q as the market value of firm divided by the replacement cost of its capital. According to this metric a high value of q implies that companies can issue stock at a favourable price compared to the cost of new plant and equipment. Therefore, new investment is attractive (the firm will undertake a project)

provided that q is greater than unity. If however, q was less than unity it would be more financially attractive to buy another firm cheaply and acquire existing capital. Hence, under the assumption of perfect capital markets, all that is needed to predict a company's investment policy is to know its q .²

2.2 Imperfections and Investment Spending: Theory and Evidence

2.2.1 The Theory

Early research on investment, especially the work of Meyer and Kyh (1957), stressed the significance of financing constraints for business investment. The importance of how investment is financed was derived with the development of theoretical models of asymmetric information based on the "lemons" problem, (Akerlof, 1970). The argument is that sellers with inside information about the quality of an asset will be unwilling to accept the terms offered by a less informed buyer. The appropriate theoretical analysis builds on information asymmetries in financial markets, placing it as the core problem in this study.

If credit markets were characterized by asymmetry of information, then unobserved differences in borrower quality can induce credit rationing (Jaffee and Russell, 1976; Stiglitz and Weiss, 1981). Further research showed that without fully collateralized loans, and the borrower's net worth being used as an indicator for her credit-worthiness, the perfect substitutability

² For more details see Tobin, J. (1969). "A general equilibrium approach to monetary theory". *Journal of Money Credit and Banking*, 1(1), 15-29.

of external and internally generated funds breaks down. Consequently, a cost differential, known as the External Finance Premium, exists between external and internal funds, with the former being more costly than the latter (Townsend, 1979; Greenwald, *et. al.* 1984; Myers and Majluf, 1984; Bernanke and Gertler, 1990; Gertler, 1992; Kiyotaki and Moore, 1997).

Therefore, internally generated funds emerge as the primary source for funding investment plans, either due to firms' inability to access the capital market or due to the higher associated cost when accessing it. This leads borrowers to adopt a rule known as Financial Hierarchy, which implies that firms' wishing to fund their investment plans, turn initially to own (internal) resources. External funds (borrowing or issuing shares) are not sought, until own resources are exhausted. Mayer (1990) provides evidence for such a hierarchy, showing that across industries in eight developed countries, retentions (own funds) are the leading source of finance, followed by debt (borrowing), and then by equity (issuing new shares).

2.2.2 Imperfections and Investment: Empirical Evidence

There are two main testable hypotheses derived from this kind of imperfection in the capital market. The first advocates a positive association between cash flow and investment spending. As noted earlier, in the absence of capital market imperfections internal funds should be viewed as perfect substitutes to external. As a result, the observed variation of internal funds should not

be able to account for any of the variation in investment spending. The second, known as Financial Accelerator, posits that financial profile becomes more important during downturns in economic activity, producing a 'second-round' amplification effect of adverse shocks. Essentially, investment would exhibit 'excess' sensitivity to internal funds during phases of economic slowdown.

Numerous empirical studies have tested these hypotheses, where after conditioning on several state variables of investment, they show that balance sheet variables (usually cash flow or in general measures of liquidity) affect investment spending (Fazzari *et. al.*, 1988; Oliner and Rudebusch, 1992; Whited, 1992; Schaller, 1993; Bond and Meghir, 1994; Hubbard *et. al.*, 1995; Goergen and Renneboog, 2001; Vijverberg, 2004). Much of this literature has followed Fazzari *et. al.* (1988) who reported that the investment decisions of more financially constrained firms exhibit higher sensitivity to liquidity when compared to less financial constrained firms. Hoshi *et al.* (1991) conclude that the investment outlays of 24 Japanese manufacturing firms that are not members of a *kereitsu* are much more sensitive to firm liquidity than that of 121 firms that are members of a *kereitsu* and are appear to be less financially constrained.

Other firm characteristics may also assist in identifying financially constrained firms. For instance, it would not be hard to defend the argument that the severity of informational asymmetries decreases with firm age, since young firms neither possess a sound nor a long track record. Evidence for that was provided by Oliner and Rudebusch

(1992) who, having studied US listed firms, found that investment is more closely related to cash flow for firms facing relatively more severe asymmetries of information and in most cases, these firms tend to be young. In addition, Schaller (1993) focusing on investment behaviour of Canadian firms reports evidence suggesting that young firms' investment spending is more influenced by liquidity than that of older firms.

Apart from age, size may also be another important firm characteristic correlated with the degree of informational asymmetries. For instance, Gertler (1988) argued that information-induced financial constraints are more likely to have a greater impact on small than large firms, partly because large firms tend to be more "mature" and have stronger and diachronic attachment with providers of finance. Hu and Schiantarelli (1998) have shown that size is positively related to the probability for quoted companies to be financially constrained. Gilchrist and Himmelberg (1998) in addition stress that small companies, with presumably higher costs of obtaining external funds are more vulnerable to liquidity shocks. Audretsch and Elston (2002) support the hypothesis that smaller firms in Germany tend to be handicapped in terms of access to capital. However, Devereux and Schiantarelli (1990) report, using a sample of relatively large quoted firms, that large firms are more sensitive than small firms to cash flow fluctuations. In addition, Athey and Laumas (1994) find that large Indian firms are more sensitive to cash flow than small firms and explain their result as an evidence of the Indian

government credit policies for promoting small companies.

2.2.3 Imperfections and Investment: Financial Accelerator Effect

Evidence for an 'excess' sensitivity of investment spending to cash flow, indicating an amplification of output shocks via capital market imperfections, has also been documented by a large number of studies (Gertler and Hubbard, 1988, Gertler and Gilchrist, 1993, 1994; Kashyap *et. al.*, 1994; Bernanke *et. al.*, 1999). Gertler and Hubbard (1988) in a study for US firms find that fixed investment for high retention firms is more sensitive to cash flow fluctuations in recessions. Gertler and Gilchrist (1993) find for US firms that the inventories of small firms decline more sharply in response to tight monetary policy. In addition Gertler and Gilchrist (1994) have shown that small firms play a major role in the deceleration of inventory demand, following a tightening in monetary policy. Kashyap *et. al.*, (1994) examining micro data on US firms' inventories around various macroeconomic episodes, found that inventories of firms not having access to financial markets are significantly sensitive to balance sheet variables. Analogously, Oliner and Rudebusch (1996) have shown a similar pattern in the response of fixed investment to a monetary policy shock across size classes.

Bernanke *et. al.* (1999) advocate the presence of an asymmetry of investment spending across the business cycle through the amplification of shocks. In fact, balance sheet profile becomes more

important during periods of decline in economic activity when compared to periods of expansion. Rondi *et al.* (1998), focusing on Italian firms conclude that fixed investment decisions by small firms are more sensitive to measures of creditworthiness in periods of monetary tightening. Guariglia (1999), studying the UK case, finds a significant link between financial variables and inventory investment, which is stronger for firms with weak balance sheets during periods of recession and also tight monetary policy. Peersman and Smets (2002), estimating the effects of a euro area-wide monetary policy change on output growth, document that financial accelerator mechanisms work mainly in periods when a recession occurs. Vermeulen (2002) also shows that the financial accelerator is in operation with asymmetric effects during the business cycle. In particular, investment is more sensitive to liquidity during downturns. Finally, Berg *et al.*, (2004) focusing on Sweden, report that the financial accelerator has substantial effects on corporate investment.

3. Limitations of the existing framework

On the empirical side, recent research has produced an impressive mass of results establishing the importance of the relationship between investment decisions and financing constraints. The majority of these studies are in line with Fazzari, *et al.*'s (1988) results, suggesting the existence of imperfection in capital markets. However, an important challenge to these findings came from Kaplan and Zingales (1997) who posit that higher sensitivities of investment to cash flow

cannot be interpreted as evidence that firms are more financially constrained. Cleary (1999) extends this sample and shows that while all firms are sensitive to liquidity, consistent with previous evidence, firms that are more creditworthy exhibit greater investment-liquidity sensitivity than those classified as less creditworthy as Kaplan and Zingales (1997) advocate.

Most of the studies interpret the typical finding of a positive relationship between cash flow and investment as signifying the presence of market imperfections. While a positive association between investment and cash flow is consistent with the presence of financing constraints, it may also be compatible with the absence of such constraints. This would be true in case cash flow carried a mixture of signals. On the one hand, cash flow might be correlated with investment due to financing constraints. On the other hand, this correlation could reflect cash flow's ability to predict future profitability (market fundamentals), rather than signifying capital market imperfections (Goergen and Renneboog, 2001; Bond *et al.*, 2004; Bond and Cummins, 2001). In particular, Gilchrist and Himmelberg (1995) distinguish between two different roles of cash flow; the first as a predictor for future investment opportunities and the second one as an additional source of finance for otherwise financially restricted firms. They find the latter effect to be relevant only for firms without bond rating, underlying the difficulty in accessing capital markets due to informational asymmetries.

Thus, any econometric model investigating the sensitivity of firm investment on cash flow should be

appropriately setup in order to allow a meaningful interpretation of estimation results. In other words, the econometric model has to filter the mixed signal embodied in cash flow, so as to extract the component relating to capital market imperfections. As a way to overcome this difficulty empirical studies have conditioned the investment-cash flow relationship on alternative variables, identified by economic theory as investment's state variables. Typically, three baseline models have been used to serve this purpose: the neoclassical model (Jorgenson, 1963), the Tobin's q (Tobin, 1969) model and the sales accelerator model (Abel and Blanchard, 1986). Each of these models attempt to identify which variables ought to have a structural effect on investment demand. The difficulties in measurement of q that lead to its empirical inadequacy³ coupled with a poor predictive performance of sales, led a number of authors to follow a different direction. For instance, firm-specific earnings forecasts have been used to construct measurements of the fundamentals that affect the expected returns on investment (Cummins, *et. al.*, 1999;

Erickson and Whited, 2000; Bond and Cummins, 2001; Bond, *et al.*, 2004). They found that if one controlled for expected profitability by using earnings forecasts, derived from securities analysts, then the correlation between investment spending and cash flow becomes less significant.

4. Conclusion

This paper sheds light on the role played by cash flow on investment decisions. Essentially, a firm's liquidity position should be irrelevant to investment decisions provided that firms operate in perfect capital markets. However, if capital market imperfections stem from informational asymmetries, then cash flow would be highly pertinent. Theoretical work has formally shown that firms facing difficulties in accessing capital markets due to informational asymmetries rely heavily on internal funds. In addition, empirical research has established the importance of financial variables, and in particular cash flow, for investment decisions.

In our view further research should focus on important issues such as providing a comprehensive definition of financial constraints and also more concrete measures of the degree of informational asymmetries. In addition, more effort should be made on disentangling the predictive ability of cash flow from its capacity to proxy for the probability of repayment.

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³ The estimation of q models is problematic since it is rather difficult to correctly measure the replacement value of assets. Moreover, during periods of excessive stock market volatility q may not reflect market fundamentals but instead be influenced by 'bubbles' or factors other than the present discounted value of expected future profits (Goergen and Renneboog, 2001; Bond *et al.*, 2004). Additionally, the theoretical model requires the measurement of a project's marginal q , however typically data considerations allow the researcher to only calculate the average q , which is inherently flawed since it reflects the average return on a company's total capital, whereas it is the marginal return on capital that is relevant (Chirinko and Schaller, 1995).

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Useful and interesting websites to visit:

http://www.iiasa.ac.at/Research/LUC/ChinaFood/index_s.htm

<http://www.econmodel.com/classic/index.htm>

<http://www.wider.unu.edu/>

Brief suggestions for further reading:

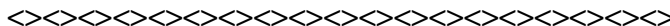
The Winter 2007 issue of the Journal of Economic Perspectives (Volume 21, Number 1, has the following articles and features:

Abhijit V. Banerjee and Esther Duflo: The Economic Lives of the Poor.

Michael A. Stegman: Payday Lending.

Robert Shimer: Daron Acemoglu: 2005 John Bates Clark Medalist.

The December 2006 issue of the Journal of Economic Literature (Volume XLIV, Number 4), has papers on ‘Illegal Migration from Mexico to the United States’, by Gordon H. Hanson; ‘Goodbye Washington Consensus, Hello Washington Confusion? A Review of the World Bank’s Economic Growth in the 1990s: Learning from a Decade of Reform’, by Dani Rodrik;



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* *The views expressed here are personal to the authors and do not necessarily reflect those of the other staff, faculty or students of this or any other institution.*

The BNE is celebrating the electronic age by disbanding its print copy distribution list. This process began some time ago but is reaching its final stages now. All former print-copy readers are invited to join the electronic mailing alert service by contacting the editor at dabirp@richmond.ac.uk

Book Note:

E. Ray Canterbury's '*Alan Greenspan: The Oracle Behind the Curtain*' is a masterful account of one of the most colourful periods in US Central Banking history. Specifically, the book details the role of its chief officer Alan Greenspan who, as Chairman of the Federal Reserve for 18 years, held centre-stage amongst the world's financial communities.

What makes this book a particularly valuable addition to our understanding of recent US central banking experience is the fact that it contains a mixture of personal reflections, anecdote and hard hitting analysis. As such the book is likely to appeal to quite a wide constituency of readers interested in encountering an entertaining and informative account of what motivated Greenspan in his professional endeavours, how he worked with the several US administrations he served and how world financial markets responded and reacted to his every thought and wide-ranging pronouncements. But the book is much more than just a series of reflections and anecdotes. Canterbury carefully marries his abilities as an accomplished author with a rare combination of wit, humour and charm. With section or chapter headings like '*Greenspan: The Master of FedSpeak*', '*The Efficient Market and God*', and '*The Fable of the Goldilocks Economy*' one knows one is in for a treat here. This is a book that will both educate and entertain. It will not disappoint.

Parviz Dabir-Alai

Book Review:

Gordon L. Clark and Paul Tracey (2004) Global Competitiveness and Innovation: An Agent-Centred Perspective. Published by Palgrave Macmillan, Basingstoke. PP 184. ISBN 1-403-9 32-63-8.

"The challenge we face is to understand the development of industries and regions in terms of the thought and action of the agents that create and sustain them." (Gordon Clark and Paul Tracey)

Globalization is the most significant and powerful phenomena to be considered when examining different social, political and economic development related issues within the postindustrial world. Firms, as economic agents, associate the advance of global integration with increased levels of competition and rapid technological progress with respect to new and more efficient ways of production, communication and transportation. Gordon Clark and Paul Tracey's book "Global Competitiveness and Innovation: An Agent-Centred Perspective" provides the reader with a valuable analytical framework for investigating firms' capacity to respond to the pressures and challenges of globalization in competitive and strategic ways.

This book will be useful for social science researchers from a variety of backgrounds since it presents a unique theoretical and methodological framework for empirical studies in the field of regional economic development. In addition, this book is a fairly broad-based study of the nature of innovative economic behaviour and agents' learning capacities in the context of increasing level of global competition. Amongst other issues the authors discuss the significance of the information and knowledge economy and its implications for economic agents' ability to create, sustain and conceptualize complex networks of interaction. Furthermore, the authors examine the significance of agents' inherited property, resources, obligations and entitlements for their competitiveness.

As previously mentioned these issues are approached from a multi-disciplinary perspective with a distinct focus on economic geography, management studies, sociology and political economy.

At times the authors' analysis of the nature of regional economic development and competitiveness appears highly abstract, which allows for a variety of interpretations of the subject in question. The central message of the book is constituted around four reference points. These include the development of an agent-centered approach to comparative studies, the theory of path dependence, the investigation of networks of interaction, and economic agents' learning and cognition capabilities.

The authors critically examine the usefulness of existing models of comparative study for the analysis of firm-specific competitive response to the forces of globalization. The book encourages the reader to re-consider the validity of existing models of comparative study with respect to their relative strengths and weaknesses. What I found particularly interesting and worth acknowledging is the fact that the authors present an alternative approach to comparative studies. This approach aims at achieving greater accuracy and reliability of the analysis, through the recognition of the complexity of human cognition and behaviour. In relation to this, the authors stress the idea that agent's actions and decisions are shaped by cultural, social, political and psychological factors, and are also subject to informational and institutional constraints.

Agents' capacity to develop competitive strategies and be successful in highly uncertain and complex settings is also a subject of analysis. The authors argue that, under such conditions, strategies typically depend upon networks of interaction, which involve customers, suppliers, competitors and other related firms. Contrary to traditional models of agent-environment interaction, the authors suggest that, through the formation of sophisticated and spatially elongated networks of interaction, economic agents build alliances and are able to impose a degree of control over the environment. Agents develop a combination of strong

and weak relationships ("ties") with other agents, institutions and organizations and, as a result, determine the structure of the networks they are involved in. The authors take this argument a step further and present the reader with a new concept, namely the concept of flexible network. These types of networks, the authors suggest, permit agents to be more competitive by enabling them to attempt integrating with other networks, should they decide that this would better serve their interests. By providing agents with a better access to knowledge, specialized skills and experience, networks of interaction facilitate the formation of regional clusters of innovation. These clusters of innovation can be a powerful source of competitive advantage for economic agents.

Gordon Clark and Paul Tracey's book provides an excellent analytical and multi-disciplinary point of departure for future empirical studies and investigations of how firms view their competitive opportunities within the world economy. Economic agents are in the centre of the analysis of the relationship between globalization, regional economic development and firms' capacity to develop competitive strategies. The authors have presented me with a compelling examination of the nature of economic agents as a locus of cognition and reflexivity. These agents are placed in a given environment, which is characterized by diverse social, institutional and organizational factors. In addition, economic agents are limited with respect to the time, knowledge and information available to them. It is the authors' objective throughout the book to convince the reader that economic agents are capable of minimizing these limitations. What is more, these agents can consciously change the environment in which they are placed in order to facilitate the formation of networks of learning and innovation. Agents are also able to develop formal methods of enhancing and expanding these complex and sophisticated networks of interaction.

Although in places the authors' arguments are excessively technical and abstract, the book, nevertheless, offers an excellent and in-depth study of agents' competitive behaviour.

Valeriya Vitkova

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