

# THE IMPACT OF FINANCIAL DEVELOPMENT ON INVESTMENT: A REVIEW OF INTERNATIONAL LITERATURE

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**Abstract.** *This article summarises the empirical literature on the impact of financial development on investment. It presents a topical analysis of empirical research that focuses mainly on the interaction between financial development and investment, determinants and measurement of both financial development and investment, and empirical findings on the relationship between the two variables under discussion. The study concludes that most of the research done on the relationship between financial development and investment is highly skewed towards assessing the relationship using mostly bank-based financial development indicators, as compared to the market-based financial development indicators. Given the number of studies assessed, the impact of financial development on investment appears to be inconclusive, at best. Moreover, the study shows that the relationship between these two macroeconomic variables seems to differ from country to country; it is dependent on the proxies used to measure the level of financial development, as well as the methodology employed.*

**Key words:** *finance-investment nexus, financial development, investment*

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## 1. Introduction

The finance-investment nexus has received extensive consideration in economic circles. However, there has been an indirect approach in evaluating the impact of financial development on investment. Most of the studies that evaluated this relationship had the main objective of evaluating the finance-growth nexus while taking investment as a mainly positive conduit to either financial development or economic growth, or both.

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This would explain the much alluded to and implied causality link between financial development and investment in finance-growth nexus studies (see Muyambiri, 2017). The impact of finance *per se* on investment is theoretically and, to a particular extent, empirically researched in economics. However, there has been no study to date that has evaluated the accomplishments of economists on this particular instrumental topic. It is, therefore, against this background that this study is commissioned to address the extensive knowledge gap in the evaluation of the finance-investment impact relationship. An assessment of the underlying theoretical literature is made so as to give a solid background of why economics is fascinated by the said relationship and how it is presumed to be transmitted. A summative evaluation of empirical literature is done to show the extent to which the practical proves the theoretical.

Given the aforementioned and the focus of this study, this paper is organized only around the theoretical models and empirical studies that scrutinize, indirectly and directly, the relationship between financial development and investment. The econometric approach employed to examine the finance-investment relationship is used as the main attribute in discussing the empirical findings. Therefore, the second section discusses the theoretical basis of the finance-investment impact relationship. The third section examines the empirical studies on the finance-investment impact relationship. The last section concludes the paper.

## 2. Theoretical Literature Review

Financial development *per se* is a term that has been used to mean a number of things in economics though all of them centre on the financial sector. Financial development is usually defined as having mainly four main functions, that is, improving production of information about potential investments and the associated allocation of capital; monitoring of firms and exertion of corporate governance; trade facilitation, diversification, and risk management; savings mobilization and pooling, and easing commodity exchange (Levine, 1997). These functions of the financial system then impact investment decisions and technological innovations mainly through savings mobilization and market organization and centrality. Hawkins (2006) defines the financial system as an economic component that is made up of interconnected sectors that include among others the legal infrastructure, the markets and the institutions. The significance of the financial sector is mainly attributed to its impact on capital accumulation and technological innovation, which are important drivers of economic growth (Muyambiri & Odhiambo, 2016).

Herein, individual investment and financial development theoretical models that can be augmented to explain the relationship under investigation are discussed\*. The impact of financial development on investment has been theoretically explained with

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\* For an in-depth study of the models discussed herein, see Muyambiri (2017)

a number of different models, namely growth models (neoclassical and endogenous), financial liberalisation models (the McKinnon-Shaw Framework, Kapur's Model, Galbis' Model, the Mathieson Model) and investment models (Tobin's Q-theory, Kalecki's Theory of Investment, the Neoclassical Framework to Investment, the accelerator model, the flexible accelerator model).

Economic growth models tend to explain how an economy achieves or tends to economic growth by looking at particular variables that induce that growth. Notably, most theoretical growth models emphasise the transmission mechanism from savings to investment, and to economic growth, underscoring the importance of the savings mobilisation function of financial development to the achievement of increased investment and inherently increased economic growth (Muyambiri & Odhiambo, 2016).

Neoclassical growth models assert that financial development impacts investment development mostly through channelling mobilised savings into investments. Growth models, in theory, have focused on a number of components so as to explain the eventual advent of economic growth in any economy. Some of the most notable components are capital accumulation, labour force growth, technological progress and population growth. Financial development, savings, government spending, monetary policy and many other issues are underlying theoretical factors to the realisation of the constituents required for economic growth (Levine, 2005). The Solow neoclassical growth model is one of the well-known models of economic growth that has been discussed extensively in economic literature and that proves the inherent relationship between finance and investment. Though the Solow neoclassical growth model illustrates the importance of financial development as an important determinant of investment, it has some limitations. The main two limitations are its assumption of some important variables being fixed exogenously and its having no clear explanation of the transmission of savings to investment. Using exogenous variables tends to ignore market inefficiencies, imperfections in capital and financial markets. The model is also weak in explaining the finance-investment nexus because it focuses only on the determinants of long-term growth and tends to ignore short and medium-term growth impacts on the economy (Lipsey, 2002).

Like the neoclassical growth models, endogenous growth models also confirm the finance-investment relationship, though under a different set of assumptions. Endogenous growth models emphasize that liberalisation of markets leads to increased domestic investment. These models assert generation of endogenous steady growth (McCallum, 1996). In particular, endogenous growth models are characterised by the absence of diminishing returns to each factor of production, coupled with endogenous technological change that generates economic growth through the increased investment transmission mechanism. However, both the traditional Solow and the endogenous growth models posit that the rate of savings is directly related to investment and the rate of technological progress, and therefore imply a direct connection between financial development and investment. Nevertheless, the latter allows for sustained long-term growth, which is absent in the former.

Endogenous growth models underscore the importance of financial development through effectual resource mobilisation and allocation so as to achieve rapid growth by increasing savings and investment. Bencivenga and Smith (1991) give a theoretical example of how financial development, measured as the introduction of financial intermediaries, shifts the composition of savings into investment through the use of endogenous growth models. Examples of various endogenous growth models include Romer's Model, Rebelo's Model, the simple human-capital model, Lucas's human-capital model, Barro's model of endogenous growth with government spending and taxation, Barro's model with endogenous savings and endogenous growth with research and development. Endogenous growth models tend to infer that saving through financial development can lead to persistent investment growth. Criticisms of endogenous growth theory centre on its dependence on traditional neoclassical assumptions, overlooking influential factors (like market inefficiencies, imperfect capital and financial markets in developing countries) and its focus on only the determinants of long-term growth, which tends to ignore short and medium term growth impacts on the economy (Fine, 2000).

The effect of financial development on investment has attracted some considerable insight from economists who have come up with many alternative schools of thought. One of the main facets that has gained popularity in macroeconomics is the relationship between financial development that is spurred on by financial liberalisation and investment. Notably, amongst the advocates for financial liberalisation as an avenue for financial development and ensuing investment are the McKinnon-Shaw framework, Kapur's Model, Mathieson's Model and the Galbis model (Jouan, 2005). The last three (Kapur's Model, Mathieson's Model and the Galbis model) are an extension of the McKinnon-Shaw framework that mainly focuses on the effects of financial liberalisation either on the quantity of investment (Kapur's and Mathieson's Models) or on the quality of investment (the Galbis Model) (Gibson & Tsakalotos, 1994, p. 584).

McKinnon (1973) and Shaw (1973) provided the theoretical background of rationalizing financial liberalisation as a conduit for financial development, hence investment. In the 1960s, government intervention that was spurred on by the Keynesian approach to tackling market imperfections is thought to have led to financial repression. McKinnon (1973) and Shaw (1973) argued for financial liberalisation, that is, the removal of all explicit controls on price and allocation of credit. Financial repression is liable to lead to below market rate interest rates that tend to reduce savings and investment. However, advocates for financial repression maintain that there are particular advantages that are only associated with a financially repressed economy. For example, financial repression is taken as an effective way to control financial institution competition levels; to circumvent the abating of the risk-return relationship; to slacken credit restrictions; to maintain favourable finance industry profits; to dampen excessive speculative activities; to strategically allocate credit to preferred sectors through government directives; to institute investment-enhancing lending rates, and to enable government to easily borrow from the domestic market (Graham, 1996).

The works of McKinnon (1973) and Shaw (1973) presumed that lower than equilibrium savings levels resulting from financial repression are the primary cause of a hindered economic growth. Controlled interest rates are thought to reveal capital scarcity inaccurately, which in turn stimulates inefficient misallocation of resources. In addition, financial repressive policies tend to discourage efficient risk-taking thereby forcing the financial sector to perform at less than potential. Therefore, the McKinnon-Shaw hypothesis encourages the abolition of interest rate maximums and other financial repressive policies so as to boost financial sector competition, which in turn leads to higher savings and investment (see Reinhart & Tokatlidis, 2003; Fry, 1978; Gibson & Tsakalotos, 1994).

Kapur's (1976) model expands Shaw's analysis by considering the transmission from interest rate rise to increased investment while focusing on working capital as an important link between finance and investment. Kapur (1976) asserts that financial development arising from financial liberalisation is an important determinant of investment.

Galbis (1977) took a step further in analysing the link between financial development and investment as he discussed an economy comprising two production sectors with broadly different technologies and financial constraints, but producing the same output that is sold at the same price. According to Galbis (1977), in agreement with the McKinnon and Shaw framework, what is required for increased quality in investment is financial development, which is explained as a consequence of financial liberalisation. The model is based on McKinnon's choice of technique approach to examine the consequence of financial repression on the efficiency of capital (Mohieldin, 1995).

The Mathieson Model, like the McKinnon and Shaw framework, emphasizes the need for financial development within financial liberalisation so as to induce increased investment. Mathieson (1979) advocates for interest rate liberalisation so as to achieve credit market equilibrium in the midst of stabilization policy. Starting with the Harrod-Domar aggregate production function in a labour-surplus economy which produces consumption and investment goods, a distinction of the domestic goods market and the foreign goods market is made. Financial markets are taken as consisting of the banking system alone and are assessed in terms of the proportion of all additions to physical and working capital holdings financed by credit from the banking system. Therefore, the implication is that savings will be dependent on return on capital and the real loan rate (i.e., with the inflationary effect accounted for). Mathieson (1979) presupposes that if the return on capital is less than the real loan rate, there will be disinvestment in the economy (assuming it is in the short run and the savings ratio is still positive). However, if the savings ratio is negative (dissaving), then most of the investment will be focusing mainly on working capital with little or no investment in physical capital. To ensure that there is sufficient investment and credit market equilibrium, Mathieson (1979) advocates for financial liberalisation that is theorized to increase financial development and in tandem increase the real return on deposits. The increase in the

real return on deposits is assumed to lead to an increase in the quantity of investments as investors benefit from the availability of loanable funds in the banking sector. Thus, according to Mathieson (1979), financial development through financial liberalisation has a positive impact on investment.

Investment is, has been and shall continue to be an important aspect in economic literature and of economics in general. Theoretical models of investment in economics can, generally, be divided into two fields of study, that is, micro and macro. The micro-models of investment concentrate more on firm-level investment behaviour, while the macro-models tend to concentrate on aggregate investment. Given that the study under review is focusing on national aggregates, a composite study of the probable investment models that can be used to evaluate the impact of financial development on investment at a macro-level is discussed in this section.

Tobin (1969) developed the q-theory as an explanation of the determinants of aggregate investment. The q-ratio, which is used to advance the q-theory, is defined as the market value of firms divided by the replacement cost of the firm's assets. When defining the q-ratio, Tobin (1969) makes use of the value of capital as disclosed in the stock market. The value of a firm's capital is given as a direct derivative of the total market value of a firm's stocks and bonds, and the replacement cost of currently owned capital. The value of capital is greater than the cost of acquiring it if the market value of the firm exceeds the capital replacement cost ( $q$  is greater than one). Therefore, in such a case, the firm should invest in new capital. Otherwise, when  $q$  is less than one, the firm should not invest in new capital. The q-theory, like all other theories of investment, links the return on capital accumulation to the level of investment with the vehicle for investment being the financial markets. Therefore, financial development is ascribed as an important determinant of investment, though for the q-theory the onus is only on the stock market and not on the financial sector as a whole (Eklund, 2013). However, the measurement of the q-ratio has been relatively problematic in nature, thus many economists have ended up using the average q-ratio rather than using the marginal q-ratio since it is very difficult to get data on the value of a marginal unit of capital but it is easier to estimate the average  $q$ . The average  $q$  on the other hand is a less appropriate measure of Tobin's q-ratio since average measures tend to confuse average and marginal returns, besides, it is not straightforward to interpret. Hayashi (1982, p. 226) alluded to the average  $q$  as being an acceptable alternative for the marginal  $q$ . This is taken to be only valid after four expectations are fully realised. These expectations are: the firm(s) should be part of a product and factor market that is perfectly competitive and have linear homogenous production and adjustment cost technologies. In addition, the capital is expected to be homogenous, while decisions can be specifically subdivided into either investment or financial decisions. The realisation of such expectations is acutely improbable in nature for most countries.

Michael Kalecki was a Polish economist who advanced indirectly the discussed issues spanning the role of financial markets and liberalisation of capital flows, with the

purpose of trying to identify their influence on economic growth, unemployment and income distribution (Sawyer, 2004). Kalecki's effective demand model was conceptualised before Keynes, and it was different in a number of significant features, specifically, its emphasis being on the significance of income distribution, social classes and prices in the determination of income (Laski, 1987). The main thrust of Kalecki's theory of investment is that it differentiates between investment decisions and investment expenditures. It should be noted, however, that in his over 250 publications Kalecki presented a number of additive theories to his initial investment theory. It is noteworthy that he pointed out the terse role of money and finance in his analysis of investment. The rate of interest was considered as a monetary phenomenon that could not be taken as a mechanism for bringing about investment through savings. Investment is postulated to be able to finance itself despite the level of the rate of interest because investment tends to automatically bring into existence an equal amount of savings (Sawyer, 2004, p. 53). Kalecki's theory explains investment decisions as a direct response to either an increase or decrease in purchasing power in the economy (Laramie et al., 2004, Sawyer, 2004). The extent to which there will be an increase in investment in the economy is taken to depend on the reaction of the banking system (especially the central bank) to every increase in the demand for investment funds (credit). Kalecki's theory states that investment tends to finance itself. The financing of investment by investment is explained as a circle that starts from the investor borrowing money to invest from the banking system. Assuming a closed economy and that workers do not save, the money will be spent on capital goods and it will be received by other investors in the economy (the sellers of the capital goods) in the form of profits. Profits are then used to pay off a debt and/or are deposited as savings in the bank. Therefore, the gross profits of an economy tend to finance their own initial investment. This gives credence to the first assertion of a prohibitive interest rate vis-à-vis gross profitability. Therefore, in Kalecki's theory of investment, the banking sector plays a passive role (Laramie et al., 2004, p. 149). In addition, since Kalecki's investment theory is mainly concerned with investment decisions and investment expenditures, it has been taken as a short period analytic model, especially when including financial constraints and credit relations in the model (Laramie et al., 2004, p. 150).

The neoclassical theory of optimal capital accumulation assumes profit-maximization, perfect competition, and well-behaved neoclassical production functions, as it presents investment as the adjustment of a capital aggregate to an optimal level (Fazzari & Mott, 1986). However, the neoclassical theory assumes that capital adjustments are immediate and complete; hence the neoclassical investment function is eliminated. Therefore, the neoclassical theory of investment becomes a capital theory rather than an investment theory (Eklund, 2013). One major drawback of the neoclassical investment function is that it does not clarify how the actual capital stock adjusts to the optimal capital stock. However, if one were to assume partial adjustment, the theory can be adopted as an investment theory, which stipulates that investment is mainly impacted by financial development through the user cost of capital and the price of the output.

The accelerator theory of investment, like the neoclassical theory, relates investment to national income (output). It is an alternative model of the neoclassical theory of investment in which price variables are reduced to constants (Eklund, 2013). The accelerator model begins with the assumption that the firm's desired capital-output ratio is constant.

The main insight that the accelerator theory provides is its emphasis on the role of net investment as a disequilibrium phenomenon, that is, the resultant effect when the stock of capital differs from what firms and households would like it to be (Lipsey & Chrystal, 1997). The accelerator theory is a model that extrapolates the change in the past period's output into the future in determining investment spending. In other words, it is one of the first models that took expectations into consideration in assessing trends in investment. Its usefulness in explaining the finance-investment relationship is rather limited given its myopic view of expectations and its exclusion of financial variables and depreciation in explaining investment. The model's major shortcomings are in assuming a fixed capital-output ratio, failing to take into account the issue of expectations when coming up with the next period's desired level of output and the notion of gradual adjustment of the capital stock to the desired one which might happen in more than one period as assumed by the model (Jorgenson, 1971).

Alternatively, the flexible accelerator theory has been adopted more often than the simple accelerator model. The model is based on the accelerator model, but in addition, it focuses more on the time structure of the investment process. It assumes that the expected (desired) future output is a function of past output levels. According to the flexible accelerator principle, the adjustment of the capital stock to the desired level is not immediate because of delivery lags and delayed response to changes in demand. Desired capital changes are transformed into actual investment amounts through the use of geometric distributed lag functions. That is, the desired output is taken as a function of past output levels with geometrically declining weights associated with these past output levels. Then by making use of the Koyck transformation, a variable relationship between the growth rate of output and the level of net investment is postulated. For the model to be a gross investment model there is a need to account for replacement capital. The specification of desired capital has been the subject of a wide variety of alternative theories but these theories do agree on the validity of the flexible accelerator mechanism (Jorgenson, 1971). The flexible accelerator model demonstrates that investment is dynamic in nature and that the concept of gradual adjustment may hold true. The flexible accelerator model has the main advantage of being adjustable so as to fit different country situations when explaining investment. The model can be augmented to take into account the effects of any other factors that might impact investment (Ndikumana, 2000). Relaxing or coming up with new but reasonable controllable assumptions in modelling investment relationships has enabled economists to propose country-specific models.



### 3. Review of Related Empirical Literature

Given the theoretical review of the postulated impact of financial development on investment, an empirical review of the said relationship is discussed herein. The methodology of the review focuses on the type of empirical model used to evaluate the relationship between the two variables under discussion. Therefore, studies are divided into three broad categories: panel studies, times series and non-panel studies, and industry and firm-level studies.

#### 3.1 Panel Studies on Financial Development and Investment

Studies of the financial development and investment have used panel data techniques, pure time series methodologies and case studies to assess and solve a number of economic problems. This subsection discusses the panel approach in some depth. Table 1 summarises existing empirical evidence on the impact of financial development on investment.

Despite a thorough search, there seem to be more studies with results advocating for a positive impact of financial development on investment rather than a negative one. Lahcen (2004) finds the only exception as he reviews the impact of financial liberalization on savings, investment and growth. That is, a negative impact of financial depth on private investment and a positive effect of the real interest rate on investment in Egypt, Jordan, Morocco, Tunisia and Turkey. The basis for such uncommon results is presumed to be an increase in and preference for household sector credit allocation instead of the business sector. Lahcen (2004) employs the following financial development indicators - the total financial intermediaries' liquid liabilities to GDP, deposit money banks assets to total assets, private credit by deposit money banks to GDP, private credit by deposit money banks to total domestic credit and a financial liberalization index (Muyambiri & Odhiambo, 2016).

Most studies though are consistent with the theoretical underpinnings of the positive impact of financial development on investment. Benhabib and Spiegel (2000) evaluate the function of financial development in economic growth and investment in Argentina, Chile, Indonesia and Korea for the 1965 to 1985 period. Total factor productivity growth and investment are found to be impacted by different financial development indicators. Their empirical model is an augmented Solow growth model\*. Investment is found to be positively related to the banking system share of assets, the Gini coefficient-financial depth variable and the initial income financial depth variable.

Ndikumana (2000) examines the impact of financial development on domestic investment in a sample of 30 sub-Saharan African countries for the period 1970 to 1995 with the aid of panel regression procedures. Using a dynamic serial correlation investment model and alternative specifications of the model, Ndikumana (2000) finds that

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\* Benhabib and Spiegel make use of a Cobb – Douglas technology function that substantiates the significance of human capital as a cause of technological innovation.

financial development has an accelerator-enhancing effect on investment through its impact on the real per capita GDP.

Despite using a different financial development index, Fowowe (2011) follows Ndikumana (2000) as he studies 14 Sub-Saharan African countries. The results support the accelerator theory of investment with the finding of a positive coefficient for output growth and that financial development positively impacts private investment (Muyambiri & Odhiambo, 2016).

Schich and Pelgrin (2002) evaluate the relationship between financial development and investment for 19 countries of the Organisation for Economic Co-operation and Development (OECD) with the aid of a panel error correction approach. Though private credit issued by deposit money banks is found to be a significant determinant of investment, stock market capitalization is proved to be of utmost significance. The results by Schich and Pelgrin (2002) mirror those of Bassanini, Scapetta and Hemmings (2001), and Leahy, Schich, Wehinger, Pelgrin and Thorgeirsson (2001). For the other near similar study on 19 OECD countries by Pelgrin and Schich (2002), financial development is found to be significantly related to investment.

Wurgler (2000) and Carlin and Mayer (2003) find out that the finance-investment relationship is dependent on the structure of a country's financial system, the characteristics of the industries and investment. However, though there is agreement on the impact of financial development on investment, Ndikumana (2005) seems to disagree with Wurgler (2000) and Carlin and Mayer (2003) as he advocates that it is the level of financial development that is important to investment rather than the type of the financial system.

While most of the panel regression studies in Table 1 agree that financial development positively impacts investment, Misati and Nyamongo (2011), and Huang (2011) find unique results. Misati and Nyamongo (2011) study the finance – private investment relationship in Sub-Saharan Africa and find a negative correlation between the deposit interest rate and private investment, which, according to the authors, signals the presence of huge interest rate spreads\*. Huang (2011) assesses the direction of causality between finance and private investment for 43 developing countries and finds the existence of bi-directional causality.

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\* Since McKinnon (1973) emphasises the role of deposits as an avenue to higher savings rate that are then translated into investment, the higher interest rates on deposits should induce higher savings, which in turn should induce higher investment. That is, according to theory, there is a positive relationship between interest rates on deposits and investment.

TABLE 1: Panel Studies on Financial Development and Investment

Author(s)	Region/ Country	Independent Variables	Methodology	Conclusion
Gelb, 1989	34 countries	Real GDP growth, incremental output-capital ratio; financial savings/total savings; real interest rates, M3/GDP; GDP Growth; lending rate asset/GDP; credit/GDP; institutions	Cross Country Regression	Financial liberalisation positively impacts the efficiency of investment.
De Gregorio & Guidotti, 1995	112 countries	Private sector bank credit/GDP; economic growth; literacy rate; inflation, GDP per capita; government spending	Cross Country Regression	Financial development positively impacts the efficiency of investment.
Benhabib & Spiegel, 2000	4 countries	GDP; labour force; average level of schooling; average annual growth rate; the Gini coefficient; financial depth (M2/GDP); deposit money bank domestic assets/deposit money bank domestic assets plus central bank domestic assets; credit to private enterprises/GDP	Generalized Method of Moments (GMM)	Financial development positively influences both rates of investment and total factor productivity growth.
Wurgler, 2000	65 countries	Credit/GDP; stock market capitalisation/GDP; financial development summary index	Cross Country Regression	Financial sector has an increased positive impact on investment in growing industries, and a negative impact in declining industries.
Ndikumana, 2000	30 countries	Real per capita GDP; GNP per capita; GDP deflator growth rate; M3/GDP; total credit to the private sector/GDP; total domestic credit from banks/GDP; government and other public entities claims/GDP; financial development index	Panel Regression using a dynamic serial correlation model	Financial development positively impacts domestic investment.
Leahy et al, 2001	21 countries	Liquid liabilities; private credit of deposit money banks provided to the private sector; stock market capitalisation; composite financial development indicator	Dynamic panel regression techniques using ARDL	Financial development (stock market development, private credit of deposit money banks and liquid liabilities) positively impacts domestic investment.

Author(s)	Region/ Country	Independent Variables	Methodology	Conclusion
Bassanini et al., 2001	21 countries	Level of inflation; private credit of deposit money banks provided to the private sector/GDP; stock market capitalisation/GDP; private final consumption deflator growth rate; general government current nominal tax and non-tax receipts/nominal GDP; government nominal final consumption expenditure/nominal GDP	Cross-country time-series regressions	Stock market capitalisation positively impacts investment.
Schich & Pelgrin, 2002	19 countries	Real GDP; real interest rate; private non-residential fixed capital formation/output price deflator; liquid liabilities; private credit of deposit money banks; stock market capitalisation	Dynamic panel error correction approach	Financial development (stock market capitalisation and private credit issued by deposit money banks) positively impacts investment.
Pelgrin & Schich, 2002	19 countries	Real private GDP; adjusted real interest rate; user cost of capital; liquid liabilities; private credit of deposit money banks; stock market capitalisation; total value traded/GDP	Panel cointegration analysis	Financial development is significantly related to investment.
Carlin & Mayer, 2003	14 countries	Growth rates; R&D share; equity finance; external finance; bank finance; employment broken down by category of skill; ownership concentration; bank concentration; accounting standards; origin of legal system; creditor rights; anti-director rights; bank ownership of equity; credit/GDP; private credit/GDP; government owned banks; market capitalisation/GDP; value traded/market capitalisation; initial public offerings (IPO); population	Pooled cross-country regression	There is a strong relation between the structure of countries' financial systems, the characteristics of industries, and the growth and investment of industries in different countries.
Lahcen, 2004	5 countries	Liquid liabilities/GDP; deposit money bank assets/total financial assets; private credit by deposit money banks/GDP; private credit by deposit money banks/total domestic credit;	Panel Regression with fixed-effects	Financial development indicators and the financial liberalisation index negatively impact private investment.

Author(s)	Region/ Country	Independent Variables	Methodology	Conclusion
		reserves/total deposits money banks; real interest rates; stock market capitalisation/GDP; total value traded/GDP; stock market turnover; net interest rate margin; overhead costs/total assets; market structure; private saving rate; economic growth; exchange rate overvaluation; trade openness; inflation rate; secondary enrolment; budget surplus/GDP; terms of trade; %population over 60; %population under 15		
Ndikumana, 2005	99 countries	GDP growth; liquid liabilities/GDP; credit to private sector/GDP; bank assets/total of bank assets and central bank assets, net domestic credit/GDP; bank credit/GDP; trade/GDP	Cross-section and panel data regressions	Financial development positively impacts investment.
Dutta & Roy, 2009	124 countries	Private credit by deposit money banks/GDP; liquid liabilities/GDP; claims on domestic real nonfinancial sector by deposit money banks/GDP; financial development index; credit provided by banks; stock market indicators; remittances; deposit resources available to the banking sector; growth of real GDP; real interest rates; imports plus exports/GDP; government expenditure/GDP	Quantile regression approach	Financial sector development positively impacts domestic investment.
Becker & Sivadasan, 2010	38 countries	Private credit to GDP; total private bond market capitalisation to GDP	Pooled cross-country regression	Financial sector development positively impacts domestic investment.
Misati & Nyamongo, 2011	18 countries	GDP growth; fiscal deficit; checks and balances; corruption perception index; world economic freedom; stock market turnover; credit to the private sector; deposit rate; informal index	Panel Regression based on simple accelerator investment model	Deposit interest rates negatively affect private investment. Credit to the private sector and the turnover ratio positively impact private investment.

Author(s)	Region/ Country	Independent Variables	Methodology	Conclusion
Fowowe, 2011	14 countries	Index of financial reforms; growth in real GDP; volatility of inflation	Cross-country regressions using GMM	Financial sector reforms positively impact private investment.
Luca & Spatafora, 2012	103 countries	Institutional quality indicators; capital inflows; domestic credit; weighted terms of trade; weighted export markets	Cross-sectional analysis and panel analysis	Private capital inflows and domestic credit positively impact investment.
Wang et al., 2012	102 countries	Domestic saving rate; private credits/GDP; financial development; age structure; rates of return; uncertainty; fiscal policy; income level and growth; region dummies; year dummies	Panel Regression	Financial development reduces household precautionary-saving incentives but increases the probability of borrowing and investing.
Adeniyi & Egwaikhide, 2013	20 countries	Credit to private sector; liquid liabilities; total banking sector credit/private sector; aid; openness; domestic savings	Panel Regression	Financial sector development (credit provided to the private sector) positively impacts domestic investment.
Costantini et al., 2013	20 countries	Real GDP; US real lending rate; US nominal lending rate; domestic real lending rate; domestic nominal lending rate; claims on private sector by deposit money banks and other financial institutions; inflation rate; 3-year moving average of the standard deviation of the domestic exchange rate vis-a-vis the US dollar	Panel Regression	Investment is sensitive to world capital market conditions and exchange rate uncertainty.
Dzansi, 2011	79 countries	Remittances/GDP; trade/GDP; GDP growth; lending rate; assets/GDP; credit/GDP; institutions	Panel regression	Financial development (remittance inflows, and sound institutions) positively impact domestic investment.
Ndikumana & Mannah Blankson, 2015	50 countries	GDP growth; external debt; remittances; trade; domestic savings; bank credit; official development aid.	The Arellano-Bover/Bulndell-Bond dynamic panel data (DPD) estimation methodology	Domestic savings and credit to the private sector positively impact domestic investment.

### *3.2 Time series and Non-panel Country Case Studies on Financial Development and Investment*

A number of empirical assessments have been published on the relationship between financial development and investment. These studies use alternative methodologies, that is, Granger-type causality tests, ordinary least squares, simultaneous equations, autoregressive distributed lag (ARDL) Bounds Testing Approach, vector autoregressive (VAR) procedures, the traditional cointegration analysis and author-specific time series econometric techniques. Notably, research methodologies have progressed by the use of more powerful econometric approaches, employing better measures of financial development and investment, and more so, by examining individual countries in greater detail.

The individual time series country studies confirm, to a particular extent, the notions alluded to in the review of panel regression studies in the earlier section. It is noteworthy that financial development is positively related to investment. However, there are a few exceptions, especially when the issue of causality is evaluated. Alem and Townsend (2014) found that bank-based financial development negatively influences investment. On the other hand, Odhiambo (2010) studied the finance-investment-growth nexus in South Africa using the bounds (ARDL) testing approach and identified a positive role of investment-led finance. The liquid liabilities/GDP is the measure of financial development that is used to get the notion that investment Granger-causes financial development both in the short run and in the long run.

Remarkably, a number of country studies have been using the accelerator modelling technique in assessing the relationship between financial development and investment in time series analysis. These studies include Tybout (1983), De Melo and Tybout (1986), Warman and Thirwall (1994), Matsheka (1998), Valderrama (2003), Husein (2007), Dutta and Roy (2009) and Asare (2013). Tybout (1983) investigates the effect of credit rationing (financial repression) on investment in Colombia. The results of the study give credence to existence of an accelerator effect of financial development on investment in Colombia and the positive effect of financial development in relation to firm size (the larger the better). De Melo and Tybout (1986) also find that, for the Uruguayan economy (1955-1983), the accelerator effect was significant throughout the sample period. The same deductions were made by Warman and Thirwall (1994) for Mexico, Matsheka (1998) for Botswana, Valderrama (2003) for Austria, Husein (2007) for China, Dutta and Roy (2009) for 124 countries (under panel studies) and Asare (2013) for Ghana. Therefore, empirical research gives more credence to the wealth effect and accelerator channel than to a direct finance channel (Valderrama, 2003, p. 108). In addition, the use of a modified and realistic model termed the flexible accelerator model has circumvented the weak and unrealistic assumptions of the traditional accelerator model. The flexible accelerator model has enabled the time series estimation for developing countries that could not satisfy the assumptions of the

traditional accelerator principle. Table 2 gives a summary of time series and non-panel country case studies on financial development and investment.

**TABLE 2: Time Series and Non-panel Country Case Studies on Financial Development and Investment**

Author(s)	Country(s)	Variables	Methodology	Conclusion
Masih, 1979	Pakistan	Financial institutions' long-term loans and investments/ private large-scale manufacturing sector; financial institutions' long-term loans and investments/entire private sector; total loans; total deposits; demand deposits; time deposits; bank borrowings from central bank; security holdings; bank loans to government; government deficit financing; change in government dummy variable; excess liquid-asset holdings by banks	Ordinary least squares, Structural equation modelling	Funds availability positively affects private investment.
Tybout, 1983	Colombia	Access to credit market	Ordinary least squares (OLS)	Financial development positively impacts investment for large firms as compared to small firms (which mainly depend on their profits).
De Melo & Tybout, 1986	Uruguay	Total savings rate; interest rate; exchange rate; credit provision; financial development indicators	Ordinary least squares (OLS)	Financial development through financial liberalisation positively impacts aggregate private investment.
Fry, 1989	34 countries	Real interest rate; GDP growth rate; M3/GDP; %Change in GDP; investment; %Change in real M3; real saving; inflation rate	Exploratory	Financial development enhances investment quality.
Laumas, 1990	India	Time deposit interest rate; real interest rate; inflation rate	Two-stage least squares estimation procedure	Financial development through financial liberalisation positively impacts aggregate private investment.



Author(s)	Country(s)	Variables	Methodology	Conclusion
Rittenberg, 1991	Turkey	Real interest rate	Ordinary least squares (OLS)	Financial development through financial liberalisation negatively impacts investment through high interest rates and uncertainty.
King & Levine, 1993	80 countries	Liquid liabilities/GDP; deposit money bank domestic assets/deposit money bank domestic assets plus central bank domestic assets; claims on the nonfinancial private sector/total domestic credit; claims on the nonfinancial private sector/GDP; size of the formal financial intermediary sector/GDP; banks' importance to the central bank; credit allocated to private firms; credit issued to private firms/GDP; real per capita GDP growth; physical capital accumulation rate; domestic investment/GDP; physical capital allocation efficiency	Cross-country regressions	Financial development indicators have a positive impact on investment.
Warman & Thirlwall, 1994	Mexico	Interest rate; credit supply; lagged GDP change	Ordinary least squares (OLS)	Financial development (supply of credit from the banking system) positively impacts investment.
Jefferis, 1995	Botswana	Stocks quoted; market index; US\$ Index; real index; capitalisation; time & savings deposits; market capitalisation; exchange rate; growth; real index growth; turnover; liquidity; inflation	Exploratory	Stock market positively impacts domestic investment.
Matsheka, 1998	Botswana	Real deposit interest rate; real private sector credit; lagged accelerator term	Ordinary least squares (OLS)	Financial development (supply of credit) positively affects domestic investment.

Author(s)	Country(s)	Variables	Methodology	Conclusion
Valderrama, 2003	Austria	Cash level; user cost of capital; liquid assets/capital; liquidity ratios; bank size	General Method of Moments	Financial development (liquid-assets-to-capital-ratio) positively affects domestic investment.
Finance, 2004	Canada	Numerous financial development indicators; growth indicators	Exploratory	Financial development positively affects domestic investment.
Ahmed, 2006	Botswana	Gross national savings; private savings; public savings; credit to the private sector/GDP; M3/GDP; M2/GDP; real interest rate	Exploratory	Financial liberalisation positively impacts investment.
Pentecost & Moore, 2006	India	Broad money; nominal (GDP); domestic credit; bank deposit rate; real money balances	Multivariate cointegration approach	Financial development through financial liberalisation positively impacts investment.
Love & Zicchino, 2006	36 countries	Capital expenditure; property plant and equipment; net sales or revenues; sales to capital ratio; cash flow to sales ratio; ranking; Tobin's q; stock market development index; market capitalisation to GDP; total value traded to GDP; turnover; financial intermediary development index; liquid liabilities to GDP; domestic credit to private sector to GDP; GDP per capita	Vector autoregression (VAR)	Financial development positively affects domestic investment in countries with less developed financial systems.
Husien, 2007	Libya	Demand; time and savings deposits plus foreign currency deposits in deposit money banks and other banking institutions; real per capita GDP; real interest rate; total credit by deposit money banks; inflation rate	Vector autoregression (VAR)	Financial sector development, as explained by credit, has a very small impact on investment in the long run.
Ang, 2009	India	Financial liberalisation index; Gross domestic saving/GDP	ARDL bounds procedure and the ECM test	Financial development positively affects domestic investment.

Author(s)	Country(s)	Variables	Methodology	Conclusion
Uçan & Öztürk, 2011	Turkey	Real per capita GDP; GDP deflator growth rate; real interest rate; total credit to the private sector/GDP; broad money/GDP; total domestic credit provided by the banking sector/GDP; claims on government/GDP; index of financial development	Vector autoregression (VAR)	Financial development positively impacts domestic investment.
Anwar & Sun, 2011	Malaysia	Financial development indicators; economic growth; level of openness; real exchange rate	Simultaneous equations model	Financial development positively contributes to domestic capital stock growth.
Nasiru & Usman, 2013	Nigeria	Domestic Savings	Autoregressive Distributed Lag (ARDL) Bounds testing approach	Financial development positively affects domestic investment.
Ali et al., 2013	Pakistan	Real per capita GDP; terms of trade; liquid liabilities; bank asset ratio; private sector credit/GDP	Ordinary least squares	Financial development (credit to private sector and liquid liabilities) positively influences domestic private investment.
Asare, 2013	Ghana	Income; savings; money supply; inflation rate; interest rate; private wealth stock; private savings	Three Stage Least Squares	Private investment responds marginally to the financial liberalisation policies.
Alem & Townsend, 2014	Thailand	Headman response; time to district centre; geographic information service	Ordinary least squares, Instrumental Variables and Generalised Method of Moments	Financial development negatively impacts investment.
Hassan, 2015	Nigeria	GDP growth rate; exchange rate; liquidity ratio; M2 and domestic credit to private sector; interest rate; monetary policy rate; cash reserve ratio	Multiple regression	Financial development (money supply and domestic credit to private sector) positively impacts private investment.

Author(s)	Country(s)	Variables	Methodology	Conclusion
Balcilar et al., 2015	Turkey	Private sector investment/GDP; financial development index; real per capita disposable income, government budget balance/GDP; the real discount rate; the credit to private sector; the inflation rate	Autoregressive Distributed Lag (ARDL) Bounds testing approach	Financial development positively impacts private investment.

### 3.3 Industry and Firm Level Studies on Financial Development and Investment

The relationship between financial development and investment was taken a step further by a number of researchers as they discuss the impact of financial development on investment at industry and firm level. Although not as numerous as other studies in the earlier sections, the research at this kind of micro level enunciates more vividly the functional importance\* of the financial system to investment. For example, Gilchrist and Himmelberg (1995, 1999) proved the role of capital markets as better facilitators of exchange and investment through provision of unlimited access to commercial paper and bond markets.

Love (2003) used firm level data for 38 countries to assert that financial development diminishes financing constraints by reducing information asymmetries and contracting imperfections. The decrease in constraints induces firm investment and hence leads to an increase in aggregate investment. The same notions are reflected by Afan-gideh (2010), Kalatzis and De Castro (2010) and O'Toole and Newman (2012), as summarized in Table 3 below.

TABLE 3: Industry and Firm Level Studies on Financial Development and Investment

Author(s)	Region/Country	Variables	Methodology	Result/ Empirical findings/ Conclusion
Gilchrist & Himmelberg, 1995	United States of America	Tobin's Q; fundamental Q; cash-flow; low dividend payouts; firm size; dummy variables; participation in bond and commercial paper markets	Standard neoclassical model of investment under perfect capital markets and the model augmented with cash flow Fundamental Q-ratio	Investment is 'excessively' sensitive to fluctuations in cash flow.

\* See previous chapter for a discussion of the functional importance of finance to investment.

Author(s)	Region/ Country	Variables	Methodology	Result/ Empirical findings/ Conclusion
Gilchrist & Himmelberg, 1999	United States of America	Marginal profitability of capital; cash flow; indicators of firm level fundamental and financial factors	Panel-data vector auto-regressions (VARs)	Financial factors have a positive impact on investment.
Love, 2003	38 countries	Stock market development index; financial intermediary development index; financial development; country's legal origin categorized into four groups: English, French, German or Scandinavian; efficiency of legal system and rule of law; risk of expropriation; measure of corruption; log of GNP per capita; annual real growth rate of GDP; property plant and equipment, net of depreciation; capital expenditure; depreciation and amortization expense; beginning period capital; sales to capital ratio; cash plus equivalents scaled by total assets; cash flow; cost of goods sold; log of total assets; rank, weight; industry dummies	Weighted regression by estimating a structural investment model	Financial development positively impacts investment.
Afangideh, 2010	Nigeria	Private sector credit, M3/GDP, total currency outside banks as a ratio of broad money to GDP, stock market capitalisation, value traded ratio, turnover ratio, real interest rate, investment in agriculture, bank lending to agriculture, agricultural output, real gross domestic product	Three stage least squares estimation technique	Financial development positively affects investment in agriculture.
Kalatzis & De Castro, 2010	Brazil	Net income; depreciation and amortization expense cash flow; sales; short-term debt; long-term debt; debt; total capital; cash and short-term investments; logarithm of firm's total assets; GDP; long-term interest rate; total credit/GDP; private sector credit/GDP; stock market capitalisation/GDP.	Fixed effect logit model and a modified accelerator model of investment	The level of financial development level has an important role in investment decisions of financially constrained firms.

Author(s)	Region/ Country	Variables	Methodology	Result/ Empirical findings/ Conclusion
O'Toole & Newman, 2012	Vietnam	Financial reform index; broad money/GDP; stock market capitalisation/GDP; domestic credit/GDP; domestic credit to private sector, bank deposits/GDP; bank credit to bank deposits; bank concentration; bank interest margin; credit to private sector as percent of industrial output; state owned enterprises share of total loans; state owned enterprises share of loans to state owned enterprises share of output; % of investment lending by commercial banks to % of investment lending by state	Generalised method of moments techniques	Financial development positively affects investment.

#### 4. Conclusion

This paper has discussed the theoretical and empirical review of related literature on the impact of financial development on investment. The studies have been categorised according to the econometric model used, that is, panel studies, time series and non-panel studies, and industry and firm level studies.

Based on the studies considered, it can be concluded that financial development has, empirically, a rather significant impact on investment. Panel data studies and cross country studies seem to be the most popular model of choice in evaluating the impact of finance on investment. In addition, in country-specific studies, the flexible accelerator model has been proven to be the model of choice even for developing countries. More so, the actual measurement of financial development, according to the empirical literature discussed in this article, varies according to the researcher's interests but some pattern of using a composite financial development index and bank-based financial measures of financial development has emerged. Given the number of studies assessed, the impact of financial development on investment by country appears to have been taken as a conduit for discussing the finance-growth nexus rather than specifically focusing on the transmission mechanism of the finance-investment relationship. Therefore, the impact of financial development on investment, especially for individual countries, can be recognized as ambiguous to a particular extend. Economic research should thus delve more into the intricacies of the finance-investment nexus, especially for individual country studies.

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