

Marjit, Sugata; Das, Pranab Kumar

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Sources of Finance and Growth

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Sugata Marjit, Pranab Kumar Das

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Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

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Sources of Finance and Growth

Abstract

The paper provides an analysis of the simultaneous existence of the formal and the informal sources of finance and their implications for the rate of growth in an economy. Our main result is that in the presence of two sources of borrowing, viz. formal banking sector with lower interest rate with finance constraint and an informal credit market with a higher interest rate but unlimited amount of availability of loans, the informal source may boost the rate of growth. Hence, without the informal source of finance easily the growth rate could have been lower. The premium associated with the differential interest rate in favour of the informal source unequivocally increases propensity towards investment. Thus higher interest rate in the informal source provides the incentive to save resources from own production as banks do not lend beyond the quota. Thus, if diminishing returns do not impede marginal productivity too much, availability of informal credit must act as a growth stimulant. Thus the presence of informal credit market can be an effective catalyst for growth and development, contrary to what is generally perceived in the literature on financial inclusion.

JEL-Codes: G200, O400.

Keywords: finance, informal, growth.

Sugata Marjit
Indian Institute of Foreign Trade
India – Kolkata 700100
marjit@iift.edu

*Pranab Kumar Das**
Centre for Studies in Social Sciences
India – Kolkata 700094
pkdas@cscsscal.org

*corresponding author

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1. Introduction

The paper aims at an inquiry into the nature of relationship between finance and growth in the presence of alternative sources of finance – formal, such as banks and informal, such as, local moneylenders. In a more general framework one can also include informal source by the non-banking sector comprising of mainly the Non Banking Finance Companies (NBFC) with less control by the monetary authority over the interest rate or other terms and conditions. We construct a model of entrepreneur-investor who has the options of borrowing from banks, non-banking sector for investment in profitable investment projects or funding the investment from out of her own sources. The bank borrowing requires collateral. Hence bank borrowing is constrained by the availability of collateralizable asset, typically the physical capital stock. The entrepreneur-investor, however has the option of using own funds for investment in the project. Alternatively, she can invest the same fund on some other financial instrument, such as bank deposit or lends to some other agent that earns return. In fact the paper brings in informal credit market along with formal sources of finance thus explicitly studies the role of informal finance, an idea that is very rare in the literature, which we survey below. Our conclusion shows that the impact of the difference between a higher interest rate in the informal credit market and the a lower interest rate in the formal banking sector boosts capital accumulation when both sources of finance are tapped for funding investment compared to when only bank credit is utilized for financing investment though at a lower interest rate. This will lead to a higher capital accumulation when both sources of finance are utilized with a

possibility of higher growth rate (under certain conditions). This will improve social welfare when growth rate rises. Ours is interesting and quite novel since the conventional wisdom seems to be that large scale dependence on informal borrowing in developing or emerging market economies has adverse impact on growth.

The idea that financial structure affects growth is nothing new in economics. Beginning with Schumpeter (1928), Hicks (1969) and North (1981) the more recent strand of the literature includes Bencivenga & Smith (1991), Greenwood & Jovanovic (1990), Greenwood & Smith (1997), King & Levine (1993), Levine (1997), Arestis & Demetriades (1997), Demircuc-Kunt & Levine (2001), Levine (1997), Levine, Loayza & Beck (2000) evaluates the empirical evidence on the finance-growth literature. However, more recent studies report that the relation is not uniform, but depends on the level of development that the country in question has achieved (Bittencourt, 2012; Nguyen *et al*, 2019; Ibrahim & Alagidede, 2018). The impact of financial development operates via the services of financial intermediation itself and rooted in the theory of micro foundations of banking. Banks or financial intermediaries help mitigate the risk of entrepreneurial ventures. The influential papers in this area are Paulson and Townsend (2004), Rosenzweig and Binswanger (1993), Rosenzweig & Wolpin (1993). The empirical evidence is not only limited to the developing countries with weak network of banking sector, but the evidence from the developed countries also strengthens the argument. For example, Nguyen (2019) reports that bank branch closure in 2000's had a persistent adverse impact on small business in US that became more severe during the financial crisis. Huber (2018) also reports that decreased lending during post war Germany not only had adverse effect on the firms but also other firms which were not subject to lending cut leading to adverse impact on the regional economy. In a slightly different context, Hansen & Ziebarth (2017) shows that bank-entrepreneur relationship led to lesser degree of bankruptcy during adverse macro shock of 1930's depression in Mississippi. Tewari (2014) finds that extension of branch networking in US in 1980's and 1990's led to increased mortgage access to disadvantaged groups, like low-

middle income, young and ‘black’. However, this view has been subject to criticism in post 2008 crisis (Gould *et al*, 2016).

The existing research suggests that access to formal financial institutions expands the economic opportunities of individuals that are unable to tap into the dynastic wealth of their families to fund their entrepreneurial endeavors. With a weaker banking network and/ or other formal financial institutions a significantly large segment of the population of the emerging market economies, such as India, Brazil, South Africa etc. have to depend on the informal credit market or in the more recent times from the micro finance institutions for meeting their credit needs. However, the borrowing from informal credit market or the micro finance institutions are not entirely segmented from the formal credit market. Both exist and supplement each other (Guirking, 2008; Jain, 1999; Madestam, 2014). Since borrowing from the formal credit market – banks, is generally governed by the amount of collateral, absence of collateral or inadequate collateral poses a hindrance for bank borrowing by a large mass of the population. This, however, is not a hindrance for the informal sector – local moneylenders to meet the credit needs of the people who are unable to offer collateral. Because the moneylender is a local resident, hence knows the borrowers well and their credit worthiness. The borrower cannot default on the loan because of various extra economic forces exerted by the money lenders. However, it comes at a huge cost in the form of a very high interest rate. ²As reported by Banerjee & Duflo (2007) and (2010), Das-Gupta (1989) that the informal interest rate is often well above 50% per year. However, de Mel *et al* (2008) has reported on the basis of field experiment that the marginal productivity of capital of such

² One can also generalise the informal source of credit to include the NBFCs who act like money lenders have often been accused of using musclemen to realize uncollateralized loans or where collateral value depreciates, as in automobile loans in India. Banks, though less frequently have also been accused of such practices (The Times of India, Mar 30, 2016 and July 06, 2018). It became so widespread in India that questions were raised in the parliament. In response to a question in the Rajya Sabha (Upper House of the Indian parliament), Mr. P. Chidambaram, Finance Minister responded that stern action would be taken against the banks and NBFCs if involved in any illegal means for loan recovery.

enterprises are also surprisingly high, as high as 55% to 63% in Sri Lanka and 3000% in Mexico. So the informal credit market is not as growth decelerating as is often thought to be. Jain (1999) and Madestam (2014) have shown in theoretical models why the formal and informal credit markets coexist.

Karaivanov & Kessler (2018) discusses the phenomenon of co-existence of formal and informal loans in Thailand - small projects are financed by informal loans while large projects are financed by formal sector loans. The empirical evidence from rural Thailand corroborates the argument based on a theoretical model. However, the distinction of formal and informal loans adopted in the study is different from the standard distinction in the literature. While formal loan is defined as the loan from banks, same as in the literature, by informal loan they refer to loans from friends and relatives with a low rate of interest. But in general the loan from informal credit market in the usual sense of the term, meaning informal moneylenders, in the developing world as in Africa, Bangladesh, India and elsewhere has a higher rate of interest that is justified by the little or no collateral. Analyzing data from several sources Allen *et al* (2012) finds that for external source of financing bank is second to non-bank finance, often backed by non-legal mechanism in India. In terms of efficiency the firms with banks or markets as the major source of finance is not superior to the non-bank or non-market sources.

While several studies have reported increase in efficiency and profitability in the financial sector in general and banking sector in particular in the post reform period in India, Das & Guha-Khasnabis (2008) reports that flow of credit has decreased in the agriculture compared to industry or services while Marjit & Das (2008) reports that aggregate growth of loan has not increased during the post-reform period compared to the pre-reform period. Banerjee & Duflo (2014) reports that small firms in India are finance constrained from the banking sector. Burgess & Pande (2005) finds that bank licensing policy of pre-reform era compared to the post-reform era helped reduction of poverty in rural areas in the country. Somville and Vandewale (2018) based on a field experiment in rural India, reports that direct payment to bank accounts significantly raises savings

that lasts long. Dupas *et al* (2018) in a study on the impact of policy driven extension of bank networking in Uganda, Malwai and Chile found that mere expansion of basic account has no impact on savings and welfare. However, Sayinzoga, Bulte and Lensink (2016) reports on the basis of a field experiment in Rwanda that while training on financial literacy led to positive effect on startups, it failed to generate an increased income.

The present study extends the horizon of the literature on ‘finance-growth’ by including the informal financial sector in the growth process. In fact we show that the simultaneous presence of the formal and the informal sector can have a growth boosting effect. With this introduction the remainder of the paper proceeds as follows: Section 2 provides the model with a typical entrepreneur-investor which has access to two sources of finance, Section 3 shows the main results of the paper under steady state and Section 4 finally concludes.

2. The Model

The typical agent in this model is an entrepreneur-investor, interchangeably also called firm, who operates in a competitive environment with a capital stock at time t which has accumulated over time from investment made in previous periods and some liquid assets, such as cash that may or may not be used for financing the current investment. Even if the liquid cash or other financial asset is used for funding own project of the entrepreneur-investor, it may not be adequate for financing profitable investment project, hence the entrepreneur-investor has to borrow from external sources. Alternatively the liquid cash or other financial asset is not used as it can have higher opportunity cost. The entrepreneur-investor produces with capital stock, K_t with CRS technology and exogenously given technology. The production function is denoted by $f(K_t)$ with usual assumptions on marginal products. One can assume that there is a given supply of labour which is normalized at unity, so that the production function is in the intensive form. The entrepreneur-investor can have access to two sources of finance, viz. (a) banks at a lower rate of interest $\bar{R}_t$ which requires collateral, (b) informal source which does not need collateral but the interest rate, R_t^* is

higher than $\bar{R}_t$. The presence of the requirement of collateral implies that bank finance is constrained by the availability of the collateral, viz. capital stock.

The volume of bank lending, denoted by B_t is determined by the availability of collateral, which in this model consists of capital stock of the entrepreneur at the beginning of the period, K_t . A fraction of the capital stock is deemed fit for collateral, not the whole of the capital stock, because there are costs of recovery for litigation and other administrative costs in the event of default. In the bad state the bank can appropriate more than $(1 + \bar{R}_t)B_t$. For the bank the no default constraint of the firm is given by:

$$(1 + \bar{R}_t)B_t < q\lambda(K_t + B_t) \Rightarrow B_t(\bar{R}_t - q\lambda) < q\lambda K_t.$$

where q is the probability of default and λ is the proportion of the capital stock that is fit to be considered for collateral ($0 < \lambda \leq 1$). The maximum amount of the bank borrowing available to the entrepreneur-investor is given by:

$$\text{Max } B_t = \frac{q\lambda}{1 + \bar{R}_t - q\lambda} K_t = \eta_t K_t \text{ where } \eta_t = \frac{q\lambda}{1 + \bar{R}_t - q\lambda}.$$

Cash flow of the typical entrepreneur is given by:

$$f(K_t) - C_t - (1 + \bar{R}_t)\eta_t K_t - (1 + R_t^*)(K_{t+1} - \eta_t K_t) = 0.$$

where C_t is the consumption expenditure. It may be noted that consumption is assumed not to be loan financed. The entrepreneur-investor borrows only for making investment in capital stock. It may also be noted that as $(K_{t+1} - \eta_t K_t) > 0$, it must be the case that $f'(\eta_t K_t) > (1 + \bar{R}_t)$. The optimal choice of the entrepreneur-investor who opt for both bank borrowing and informal borrowing is given by:

$$\max_{C_t, K_{t+1}} \sum_0^\infty \beta^t U(C_t)$$

$$\text{s.t. } f(K_t) - C_t - (1 + \bar{R}_t)\eta_t K_t - (1 + R_t^*)(K_{t+1} - \eta_t K_t) = 0,$$

where $\beta = \left(\frac{1}{1+\rho}\right)$ is the discount factor.

The Bellman equation for the optimisation is given by:

$$V(K_t) = \max_{C_t, K_{t+1}} u(C_t) + \beta V(K_{t+1})$$

$$\text{s.t. } f(K_t) - C_t - (1 + \bar{R}_t)\eta_t K_t - (1 + R_t^*)(K_{t+1} - \eta_t K_t) = 0.$$

The Lagrangean for the above problem is:

$$\Phi = \max_{c_t, K_{t+1}} u(c_t) + \beta V(K_{t+1}) + \mu_t [f(K_t) - c_t - (1 + R_t^*)(K_{t+1} - \eta_t K_t)], \text{ where } \mu_t \text{ is the}$$

Lagrange multiplier for period t .

The FOC:

$$u'(C_t) = \mu_t$$

$$\beta V'(K_{t+1}) = \mu_t (1 + R_t^*)$$

where μ_t is the Lagrange multiplier for the constrained optimisation for the t^{th} Period.

Using Benveniste-Scheinkman Formula we have

$$\beta u'(c_{t+1}) [(R_t^* - \bar{R}_t) \eta_t + f'(K_{t+1})] = (1 + R_t^*) u'(C_t).$$

With a logarithmic utility function, $u(C_t) = \ln C_t$ the above expression boils down to

$$\frac{C_{t+1}}{C_t} = \frac{f'(K_{t+1}^*) + \eta_t (R_t^* - \bar{R}_t)}{(1 + R_t^*)(1 + \rho)}.$$

In steady state all the variables grow at the same rate so that rate of growth of consumption is the same as the rate of growth of income. Denoting the rate of growth of income by g_t we have,

$$\begin{aligned} \frac{f'(K_{t+1}^*) + \eta_t (R_t^* - \bar{R}_t)}{1 + R_t^*} &= (1 + g_t^*)(1 + \rho) \approx g_t^*(1 + \rho) \\ \Rightarrow g_t^* &= \frac{f'(K_{t+1}^*) + \eta_t (R_t^* - \bar{R}_t)}{1 + R_t^*} - (1 + \rho). \end{aligned}$$

Denoting the steady state growth rate in this case by g^* ,

$$g^* = \frac{f'(K^*) + \eta (R^* - \bar{R})}{1 + R^*} - (1 + \rho) \quad (1)$$

When the only source of finance is bank then the growth rate is given by,

$$g_t^0 = \frac{f'(\eta_t K_t)}{1 + \bar{R}} - (1 + \rho). \quad (2)$$

The corresponding steady state is given by:

$$g^0 = \frac{f'(\eta K)}{1 + \bar{R}} - (1 + \rho) \quad (3)$$

Comparing equations (1) and (2) it is clear that

$$g^* > g^0 \text{ iff } \frac{f'(K^*)}{1+R^*} + \eta \frac{(R^* - \bar{R})}{1+R^*} - \frac{f'(\eta K)}{1+\bar{R}} > 0 \quad (4)$$

3. Results under steady state

Proposition: In the presence of an informal credit market along with a formal banking sector which charges a lower interest rate along with collateral requirement, the growth rate will be higher provided that the difference in the interest rate between the formal and informal sources are very high.

It may be noted that ηK is not a choice variable for the firm as it is the rationed amount of credit by the bank depending on the availability of capital stock in the current period. So firms would like to invest more, so that $K^* > \eta K$.

From (4)

$$\frac{f'(K^*) + \eta(R^* - \bar{R})}{f'(\eta K)} > \frac{1+R^*}{1+\bar{R}} \quad (5)$$

If $K^* > \eta K$ then $f'(K^*) < f'(\eta K)$.

However, firms have an added advantage with a higher K^* as the higher K^* will reduce their cost of capital and that would depend on the rate of interest in the informal (or non-banking) sector,

$(R^* - \bar{R})$, greater is η the impact is reinforced. Hence, availability of additional credit can be a growth boosting factor. It follows from the RHS of (5) that higher R^* is bad for growth financed by informal source of credit, but good because it increases the incentive to accumulate as evident from the RHS of (5). Higher R^* is costly in the sense that it acts as the discount factor of marginal product of capital. Marginal product of capital is realized later and R^* is the current cost. So $f'(K^*)$

must not fall too much with respect to $f'(\eta K)$ when $K^* > \eta K$, i.e. $\frac{f'(K^*) + \eta(R^* - \bar{R})}{1+R^*}$ should not be

less than $\frac{f'(\eta K)}{1+\bar{R}}$. That is what is spelt out in (4). But $(R^* - \bar{R})$ is the added benefit that rises with R^*

given $\bar{R}$. Hence it is a boost to the marginal benefit. Firms' profit will surely go up with the

availability of the informal credit. But as $K^* > \eta K$, with diminishing returns g^* may not be higher

than g^0 , the usual Solow effect will prevail. However, for a high enough premium of the interest rate differential the rate of growth with two sources of finance will be higher than when there is only bank as the source of finance. In case of any variant of “AK” type endogenous growth model there will be no difference whether it is K^* or ηK is the steady state capital. Equation (5) will look like

$$\frac{A + \eta(R^* - \bar{R})}{A} > \frac{1 + R^*}{1 + \bar{R}} \quad (6)$$

where A has the usual meaning in the endogenous growth literature with a ‘AK’ production function.

Often in the literature the development economists express their concerns with the gap in $(R^* - \bar{R})$ with detrimental effect on the capital accumulation and growth which, however, as we show provides a stimulus for investment when firms are credit constrained. What is missed out is that having an informal source and not having an informal source makes a significant difference. $(R^* - \bar{R})$ provides a large benefit to the firms where they are credit rationed. In fact $(R^* > \bar{R})$ provides them the additional incentive to accumulate extra capital, i.e. go for higher investment, ofcourse if we focus only on investment loans and not consumption loan, the latter often leads the poor to debt trap. But in a system where formal sector cannot afford to be more flexible due to institutional rigidity (as captured by q and λ in our paper), existence of informal credit market is of great help to the firms. The empirical literature corroborates the theoretical justification provided here. What is often not taken into account in the development economics is that such high rate of interest in the informal credit market can be sustained because the marginal product of capital for very small sized firms with very little access to formal banking sector loans can be very high.

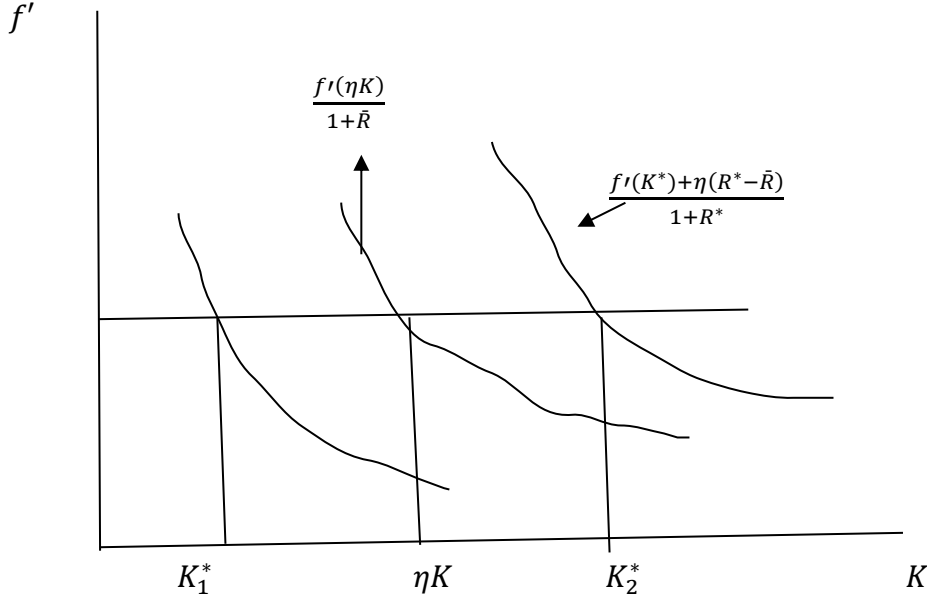
Further analysis is provided for the solution of the stationary state with (a) the level of capital K^* and ηK and (b) AK type model.

(a) Stationary State Solution with K^ and ηK .*

From equations (1) and (2) under stationary state we have,

$$\frac{f'(K^*) + \eta(R^* - \bar{R})}{1 + R^*} = \frac{f'(\eta K)}{1 + \bar{R}}.$$

This is represented in Fig. 1 below. When the capital accumulation given by the LHS of the above equation is lower than the RHS then we have a lower capital accumulation K_1^* with both sources of finance. In the other case with the corresponding capital accumulation with both sources is higher than when there is only bank as the source of finance.



(b) Stationary State Solution with AK Type Production Function $f(K) = AK$.

We consider the same problem in an endogenous growth model of AK type as in classic models of Rebelo (1991), Barro and Sala-i-Martin (2004), Lucas (1988) and more recent variant Marjit and Mandal (2017), Beladi *et al* (2024). In this case the steady state growth for the two cases are given by

$$g^* = \frac{A + \eta(R^* - \bar{R})}{1 + R^*} - (1 + \rho) \quad (7)$$

$$g^0 = \frac{A}{1 + \bar{R}} - (1 + \rho) \quad (8)$$

$$\begin{aligned} g^* > g^0 & \text{ iff } \frac{A + \eta(R^* - \bar{R})}{A} > \frac{1 + R^*}{1 + \bar{R}} \\ & \Rightarrow \frac{A + \eta(R^* - \bar{R})}{A} - 1 > \frac{R^* - \bar{R}}{1 + \bar{R}} \\ & \Rightarrow \eta(1 + \bar{R}) > A \end{aligned} \quad (9)$$

(9) states that for low productivity firms (lower A) if the informal credit market boosts growth rate, greater requirement of collateral (higher η) will do the same as well as higher $\bar{R}$.

It may be noted that the interest rate in the banking sector is determined by the zero profit condition of the banking sector under the assumption of the competitive banking. It will be determined by the deposit rate which in turn is determined by the policy rate, aggregate money supply, cash

reserve ratio etc. The interest rate in the informal sector is determined by the lender under the assumption of local level monopoly pricing as we argued earlier. The demand for informal sector loan is the volume over and above the borrowing from the banking sector. There is however a cost of recovery by way of use of extra economic forces, like muscle power, or a cost due to such extra illegal means. However, in the steady state both the interest rates are at their steady state levels and does not change our main results. We did not provide the determination of both as the same are not very important for our basic results.

4. Conclusion

We consider the problem of two sources of finance a simple model of entrepreneur-investor with two sources of finance, one the formal banking sector and the other an informal sector credit market. The banking sector lends at a lower rate of interest but the finance is constrained by the availability of collateralizable asset which takes the form of physical capital in this model. The informal source of credit is unlimited without any requirement of collateral, but the interest rate is appreciably higher than the availability of the banking sector credit. We derive the optimal level of capital when both sources are utilized and when only the banking sector credit is utilized. The latter is not endogenously determined, but determined by the available capital stock which is given from investment made in earlier periods, hence given to the firm.

It is shown that the premium due to the difference of the informal and formal sector interest rates there is an incentive on the parts of the firms to accumulate higher level of capital, but no such premium exists when only one source of finance is utilized. The higher capital accumulation has a lower marginal productivity of capital. So there are two forces in play when two sources of finance are utilized. Since the premium which is the benefit appropriated in the previous period while the marginal product is appropriated in the next period, hence the presence of two sources of finance leads to higher capital accumulation undoubtedly. But the growth rate may or may not be higher than when only bank finance is available in the steady state. This is true with an usual neo-classical

production function with diminishing marginal product as well as an ' AK ' production extensively used in the endogenous growth literature. The results of the model implies a policy of financial development in the formal financial sector may not have higher capital accumulation nor the growth boosting effect, hence lower social welfare. This is contrary to the conventional wisdom towards the policy of financial inclusion especially in the deloping and emerging market economies with a large informal credit market.

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