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The Theoretical Derivation of Credit Market Segmentation as the Result of a Free Market Process

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Abstract

Information asymmetries make it difficult for banks to assess accurately whether specific entrepreneurs are able and/or willing to repay their loans. This leads to implicit interest rate ceilings, i.e. banks "refuse" to increase their interest rates beyond this ceiling as this would lower their net returns. Although the maximum interest rate increases as the size of enterprises decreases, such ceilings nonetheless constrain the banks' ability to set interest rates at a level that would enable them to cover costs. If transaction costs are high, the total costs associated with granting small and medium-sized loans will exceed the maximum average return which the banks can earn by issuing such loans. For this reason, banks do not lend to small and medium-sized enterprises, and, as a consequence, these businesses have no access to formal sector loans.

Because micro and small enterprises have a very high RoI, it is worthwhile for them to rely on expensive informal loans to finance their operations, at least until they reach a certain size. Once they have reached this size, however, it does not make economic sense for them to continue taking out informal credits, and thus they face a growth constraint imposed by the credit market. Medium-sized enterprises earn a lower RoI than small ones, which is why borrowing in the informal credit market is not a worthwhile option for them. Moreover, they do not have access to credit from formal financial institutions, and are thus excluded from obtaining any kind of financing in either of the two credit markets.

As the result of free, unregulated market forces we get a stable equilibrium in which the credit market is segmented into an informal (small loan) segment, a formal (large loan) segment and, in between, a "non-market" (medium loan) segment.

Introduction

In most developing countries, large segments of the population live in poverty. They work in informal small or micro enterprises which must rely on extremely expensive informal loans, as they do not have access to formal sector bank loans to meet their financing requirements. Because capital is expensive, the operations of such enterprises are highly labour intensive, and labour productivity is low; thus, wages in the informal sector are also very low.

Developing countries also have a modern, formal sector which operates parallel to the informal sector and which, by comparison, enjoys a good supply of relatively cheap capital, high labour productivity, and high wage rates. Large factor price differentials create a wide gap between rich and poor in these countries, although they do not, as traditional economic theory predicts, lead to a high degree of factor mobility, which would tend to reduce differences in factor prices.

Economic theory has so far been unable to explain why it is that, even in countries where far-reaching liberalisation has made markets relatively competitive, factor markets remain segmented. For lack of a better explanation, the refusal on the part of formal financial institutions to offer small loans to informal-sector enterprises has been justified by pointing to interest rate ceilings[1] (which in the meantime have been largely eliminated) or asymmetric information problems.[2] However, banks also seldom lend even to medium-sized enterprises. Moreover, the interest rate differentials between the smallest bank loans and the largest informal loans are striking. At present, there is no clear explanation as to why no formal institutions have been established to bridge this gap by offering loans which are smaller than those available from banks at somewhat higher interest rates than those charged by banks. If such institutions existed, credit market segmentation would not occur. Instead, there would be a continuum of lending rates which would be a function of the intermediation costs and loan amounts involved in each case.

This paper addresses the question why credit market segmentation occurs. Are there "compelling" factors which make its existence inevitable? Under what conditions does segmentation occur?

To facilitate answering this question, "enterprise size" is explicitly incorporated as a dimension of the analysis. Rather than making the typical distinction between "large" and "small" enterprises, this paper assumes a continuum of possible sizes. On the one hand, this will enable us to describe more clearly the causes of credit rationing and credit market segmentation; on the other, it will lay the conceptual groundwork which will be used to illustrate why there are no institutions which cater for the demand of "medium-sized" borrowers.

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1 Cf. GONZÁLEZ-VEGA, 1984.

2 Cf. e.g. VON PISCHKE, 1991.

In the following analysis all issues relating to lending are invariably viewed from the perspective of the credit institutions, as they are the limiting side of the market. Unless explicitly defined otherwise, the "total costs of the bank" and their components are invariably understood to be the costs of lending expressed as a percentage of the loan amount.

The first section contains a presentation of the basic model and the assumptions on which it is based. The second section examines how banks respond when information asymmetries prevent them from making a relatively reliable estimate of the *ability* of individual borrowers to repay their loans. Both sections form the basis for the derivation of a credit supply function of banks in the third section. The fourth section explores the banks' response to the possible or purported *unwillingness* of borrowers to pay, i.e. a modification of the bank credit supply function. This function will be compared with the supply function of informal lenders to demonstrate why credit market segmentation inevitably occurs.

1. The basic model and its underlying assumptions

It is often observed that the RoI of an enterprise depends on its size. The RoI of very large enterprises is relatively low because there are virtually no restrictions on the international mobility of capital for large-scale projects, and yield advantages are quickly noticed by other market participants, who then take steps to exploit such advantages for themselves.[3] In contrast, smaller enterprises can move into, and develop, narrow market niches without attracting too many direct competitors on the same scale, as capital restrictions and high capital costs usually restrain the scope of activity for small, informal enterprises. This in turn enables them to achieve higher returns than those earned by large enterprises. In addition, in nearly all developing countries the opportunity cost of (unskilled) labour is very low. As a result, informal enterprises produce with very high labour intensity and their RoI is therefore extremely high. It can exceed 100 percent per month.

This is shown in figure 1 derived from empirical studies on the return on investment of borrowers of Caja Los Andes, Bolivia.[4] The data presented here are not corrected for any entrepreneurial salaries because it is difficult or impossible to estimate an appropriate salary. Therefore, the average return on investment shown here might be misleading. For this reason, the marginal return on investment is depicted as well, showing that increases in total assets yield high but decreasing returns.

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3 This may be different in certain high-tech sectors such as computer chip production or the software or aircraft industries, owing to high market entry barriers. In the majority of "developing country industries", however, businesses wishing to produce the goods supplied by most "large enterprises" do not face especially high market entry barriers.

4 Cf. JUNGBLUTH, 1999.

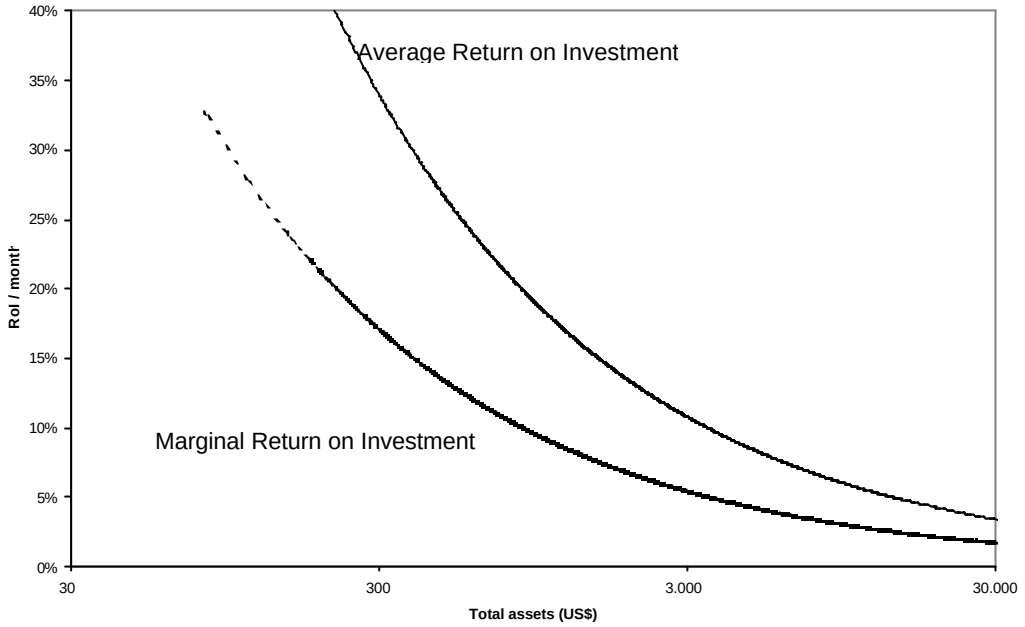

Fig. 1: The empirical relationship between RoI and enterprise size

These observations form the point of departure for the following analysis. It will be assumed that an enterprise's RoI decreases as its size increases. The total assets of an enterprise will be taken as a measure of its size. For the sake of simplicity we will assume a linear RoI-function as shown in Figure 2, using a logarithmic scale for the X-axis.

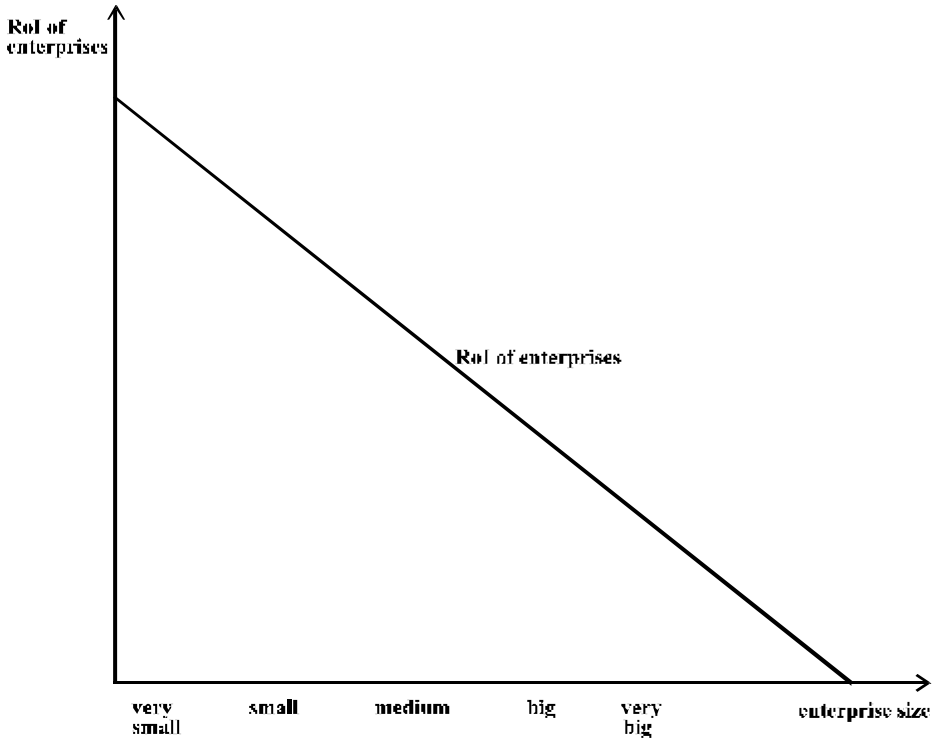

Fig. 2: The (assumed) relationship between RoI and enterprise size

As the next step, we must determine the costs which banks incur by lending to enterprises of various sizes.[5] It is assumed that the size of loan demanded by an enterprise is proportional to its size.[6] Because certain transaction costs are fixed – i.e. they have no relationship to the size of the loan disbursed – the banks' costs of lending, expressed as a percentage of the loan amount, are higher for small credits than for larger ones. The risk-related costs (likewise expressed as a percentage of the loan amount) are also higher for small borrowers than for larger ones, not because their business activities inherently involve higher risk – indeed, the opposite is true – but rather because conventional banks, with their traditional procedures, are not able to assess accurately the risk inherent in lending to such enterprises, which typically do not even keep written accounts. The purpose of a given loan has no bearing on the bank's funding costs, which are thus the same for all loans.

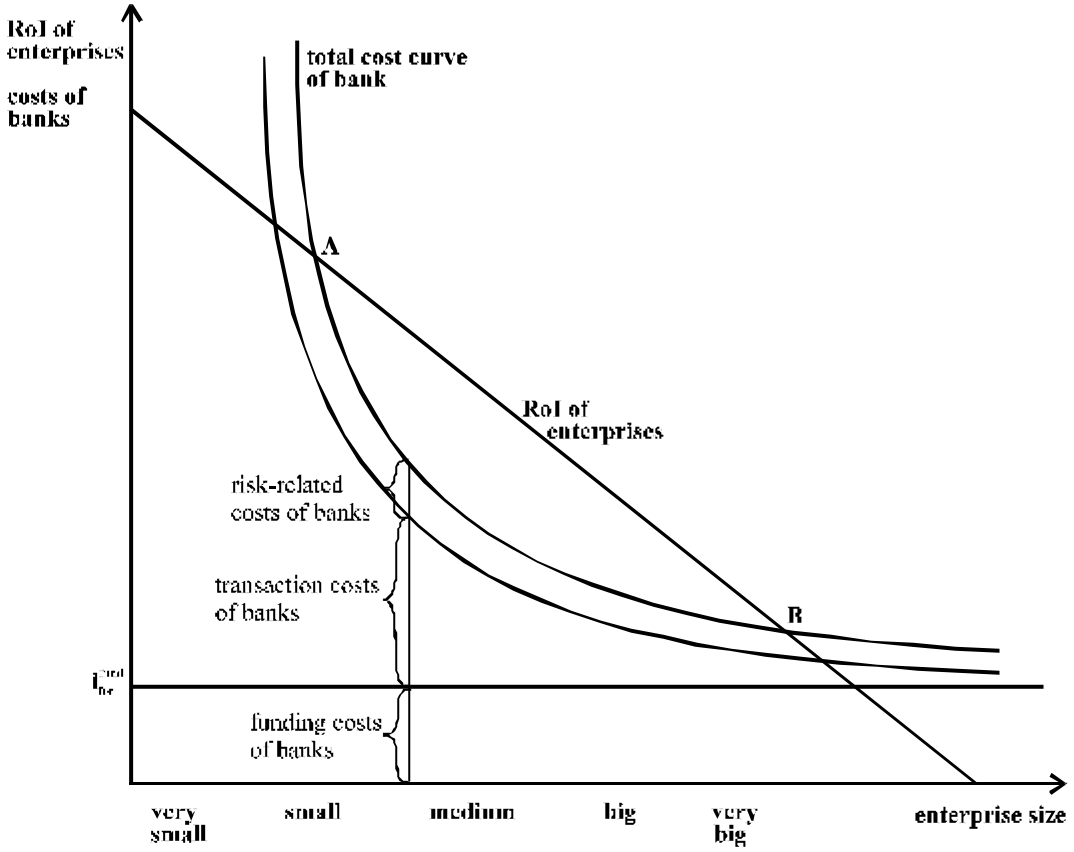

Fig. 3: The costs of lending for banks

5 The perspective of the enterprise is analysed in the annex of the paper.

6 Indeed, it has been observed that small and micro enterprises finance a far larger share of their "balance sheet total" internally than do large enterprises. For the sake of simplicity, in the following it will be assumed that all enterprises have the same capital ratio. If the lower capital ratios of large enterprises were taken into account in the analysis, there would be no qualitative change, and the quantitative effects would be amplified.

Figure 3 above shows the costs of lending incurred by banks (expressed as a percentage of the loan amount) as a function of the size of the loan, and thus of the enterprise size. First, the banks' variable and fixed transaction costs must be added to the funding rate, i_{for}^{fund}. The transaction costs for small loan amounts can be extremely high because the loans in question are enterprise loans. Micro entrepreneurs usually do not qualify for other types of credit such as personal loans or overdraft facilities on current accounts, and thus have no choice but to take out enterprise loans, which are more costly for banks to grant. The relevant risk costs have also been taken into account.

The uppermost curve represents the costs of lending for banks as a function of the size of the loans or of the size of the borrowing enterprises. In other words, if banks lend at the interest rates on this curve, they will only just be able to cover their costs. As a consequence, bank credits would be available to, and attractive for, all enterprises for which the RoI lies above the cost curve of the banks and therefore enterprises larger than A and smaller than B. Such an allocation of credit would also be efficient at the macro-economic level.

This model illustrates clearly the effects of statutory interest rate ceilings (Figure 4).[7] For example, if the government introduces an interest rate ceiling of i_{legal}^{max}, enterprises will only be eligible to borrow if they generate costs of less than i_{legal}^{max} for the banks, which means they must be at least as large as SE_{for}^{min}. All enterprises smaller than SE_{for}^{min} are subject to credit rationing because the banks would lose money by lending to these businesses at an interest rate of i_{legal}^{max}. This is worthy of note in particular because the larger enterprises in this segment show the greatest spread between RoI and capital costs; i.e. from a macro-economic point of view they make the most efficient use of the capital available to them.

Thus, an area emerges within the credit market (area DBE) in which a loan contract is of absolute advantage for all participants (henceforth, this area will be referred to as the "contract area"). A contract on one of the boundaries will enable only one party to realise the maximum possible return, while the other party remains indifferent. For an enterprise of a given size, the greater the vertical distance between the "contract point" and the respective party's cost function or yield point, the higher the profits for that party will be. If this distance is multiplied by the loan amount (a function of the size of the enterprise), the result is the absolute profit for each party to the contract. The graph illustrates that an interest rate ceiling has no influence on the lending rates offered to large enterprises, whereas for smaller enterprises which have not been subject to credit rationing, such a ceiling causes the "profit distribution" to shift in favour of the enterprises.

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7 For a simplified explanation cf. GONZÁLEZ-VEGA, 1984.

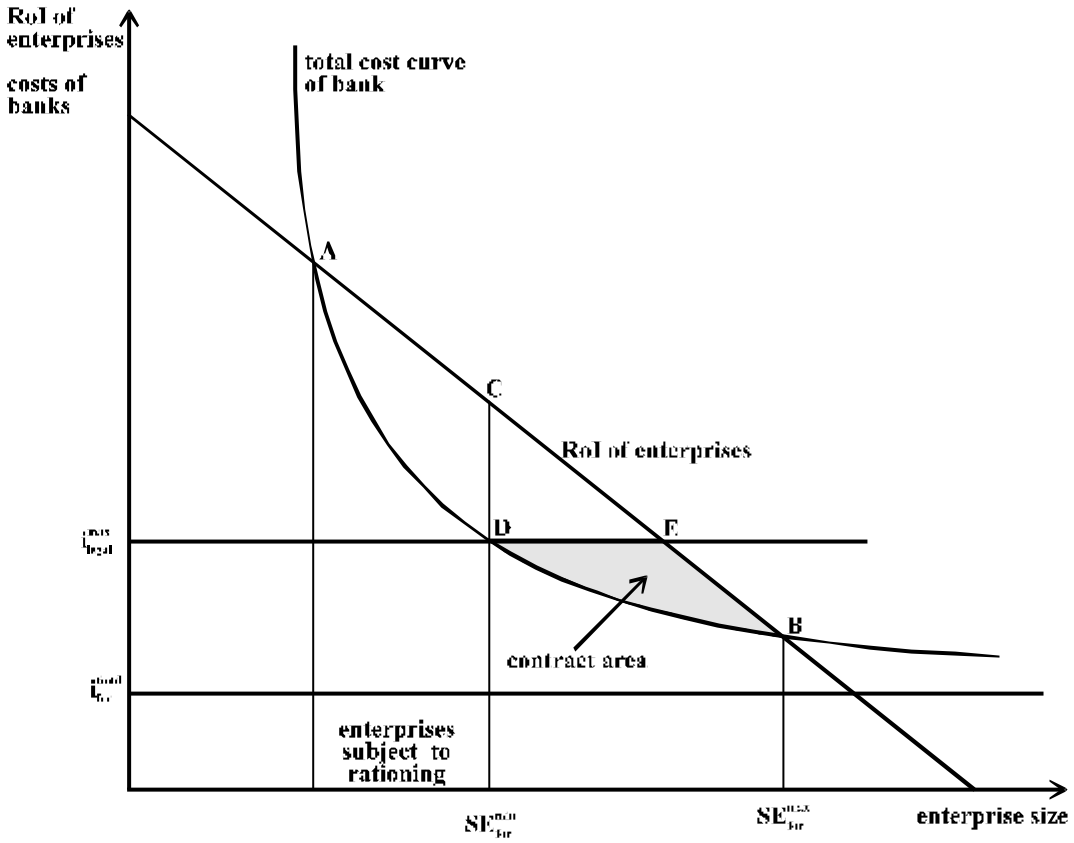

Fig. 4: The effect of legal interest rate restrictions

In the course of the past decades, legal maximum interest rates have been eliminated in nearly all countries. Nonetheless, experience has shown that banks usually do not raise their interest rates beyond a certain limit, preferring instead to avoid lending to small enterprises. The reasons for this will be discussed in the following sections.

2. The ability to pay and information asymmetries

This section analyses the impact of information asymmetries on the credit supply provided by banks. Using the STIGLITZ/WEISS (1981) model, it will first be demonstrated that – like statutory regulations – asymmetric information can lead to a situation in which it would be detrimental to the banks if they were to raise interest rates above a certain level. As a result, the pricing mechanism which could serve to clear the markets is rendered ineffective. In the second part of the section, several highly restrictive assumptions of the STIGLITZ/WEISS model are relaxed; the revised model is then used to derive the banks' response to information asymmetries, especially as regards pricing and rationing.

a) The STIGLITZ/WEISS model

This sub-section contains a brief summary of the key arguments presented in the article by STIGLITZ and WEISS (1981). A detailed derivation of the results will not be presented here.[8]

Figure 5 summarises the basic features of the STIGLITZ/WEISS model.[9] The third quadrant represents a savings function in which it is assumed that there is a positive correlation between savings volume (S) and the interest rate on savings deposits (r^s). However, there would be no fundamental change in the results even if the savings volume were completely inelastic with respect to interest rates. The return on the banks' lending activities (r) must be at least as high as the deposit interest rate. For the sake of simplicity, these two variables are assumed to be equal and in the following are represented by the same symbol (r). In the second quadrant, the savings volume is merely transposed into the first quadrant, where it represents the credit supply.[10]

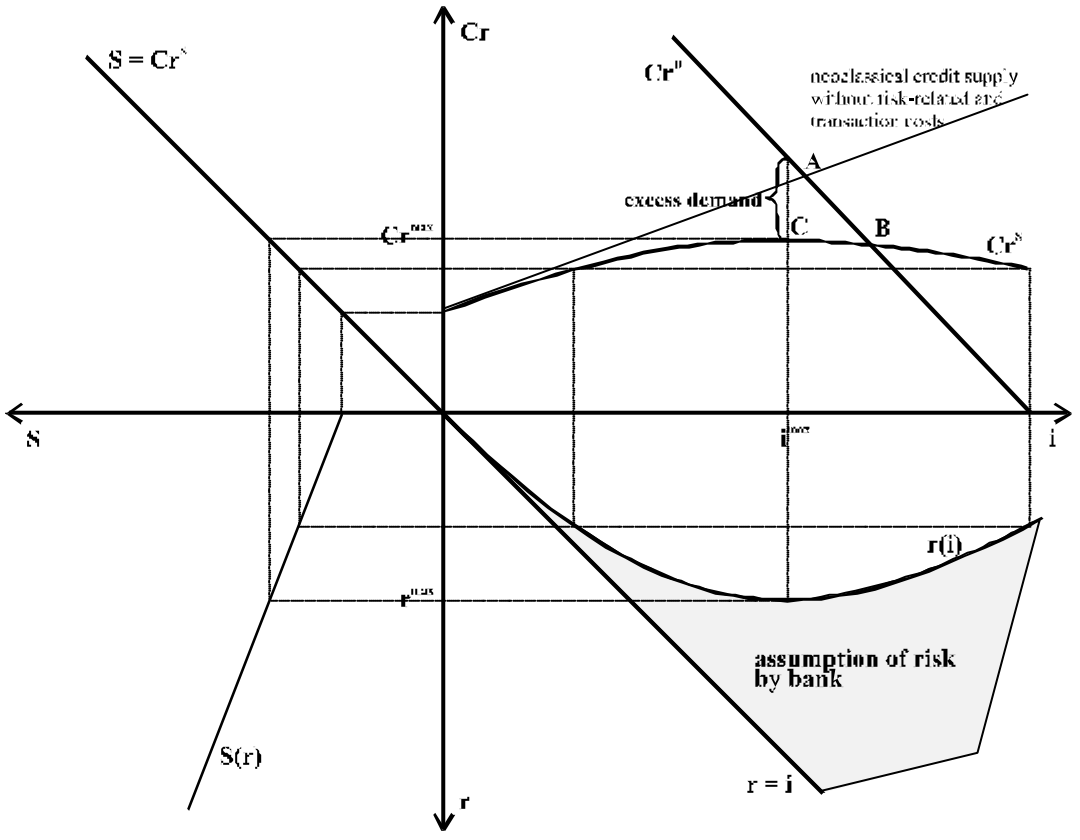

Fig. 5: The central implications of STIGLITZ/WEISS (1981)

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8 In addition to STIGLITZ/WEISS, 1981, see TSCHACH, 1995, for a more detailed derivation.

9 Cf. STIGLITZ/WEISS, 1981.

10 Owing to the multiplier effect, the banks can lend amounts which are a multiple of their deposits. However, because the multiplier is an exogenous factor and thus a constant, the result is merely a bubble which is assumed to be already contained in the savings function shown on the graph.

The first and fourth quadrants are of key importance. The fourth quadrant shows the banks' return (r) as a function of the contracted lending interest rate (i). Proceeding from the assumption of asymmetric information distribution between lender and borrower, STIGLITZ and WEISS show, on the one hand, that when lending interest rates go up, low-risk borrowers do not (cannot) implement their projects. On the other hand, for borrowers who continue to implement projects, rising interest rates provide an incentive to invest in increasingly risky projects. The banks must bear part of the risk, which is reflected in their returns: While the straight line in the fourth quadrant describes a relationship between r and i which would apply if there were no credit risk for the bank (r = i), r(i) represents the relationship which is in fact relevant for the bank. STIGLITZ and WEISS have shown that when interest rates increase beyond a certain rate (i^{max}), the banks' returns must decrease.

The first quadrant plots the credit supply of the banks, which is derived through simple transposition in a four-quadrant system (unlike typical representations of supply and demand, the position of the axes here has been reversed). Although there is a point at which credit supply and credit demand intersect (B), this point represents an interest rate which is higher than i^{max} (C). The banks are not willing to charge such high rates, because in doing so they would reduce their returns. Thus, they will disburse loans of Cr^{max} at the interest rate of exactly i^{max}. By "refusing" to charge higher interest rates (i.e. prices), which would in turn reduce the demand which exists at i^{max}, the banks render the market mechanism ineffective: The existing excess demand for funds cannot be absorbed by higher prices, but instead remains at the level plotted in the graph.

From this analysis, it can be concluded that even without legal interest rate restrictions, information asymmetries can lead to "implicit" interest rate ceilings; this in turn prevents markets from clearing and leads to credit rationing. These effects are analogous to the impact of statutory interest rate ceilings.

b) Extensions of the STIGLITZ/WEISS model

We shall now extend the STIGLITZ/WEISS model so as to make its assumptions compatible with those of the basic model. The assumptions of STIGLITZ and WEISS which are problematic in this respect are that a) all borrowers demand credit in equal amounts, b) all borrowers have the same expected RoI of their projects, and c) no transaction costs need be taken into account.

These three assumptions shall now be relaxed. Depending on their size, enterprises achieve different RoIs, demand loans of varying size, and generate varying transaction cost levels expressed as a share of the loan amount. How do these changes affect the model as depicted above?

Owing to higher anticipated profits, an increase in an enterprise's expected RoI will in principle have two effects: on the one hand, the risk borne by the banks at a given interest rate decreases (distance to the 45° line); on the other, the interest rate at which banks can maximise their returns, i^{max}, increases. As a result of these two effects, the return function for the banks, r(i), is extended downward and to the right.

The level of the transaction costs incurred by the banks is not a function of the interest rate charged, and, as a result, factoring in transaction costs causes an upward parallel shift in the return function.

Fig. 6 illustrates these effects separately for small and large loans. Small loans are granted to small enterprises with higher RoIs, and thus the gross return function of the banks which applies to them, $r(i)_{gross}^{small}$, is relatively flat. However, this function does not yet take into account the banks' transaction costs. Because transaction costs are relatively high for small loans, this causes a relatively strong upward shift in the return function. The net return of the banks, less transaction costs, is shown by the function $r(i)_{net}^{small}$.

The corresponding function for large loans is relatively compressed; the distance between this curve and the 45° line increases more than the function $r(i)_{gross}^{small}$ as the interest rate rises. However, because the banks' transaction costs, expressed as a percentage of the loan amount, are significantly lower for large loans, the curve is not shifted upward as strongly; $r(i)_{net}^{large}$ is the function which represents the banks' net return on large loans.

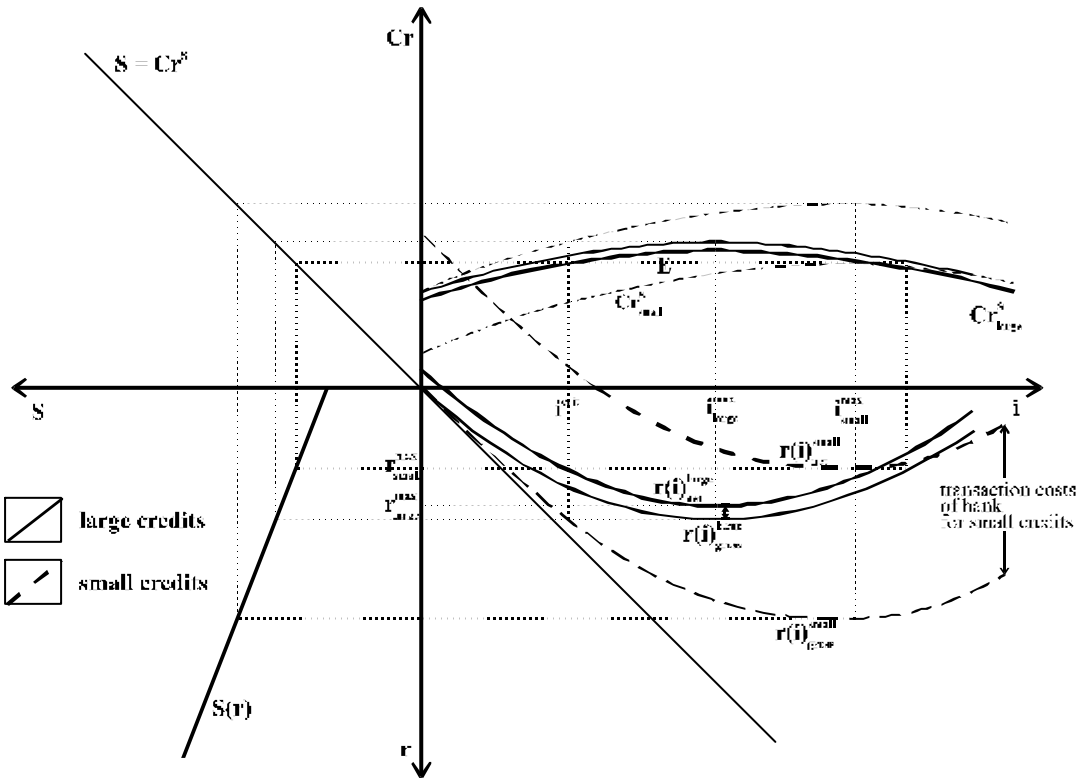

Fig. 6: The expanded STIGLITZ/WEISS model

Although the interest rate at which banks can maximise their return is substantially higher for small loans (i^{max}_{small}) than for large credits (i^{max}_{large}), the banks' return, r(i), is nonetheless higher for large loans. Banks' return on small loans will only be comparable to what they can earn on large loans if the interest rate in the market for large loans is lower than f^{rit}. If this is the case, large loans would be granted at an interest rate of f^{rit}, while small borrowers would have to pay the much higher interest rate i^{max}_{small}. It should be noted that despite the considerable difference in interest rates, the banks' net return, r^{max}_{small}, would be identical for both groups of borrowers.

The credit supply curves transposed into the first quadrant require a great deal of interpretation. The necessary analysis will be performed on the basis of the following graph. In Figure 7, the conditions presumed above are combined with, and compared to, three possible credit demand functions for large borrowers. If the demand of large borrowers is equivalent to Cr^{D2}_{large}, an interest rate higher than f^{rit} will result in this market segment, and at this rate for large loans, the banks' net return is higher than the return they could earn in the small loan market. Therefore, the banks will only grant large loans, and completely ration credit to small borrowers. If the demand function for large loans is Cr^{D3}_{large}, then even large borrowers will be subject to credit rationing, because demand will also exceed the maximum possible supply at an interest rate of i^{max}_{large}.

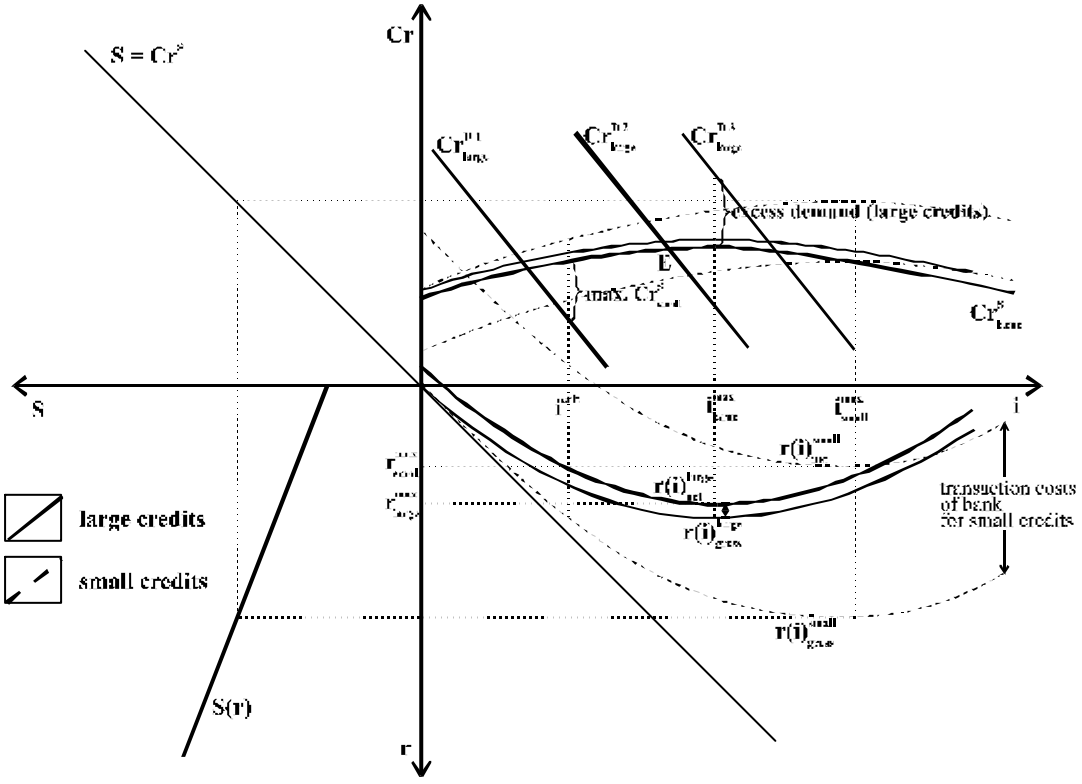

Fig. 7: The credit supply provided by banks according to the expanded STIGLITZ/WEISS model

Loans will not be offered to small borrowers at all unless the demand for large loans intersects the supply function at an interest rate below i^{crit}. In the case of the demand curve plotted here, Cr_{large}^{D1}, the credit volume available to small borrowers would correspond to the difference between supply and demand in the large loan market at the interest rate of i^{crit}, which would be charged to large borrowers. The small loans would then carry an interest rate of i_{small}^{max}. If the demand for small loans is larger than $\max Cr_{small}^{S}$, credit rationing would continue to occur in this market segment. Only if the demand is smaller than $\max Cr_{small}^{S}$ will interest rates decline for both small and large loans, and they will decline in such a way that the net return for the banks, r(i), is always the same in both segments of the market.

Thus, we can distinguish between three market situations, each of which would have different consequences for small borrowers:

1. The demand for large loans causes interest rates in this market to rise above i^{crit}, and thus no small loans are granted. The banks earn a net return which is higher than r_{small}^{max}.
2. In the market for large loans, demand intersects the supply function at an interest rate lower than i^{crit}. The banks nonetheless charge large borrowers an interest rate of i^{crit}; with the excess supply of funds from this market being lent to borrowers in the market for small loans at an interest rate of i_{small}^{max}. However, this excess supply diverted from the market for large loans is not sufficient to satisfy the demand in this market segment. Changes in supply or demand in the market for large loans have no impact whatsoever on conditions in this market; lending rates remain stable. However, given a constant interest rate of i_{small}^{max} for small loans, these changes will cause the credit supply in the market for small loans to fluctuate by precisely the same amount as the excess supply in the market for large loans. For example, if the demand for large loans were to increase by US$ 1 million, the credit supply in the small-loan market would drop by exactly the same amount. In contrast, fluctuations in the demand for small loans will only affect the small-loan market itself by varying the extent to which borrowers are subject to credit rationing. Thus, the market for small loans is dependent on the large-loan market. The banks realise a net return of exactly r_{small}^{max}.
3. The demand for small loans at an interest rate of i_{small}^{max} is smaller than the excess supply in the large-loan market at an interest rate of i^{crit}. Credit rationing no longer takes place; the banks must accept a net return of less than r_{small}^{max}. Fluctuations in demand in each of the two market segments now affect interest rates and the credit volume available in both segments, i.e. there is an interdependence between the two market segments.

3. Pricing and rationing given asymmetric information

The previous section has made statements with respect to credit rationing only insofar as two loan sizes are concerned. As this restriction could be misleading, it will now be eliminated. As this cannot be done on the basis of the STIGLITZ/WEISS model, the preliminary results derived in the previous section will now be incorporated into the basic model.

As was shown, information asymmetries can lead to the emergence of implicit interest rate ceilings. Even in the absence of statutory regulations, these ceilings prevent banks from raising their interest rates beyond a certain level. However, the difference between implicit and statutory upper limits on interest rates is that the implicit ceilings are a function of the size of the borrowing enterprise. The smaller an enterprise, the higher its expected RoI, which, given a constant interest rate, reduces a bank's risk costs. Therefore, the interest rates at which asymmetric information begins to have a negative impact on the banks' net return are higher for small enterprises than for large ones. The implicit interest rate ceiling rises as the size of the enterprise decreases; this phenomenon is represented by an "interest rate ceiling function", which is shown in Figure 8.

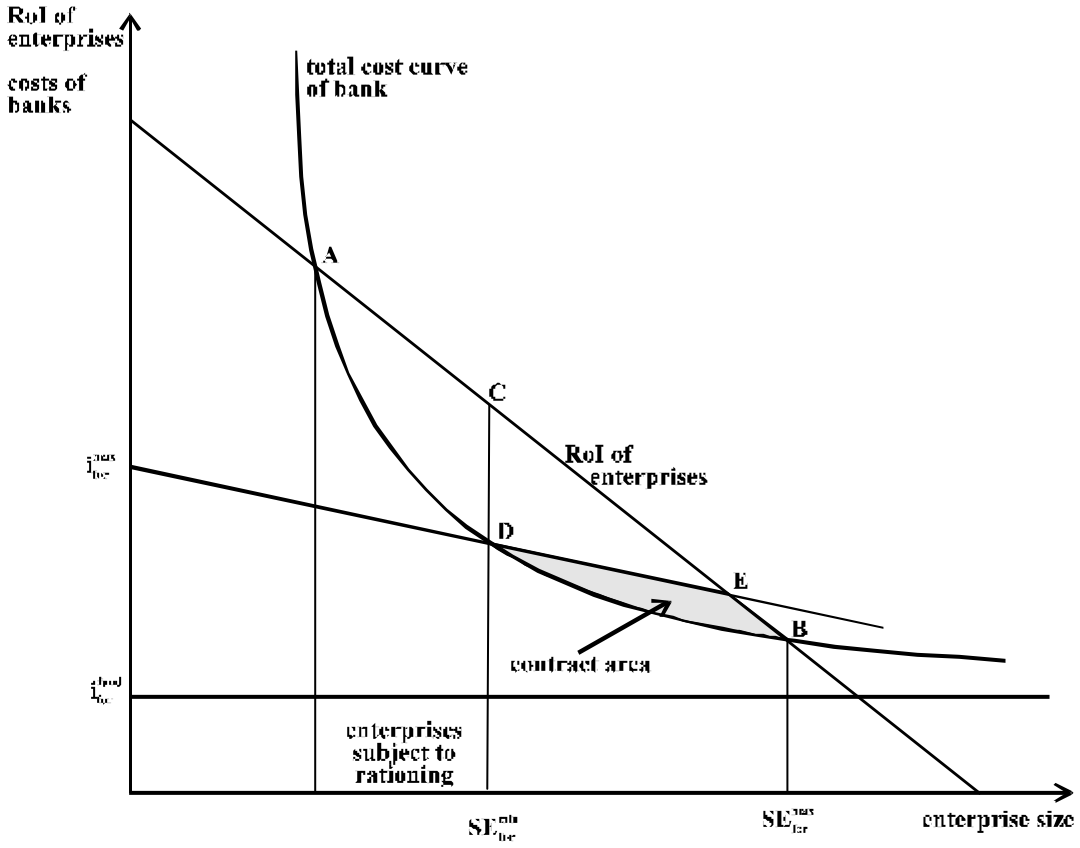

Fig. 8: The credit supply provided by banks under conditions of asymmetric information

The banks must take into account the interest rate ceiling function i_{for}^{max}, which plots the interest rate at which they can maximise their return for an enterprise of any given size. Banks will thus not charge interest rates which lie above this function, nor will they lend to enterprises for which the anticipated costs exceed revenues. They will only lend to enterprises for which the total costs curve lies below the interest rate ceiling function, which is the case for enterprises of a size ranging between SE_{for}^{min} and SE_{for}^{max}. All enterprises smaller than SE_{for}^{min} will be subject to credit rationing.

The contract area is represented by the figure DBE. The banks will attempt to lend at rates which correspond to the points on the segments DE and EB, because this is where they will realise the highest profits. For the enterprises, interest rates corresponding to points on the DB curve would be ideal. All points between these lines represent lending rates which make credit relationships profitable for both banks and enterprises; the lending rates that actually obtain will be a function of prevailing market conditions and the extent of competition in the financial sector.

Thus, even if allowance is made for the dependence of the size of enterprises on their RoI, for transaction costs, and for the fact that there is a continuum of possible enterprise sizes, information asymmetries lead to implicit interest rate ceilings which prevent small and medium-sized enterprises from obtaining access to bank loans, despite the fact that their expected RoIs are higher (sometimes much higher) than the banks' total costs. What is efficient for an individual economic unit thus leads to inefficiencies for the economy as a whole.

4. The willingness to pay

If a loan is actually to be paid back, the borrower must not only be able, but also willing to pay. Yet why should borrowers wish to pay back their loans at all? The answer is simple: by repaying the loan, they will reap greater benefits than if they refuse to pay! In other words, they will only pay back their loans if it is advantageous for them to do so.

But why should borrowers be better off if they pay back their loans? After all, this requires a considerable sacrifice. What exactly compels a borrower to repay his or her debts?

The repayment of a loan can be motivated by *intrinsic* or *extrinsic* factors. In this context, intrinsic motivation means that borrowers pay back their loans because of their own attitudes, ethical considerations, personal relationships, etc., rather than because of economic considerations. Behaving otherwise would simply make them feel bad. In a broader sense, repaying a loan to avoid losing face is also a form of intrinsic motivation. Because borrowers' actions are noted by other persons in their social environment, they must expect social sanctions for behaviour which does not comply with social norms. Intrinsic motivation will

be, however, disregarded in this analysis, as one can assume that micro entrepreneurs do not have any intrinsic motivation to repay a loan to a conventional bank.[11]

There are two extrinsic factors which can motivate borrowers to repay their loans. On the one hand, they avoid costs that could arise if the bank attempted to force them to pay back their loans. On the other hand, they safeguard future benefits for themselves which can arise in the form of a continued business relationship with the bank, but which they will only be able to reap if the current credit has been repaid (intertemporal linkage).

Of course, intertemporal linkage only "works" if borrowers can in fact assume that their co-operative behaviour will in fact induce their banks to grant them access to credit in the future. However, this is seldom the case. As was shown in Section 2, given constant interest rates, fluctuations in demand in the "large loan market" usually lead to corresponding fluctuations in supply on the "small loan market". The same mechanism naturally applies to fluctuations in supply – e.g. as a result of measures taken by the central bank – to which commercial banks respond by "regulating" the supply of funds which they are willing to lend out in the form of very small loans; larger loans are usually affected only slightly, if at all. It has thus been observed in many countries that the supply of small credits, assuming such a supply exists at all, is subject to strong fluctuations. Consequently, small borrowers have learned in the past that timely repayment of all instalments does not guarantee their personal access to credit. Intertemporal linkage therefore provides little incentive for repayment of loans to conventional banks.

As a consequence, the only remaining option for the banks is to make clear that they will force borrowers to fulfil their obligations by taking legal action. In many countries, however, the banking sector is subject to laws which are designed to protect borrowers and which grant creditors little scope for action. For them, initiating legal proceedings to collect their claims is a very lengthy and expensive process in which the costs of the legal measures often exceed the value of the small loans involved. In addition, if legal restrictions or a given borrower's economic situation prevent the banks from passing on these legal costs to uncooperative borrowers, it makes little economic sense for them to enforce the repayment of loans through legal measures. Borrowers are also aware of this, and thus they would presumably have little, if any, extrinsic motivation to repay their loans.

As a result, banks will not grant loans if the costs generated by potential legal proceedings would exceed the loan amount. The laws which are intended to protect borrowerss thus prevent them from receiving access to credit in the first place. The more expensive it is for the banks to enforce the repayment of loans through legal action, the higher the "minimum loan amount" will be.

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11 For an analysis of intrinsic motivation in the context of credit rationing, cf. TSCHACH, 2002, pp. 19–24.

Figure 9 shows how these considerations can be incorporated into the results of the preceding analysis. Assumed that the costs which banks incur by taking legal action to enforce payment (the costs of foreclosure and liquidation of collateral) are equal to the size of the loan demanded by enterprises with a size of $SE^{*\,min}_{for}$, this will be the minimumsize of enterprises to qualify for bank loans. Thus, these loans would still be larger than the minimum loan amount which would emerge as a consequence of information asymmetries and the accompanying lack of opportunities to accurately assess the borrowers' ability to pay back their loans (SE^{min}_{for}).[12]

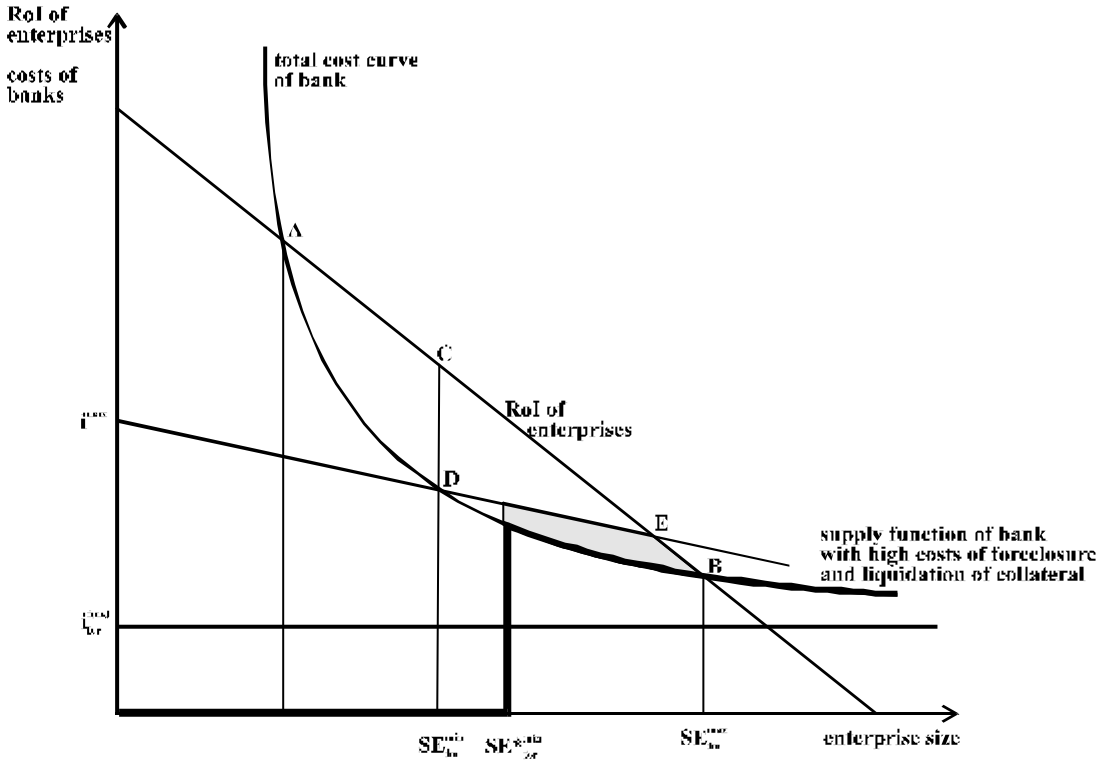

Fig. 9: Costs of foreclosure and liquidation of collateral and the credit supply of banks

As was argued above, banks will only grant loans in which the loan amount exceeds the potential costs of foreclosure and liquidation of collateral, in this case to enterprises with a minimum size of $SE^{*\,min}_{for}$. The bank's total costs function still represents the possible credit supply. Of course, here as well the bank will attempt – depending on market conditions – to charge higher interest rates within the contract area.

12 This does not have to be the case. However, if $SE^{*\,min}_{for}$ is smaller than SE^{min}_{for}, there is no binding constraint, and further analysis is superfluous. Figure 9 thus applies to all other cases.

Borrowers who demand loans which are smaller than $SE^{*\,min}_{for}$ are subject to credit rationing because they would have neither intrinsic nor extrinsic motivation to pay back their loans, and are thus unattractive customers for banks. Credit is rationed not only due to asymmetric information, but also as a result of the high costs of foreclosure and liquidation of collateral. Which of these two possible causes serves as the binding constraint, and thus determines precisely where the "frontier of formal finance"[13] lies, must be decided separately for each individual case.

5. The credit supply of the formal and informal financial sectors

In the preceding sections, arguments were presented to explain why banks exclude small and medium-sized enterprises from access to credit. However, this credit rationing in certain market segments becomes a problem only if there are no other institutions which can efficiently serve these market segments. To ascertain whether such institutions are in fact lacking, the supply function of informal lenders is presented and then compared with the credit supply provided by banks, following which the results of the comparison are analysed to determine the implications for the credit market as a whole.

Informal lenders are not part of the formal financial system, and thus are unable to fund their lending activities on relatively attractive terms using credit facilities provided by the central bank and/or savings collected from the general public. Because they operate as disparate entities rather than as an integrated system, it is difficult for them to deal with liquidity mismatches; as a result, their liquidity management is inefficient and therefore costly. For these reasons, they must factor in very high funding costs when setting their prices.

However, they have an advantage over conventional banks – namely, that they can assess the situation of "their" small borrowers with great precision, and thus are not confronted with the problem of asymmetric information to the same extent as banks. Moreover, they are often regarded by the potential borrowers as belonging to the same social environment as their customers, which significantly increases the borrowers' intrinsic motivation to repay their loans, thereby reducing moral hazard problems. Although informal lenders are exposed to credit risk if a borrower becomes incapable of repaying his or her loan, they are able to assess this risk relatively well and thus pass on the resulting costs to their customers. Thus, credit risk assessment is not considered a problem, but is instead part of the business. In addition, their transaction costs are relatively low in comparison with those of conventional banks.

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13 Cf. VON PISCHKE, 1991.

In Figure 10, these points have been incorporated into the graph which was elaborated in the preceding section. The risk costs (c^{risk}) can be assessed by informal lenders and are independent of the size of the enterprise; these are added to the costs of funds, i_{inf}^{fund}, which are already relatively high. By then adding the transaction costs, which, as in the formal sector, are proportionally higher for very small credits than for "larger" loans, one arrives at the total cost curve for informal lenders which, as an analogue to the cost curve of the banks, represents the minimum interest rates which moneylenders would have charge to break even, given a particular loan amount or size of enterprise.

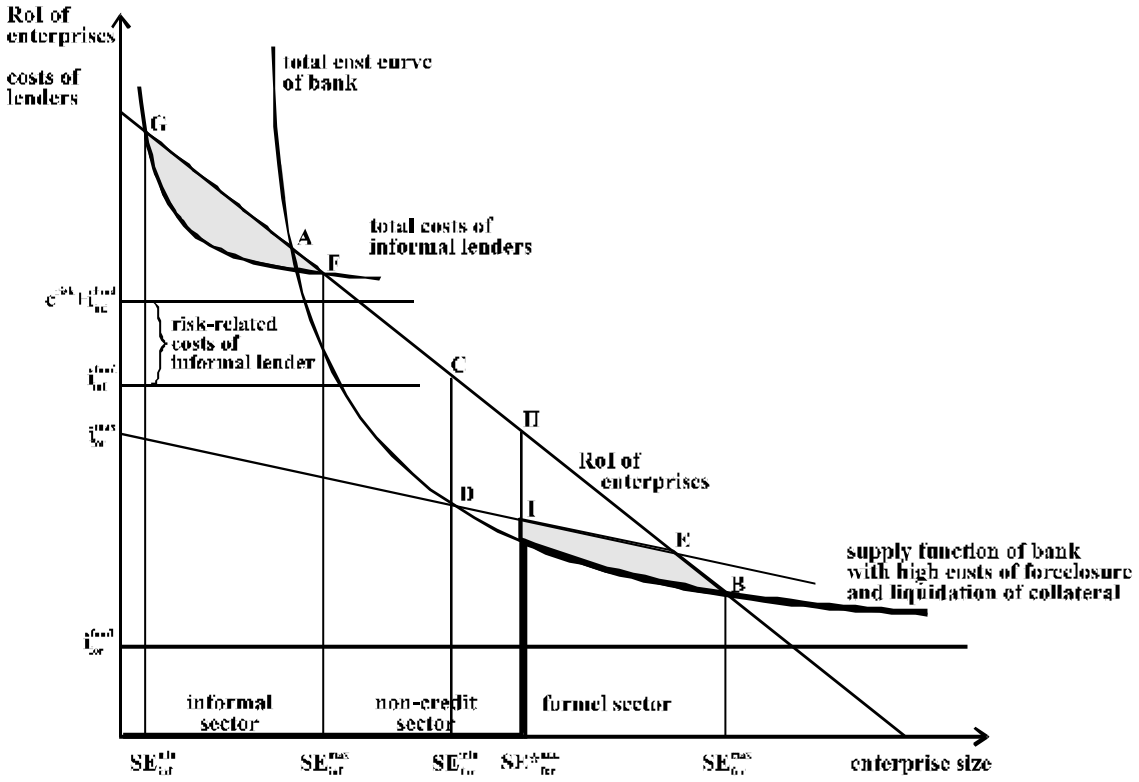

Fig. 10: The credit supply functions of the formal and informal financial sectors

In this graph as well, there is a second contract area which lies between the cost curve of the informal sector lenders and the RoI of the enterprises, and which defines the range of possible interest rates in the informal credit market. It is apparent that all enterprises of a size between SE_{inf}^{min} and SE_{inf}^{max} will have access to informal credit. In contrast to the formal credit market, credit rationing in the informal market does not occur as a consequence of information and incentive problems; however, borrowing simply does not make economic sense for enterprises which are smaller than SE_{inf}^{min} or larger than SE_{inf}^{max}, as they would have to pay interest rates above their potential RoI.

Conclusions

The implications of the various phenomena outlined above for the credit market as a whole are as follows: relatively small enterprises whose size ranges between SE_{inf}^{min} and SE_{inf}^{max} can obtain financing in the informal credit market (at high interest rates), while larger enterprises can turn to the formal financial market to procure capital at comparatively low interest rates.

The high interest rates prevailing in the informal sector may merely reflect the high cost of small loans. In the example shown in Figure 10, informal lenders actually have competitive advantages over the formal sector at nearly all points in this segment (with the exception of AF). However, this does not have to be the case; if the banks' transaction costs were slightly lower, for example, their total costs curve would shift toward the origin.

Because micro and small enterprises have a very high RoI, it is worthwhile for them to rely on expensive informal loans to finance their operations, at least until they reach the "maximum size" of SE_{inf}^{max}. Once they have reached this size, however, it does not make economic sense for them to continue taking out informal credits, and thus they face a growth constraint imposed by the credit market. Internally financed growth does not take place because, given the entrepreneurs' rates of time preference which are typically very high, surplus funds are used for other purposes, i.e. allocated to finance alternative investments or expenditures. Small enterprises will therefore *not* grow to become medium sized enterprises.

The most important finding is that medium sized enterprises of a size between SE_{inf}^{max} and SE_{for}^{min} can borrow in neither of the two markets. They are too small – and thus unattractive – for formal-sector banks, and the interest rates in the informal sector would be higher than their RoI, i.e. borrowing would be irrational in economic terms for them. Medium-sized enterprises thus have no access to either formal- or informal-sector financing, which probably has a sustained negative effect on their competitiveness. Moreover, and perhaps much more importantly, the fact that they might forsee that they would run into a financing constraint if they grew to become medium sized enterprises will probably weaken their incentives to aspire growth in the first place.

As a result, the credit market is segmented to one segment of small, informal enterprises with access only to informal loans, one segment of medium sized enterprises that do not gain access at credit at all, and one segment of large enterprises with access to bank loans. This segmentation is the result of a free market and not of any bureaucratic or legal restrictions. Thus credit market segmentation and the lack of financial institutions which tried to bridge this gap between the informal and the formal credit market can be regarded as a severe obstacle to economic development.[14]

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14 How specialized microfinance institutions can bridge this gap is discussed in SCHMIDT/TSCHACH (2002).

Annex: The perspective of the borrower

or: Average return vs. marginal return on capital

In the paper, the analysis has focused on factors which the banks must consider when taking lending decisions. The banks are mainly concerned with the average RoI of enterprises as a criterion for assessing their ability to repay their loans, and as a consequence, the total capital productivity of the enterprises in question has formed the basis for the analysis in the paper.

In contrast, when entrepreneurs need to decide whether to finance an additional investment with a loan, they will weigh their marginal return – i.e. the additional profits generated by their planned investments – against the marginal costs of taking out additional loans. These variables must therefore be incorporated into an analysis of credit demand.

Figure A1 compares the average RoI of enterprises with their marginal capital productivity. Numeric values for the total assets of enterprises were entered so as to render the logarithmic scale of the X-axis somewhat more plausible. The marginal productivity curve intersects the X-axis at a value which is equivalent to half the value represented by the point of intersection of the average return curve. Given the logarithmic scale, however, the point of intersection of the marginal productivity curve does not actually lie midway between the Y-axis and the average return curve. Instead, as shown, it is relatively close to the average return curve. The two curves are also parallel for the same reason.

The marginal costs of additional loans will be lower than the average interest costs because the interest rate will also decrease for funds borrowed anyway. The difference between the average and marginal costs of loans will decrease as the loan amount increases because the interest rate for larger loans will no longer fall by as much.

For small enterprises, the costs of financing an expansion through borrowing decrease more than their RoI, which is why a greater number of enterprises demand credit (represented by the area between A and G) in comparison to the number shown by an analysis based on average costs. However, as enterprises of this size are subject to credit rationing in any case, the extent of rationing merely increases.

In contrast, demand on the part of large enterprises decreases with size. Starting at an amount of slightly less than US$ 10 million, financing an expansion with borrowed funds no longer makes economic sense. The contract area is reduced by the trapezoid HFBE (the banks continue to base their calculations on average values). However, this decline in demand for credit on the part of large enterprises has no impact on the analysis of credit market segmentation, as the latter occurs when small and medium-sized enterprises are subject to credit rationing.

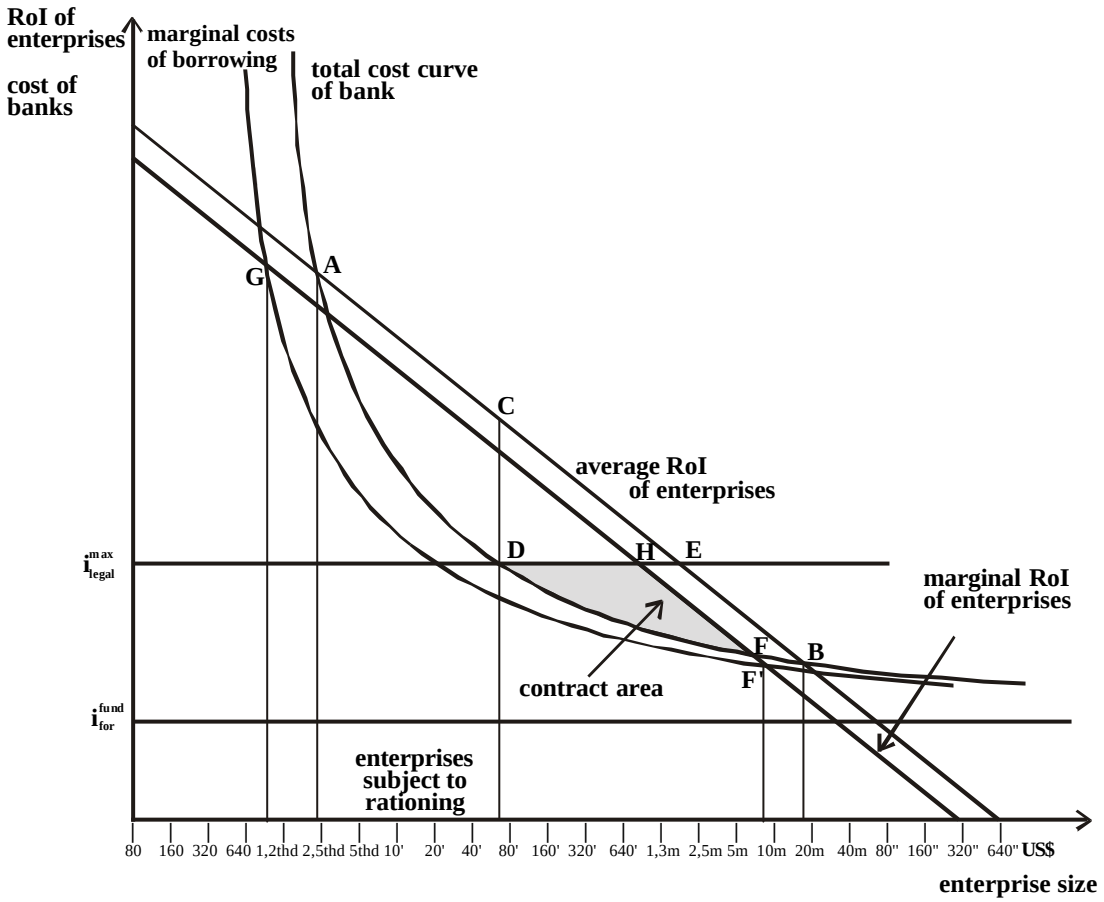

Fig. A1: Average and marginal return on capital

Basing calculations on enterprises' average return on capital will have different implications for and effects on the market than if marginal values are used. Average returns are the relevant variable for the banks' calculations, while marginal values influence the credit demand of enterprises. In the market segments analysed in the paper, applying marginal values will result in a greater credit demand than is obtained when average values are used. However, the banks, which base their calculations on average values, subject the enterprises in question to credit rationing, and thus marginal values can be ignored in the discussion. At the same time, though, it should be borne in mind that the extent of credit demand, and thus of credit rationing, is always somewhat greater than an assessment based on average values would suggest.

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