

Micro-macro Finance Structure Modeling

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Abstract

In many developing countries, micro finance has been successfully introduced as a useful tool for poverty reduction and micro entrepreneur development. However, weak macro and medium level financial structure can put a limit on sound socio-economic development even if macro level financing structure was strengthening and accelerating micro enterprise sector development. Even when the micro enterprise sector has steady development in the first phase, this development can be interrupted suddenly by adverse occurrences in the macro level economy (e.g. inflation, deflation) or natural disasters. Seamless linkage between the micro enterprise sector and the large enterprise section with the SME: Small and Medium Enterprise sector is necessary and one of key issues is the financing structure for the SME.

We have tried to develop a micro, macro and linkage model that focuses on the financial mechanism that has an impact on, and stimulates economic development. As a conclusion, sound financing structure focuses on the SME sector and development of the SME sector has a positive impact on economic development in the long term.

Key words: SME sector development, micro-finance

1. Introduction

For ISDC 2001., we developed a SME model and simulated their key issues for sector development. In our paper, we pointed out that financial issues are one of critical things for growth of SME itself and also for sector development. Many governments of developed and developing countries prepare for these issues with tax incentives and venture investment capital, especially for SME of IT sector. Some governments prepare government banks for specific finance for SME. However, collateral and guarantee problems always make a barrier to smooth financing for SME. In order to avoid this lack of collateral issue, micro finance has become popular in developing countries.

The success of Brahmin Bank of Bangladesh, founded by Professor Muhammad Yunus in 1979, is a prime example of the success of micro financing. In this system, a group of around 5 women in rural areas (solidarity) whom want to borrow money from the Brahmin Bank for business enterprises is made. Then one of the members of this group borrows a quite small amount of money, normally around 500 US\$ for her business, such as to buy hens, goats, cows or raw materials for handmade crafts. If this borrower could return the entire amount of the money, then another member could then borrow money from the Brahmin Bank. If some trouble of an accident happens to the borrower and she cannot return the money, the other members try to help her solve that problem. Professor Yunus pointed out that this collaboration activity for solving problems is a key success factor for micro finance. *1) Even though they do not request any collateral from the borrower, their collectability of the money they lend is more than 90%.

Also, he points out that this micro finance helps to accelerate entrepreneurs and assists the SME sector's development, especially development of micro industry enterprises and family businesses (so called rural industrialization). Brahmin Banks do not only provide finance to poor people of rural areas but they also try to provide new business opportunities such as establishing cellular phone companies and lending of cellular phones to rural people to support

communication in their business development. Such activities by micro finance organizations create dynamism for socio-economic development of Bangladesh and I could see the vitality of rural area industrialization while I was involved in the ODA project in Bangladesh during the past five years.

However, quite opposite of the business style of the Brahmin Banks, some micro finance organizations conduct micro finance as charity for poor people such as micro finance organizations founded by NGOs. The number is quite few but some governments also have state-owned micro finance organizations. Several governments even have state-owned financial organization for SME. Charity based micro finance organizations do not intend to gain profit but many other government financial organizations do not get suitable profit to sustain their business and many international assistance agencies including the IMF criticized government financial institutions.

We also briefly mentioned in our last paper in 2001 about finance for SME, not for micro enterprise but for medium sized enterprises between micro and large or SOE: State Owned Enterprises, which are in very poor condition. It is difficult to find a success story of financial organizations specific to business with SME except in developed countries. In most cases, problems come from a failure to established sound collateral and guarantee schemes.

Interestingly, the weak financial scheme for SME seems to be linked with the weak financial structure of the macro level, which means there exists a weakness in control linkages between central banks and city banks. This weakness sometimes causes trouble in making macro financing policy in developing countries.

There is a lot of research and studies on financial issues by many economists including recommendations of financial restructuring to developing countries by the World Bank and Asian Development Banks. We do not want to argue the merits of that research or those studies, but rather give analysis in this paper of the structure and mechanism of financial restructuring from a different viewpoint.

We want to point out that:

1. For sound development of the SME sector and industry development, sound structure of the financial sector is a key issue
2. Balanced structure of micro, medium and macro financial structure is important, especially medium finance is important to linking industrial development of micro and macro.

2. Micro model

The relationship of micro finance and micro enterprise sectors are shown as fig. 2.1. With sound financing to micro enterprises, and if micro enterprises keep growing steadily, micro finance organizations can also keep growing. If there is no interruption to the business of micro enterprises, micro finance from lending organizations will help growth of the borrower and the lender can get profit from lending as interest from the borrower. However, the business of the borrower does not always succeed. Simply speaking, it depends on the business successability of the borrower and this factor is related to "growth rate of micro enterprise sector." Also, this business successability depends on not being interrupted by natural disasters or business accidents. Micro enterprises normally do not enter into any risk hedge schemes such as business insurance and such schemes do not exist for micro enterprises in many developing countries. Macro factors such as inflation may effect consumer behavior and have negative impact on the business of micro enterprises. Because of these characteristics, micro enterprise growth can be easily and quickly interrupted. If the economy of the country is growing steadily, interruption may slow down growth temporary and some micro enterprises may fall into bankruptcy, however, newly created micro enterprises can pick up the customers and as a whole, the micro enterprise sector will continue growing with an average rate of growth. For this reason, the micro finance sector also could keep growing. The behavior of this macro enterprise model looks quite similar

to actual behavior of micro enterprises in developing countries, including Bangladesh and Indonesia.

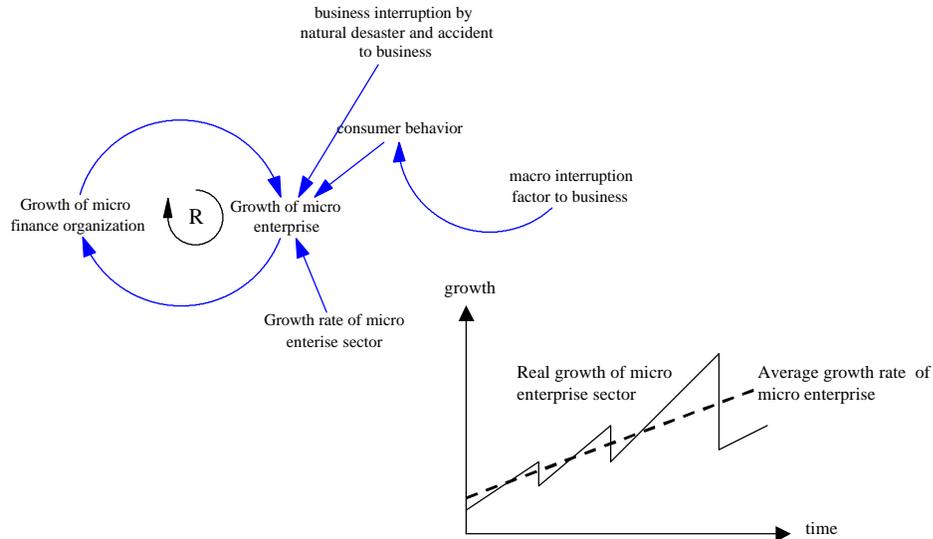


Fig 2.1 Relationship between micro finance organizations and micro enterprises

Simplified micro finance model is shown as fig. 2.2. With delay however, one significant loop, shown as a thick line, is the basis of the banking business. The bank lends money and receives interest revenue in return. This interest revenue is the most basic form of revenue out of which the bank must pay administration costs, training costs and marketing costs. Some banks conduct direct investment such as purchase of stock, but we decided to eliminate such activities from this model.

Interest revenue depends on the amount of lending. A bank can increase its assets by increasing the amount of money it lends as long as there are no problems and the lent money is safely returned with interest. Then the bank can lend money to another borrower. This system continues on in a reinforced loop as the bank accumulates more assets.

However, lending amount is limited by BIS rules and essentially decided by the amount of capital and assets that the bank has. Also, the volume of applications has an impact on lending. (Actually, it depends on the amount of money requested to be lent by applicants. But we simplified it for the model.) Loss of uncollected return that comes from bankruptcy of borrower has a significantly negative impact to the reinforced loop of bank's revenue with interest.

Employee training can reduce the uncollected return with keen careful investigation of applicants in order to omit insufficient borrowers, monitor the borrower's financial situation and take early stage control to reduce the damage of un-collection. However, the most significant impact comes from behavior of the local market. An increase in elements of the local market also impacts to increase loan applications (number and required amount). A decreases in elements of the local markets impacts to decrease loan applications. Those elements related to local market mostly come from macro policy and strategy of the central government that we described in the linkage model. In this micro model, we just pointed out the relation that micro finance (lending) impacts to increase the growth of the local market.

The biggest difference between micro finance and other types of banking businesses is that risk-hedging mechanisms with collateral and guarantee schemes do not exist. In other banking systems, risk-hedging mechanisms are compounded and reduce the impact of "loss of uncollected return". Pawnshops are sometimes called old type micro finance. In a pawnshop, jewelry or assets are used as collateral. Some old types of traditional micro finance, such as usury,

avoid the risk with tremendously high interest rates. In general, new types of micro finance, such as the Brahmin Bank, set rather high interest rates compared with interest rates of city banks, but compared with other traditional micro finance, their interest rate is quite reasonable. Also, they insist that they have a very sophisticated risk avoidance mechanism including grouping of the borrowers (solidarity) or support knowledge transfer to borrower (e.g. primary education to increase literacy). *note-1) Even though rather high interest rates are set, un-collection return is still has the biggest impact on the banking business, but micro finance organizations seem to be able to control this far better than other types of banks.

It is not necessary for a micro financing organization (enterprise) to be a SME, but in actuality those conducting micro finance in developing countries are rather large-scale companies or organizations. Theoretically they should compete with other normal private and government banks but in reality, competition is quite low. Ordinary types of commercial banks do not participate in this area for fear of risk. Several government banks try to do the micro financing but most of them are not as successful at controlling risk as they are at operations and management.

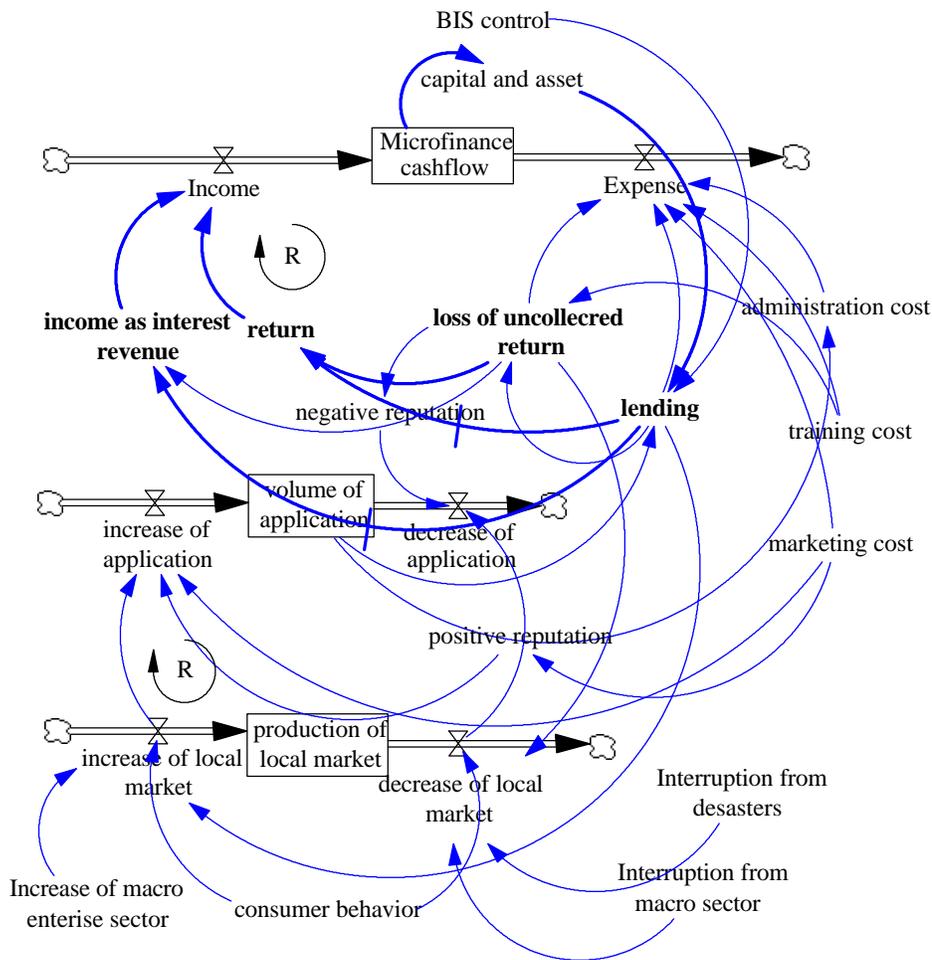


Figure 2.2. Simplified micro finance model

3. Macro model

Our macro model focuses on the monetary supply shown as figure 3.1. In this model, basically, two balancing loops are the main elements. One balancing loop of currency supply by the government for controlling deflation and another balancing loop of money withdrawn from the market by the government to control inflation. This controlling activity is always delayed and disturbed through many commerce activities such as investment, import and export. Those activities are rather easy to control but activity for profit is difficult to control because currency itself does not physically move and transactions are done in quite a short period of time. Briefly, this situation may be thought of as the relationship between the real world and the virtual world and many economists explain that much focus on in such real-virtual world model including Iwan J. Azis, 2001. *2) Compared with his model, our model may be too simple.

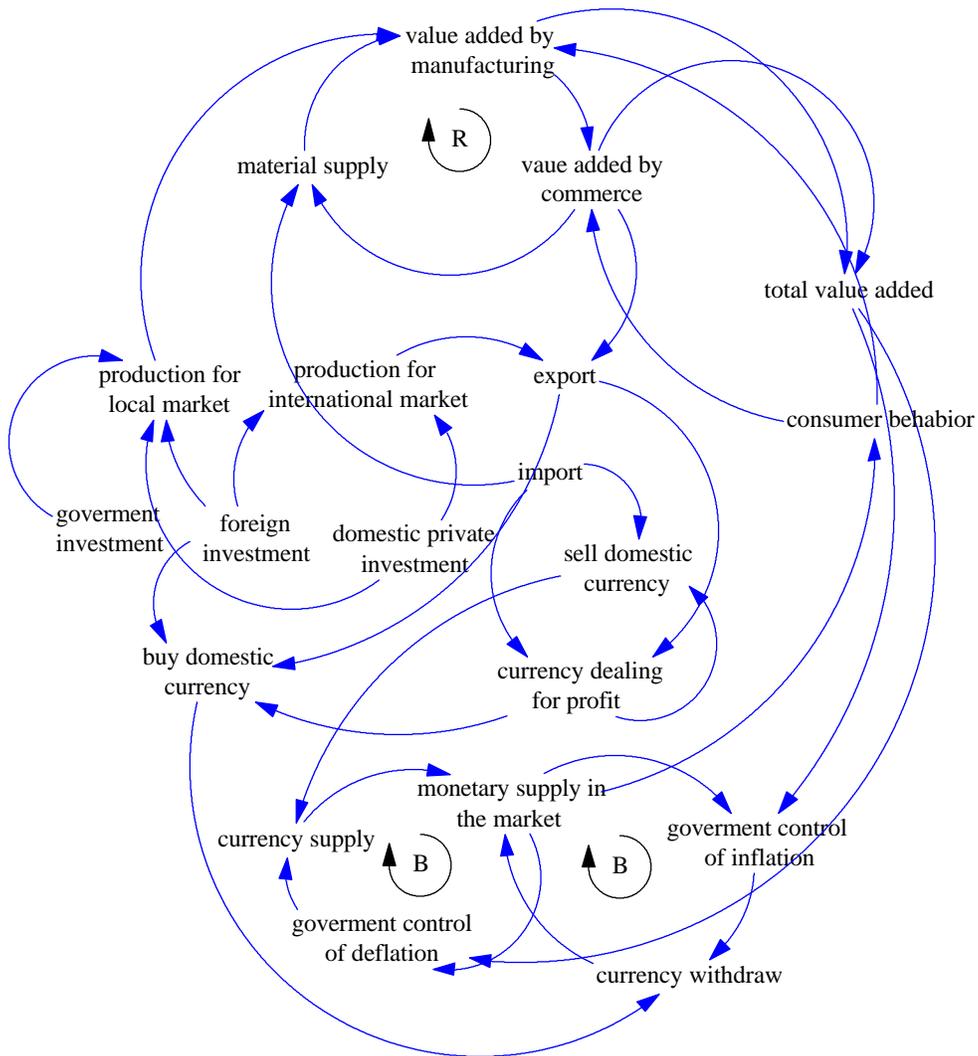


Figure 3.1: Simplified macro financial model

The model in fig. 3.1 represents the real world; real activity of the material world (procurement, value added by manufacturing and value added by commerce) and controlling activity of the monetary supply for inflation and deflation by central government. The virtual world deals with currency for profit conducted by city banks. We do not mean this activity is immoral. Its comes from risk hedge activity to avoid loss of profit by import and export.

Basic simulation behavior looks similar with behavior of micro enterprises interrupted by the macro world. The real world, which is simplified with value added chain from raw materials produced from agriculture, forest and fishery sectors to industry sector and then delivered to the service sector, is the main and core engine of growth. Data used from “Asian Development Outlook 2001” and “Key Indicators 2001: Growth and Change in Asia and the Pacific” published by Asian Development Bank and they conducted comparative analysis with Japan, Bangladesh and Indonesia. If raw materials are affordably available in the domestic market, and products (value added products by industry sector) could be sold in domestic markets without much competition from foreign (imported) products, the value chain works and GDP will steadily keep growing. However, even if we do not consider the weakening of competitive advantage by imports, the change in monetary supply influences investment and changes the productivity of the domestic market. Those interruptions affect the growth of GDP. In reality, GDP growth by value added chain could be interrupted by many factors.

In this simplified model, we assumed the basic lending functionality of city banks is guaranteed by collateral. In reality, especially in developing countries, this guarantee scheme with collateral does not work perfectly, mostly because of poor training of employees who judge the lending, political pressure and adherence, and competition with direct finance from the stock market.

Though, from a macro viewpoint, trading volume of the currency exchange is more than 10 times the lending amount and more than 100 times the trade amount of goods that are actually demanded by currency exchange. If the focus is only on the monetary supply, currency exchange, investment activity and delay of government activity for adjustment cause frequent interruption to growth in the real world.

4. Linkage model

The micro and macro linkage model is shown as fig. 4.1. In this model, we do not consider the linkage of micro enterprises and SMEs, also it is very difficult to find reliable statistics of the value added process. We simply think linkage is only impacted by consumer behavior caused by inflation or deflation. In this context, since value added activity of micro enterprises is almost independent from productive activity by SMEs and large enterprises, they could maintain a stable condition until they are influenced by the change of consumer behavior that is caused by inflation or deflation that comes from the government’s miscontrol of the monetary supply. Also the micro world could remain sustainable because they are independent from exports and imports, which are quietly effected by the fluctuation of the international market.

The basic behavior pattern of the micro enterprise sector is almost the same as in the independent model. The micro enterprise world is growing despite interruptions that come from changes in exports/imports, investment and currency trades. However, interruptions do not just affect growth internally. Growth of the macro world has also been interrupted by changes in the virtual world, coming from investment and risk hedge mechanisms. The macro world does not receive so much impact from the micro enterprise sector except the change of consumer behavior, but it is not so big an impact.

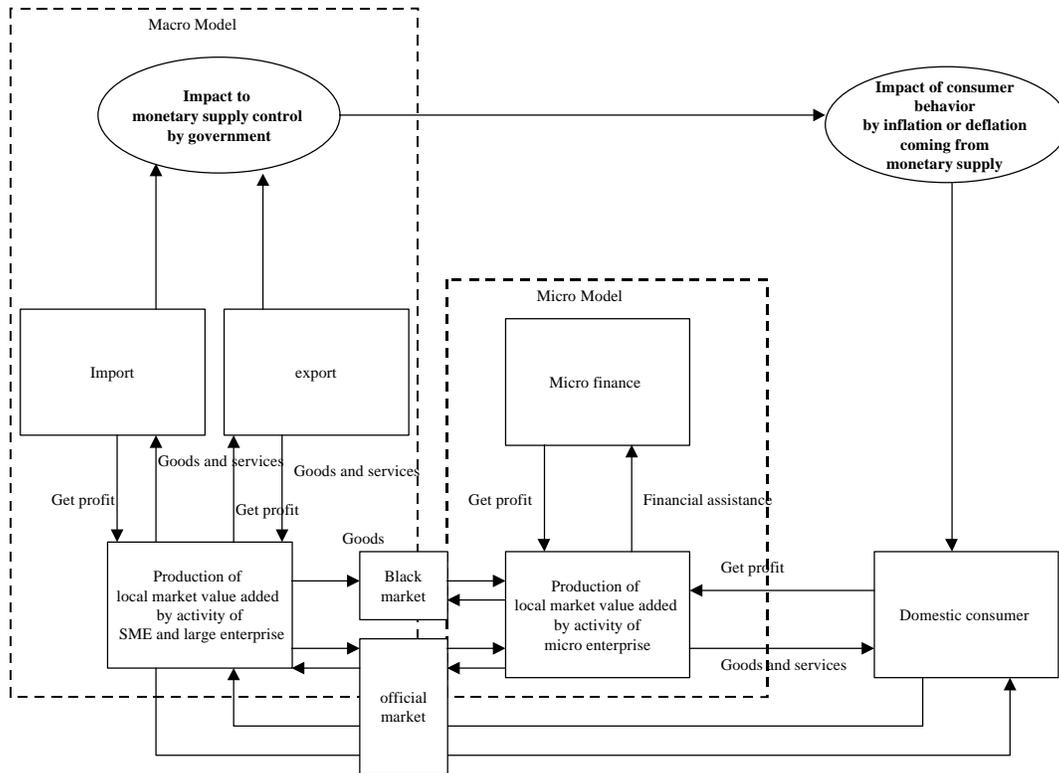


Figure 4.1: Simplified micro-macro linkage model

Simulated behavior of this model seems to fit most developing countries. Even value-added structure of the micro world is basically a re-enforcement loop but at a quite small increment in statistics. Considering inflation, neither price index nor growth is changed so much in many developing countries. One of the reasons may be from the frequent interruptions in both not changed micro and macro enterprise sector.

5. Thesis for simulation

The simulated behavior of the linkage model is quite strange, especially the increment of micro world re-enforced domestic production. In this context, all developing countries could easily become developed countries but the problem may come from behavior in the macro world. In the macro world, even imports and exports fluctuate. As a result, growth of the micro world is always pulled down by any influences that come from the macro world that affects consumer behavior in a conservative or negative way.

Also, activity of SMEs and large enterprises is unstable because of fluctuation of consumer behavior even though the structure of SMEs is a reinforced loop. Why is the structure basically a linkage of two reinforced loops but the behavior seems to be that of a balanced loop? Also, why is this almost independent structure of the micro macro world so unstable and the other word so weak that it can't resist fluctuation? If the structure of the world is fundamentally so weak, it might be hopeless to try to design and control development.

In order to stabilize the growth, we think there may need to be a strong linkage between the micro and macro worlds in the production side. Fig. 5.1 shows our new linkage model.

This new linkage model is essentially a link of three reinforced loops that makes it much more stable and the growth behavior much stronger by its interdependency. In many developing countries, micro enterprises procure goods from the black market or other unofficial markets. Also many goods and materials used both for micro and large enterprise manufacturing

companies are procured from the foreign market. But sound linkage of micro and macro manufacturing and retail markets with SME sector reduce the import of many goods and services, and could be procured in local markets mostly by SMEs. Micro enterprises also could reduce the procurement from unofficial markets and reduce the risks coming from quality and price. *note-2)

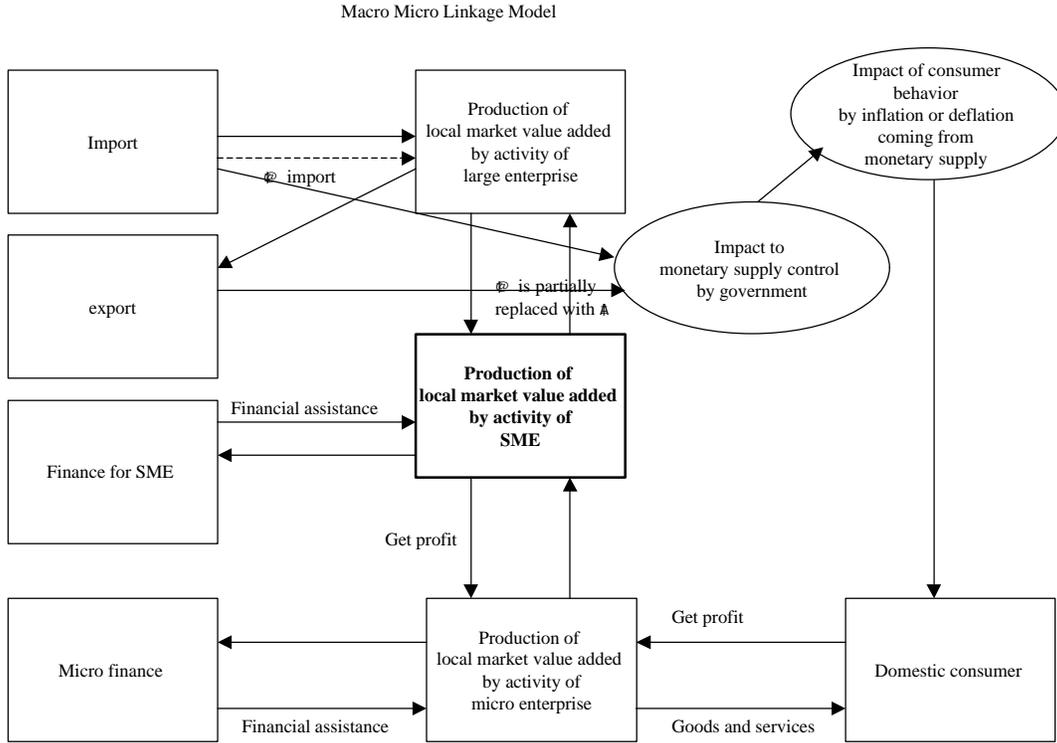


Figure 5.1: Simplified micro-macro linkage model

However, for sound development (growth), finance of SMEs is important as well as micro finance. Structurally, the banking business remains viable and avoids risk through the collateral system. Even though they have a risk hedge system, in developing countries, this guarantee or risk avoiding system seems to not work well. As a future study, we want to develop a SME financial sector model and analyze the reasons for failure.

Note-1) The reason for the success of modern micro finance organizations is the solidarity system. In "Poor Monitoring and Credit Market", World Bank Economic Review, Volume 4, Number 3, 1990 by Joseph E. Stiglitz, the impact of solidarity is determined as:

$$\bar{V} = U_i p_i^2 + U_{ig} p_i (1 - p_i) = V_i(r, L, q)$$

where $U_i \equiv U[Y_i(L) - \bar{r}L]$

$$U_{ig} \equiv U[Y_i(L) - \bar{r}L - qL]$$

$$U(0) = 0$$

$$i = R, S$$

as r : interest rate, L : lending amount, U : utility function of lender, V : value added, P : productivity function, q : coverage of solidarity, R : high risk high return project, S : low risk low return project.

In this solidarity system, the borrower is forced to choose R or S with agreement and reduce the risk of R near S and establish much higher safety even without having any collateral guarantee scheme.

Note-2) A model of the SME sector was already submitted in 2001. In this model, we considered the link between sub industry groups of SME. If some support industries could succeed in growing, it affected the other industries in a chain reaction. However, if growth of some sub sector drops, it means many bankruptcies would happen and the chain reaction would have a negative affect on the other linked sub sectors.

The black market is not affected as a shock absorber but accelerates the impact of interruption in many cases. Also, in many countries, the official wholesale sub sector is not so strong and is limited in its variety of goods, mostly local brands such as beer, cookies and snacks.

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