Chapter 2

Microfinance Revisited: Towards a More Flexible Lending Contracts

Kazunari Tsukada

2.1 Introduction

Many economists believe that the absence of financial markets for the poor is one of major obstacles to alleviate global poverty. People can allocate their consumption efficiently over time and cope with future risk effectively if financial services such as loan, savings and insurance are available in financial markets. Yet despite the apparent benefits, the poor usually find it difficult to have access to such financial services. In a traditional loan contract, for example, a borrower is required collateral but the poor rarely have sufficient assets for collateral use. Since a lender incurs all the loss in case of default, substantial efforts have to be made for screening, monitoring and enforcement in order to mitigate risk of default. However, in general, those efforts are too costly for an uninformed lender to be compensated by interest revenue from a very small loan.

For last several decades, microfinance institutions have introduced a series of new financial products for the poor. Microfinance now flourishes all around the world and, according to the Microcredit Summit Campaign, 3,552 microfinance institutions provided 154,825,825 clients with small loans, as of December, 2007. For the sake of explaining the remarkable success of microfinance, various economic mechanisms have been suggested as to how microfinance could overcome problems faced by traditional lending programs. Although the debate is still going on, two notable features, group liability lending and fixed repayment schedule with frequent installments, have particularly attracted many attentions (Armendariz de Aghion et al. (2010)). Both features are thought to be important mechanisms through which a lender could reduce lending costs and maintain high repayment rates. However, it is also important to notice

that these two features impose considerable costs on borrowers. Under group liability lending, any costs associated with the failure to repay must be incurred by borrowers and this may create a tension between them. Frequent repayment also increases a direct cost of attending the meeting where repayment takes place. Furthermore, fixed schedule eliminates any room for adjusting the amount of repayment based on economic conditions. A borrower must repay fixed amount even in case of bad time. Being aware of costs related to rigidity, microfinance institutions currently try to convert their portfolio to mode flexible services. A central problem is how to balance flexibility and repayment discipline.

In this chapter, I review selected literature on rigidity and flexibility of microfinance lending contract. I focus on issues regarding group liability and repayment rules, since they are supposed to be major factors that make microfinance loans more successful and, at the same time, more rigid. To examine potentials for flexible loan contract is important for two reasons. By offering financial services tailored to client's demand, flexible loans may increases a number of beneficiaries and may also improve client's welfare. According to previous studies, microfinance goals have not yet been achieved in terms of outreach or impacts (Armendariz de Aghion et al. (2010), Kono and Takahashi (2010)).

The rest of this chapter organizes as follows. Section 2 discusses about benefits and costs of group liability lending. I also review recent literature on the comparison between group and individual liability lending. Chapter 3 examines the role of fixed repayment schedule with frequent installments. Based on literature, I show that repayment frequency has its merit in offering a commitment device for the poor, whereas there are some costs of rigidity when client's income fluctuates over time.

2.2 From Group to Individual Liability Lending

2.2.1 Economics of Group Liability Lending

Many early studies on microfinance focused on the economics of group liability. Under group liability lending, members of a voluntary-formed group are jointly liable, either implicitly or explicitly, for one another's repayments. When one borrower cannot repay her loan, group members are required to repay on her behalf. All group members are denied future loans until entire loans to the group are fully repaid. This innovative style of lending was pioneered by the Grameen bank in Bangladesh (the classic Grameen model)

and employed by many subsequent replicators all over the world. Group liability was so prominent in initial microfinance activities that it was considered a distinguished aspect of contract design that worked for successful lending to the poor with high repayment rates. Until now a number of theoretical models have identified various mechanisms, including peer screening (Ghatak (1999)), peer monitoring (Stiglitz (1990), Varian (1990)) and peer enforcement (Besley and Coate (1995)), through which group liability enables a lender to make uncollateralized loans to the poor. Ghatak and Guinnane (1999) provide a review on early theoretical literature. A basic idea of theoretical approach is very simple and is shared by almost all existing models. Shifting the burden of default from a lender to a group gives correct incentives to borrowers to use their local information and social ties for ensuring repayments of peers within the same group.

One such mechanisms, peer screening, works at the stage of group formation. When a group is formed, potential borrowers should desire to be paired with safe borrowers because risky borrowers have high probability of defaults, of which burden must be borne by group members. Hence, group liability effectively raises an interest rate for borrowers who are paired with risky partners. If agents know one another's type, risky borrowers are avoided by safe borrowers and assortative matching will emerge as an equilibrium structure. Peer screening can thus differentiate the effective interest rates between safe and risky groups. Lower effective interest rate can be imposed on safe groups, while risky groups face higher effective interest rate. This implicit differentiation of effective interest rates can mitigate the adverse selection problem. Without group liability, an uninformed lender should offer a uniform interest rate to all borrowers based on their average risk. However, the interest rate might be too high to attract safe borrowers. An advantage from peer screening is that a lender need not elicit local information by costly investigation in order to offer different interest rates by risk type.

Other important mechanisms suggested by theoretical works are peer monitoring and peer enforcement. Once a group is formed, each borrower individually decides how to use her loan. Although some microfinance institutions restrict the purpose of loan to income generating activities, such as productive investments, the loan can be diverted into any usages due to fungibility. Whatsoever is an ultimate purpose of loan, the borrower has to exert efforts to keep her business well performing for successful repayments. If her inappropriate behavior, in terms of the purpose of loan and her effort levels, leads to the repayment failure, the burden of default should be borne by group members. Therefore, borrowers have incentives to monitor each other and to pressure peers into appropriate behaviors as long as they can observe one another's actions. Peer

monitoring mitigate an ex-ante moral hazard problem. In the absence of an ability to observe borrowers' actions, a lender should use financial reward and punishment, depending solely on the repayment results, to prevent an ex-ante moral hazard. However, a limited liability severely restricts the possibility of financial punishment. In this respect, the presence of non-financial social sanctions that borrowers can rely on is critical in punishing misbehaviors. A similar story applies to the prevention of an ex-post moral hazard problem. After income is realized, a borrower may have a chance to put her earnings in her pocket and default even though her income is sufficient to repay. A lender cannot force such defaulting borrowers to repay because the cost for verifying income is prohibitively high. Again, using local information and social pressures, group borrowers have incentives to discourage peers from intending to strategic default.

A basic presumption of peer mechanisms described above is the existence of social interaction among group members which makes it easier to observe one another's types, actions and true states of nature. In addition, borrowers are thought to be endowed with capabilities of making social sanctions in case of defaults by their fellow members. It is, therefore, interesting to ask whether strong social interactions among group members affect the repayment performance under group liability lending. A handful of empirical studies try to examine this question (Wydick (1999), Ahlin and Townsend (2007), Cassar et al. (2007), Karlan (2007)). Using non-experimental data from Guatemala, Wydick (1999) concludes that previously existing social ties per se have little impact on the repayment rates[1]. Ahlin and Townsend (2007) shows that strong social ties have adverse impacts on repayment probability in Thailand, which is contradicting theoretical predictions. On the other hand, based on data from FINCA-Peru, Karlan (2007) finds the evidence that social connections, measured by geographical proximity and cultural similarity, increase peer monitoring and have a positive impact on high repayment rates. Since his study uses quasi-experimental environment in which borrowers are sorted into groups in a random way, an endogeneity problem resulting from the possibility that social connections affect both the group-formation process and economic opportunities should be avoided. Cassar et al. (2007) also finds a positive relationship between social connections and repayment performance in South Africa and Armenia.

Feigenberg et al. (2011) shed a light on a different aspect of social interactions. They compare two types of randomly assigned groups. One is a group with weekly

[1] Wydick finds that the intensive monitoring and the willingness to punish misbehaviors are associated with high repayment rates. However, previously existing social ties are not necessarily prerequisites for those monitoring and strict enforcement.

meetings and the other is a group with monthly meetings[2]. They find that more frequent meetings facilitate informal risk sharing among members. Clients who meet on a weekly basis achieve higher repayment rates than clients who meet on a monthly basis, even after all groups are converted to the same frequency of group meetings. Overall, empirical results suggest that the intensity of monitoring and the potential of social sanctions are positively related to lower defaults. However, too strong social ties can have adverse impacts on repayment rates because close relationships among borrowers make them reluctant to inflict severe sanctions on their fellow members, whereas doing so is optimal from the ex ante point of view. Hence, social interactions have both negative and positive effects on the repayment performance. Positive effects may arise not just from improved monitoring and/or enforcement but also from enhanced informal risk sharing among borrowers.

Theoretical models of peer monitoring and peer enforcement have some empirical supports as discussed above. As for peer screening, Ahlin (2009) finds the evidence for homogenous sorting by risk in group liability lending in Thailand. Assortative matching and appropriate risk-pricing predicted by peer screening model is empirically supported by data. However, he also reveals the tendency of risk anti-diversification within groups. This result may indicate that a borrower minimizes potential liability for fellow group members. Peer screening, therefore, limit the scope of efficient risk sharing among borrowers. Bryan et al. (2012) assess whether peers have superior information on creditworthiness of their friend and can use social pressure to enforce loan repayment. Instead of group liability, borrowers who are individually liable are given monetary incentives to screen their friends and to enforce repayment. Their experimental evidence from microcredit borrowers in South Africa shows that peers are effective in enforcing repayment, whereas they have no more information on friends than a lender. The latter result indicates that peer screening mechanism is less effective in their study location. Finally, using observational data from Thailand, Ahlin and Townsend (2008) assess the relative importance of all existing models. This unique challenge reveals that peer enforcement model performs well in the low-infrastructure poor region, while peer screening model well explains the data in the richer region close to the capital city. Taken all together, while each mechanism suggested by theory works in some specific contexts, there is no mechanism that works universally. Furthermore, the relative importance of

[2] The clients in their experiment are on individual liability lending contracts, while groups are formed because of a cost saving reason. The endogenous self selection problem, therefore, is not a serious issue in their study.

such mechanisms in practice depends on many location-specific factors, such as economic, cultural and historical conditions.

2.2.2 Group versus Individual Liability Lending

In 2002, the Grammen Bank introduced the so-called Grameen II system. Among other features, the Grameen II system formally eliminates group liability and allows for flexible repayment (Dowla and Barua (2006), Collins et al. (2010))[3]. Individual liability lending is now increasingly popular among microfinance institutions. For example, BancoSol, a large Bolivian microfinance institution, has moved a large share of its portfolio to individual liability. Bank Rakyat Indonesia (BRI), a flagship microfinance institution of Indonesia, and Association for Social Advancement (ASA) in Bangladesh have increased the number of loan clients without relying on group liability. Today, there are three major types of lending methodologies available in the microfinance industry: group liability lending, individual liability lending, and FINCA-style village banking (Karlan and Mullainathan (2009)). According to database from Microfinance Information Exchanges (2009), among 972 microfinance institutions, 37% of them exclusively adopt individual liability lending, and 44% of them adopt both group and individual lending. Hence, group liability is not a sole lending methodology these days. Rather, group liability lending is becoming a smaller part of total portfolio of this growing industry.

Although individual liability lending can release borrowers from social pressure and attract more potential clients, an apparent concern is how a lender can enforce loan repayment without any peer mechanisms. Importantly in this regard, most microfinance institutions retain other aspects of the classic Grameen model even under individual lending. The classic features include regular group meetings, contingent renewal of loans and public and frequent repayment. Regular group repayment (without group liability) reduces the administrative costs. Contingent renewal of loans should create dynamic incentives for borrowers to keep good repayment records[4]. Making repayment public imposes additional costs, resulting from the loss of reputation, on defaulting borrowers. Finally, frequent installments are believed to maintain repayment discipline, and also make it possible for credit officers to notice early evidences of problematic borrowers. Although all these features have been combined with group liability in the classic model,

[3] At the same time, the Grameen Bank introduced new saving products into the market. I discuss the roles of savings and flexible repayment schedule in subsequent sections, respectively.

[4] In general, the amount of renewed loan is greater than that of previous cycle. This progressive lending feature strengthens the effects of dynamic incentives.

they have been overlooked by economists until recently.

In addition to the awareness of potential benefits from several features other than group liability, economists also tend to pay more attentions to the potential costs of group liability lending. Fischer (2011) argues that group liability can cause distortions regarding the choice of borrowers' investments. If information is imperfect and informal risk sharing contract is incomplete, borrowers can free ride on their partners by taking risky but high expected return investments, without compensating their partners when risky investment generates very high returns. On the contrary, if information is perfect, peer approval of project type discourage borrowers from taking excessive risky investments and it reduces expected returns. Group liability, therefore, leads to either over- or under-investment in risky projects. Taking too safe investments under group liability lending is consistent with the empirical fact that the typical microfinance-funded business experiences only sluggish growth. Fischer conducts several lab experiments with actual microfinance borrowers in India and confirms theoretical predictions.

Despite the increasing trend towards individual liability lending, direct comparison between group and individual liability lending is surprisingly rare in empirical studies. Gine and Karlan (2011) is one of notable exceptions. They report on a field experiment in the Philippines, in which some of pre-existing groups are randomly converted from group to individual liability lending. They find no change in repayment rates under individual liability lending. Note that their experiment cannot identify the effect of peer screening because converted groups are originally formed under group liability lending. Carpena et al. (2010) examines an exactly opposite direction of change in liability structure. Based on data from a natural experiment in India, they assess the repayment impact of the conversion from individual to group liability lending. Contrary to the results of Gine and Karlan, they find an increase in repayment rates under group liability lending. These two studies seem to suggest that both group and individual liability lending perform equally well as long as the screening of potential clients is successfully done under individual liability lending. In this respect, the role of investigations by credit officers should be more important under individual liability lending than group liability.

Group liability lending has played a considerable role in expanding loan markets to the poor in developing countries. However, it is still unclear which theoretical mechanism truly works in practice in different conditions. In addition, group liability and resulting social pressure impose excessive burden on group borrowers under the system. Increasing attentions are now paid to other aspects of microfinance loans, including repayment frequency, dynamic incentives and public reputation. Individual liability

lending with those elements is thought to be sustainable when screening of potential clients does not become a serious issue. In the next section, I discuss more on the role of repayment frequency since it is a central feature that brings rigidity to microfinance loans.

2.3 Rigidity and Flexibility of Repayment Rules

2.3.1 Repayment Frequency as a Commitment Device

Most microfinance loans require frequent repayment installments, by weekly or monthly, and repayment starts immediately after the disbursement of loan. In addition, the amount of each repayment is fixed and usually non-negotiable during the repayment phase. This rigid repayment schedule has been advocated by many microfinance professions. Their argument is related to the ability of borrowers to save. Unless borrowers are obliged to make small installments frequently, they have to accumulate a certain amount of money to make repayment at the end of loan cycle. However, to accumulate a wealth is sometimes a difficult task for the poor because of saving constraints, sudden need of expenditure and consumption on tempting goods.

There are several empirical evidences for difficulties in savings (Ashraf et al. (2006), Gugerty (2007), Collins et al. (2009)). These evidences have been interpreted along the lines of behavioral weakness and present-biased preferences (Laibson (1997)). People are sometimes unable to resist immediate temptation even if they value future consumption, and end up with a smaller amount of savings than originally planned. In such a case, rigid and frequent repayment schedule of microfinance provide borrowers with opportunities that help them to commit to a savings-like behavior. Hence, if a potential borrower needs a loan and also desires not to default, rigid repayment rules is found to be helpful for this borrower. Based on this sort of argument, Bauer et al. (2012) examines the relationship between behavioral weakness and participation in microfinance in India. Using data obtained from lab-experiments in the fields, they find that present-biased women are more likely to borrow from local microfinance institution in order to meet their loan demand. This result suggests that, once taking into account behavioral aspects of clients, rigid and frequent repayment schedule should be supported as a useful commitment device. Fischer and Ghatak (2010) provide another justification for frequent repayment rule. They construct a theoretical model in which borrowers have present-bias preferences. They show, under some parameter conditions, that frequent repayment relaxes constraints of repayment enforcement and increases maximum

incentive compatible loan size.

Using a similar model with Fischer and Ghatak (2010), I show how frequent repayment can potentially improve repayment performance and client's welfare. Unlike a previous model, the amount of repayment in each period can be changed continuously here. Suppose there are three periods. Peirod 0 is a contacting stage and there is no consumption. In this period, an agent borrows a fixed amount 1 from a lender at an exogenous gross interest rate R and invests in productive inputs that generate a certain income y both in periods 1 and 2. If the agent does not make investments, no income is realized and, therefore, the agent necessarily makes investments. The utility function of the agent is given by,

$$U_t = u(c_t) + \beta \sum_{\tau=t+1}^{T} \delta^{\tau-t} u(c_\tau),$$

where c_t is consumption in period t. δ denotes a standard discount factor and β represents the degree of present bias. $u(c)$ is an increasing, twice-differentiable concave function. I assume $\beta < 0$ and $\delta\beta R < 1$. I also assume that the agent is sophisticated.

Let m_1 and m_2 denote the amount of loan repayment in periods 1 and 2, respectively. For the break even condition of the lender to be met, the amount of loan repayments must satisfy,

$$\frac{m_1}{R} + \frac{m_2}{R^2} = 1.$$

The above equality implies $m_2 = R^2 - Rm_1$. For the expositional simplicity, I denote $m_1 = m$ and $m_2 = R^2 - Rm$. The agent can save at the same gross rate R. Therefore, if the agent complies with the repayment schedule, $c_1 = y - m - s$ and $c_2 = y - R^2 + R(m + s)$, where s is a amount of savings in period 1. With those assumptions, period 0 agent wants to maximize $u(c_1) + \delta u(c_2)$, since there is no consumption in period 0. However, when priod 1 arrives, period 1 agent wants to maximize $u(c_1) + \beta\delta u(c_2)$. This is a well- known problem of the time-inconsistency of preference. Since the amount of savings depends on repayment schedule. let $s(m)$ denote the optimal level of savings for period 1 agent, which is determined by the following conditions,

$$u'\big(y - m - s(m)\big) \geq \delta\beta R u'\big(y - R^2 + R(m + s(m)\big) \quad \text{and} \quad s(m) \geq 0.$$

Apparently, $s(m)$ is non-increasing function of m. As the amount of repayment in period 1 increases (which decreases the amount of repayment in period 2), the agent is less required to save for consumption in period 2. Enforcement constraints for period 1 and 2 agents are given, respectively, by the following inequality,

$$u(y - m - s(m)) + \delta\beta u(y - R^2 + R\big(m + s(m)\big) \geq u(y) + \delta\beta u(y) - F,$$

for period 1 agent, and

$$u(y - R^2 + R\big(m + s(m)\big) \geq u\big(y + Rs(m)\big) - F,$$

for period 2 agent. F is a punishment that the lender can impose on the defaulter in case of the failure to repay. F may include the loss of defaulter's reputation as well as the loss of continuation value of relationship between lender and borrower (though not explicitly modeled here). Note that period 1 agent does not save at all when she decides to default in period 1 because $\delta\beta R < 1$.

How does repayment schedule affect enforcement constraints? To answer this, it is important to notice that consumption levels of period 1 and 2 under compliance with repayment schedule are totally unchanged when $0 \leq m \leq s(0)$. $s(0)$ is a maximum amount of savings the agent possibly makes. Since repayment and savings in period 1 are perfect substitutes regarding the intertemporal decision makings, the increase in m purely crows out savings by the same amount so long as $0 \leq m \leq s(0)$ is satisfied. Now consider the change from $m = 0$ to $m = s(0)$, this change has no effect on the enforcement constraint for period 1 agent because an endogenous substitution between repayment and savings occurs and utility is unchanged. However, this change can mitigate the opportunistic behavior of period 2 agent. The reason is simple. If period 1 agent has already decided to save less due to large m, period 2 agent has a smaller money but required to repay less installment. Hence, the befit of default shrinks. Earlier repayment, therefore, reduce the incentive for default in later periods. This effect is in particular large when interest rate is high. Since $u\big(y + Rs(m)\big)$ is increasing in R, the agent is tempted to use her accumulated wealth for consumption, instead for repayment. Frequent repayment schedule can improve repayment performance in that case.

If F is sufficiently high, the lender can further increase the amount of repayment in period 1. This is beneficial for the present-biased borrower from an ex-ante view. Period 1 agent always saves less than the optimal amount period 0 agent desires. Optima allocation of consumption from an ex-ante view is given by,

$$u'(c_1) = \delta R u'(c_2).$$

When the interest rate equals the discount rate, $\delta R = 1$, the above equation implies $c_1 = c_2$. It then implies that $y - m = y - R^2 + Rm$ should be satisfied. Note that there is no savings in this case because $m > s(0)$. Simple arithmetic confirms that $m_1 = m_2 = R^2/(1 + R)$, which means equal size of each repayment as in usual cases of standard microfinance arrangements. Overall, frequent repayment rule works as a commitment device. Frequent repayment has almost same meaning with frequent savings in practice. It can also improve welfare of present-biased borrowers by enabling optimal consumption allocation from an ex-ante point of view.

2.3.2 Flexible Repayment under Income Fluctuation

While frequent repayment schedule help borrowers to commit to repay and can lead to better allocation of consumption. How should repayment schedule be frequent? This is an important empirical question. Field and Pande (2008) compare randomly assigned weekly repayment groups to monthly repayment groups. They find that there exists no significant difference in their repayment rates between groups. Hence, weekly repayment may not be essential to provide an effective commitment device. The result indicates that it may be possible to reduce meeting costs both for microfinance institutions and borrowers using mode infrequent repayment without worsening the repayment performance.

A serious drawback of rigid repayment schedule lies in the fact that it is not state-contingent. It is often observed that seasonal variations in income in rural area cause seasonal variations in consumption as well (Khandker (2012)). In addition, a borrower usually faces uncertainty in income. Either in a predictable or unpredictable way, income fluctuation is a pervasive phenomenon and makes it difficult to smooth consumption over time. Microfinance intuitions recently try to introduce state-contingent repayment rule to mitigate the problem associated with mismatch of patterns between repayment and borrowers' cash flows. Shoji (2010) finds that allowing borrowers to reschedule their repayment during natural disaster in Bangladesh significantly reduced their reliance on

informal money lenders and enabled consumption smoothing. Loan repayment can be safely rescheduled if shocks are readily observable information for lenders. Bank for Agriculture and Agricultural Cooperation (BAAC) in Thailand also allows ex-post loan renegotiation if borrowers face repayment difficulties due to flood, drought, etc (CGAP/FAD (2006)). Flexible repayment schedule will attract more clients who are facing uncertainty in income and are afraid of possible default when they encounter negative shocks.

As for seasonality, a direct solution would be providing better opportunities for commitment savings. Clients should be offered an account of commitment savings when periodic income level is high, like after harvesting season, and the withdrawal should be only allowed during severe periods such as lean seasons. These arrangements will help the poor with present-biased preferences to mitigate seasonal variations in income to some extent. Another possible solution in microfinance loan is to allow the suspension of repayment during low income season. Confianza in Peru and Banco Los Andes ProCredit in Bolivia both offer loan products, where repayments are set according to revenue flows (CGAP/FAD (2006)). Czura et al. (2011) examines this type of repayment flexibility using experimental data from dairy farmers in India. They cannot find strong evidences for the increase in consumption for clients who are randomly offered flexible repayment schedule. Furthermore, the probability of default increased for clients who are required advance repayments. These results suggest that there may be some negative effects of temporal moratorium on overall repayment performance and that the appropriateness of design of flexibility matters in practice.

Finally, Field et al. (2011) assess the effect of two months grace periods before repayment starts on investment choices of business enterprises. They find that postponing repayment enhance the long-run development of business through larger investment during initial periods. However, their findings also reveal that grace periods increase the variance of investment returns and, therefore, lead to high default rates. Although their study is not directly related to income fluctuation, it provides further evidences for the existence of costs resulting from repayment moratorium. Flexible repayment schedule brings a potential for clients who suffer from income fluctuations. However, there exists a concern about erosion of financial discipline. Which effect is stronger depends on location specific factors and on details of contract design. Clearly, further research has to be made for better understandings of mechanism in which flexible repayment schedule improve welfare of clients.

2.4 Conclusion

Group liability and fixed repayment schedule with frequent installments are prominent features of microfinance lending contracts. They make it possible for lenders to reduce lending costs and to provide borrowers with appropriate incentives to repay. Sometimes they facilitate mutual insurance among members and improve welfare of borrowers by the provision of commitment device. However, they also impose considerable burdens on borrowers.

Microfinance institutions have recently introduced more flexible loan products, such as individual liability loans and ex-post negotiable loans with flexible repayment rules. Both empirical and theoretical studies indicate that flexibility of lending contract has both benefits and costs. Overall effects depend on location specific factors and actual design of flexibility. Seeking for better design of flexible lending contract is beneficial for potential borrowers. Accumulation of empirical evidences also contributes to better understanding of the conditions under which flexibility works well. Challenges toward more flexible lending contract are still on the way and further research efforts should be made in this fruitful area.

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