A Contribution to the Empirics of Micro Credit. Evidence from AlSol, in Chiapas México

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Abstract:
This paper analyzes the ALSOL micro credit firm in San Cristobal de Las Casas, Chiapas, Mexico. This micro credit bank is a Grameen style bank, employing joint liability loans in an attempt to alleviate poverty among female participants. We construct payment indicators, in order to determine the financial viability of the ALSOL bank, and to assess differences in repayment behavior. Fieldwork at the ALSOL site includes the construction of a consistent data set and interviews with program participants.

Our results show that ALSOL has a high rate of repayment. Urban participants have a high repayment rate and tend to not carry arrears, while those in the rural community have a lower rate of repayment and tend to carry arrears. We hypothesize that proximity to the market is a primary factor that causes the urban/rural difference.

I. Introduction

Micro credit, or the lending of small loans (some as small as $50 USD), has been hailed as a new solution to the problem of poverty. Supporters of Micro credit assert that the programs are both self-sustaining and effective as a means of raising participant’s standard of living. Along with this praise has been a vast increase in the number of micro

1 Wabash College and the University of South Dakota, respectively. This version February 2004. We are thankful to Dr Humberto Barreto of the Wabash College Economics Department for help in writing the Macros used to analyze our data set. We are also greatly thankful to David and Nancy Orr and the Rogge Memorial Fund for financial and logistics support. The staffs of ALSOL, especially Claudio Rovelo, Pilar Garcia, Katia Castro, and the promotors were of the utmost assistance. In addition, Masud Bahramand was instrumental in helping collect the data and conducting interviews. Finally, Ramon Gonzalez the IV and Aaron Latham for assistance and comments. All mistakes are ours. Contact Information Grimmerj@wabash.edu Do not quote without permission from the authors. Graphs available upon request.
credit programs, with an expectation of micro credit serving up to 100 million households by 2005\textsuperscript{2}.

Yet, in spite of the high expectations of micro credit programs, there has been little empirical evidence to back up the “rhetorical strength of the anecdotal evidence” that micro credit firms offer potential donors on the positive social and economic effects that the firms offer the credit recipients\textsuperscript{3}. In addition, there is debate on the financial viability of the micro credit firms as financial institutions. Micro credit firms are able to sustain their operations based on the donations of individuals and favorable interest rates received on loans. Most banks would be forced to close their doors or only loan to less impoverished individuals if cut from this aide\textsuperscript{4}.

Analysis of the role and impact of micro credit programs is both difficult and complicated. There are two major streams of study. First, the financial efficiency of the providers, such as recovery rates on loans, can be evaluated. Models of optimizing agents in game-theoretic settings have developed to analyze group-formation, peer monitoring and the role of future incentives on ensuring that loans are repaid (e.g., Stiglitz and Weiss 1983; Stiglitz 1990; Varian 1990; Banerjee et. al. 1994; Besley and Coate 1995; Aremdariz 1999; Van Tassel 1999; and Smith 1983). The other mode of analysis has focused on the ability of micro credits to alleviate poverty, analyzing the ability of micro credit firms to raise the standard of living (Khandker 1998; Zaman 2001; Rosintan et. al. 1999; Pitt and Khandker 1998).

Barboza and Barreto conducted an analysis of ALSOL (Alternativas Solidarias), a micro credit in Chiapas, Mexico, from July 2000 to July 2001 based on a deficient data

\textsuperscript{2} Murdock, Jonathan “The Microfinance Promise” *Journal of Economic Literature* 37,4 1999 1569-1570
\textsuperscript{3} Ibid 1572
\textsuperscript{4} Ibid 1571
set comprised solely of the most recent loan received for all program participants\textsuperscript{5}. The authors argue that women participating in a micro credit firm will undertake learning by association, that is, the group dynamics that take place within a program allow for easier exchange of information among women. This facilitates attempts to educate women on how to manage funds, develop entrepreneurial skill, and to increase propensity for success in the market economy.

Barboza and Barreto’s analysis showed that ALSOL was performing well as a financial institution, with a repayment rate of roughly 94%. Their results also showed that a great deal of variation was observed between the repayment behavior of rural and urban participants within the program, with rural participants with a 15% lower repayment rate.

This paper’s primary contribution is a consistent data set and the application of eight weeks of experience at the ALSOL data site. Results of our analysis show that ALSOL has a high level of repayment and significant differences in the payment behavior of rural and urban participants. We also note that the preliminary analysis of Barboza and Barreto underestimated the repayment rate of ALSOL participants observed in this paper. The next section will describe the ALSOL micro credit firm, section 3 summarizes fieldwork conducted at the ALSOL site by Justin Grimmer and Masud Bahramand, section 4 summarizes the original data and constructs the payment indicators and then an analysis of our results, and finally we will conclude our analysis in section 5.

\textsuperscript{5} Barboza, Gustavo; Barreto, Humberto “Learning by Association: An Empirical Analysis of a Micro Credit Program” Unpublished Draft. This paper will provide the payment indicators used to analyze payment behavior in this paper.
II. Describing the ALSOL microcredit process and Development of the Program

The ALSOL micro credit program is a Grameen style program, giving out small loans to impoverished women in the area surrounding San Cristobal de las Casas, a city located in the southern Chiapan highlands. Loan sizes are offered on six levels, with an initial loan level of 500 pesos ($50 USD), a second level loan of 1000 pesos ($100 USD), and a 1000 peso increase with each loan level thereafter. The loans are broken down into two distinct types, urban and rural loans, with a 30% and 20% fixed interest rate respectively. Payments are broken down into fifty payments, which are comprised of 1/50\(^{th}\) of the principle, a payment of 1/50\(^{th}\) of the fixed interest rate, and a mandatory savings payment. In addition, women have access to a voluntary savings account, if desired\(^6\).

ALSOL program participants are given dynamic incentives to pay off loans faster than the fifty-week period. Individuals are unable to receive the next line of credit unless the current loan has been completed. Therefore, individuals that place a high value obtaining a higher level of credit are willing to incur the higher interest associated with an early liquidation in order to receive the next loan level\(^7\). Furthermore, individuals may be forced to carry arrears due to lack of market activity or family problem that prevents market access.

Because ALSOL is a Grameen style bank, it organizes its participants in a similar manner. Loans are offered on the basis of group liability: an association of five women

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\(^6\) Ibid 3-4

\(^7\) Because the interest payments are fixed, the effective interest rate increases as the time to repay loan decreases
that are unable to receive further loans unless all are in good standing with the ALSOL program. Each group has a leader that collects the group’s payments for the week and serves as the spokesperson in meetings with the ALSOL representative for the week. Furthermore, groups initially receive the loans on a week-by-week basis, with two members initially receiving the loan during week one, two more members during week two and finally the last member during week three. The groups alleviate the lack of information that ALSOL has regarding viable financial risks, lowers the costs of monitoring loans, and allows the poor to receive credit without offering collateral. These groups are then collected into centers, which meet once a week in a designated location\textsuperscript{8}.

The ALSOL program was initially known as Grameen Chiapas and was officially associated with the Grameen bank. However, a Mexican politician running for office attempted to claim the bank as her creation, and then tried to take over the program. Rather than allow the bank to fall into the hands of the politician the co-directors of the program hid the original data and created a false data set to present the politician. After this conflict, ALSOL was forced to break away from the Grameen bank; however, ALSOL still maintains close ties with Grameen\textsuperscript{9}.

In addition, the ALSOL program has gone through three phases of different discounts associated with liquidation. Phase 1, the initial discount program, allowed individuals that were liquidating to pay only the capital. However, individuals at loan level three had to make a minimum of 47 payments before they were allowed to liquidate. Phase 2 allows individuals that are leaving the program to liquidate for only the capital remaining on a loan. Individuals staying in the program had to pay capital and interest

\textsuperscript{8} Ibid 3-5, Grimmer’s Observations, collected June-August 2003
\textsuperscript{9} Interview of Claudio Rovelo and Pilar Garcia conducted by Grimmer July 2003
owed minus a sliding discount based on the amount remaining. Phase 3, the current phase of the ALSOL program, required individuals to pay the entire remaining capital and interest. Unfortunately, these Phases did not change on a fixed date, but rather on different dates on a center-by-center basis, therefore it is impossible to identify the phase associated with a given liquidation\textsuperscript{10}. The program changes are evidence of how the ALSOL program has attempted to develop and find an optimal strategy to promote both collection and welfare of the participants in the program.

The ALSOL program has expanded its scope of operation and has increased the number of services offered to women. In addition to the loans and voluntary saving programs, ALSOL offers women training in the production of various goods, childcare suggestions, and empowerment education. ALSOL has also expanded its operations to include the area surrounding Palenque, Chiapas located northeast of the central ALSOL location. Plans in the future include a center in Cancun, located in the Yucatan peninsula\textsuperscript{11}.

III. Fieldwork at ALSOL Bank and at Weekly Meetings

ALSOL Bank and Data Collection

The data set that Barreto and Barboza employed in their analysis was missing crucial data due to the ALSOL method for maintaining records. The bank retains only the highest-level loan that a participant achieved or is currently and repaying, deleting all other records. Therefore, in the initial data set a woman in the fourth level loan would have no previous record of her repayment behavior. The primary task of the fieldwork

\textsuperscript{10} Interview of Katia Castro conducted by Grimmer on June 23\textsuperscript{rd}, 2003

\textsuperscript{11} Interview of various ALSOL staff members, conducted by Grimmer and Bahramand Summer of 2003
work at the ALSOL site was to assimilate a close to complete data set of participant’s repayment behavior.

Our primary source for the new data set was the records kept by the program’s *promotors*. The *promotor* was charged with monitoring and collecting the program participants’ debt. The information included in these records was: the number of payments made on a given date, the voluntary savings made, and the date and amount of liquidation. A secondary source of data was the *liberettas* or the small books that are given to program participants to track the number of payments made in the program. These books were used as a back up to the *promotor’s* records, in order to compensate for missing pages or days in which there is confusing notation. For data dating before 1999, we employed a master book recording payments for all three original centers. In order to verify questionable liquidation dates, the contracts that women signed to be included in the program were used. Furthermore, situations arose in which we were able to exploit our knowledge of how loans were handed out in the program and the date that a contract was signed in order to correct for one or two weeks of missing data for a given center.

As data collection was undertaken, two major issues with the data set that had been previously unknown emerged. First, women appeared to be receiving higher loan levels, without completing the requisite lower loans. In fact, permutations of loans, as strange as one woman receiving a first, third, and then fourth level loan are observed in our data set. Secondly, group recomposition was observed: after a period of time it appeared that some groups were broken up and reorganized with different participants from the same center.
There are several possible hypotheses that could explain the presence of women that have not received the prescribed line of credit. First, it is possible that earlier loan levels are completed in one center and then later loan levels completed in a second center. We have roughly ten documented cases of women who switch centers. However, the poor notation that promotors use in folders, along with a high propensity for similar names complicates following the data trail for an individual participant. Furthermore, the creation of false data and the other problems that caused the official separation of ALSOL from the Grameen bank could have led to the loss of data in earlier centers. However, several promotors, along with the program director asserted that it would be impossible for a woman to have skipped the beginning loan stages and receive the more advanced lines of credit.\textsuperscript{12}

Along with the problems associated with non-standard loan histories, the idea of women switching groups seemed to violate the program rules. However, there are situations in which the group members were reordered to create a more favorable environment for peer monitoring of loan performance. First, in some centers we see that groups may be reduced to only two members, as members of their group decide to liquidate and then leave the program entirely. The promotor will then decide to reorganize the members of the group to create standard sized groups from the remaining participants in a center. In addition, the promotor may decide to reorder groups if he views that the group dynamics are not conducive to the recollection of credit. Situations include too many family members within a group, or a poor relationship between group

\textsuperscript{12} Interviews Conducted by Grimmer and Masud Bahrahmand Summer 2003,
members. The group recomposition that is observed is primarily a *promotor* driven phenomenon\(^\text{13}\).

*Interviews and Observations at Weekly Meetings*

Upon completion of the raw data set, interviews of program participants were undertaken in order to ascertain more information from women, in both urban and rural settings, that were participating in the program. Women who had reached the higher-level loans were the preferred candidates for our interviews. Questions were asked regarding basic housing and food conditions, the educational progress of the participant’s children, the primary application of the credit received, current occupation, and changes that have occurred in the participant’s life while in the program.

The background and living conditions provided initial insight into the lives of program participants. A majority of the women interviewed did not speak Spanish as a primary language\(^\text{14}\). Furthermore, six of the seven women were married, and all had children. The housing conditions varied, but all were humble: some living in homes made of adobe, others were able to construct homes with an aluminum roof, while one woman rented a small room for her and her daughters\(^\text{15}\). Among the women interviewed we see that language provides a key dividing line, while all participants had a similar housing and family conditions.

The women interviewed held similar occupations and, on the whole, employed the loans for similar purposes. Six of the women identified themselves as artisans and one participant was a small store owner. Furthermore, five women stated the loans were

\(^{13}\) Ibid

\(^{14}\) Four women spoke Tzotzil, two spoke spanish and one woman spoke Tzeltal. Women who spoke a language other than Spanish were interviewed with the help of a translator

\(^{15}\) Interview of Women in program 7-15 to 7-30-03 conducted by Grimmer and Bahramand
being used solely to expand their small businesses: buying more threads for the production of small crafts or to ascertain more items to sell in the small store. One other participant stated that she used the loans for personal reasons; while one other stated that the loans were being used for both food and for work materials. On the whole, the women interviewed seemed to view the loans as primarily a business venture.

The impact of the ALSOL program, as measured by the women receiving the credit, varied greatly. Maria Arias Perez, an artisan in the local markets, gave the ALSOL program the highest praises. Maria stated that previous to receiving the credit she lived in a cardboard home, without running water or lights. In addition to the poor living conditions, her family was unable to afford provisions other than fruit and was becoming ill from the lack of meat. However, after the ALSOL program both her living conditions and self-esteem had improved greatly. She now lives in a small room that she rents in the San Cristobal city limits, has running and bottled water, and a metal roof. Her family is now able to afford more meat in their diet, and Maria asserted that her self-esteem had increased greatly. However, Maria’s daughters participated in other programs in the area, so the improvement may not be totally accredited to ALSOL.\(^\text{16}\)

While Maria Arias Perez paints a seemingly perfect picture of the potential of the ALSOL program, most of those interviewed did not undertake as dramatic of a transition. Maria Perez Diaz stated that there had been no change in her house and she still could not buy the materials her children needed for school. Yet, her family was able to afford a sufficient amount of meat in their diet.\(^\text{17}\) Ola Santis Lopez, a participant on the fourth loan level, showed the least amount of change and response to the program when asked

\(^{16}\text{Interview with Maria Arias Perez 7-29-03 conducted by Grimmer}\)
\(^{17}\text{Interview with Maria Perez Diaz 7-29-03 conducted by Grimmer}\)
how her life has improved. She stated that the only major change in her family’s life was
that they were now able to buy newer things for their home\textsuperscript{18}. The variety of assessments
of the ALSOL program illustrates the need for scientific evaluations with “carefully
chosen treatment and control groups” in order to carefully evaluate the impact of the
program\textsuperscript{19}. However, program participants are often unwilling to participate in an
interview, may be absent regularly in meetings, or may not trust the interviewer enough
when providing answers to survey questions. All of these behaviors were observed
during our small round of interviews and further complicates the process of evaluating
the impact of micro credit on the wellbeing of program participants.

IV. Original Data and Transformations

The data set constructed at the ALSOL site consists of all program participants
that had a paper record at the ALSOL loan site. It consists of 2788 different
observations\textsuperscript{20}. There are two major deficiencies in this project’s data analysis. First,
there are unknown missing observations, due to information from loans that ALSOL has
lost over time. Secondly, individuals that switched groups with a loan repayment still in
progress are excluded from our analysis, due to difficulties in tracking the movements of
these individuals. A later version of this paper will correct for the latter of these
deficiencies.

Individuals that fail to repay back their loan over the allotted amount of time will
not be defaulted in this analysis. This is an important deviation from the Barboza,
Barreto analysis, however, should not cause a large enough deviation to make our results

\textsuperscript{18} Interview with Ola Santis Lopez 7-29-03 conducted by Bahramand
\textsuperscript{19} Morduch 1572
\textsuperscript{20} Group changes are counted as new observations
incomparable\textsuperscript{21}. Of particular interest in this data analysis will be evidence of significant deviation between the repayment behavior of rural and urban and a comparison between the initial Barboza and Barreto results to our current results.

*Constructing Payment Indicators*

In order to sustain a long-term source of finances, micro credit firms must be able to identify projects that will allow high recovery rates associated with the program’s loans. With high recovery rates, micro credits will then be able to have a long-term source of capital for its loans, allowing the alleviation of poverty via market incentives.

Barboza and Barreto’s payment indicators will be used in this analysis in order to determine the financial viability of the ALSOL project. Our goal in constructing the payment indicators will be to compare the actual to the expected number of payments received. The first step is the creation of a Weekly Payment Indicator ($WPI$). The $WPI$ is based on the number of payments that the participant is ahead or behind on the loan. The $WPI$ is defined as:

\begin{equation}
WPI_{j,t} = \left( \frac{D_t - ID}{7} \right) \prod_{i=1}^{t} P_i
\end{equation}

where, $j$ indexes observation 1 through 2788 and $t$ time. $P_i$ tracks the number of payments the participant makes in time period $i$, $D_t$ is the date from which the loan is to be evaluated, $ID$ is the date the loan was started. Therefore, our indicator tracks the sum of number of payments made against the number of weeks that have elapsed since the loan began.

\textsuperscript{21} Barboza and Barreto define a default as a loan that has not been paid for longer than 25 weeks. It is argued that leaving defaulted loans on the books “will bias downward measures of performance”. This deviation on treatment of defaulted loans will be removed in a later version of the paper.
Computing the $WPI$ allows for three possibilities. First, if $WPI_{j,t} \leq X < 0$ then the program participant is $X$ payments ahead. If $WPI_{j,t} = X = 0$ then the participant is current with her repayments and if $WPI_{j,t} = X > 0$ then the participant is $X$ payments behind.

While the $WPI$ indicator allows us to track the number of payments ahead or behind that a participant may be ahead or behind, it cannot be used to summarize program statistics. The indicator does not account for differences in the loan size. For example, a woman with a $WPI = 1$ on a first level loan does not cancel out a fifth level loan participant with a $WPI = -1$.

The creation of indicators that account for loan size will allow the comparison of payments across the various loan sizes that comprise the ALSOL program. The expected and actual amounts of payment are defined as:

\begin{equation}
(2) \quad \text{ExpectedPaymentAmount}_{j,t} = \frac{LS_j}{50} \frac{Dt - ID}{7} \tag{2}
\end{equation}

\begin{equation}
(3) \quad \text{ActualPaymentAmount}_{j,t} = \frac{LS_j}{50} \sum_{i=1}^{t} P_i \tag{3}
\end{equation}

Where $LS$ is the loan size of the participant and the other variables are the same as above. With the computation of the actual and expected payments we are now able to construct two indicators that assess individual program performance:

\begin{equation}
(4) \quad \text{IndividualValueGap}_{j,t} = \text{ActualPaymentAmount}_{j,t} - \text{ExpectedPaymentAmount}_{j,t} \tag{4}
\end{equation}

\begin{equation}
(5) \quad \text{Individual ValueRatioGap}_{j,t} = \frac{\text{ActualPaymentAmount}_{j,t}}{\text{ExpectedPaymentAmount}_{j,t}} \tag{5}
\end{equation}
The Individual Value Gap is measured in pesos and negative values indicate arrears. A value less than one for the Individual Ratio Gap indicates that the individual is carrying arrears.

Now, because the data has been weighted according to the loan size we are able to aggregate individual performance indicators over program data. The summation of the Individual Value Gap allows for a snapshot of the total money collected on a given date compared against what should have been collected.

\[
(6) \quad \text{OverallValueGap}_{j,t} = \sum_{j=1}^{2788} \text{IndividualValueGap}_{j,t}
\]

In a similar vein, dividing the sum of the actual by the sum of the payments allows for an analysis of individuals repayment behavior with the loan.

\[
(7) \quad \text{OverallRatioGap}_{j,t} = \frac{\sum_{j=1}^{2788} \text{ActualPaymentAmount}_{j,t}}{\sum_{j=1}^{2788} \text{ExpectedPaymentAmount}_{j,t}}
\]

The Overall Ratio Gap (ORG) is compared to one. These indicators can now be used to explicitly state the program goals and to analyze the performance those within the program. In order to remain financially viable, the ALSOL program should attempt to minimize the variance of the ORG around one, allowing the program to effectively plan how to loan out its resources.

*Is ALSOL a viable Micro Credit Program?*
The overall findings of this analysis indicate that ALSOL has a tendency for high repayment rates, with a repayment rate in the range of 97%. However, along with this high repayment rate there is a high amount of differentiation among repayment behavior between rural and urban loan participants. In addition, our analysis shows that, as expected, the initial Barboza and Barreto analysis underestimated the recovery rate of the ALSOL program downwards.

Graph 1 indicates that the overall repayment rate of ALSOL is very high, with the program exceeding 100% several times and obtaining a minimum of only 94% over the dates of analysis. The sources of variation observed in Graph 1 are a result of several factors, including group recompositions, individuals becoming more viable in the marketplace via the learning process that Barboza and Barreto hypothesize, and even weeks in which some centers did not meet to collect payments. Graph 2 shows the number of missing observations that occurred in our analysis, due to members switching groups while still repaying a loan.

In order to better determine the sources of variation in the ORG, the data was separated into urban and rural classifications; the results are shown in Graph 3. There is a clear difference between the performance of urban and rural loans. The ORG for urban participants tends to be over 1, indicating that the Urban participants are performing above the expected number of payments. However, the ORG below one for rural loans indicates that, on average, the participants are carrying arrears. Urban loans tend to have a repayment rate 15-20% higher than the rural loans, with urban loans exceeding rural loans by over 25% several times.

22 As mentioned above, the Graphs are available upon request. Contact Grimmerj@wabash.edu
Differences in access and frequency of trips to the market form our primary hypothesis regarding differences between urban and rural participants. Some loan recipients are unable to venture to San Cristobal in order to sell their wares in the city marketplace. Furthermore, women that are able to access markets in the city are only able to go a limited amount of time. Both of these obstacles serve to limit the loan recipient’s interaction with the consumer and lowers information about performance of various goods in the market. This lowers the program participant’s ability to effectively sell their wares, decreasing the possible revenue and therefore decreasing the probability of payment during a given week.

The observations made while at the ALSOL centers agrees with the primary hypothesis. While at a meeting in a rural center, several women asked one of the authors how they could overcome their lack of access to the market. The women stated that the major problem was not the production of goods, but rather, having a location to market their wares.

It follows that the good performance of the urban participants is partly a result from daily access to the markets of the city. Here, urban participants are able to monitor the markets constantly and can make daily trips to sell their goods as they are produced. This allows for a distinct advantage in time with consumers and assimilation of information regarding performance of goods in the marketplace. This allows for greater revenue for urban residents, which will raise the propensity to make the weekly payments.

Our analysis shows that the Barboza and Barreto’s initial estimation underestimated the repayment rate of loans in the ALSOL program. Barboza and Barreto
identified the repayment rate to be roughly 94%, with a low of 88%. Both of these figures are significantly lower than our analysis. This was due to the data that limited the analysis to the latest or last loan for all observations. Therefore, loans that were successfully completed were eliminated from the data set, causing the estimated repayment rate to be lower than the actual rate of repayment.

V. Conclusion

We have shown in this paper that ALSOL is a viable financial institution, with high loan repayment rates. This shows that individuals that are in the lowest income bracket are able to repay loans. This offers strong evidence micro credit firms, with only a small amount of help from donors, may be able to create long-term financial stability which will allow firms to have available capital to loan impoverished women.

However, there is a large amount of variation in repayment behavior between urban and rural participants. In addition, we showed, through our interviews, that participants in the program view the impact and benefits of participating in the ALSOL program differently. This evidence strengthens the argument that micro credit is not a solution that can be standardized and then applied indiscriminately. Rather, potential areas for the program must be carefully evaluated in order to ensure that the micro credit mission, employing market incentives to alleviate poverty, will perform effectively in a region.

Further research in this project will first focus upon the missing observations in this data set: individuals that switched groups while repaying loans. Later versions of this paper will also explore and quantify the dynamics associated with group changes.
What are the characteristics of centers that contain groups that have a recomposition? Do individuals tend to do repay at a higher rate when they are placed into new groups?

Micro credit offers an exciting and fresh approach to the alleviation of poverty. The future of micro credit will be when developing countries are able to effectively set up financial institutions that employ micro credit like strategies in the alleviation of poverty. Then, micro credit may be able to reach its full potential as a tool for economic development.

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