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**HETEROGENEOUS FIRMS AND EFFICIENT
INTERMEDIATION IN TAIWAN**

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ABSTRACT

Taiwan, because of its heterogeneous firm size structure, had a tremendous credit intermediation problem. Dependent on many small and medium firms for industrial competitiveness in world markets, formal financial institutions faced prohibitive information costs in providing credit. When information costs are significant, credit markets do not work in a smooth Walrasian fashion and banks will tend to ration credit even when they are allowed to raise interest rates. Advice to liberalize Taiwan's very "rigid" formal financial markets ("get prices right") in the presence of its heterogeneous firm structure would, therefore, not have been practical.

Taiwan solved its credit intermediation problem by allowing (and assisting) the development of an active curb market. A dual financial system was thus created which segmented borrowers into "full-information" borrowers, which dealt with the formal financial institutions and "information-intensive" borrowers, which got credit from curb lenders. This paper analyzes the many beneficial effects of this market segmentation, and why financial liberalization, particularly in the early development years, could have created substantial costs of adjustment.

CONTENTS

1.	Introduction.....	1
2.	Efficient Intermediation and the Size Structure of Industry.....	2
2.1	Imperfect Information and Credit Rationing.....	4
2.1.1	Credit Market Equilibrium With High Information Costs.....	5
2.1.2	Credit Market Equilibrium With Restriction on Loan Contracts.....	7
2.2	Financial Regulation in Taiwan.....	8
2.3	Evidence for Quantity Rationing, Discriminatory Lending and Intermediation Inefficiency in Taiwan.....	9
3.	Taiwan's Answer to the Credit Intermediation Problem: Intermediaries and De Facto Intermediaries.....	12
4.	A Reconnaissance of Taiwan's Curb Markets.....	15
4.1	Post-dated Checks: Dee-Hua Street and Other Informal Money Markets.....	15
4.2	"3:30 Financing".....	17
4.3	"Car Loans".....	17
4.4	"Partnerships" and "Investors".....	17
4.5	"Byau Hwei".....	18
4.6	Lease and Installment Companies.....	19
4.7	Friends and Relatives.....	19
5.	Why the Curb Market Matters in Taiwan.....	20
5.1	The "Small Loans" Function.....	20
5.2	Mobilization of Domestic Savings.....	22
5.3	The "Safety Valve" Function.....	22
5.4	Interlinkage of Credit and Production Transactions.....	23
6.	Concluding Remarks.....	26

1. Introduction

Credit has been a long-standing concern of those interested in promoting greater participation of small and medium firms in industrial sectors of less developed countries. The problem is often stated as how to finance the emergence and growth of smaller enterprises, given their unequal access to formal financial institutions. Two ideas have been at the center of most advice about how to solve this problem. The first is that because smaller enterprises face unequal access and costs for commercial bank credit, "supply-leading" concessional credit programs are necessary to stimulate their emergence and growth. The second is that financial market integration and liberalization are required to ensure adequate flows of financial resources at "reasonable cost" to the private sector and to smaller firms. The financial development literature argues that fragmented markets (fragments of the market with substantially different interest rates, excluding risk premia and transaction costs) discourage credit use in some parts of the economy and encourage its use in others, reducing the efficiency of capital allocation and economic growth.

The purpose of this paper is to examine how the small-scale enterprise financing problem was solved in a country with one of the world's most successful records of small enterprise development. Specifically, we focus on the question of how Taiwan dealt with the problem of credit intermediation in an industrial setting characterized by heterogeneous, family-owned firms and extraordinarily high information costs. Were "supply-leading" concessional credit programs and special banks for small enterprises essential to Taiwan's success? And what about the nature of the financial system: did integration and liberalization of financial markets play a role in channeling more funds to small and medium enterprises and in raising the efficiency of credit allocation?

The answer to the first question can be stated simply.¹ "Supply-leading" credit programs played little if any role in small enterprise development in Taiwan. Many developing countries, especially India, have done far more to promote small enterprise than Taiwan. Only a small proportion of domestic credit flowed through specialized banks to small and medium firms and most of these loans went for exporting working capital to medium size establishments. Moreover, there have been no "supply-leading" credit programs for small enterprises, and government-supported credit guarantees have been relatively small in number. Since most successful firms in Taiwan have grown from small beginnings in the past three decades, it is questionable whether, at least in a country where entry barriers are low and incentives favor the reinvestment of profits, financial institutions and programs which specially serve small enterprises are really necessary.

The answer to the second question, regarding the nature of the financial system, is more complex and is the subject of the remaining sections of this paper. Put simply, our main conclusion is that Taiwan's experience calls into question the conventional wisdom, which prescribes everywhere greater financial market integration, through financial liberalization, to increase the allocative efficiency of investable resources. While it may be true that substantial differences in interest rates across markets reduce allocative efficiency, decentralization of lending and fragmentation of borrowing groups to optimize screening and monitoring of loans can increase investment efficiency in many LDCs. A call to eliminate financial market fragmentation in countries where industrial competitiveness is importantly dependent on innovative small enterprises and where there are significant information constraints and imperfections in financial markets could entail prohibitive costs of adjustment. Based on field surveys in Taiwan in 1987, we find that a dualistic financial system helped Taiwan solve several problems. First, the government-controlled, formal financial sector helped policymakers limit private economic power, foster industrial policy and control inflation. Second, the informal curb market helped credit intermediaries allocate funds to "information-intensive" borrowers at a lower cost and more efficiently than would have occurred in the case where all investable resources were channeled through formal sector banks.

The paper is organized in the following way. We begin with a description of Taiwan's enterprise size structure in section two, together with an analysis of how a heterogenous firm structure affects efficient credit intermediation. Section three then examines how Taiwan managed to overcome its significant credit intermediation problems by allowing the development of a dualistic financial system--one fragment serving "full-information" borrowers, the other (the curb market) serving "information-intensive" borrowers. Section four survey's Taiwan's curb markets. Section five follows with a discussion of why the curb market matters in a developing country like Taiwan. Lastly, the paper closes with concluding remarks.

2. Efficient Intermediation and the Size Structure of Industry

Taiwan's businessmen have a preference for family-controlled, independent companies. As one businessman in Taipei put it, "If you stood in the middle of this city and tossed a stone in any direction, you'd probably hit a boss." This proclivity for family-ownership and independence plus the historical absence of state policies encouraging large enterprises (and many factors that eased entry) have produced an industrial firm structure heavily weighted by small and medium companies.

In 1986, Taiwan had almost 115,000 firms.² More than 98 percent of these establishments had fewer than 300 employees, and 48 percent of these employed fewer than 5 workers. A graphic depiction of how the firm size structure has evolved over the last two decades is summarized by the following statistic: Between 1966-1986, the number of establishments in Taiwan grew 315 percent, while average firm size, as measured by the number of employees, increased by only 15 percent. In terms of production, small and medium firms contribute about 50 percent of manufacturing value added, much of it for export, and employ about 62 percent of the work force. Interestingly, the largest enterprises, with 500 or more employees, actually reduced their share of net value added from 46 percent to 37 percent in the last 20 years.

While small firms multiplied in number, it was the medium-size companies that performed best in many industries. Between 1966 and 1986, medium-size establishments raised their net value of production per enterprise at an annual rate of 23 percent, compared to 18 percent for larger firms, and 14 percent for small. Total factor productivity in 60 percent of Taiwan's industries grew fastest in the middle of the size distribution of firms. And medium-size enterprises created jobs at a rate of more than 20 percent per year, while small enterprises raised employment by 11 percent and large enterprises by 10 percent.

Although small and medium firms produce only about half of manufacturing value added, they are important producers in many of Taiwan's industries. Table 1 presents data showing the share of small and medium firms (less than 300 employees) in the value of sales of twenty manufacturing industries for the year 1985. As expected, these enterprises play a relatively minor role in highly capital intensive industries such as chemical materials, electrical machinery, beverage, and transport equipment. However, in most others, smaller enterprises make a major contribution to total sales.

More important still, small and medium enterprises contribute significantly to the total value of exports in Taiwan. According to figures from the Small Business Administration, small and medium enterprises were responsible for 65 percent of total export value in 1985.³ (In the same year, small and medium trading companies were responsible for 55 percent of the value of export trading business.) Independently and in tight subcontracting networks, with flexible production technology, small firms have facilitated a product-differentiated niche strategy in international markets. Taiwan's firms have been quick to move into fast growing product areas and to redesign products to meet changing world market demands. All of these strategic factors have helped Taiwan offset any competitive disadvantage that would have come from limited economies of scale.⁴

With industrial competitiveness importantly dependent on small

Table 1 Share of Small and Medium Enterprises in Total Industry Sales Value, 1985

<u>Industry</u>	<u>Percent of Sales Value</u>
Food	33
Beverage	22
Textile	41
Wearing Apparel	76
Leather	80
Lumber	80
Printing	58
Chemical Materials	11
Chemical Products	61
Coal Products	50
Rubber Products	55
Plastic Products	79
Non-Metallic Mineral Products	58
Basic Metal	39
Metal Products	78
Machinery	70
Electrical Machinery	34
Transport Equipment	38
Precision Equipment	70
Misc. Manufacturing	75
<u>TOTAL (small and medium)</u>	50

Source: Medium and Small Business Administration, Ministry of Economic Affairs, ROC, August, 1987.

and medium firms, Taiwan's financial institutions faced enormous problems. To provide the financial wherewithal necessary for new start-ups, working capital and expansion of these firms, financial intermediaries had to find a way to overcome exceptionally high information costs. Information costs (or screening costs) are the costs a lender incurs in trying to distinguish between the risk and potential profitability characteristics of different borrowers. Particularly in an industrial setting with many new and heterogeneous firms, which are family-owned and follow unreliable accounting practices, information costs can be prohibitively high. Under these conditions, banks ration credit and discriminate against small borrowers. We turn now to a more detailed discussion of the problems of credit intermediaries in markets with imperfect information.

2.1 Imperfect Information and Credit Rationing

Financial markets with imperfect information do not operate in the same smooth Walrasian fashion as do full-information financial markets. Where no information problems exist, competitive equilibrium involves "clearing" supply and demands for loanable funds through collateral and interest rate movements. Borrowers with different characteristics can be charged differential market-clearing interest rates, or can be asked to provide collateral based on information about their riskiness and potential income streams. Where information costs are significant, however, lenders (banks) have difficulty distinguishing "good borrowers" from "bad borrowers." As a result, loan contracts cannot be written in a way that discriminates among borrowers. Nor will lenders be able to effectively monitor behavior of borrowers after receiving loans. When this happens, credit rationing and inefficient credit allocation turn out to be the "efficient" outcome of the unfettered rational behavior of lenders.⁵

To understand how banks operate in the presence of imperfect information, one has to know something about the production and information environment lenders face. It is convenient to begin our discussion by setting out a stylized representation of Taiwan's environment.⁶

By and large, banks in Taiwan deal with broad, observationally distinguishable groups of borrowers, characterized by firm size. Within each group net profits of individual firms are determined by three important variables: a production function (group-specific),⁷ which relates firm profits to the value of purchased inputs; a collection of firm-specific assets (management ability, technological capability, reputation in the business and social community), which fix the level of technical and allocative efficiency; and a stochastic term, which defines firm-specific effects of exogenous shocks

(government policy changes, business cycles, input supply shocks

and so on). Net profits measure the firm's debt repayment capacity.

Each firm has a good estimate of the specific distribution of its net expected profits, as well as its expected returns on investments, based on historical experience, knowledge of firm-specific assets and its production function. Bank lending officers, on the other hand, know the average characteristics of each group, but for reasons of high information costs, cannot distinguish between members of each group (particularly at the small end), nor can they monitor individual member behavior. In such an environment, banks are vulnerable to changes in the group composition and shifts in behavior of individual group members.

Banks correctly perceive several differences in the average characteristics of each group. First, the probability density function of the risk parameter for small firms differs from that of large firms. Small firms (particularly new firms), on average, have a much higher probability of failure and, because they are vulnerable to exogenous shocks, exhibit more erratic fluctuations in average profits. In short, small firms, as a group, are riskier borrowers from the lenders' point of view. Second, in some industries the average profit rate of small firms is less than that of larger firms. Third, the level of firm-specific assets, on average, is higher in the larger firm group than in the small.⁸ It is these perceived average group characteristics that form the basis for lending decisions when banks have imperfect information about individual group members.

Banks offer loan contracts to maximize their expected profits. Two terms are specified in these contracts: collateral requirements and interest rates. If banks are permitted to vary both terms freely, and they have enough specific information to discriminate among individual borrowers (i.e., if they know firm-specific risk parameters, monetary and non-monetary assets and productivity) a credit market equilibrium will ensue in which there is no excess demand for loanable funds and intermediation is allocatively efficient. In equilibrium, every borrower is willing to pay the contractual terms necessary to yield the bank its expected profit. Small firms that display average group characteristics (higher risk, lower productivity and fewer firm-specific assets) will be offered less favorable terms than large firms.⁹ And small firms that perform at a higher level and are less risky will be offered equivalent terms to those of large firms.

2.1.1. Credit Market Equilibrium with High Information Costs

What happens to credit market equilibrium when information costs are high and bankers have imperfect knowledge about individual borrower characteristics? The answer depends on the

lender's credit allocation procedures and on whether or not borrower behavior responds to changes in the terms of credit contracts. We begin with the case of fixed borrower behavior first.

Having information only on the average characteristics of borrower groups, banks will offer firms with equal characteristics different loan terms if they are members of different size groups. Even when a small firm is above average in terms of risk and productivity, banks will "tag" the firm with its group characteristics. Because loan officers rely on firm size as an (imperfect) signal of individual firm characteristics, banks will "statistically discriminate" against the progressive small enterprise. Relatively productive, low risk small firms will be offered discriminatory loan contract terms, resulting in reduced credit use.

The by-product of discouraged credit use is a distorted equilibrium allocation of credit away from high productivity small enterprises. If, as in Taiwan, progressive small enterprises are important for industrial competitiveness, such distorted credit allocation could slow growth. Correction of this allocative inefficiency requires credit intermediaries that can collect and process information more efficiently than banks.

When borrower behavior can respond to changes in the terms of loan contracts, the negative effect of high information costs on efficient credit market equilibrium is increased. Stiglitz and Weiss note two ways that loan contract terms can influence borrower behavior, assuming that borrowers can freely decide whether or not to apply for credit and can choose how to use the credit once they receive it.¹⁰ First, raising the interest rate (or collateral requirements) has an incentive effect. As rates rise, the incentive for borrowers to choose riskier projects increases. To cover the higher cost of debt, borrowers will often divert credit to higher return, but often riskier, investments, raising the probability of default. Borrowers can respond to changing contract terms in this way because lenders find it too costly to obtain the necessary information to monitor borrower behavior. Second, raising the rate of interest causes an adverse selection effect. As interest rates increase, good borrowers self-select out of the credit market in a way that worsens average borrower characteristics (from the lenders viewpoint). Having asymmetric information about group member characteristics, banks are vulnerable to such changes in group composition.

The upshot of these effects is to reduce the lender's expected return as the interest rate rises. As a consequence, unfettered credit market equilibrium can exhibit self-imposed interest rate (and collateral) restrictions and non-price quantity rationing, resulting in an excess demand for loans. Irrespective of these excess loan demands, banks will find it unprofitable to raise the

rate of interest, because of deteriorating average borrower characteristics. Thus, if either the adverse incentive or selection effect from raising interest rates is strong, interest rates will not be used to equilibrate the loan market. Increases or decreases in (the) loan supply (function) may have no effect on the interest rate charged. And the market rate of interest may change with changing economic circumstances, but not necessarily in a way which will be stabilizing, or in the manner which would be suggested by conventional supply and demand analysis.¹¹

If the possibility of direct voluntary default is added to borrower behavior, the bank's credit offer curve and the nature of credit market equilibrium would change still more from the case where borrower behavior is fixed, particularly if incentives for default vary positively with contract terms. Formal financial institutions are generally limited in the types of indirect controls they can use to raise the cost of voluntary default and lessen adverse incentive effects. Correcting for the effects of borrower behavior is accomplished in informal credit markets by such devices as interlinking credit transactions with transactions in product markets and strictly constraining any and all access to future credit (more on this later).

When there is quantity rationing in credit markets, small firms are the first to be cut out. Even if adverse selection and incentive effects are the same in both groups, differences in expected profitability of loans to each group (because of average group characteristics) cause small firms to be rationed out. In the event that adverse selection and incentive effects are perceived to be larger in the small firm group, rationing of small firms will be even greater.

It is likely that conditions exist in credit markets with imperfect information where economically viable small firms are largely rationed out of the formal sector. When this occurs, the return on the excluded group's investments may be higher than the investments of some of those borrowers that have access to credit. In such cases, credit rationing clearly leads to allocative inefficiency.

2.1.2. Credit Market Equilibrium With Restriction on Loan Contracts

In Taiwan, as in many other countries, loan contract terms are restricted by government policy. Banks (in part because they are government controlled) are not free to vary collateral unreservedly because of political sensitivities (although bank collateral requirements have been stiff). And interest rate controls have been in place since the late 1950s. Such restrictions on the terms of loan contracts can impinge on efficient financial market equilibrium.

With interest rate controls and a collateral ceiling, there may be no loan contract that can be offered by banks to small firms that will yield required levels of expected profits. That is, with restrictions on contract terms, there may be no combination of collateral and interest rates that can offset the higher risk and lower profitability of many smaller enterprises. In this situation, banks simply refuse to lend to small firms and shift lending to the better collateralized and, on average, safer and more productive large firms. As in the case of self-imposed bank interest rate restrictions, credit market equilibrium will involve non-price quantity rationing and allocative inefficiency. Liberalization of interest rate controls would eliminate this discriminatory rationing and lead to a more equitable and efficient equilibrium. But the resulting equilibrium would only be second best. In the presence of significant information costs, abolishing interest rate repression is not sufficient to achieve optimal allocative efficiency of investable resources.

2.2 Financial Regulation in Taiwan

Intermediation problems brought on by industrial size structure and imperfect information have been aggravated in Taiwan by strict financial regulation, by selective credit controls and by repressed interest rates.¹² Taiwan's formal financial system has been rigidly controlled over the last three decades. Banks are government owned and bureaucratically regulated. Competition from foreign banks has largely been inhibited by the authorities. And non-bank financial institutions have been highly constrained. The upshot of this rigid government regulation has been that banks (the dominant credit institutions) operate through very bureaucratic and conservative procedures.

In simple fact, banks in Taiwan have functioned as little more than a chain of pawn shops: three-quarters or more of what they lent had to be secured by collateral, generally in fixed assets. Administration of banks has been mired in red tape and often inefficiency. And, as bank officials have been held personally responsible for every penny of "the state's money" by government auditors, they have taken few risks; their main object being to avoid errors and to advance through the bureaucracy.¹³ In such an atmosphere, the propensity for credit rationing and inefficient intermediation has been substantially increased.

Two of the most important elements of financial regulation have been controlled interest rates and selective credit controls. Bank interest rates in Taiwan have been subject to direct government control and government has consistently exercised this control as a major monetary policy. Throughout the 1960s and 1970s, official interest rates were controlled at levels well below the natural rate that would have cleared the market. The large 10-

20 percentage point gap in the 1960s and 1970s between official loan rates and curb market rates is evidence of this disequilibrium.¹⁴ Undoubtedly, controlled interest rates have aggravated credit rationing and allocative inefficiencies in official loan markets and have been responsible for a diversion of savings into the unregulated financial sector. Unlike many other developing countries, however, Taiwan managed to reduce some of the worst effects of repressed interest rates by maintaining positive, albeit disequilibrium, real rates for most years.

Since the 1950s, concessional selective credit programs have also been part of the government's financial policy.¹⁵ Exporters, "strategic industries" and others have, through special discount windows at the central bank, received bank loans at less than general loan rates (which were already controlled at levels below the equilibrium rate). With the addition of special interest rates (and outright channeling of bank credit to favored borrowers) a three-tiered credit market emerged. At the top were those such as exporters who could get subsidized interest rates, in the middle were other privileged borrowers -- mostly larger firms -- who paid the bank general loan rates, and on the bottom were the majority of small and medium companies who had to seek relatively high-cost finance in the informal credit market.

2.3 Evidence for Quantity Rationing, Discriminatory Lending and Intermediation Inefficiency in Taiwan

Many authors writing about Taiwan's industrial growth mention the limited access of small firms to formal financial intermediaries. For example, Erik Lunberg remarks that high annual rates of growth of private investment from 1965-75, which averaged about 20 percent, together with Taiwan's imperfect credit and capital markets "suggests a relatively high share of self-financing, particularly for the great number of small and medium size firms in manufacturing and trade."¹⁶ Banks unquestionably have rationed small borrowers in Taiwan and offered discriminatory loan contracts to those that could gain access to the financial system. A recent study by Snea and Kuo shows the extent of this bias. From 1965 to 1982, per dollar of sales revenue, large firms obtained five times more bank credit than small firms and, per unit of value added, secured approximately four times more.¹⁷

Interviews by the author in the fall of 1987 with more than 100 manufacturing enterprises of all sizes in five industries further substantiate these statistics. In more than 90 percent of the cases interviewed, firms had no access to bank credit when starting up the business. Short-term working capital loans were extended to the firm only after a record of business success was established and after the firm had grown to a respectable level of sales (and in many cases a certain level of exports). Some small companies did obtain access to start-up loans through personal

credit to the company owner. These were generally collateralized loans based on home mortgages. Until the mid-1970s, however, even mortgage-based, personal loans were limited. Only as bank liquidity grew rapidly with increasing trade surpluses in the late 1970s did mortgage lending increase substantially.

Table 2 presents figures illustrating the magnitude of allocative bias in domestic bank lending for the 1974-86 period.¹⁸ A mild bias in the direction of exporters and heavy and chemical industry is indicated together with a substantial bias towards large manufacturing firms. Especially in the early 1970s, the bias toward large firms was extreme. As Taiwan's trade surplus accumulated and bank liquidity increased in the late 1970s and early 1980s, however, statistical discrimination and rationing of smaller firms diminished somewhat.

Comparison of debt to equity ratios for large and small firms gives a rough indication of the effect of discriminatory bank lending. For the 1970s and early 1980s, the top 500 private enterprises in Taiwan had average debt equity ratios (290) that were twice the average for all private enterprises (155) and approximately three times the average for smaller enterprises (102).¹⁹

It is important to note that while there may have been interindustry and intraindustry allocative biases in bank lending, Taiwan's financial system consistently favored private over public sector borrowers. Although the state has strictly controlled financial intermediaries and interest rates, it did not exercise this control, as did governments of so many other developing countries, to expropriate increasing amounts of seigniorage. Conservative fiscal policy in Taiwan meant that the real cost of financial restriction -- "squeezing out" private sector credit demands -- never materialized. By the mid-1960s, 70 percent of domestic credit went to accommodate the private sector and this increased to almost 80 percent in the early 1970s (Table 3). Given the high positive correlation between share of domestic credit flowing to the private sector and the level and efficiency of aggregate investment, favoring the private sector doubtlessly had considerable positive influence on Taiwan's rate of economic growth.²⁰ Chief among the benefits of high real growth rates has been the large proportion of enterprise finance that has come from accumulated profits, particularly in the case of small and medium firms. Surveys indicate that on average about 45-55 percent of private enterprise investment has been financed from internal sources over the last three decades.²¹ For smaller firms, internal financing has been even higher, averaging 60-65 percent.²²

As small and medium enterprises were producing about 50 percent of value added in the 1970s and early 1980s and were getting only a fraction of outstanding loans, there is good reason to believe that some allocative inefficiency accompanied bank

**Table 2 Access To Domestic Borrowings
By Manufacturing Sector In Taiwan (percentage)^a**

	<u>1974-77</u>	<u>1978-82</u>	<u>1983-85</u>	<u>1986</u>
Total Manufacturing ^b .	63.9	48.3	38.2	31.1
Export Industry ^c .	34.4	23.9	20.5	18.4
Domestic Industry ^d .	29.5	24.3	17.7	12.7
Domestic-Export	-4.9	0.4	-2.8	-5.7
Heavy Industry ^e .	33.8	29.0	22.5	18.3
Light Industry ^f .	30.2	19.1	15.7	12.8
Light-Heavy	-3.6	-9.9	-6.8	-5.5
Large Manufacturing Enterprises	49.5	32.9	24.8	19.8
Small and Medium Manu- facturing Enterprises ^g .	14.4	15.3	13.4	11.3
Small-Large Enterprises	-35.1	-17.6	-11.4	-8.5

^a. Figures are percentages of total domestic bank loans (foreign bank lending averaged about 10 percent of total lending from 1972-1986).

^b. Includes public and private manufacturing enterprises. The decline in manufacturing loans is mirrored by a similar increase in mortgage-based loans to individual, which become increasingly important from the mid-1970s. Many of these mortgage loans, bank authorities state, have been used for business. Mortgage-based loans, particularly for small borrowers, were the only way to get formal credit.

^c. Export industries are classified as textiles and apparel; wood products; metal products; export food processing and misc. manufacturing on the bases of sales-export ratios (20 percent of sales).

^d. Domestic industries are classified as domestic food processing; paper and publishing; chemicals and chemical products; transportation equipment.

^e. Heavy industries are classified as chemicals and chemical products; non-metallic mineral products; basic metals; metal products, petroleum; transportation equipment.

^f. Light industries are those not classified as heavy.

^g. Based on the Small and Medium Business Administration's figures on "Trend Outstanding Loans Extended by domestic banks to small and medium enterprises, which includes industry, agro-industry, commerce and services. We use their percentages to estimate the totals for manufacturing enterprises. Small and medium enterprises are those with fewer than 300 employees.

100

Table 3 Private Sector Share
in Domestic Credit: Taiwan (percentage)^a

	Private Sector	Private Enterprise	Individuals and others	Government Employees	Government Agencies
1961-69	70	56	14	25	5
1970-79	79	65	14	19	2
1980-86	75	47	28	22	3

^a All figures are outstanding balances at the end of the year.

Source: Financial Statistics Monthly, Taiwan District, ROC;
Economic Research Department, the Central Bank of China.

lending. Allocative inefficiency of the financial system can be measured in several ways, the best of which is probably to compare marginal returns on capital investments across different sectors and industries (interindustry efficiency) and across different size firms within an industry (intraindustry efficiency). Abstracting from risk, uncertainty and transactions cost, if marginal returns across different sectors, industries and firm size groups are approximately equal, the condition for allocative efficiency is met.

Unfortunately, accurate estimates of marginal returns to credit in different industries and firms are difficult to obtain. To assess intraindustry returns to credit, we calculated a proxy measure using total factor productivity for different firm size categories at the 4-digit ISIC level for the late 1960s, 1970s and early 1980s.²³ Firms with 50-299 employees were found to have slightly higher total factor productivity than either larger or smaller firms in 65 percent of Taiwan's industries in the late 1960s and 1970s. In the 1980s, larger firms (500 workers or more) increased their productivity and slightly outranked medium size firms, but smaller firms with less than 50 employees remained third place. The relatively high productivity of firms with 50-299 employees in the 1960s and 1970s provides some evidence to suggest intraindustry inefficiency in credit allocation for those years, considering how little credit these firms received.

As a proxy for interindustry returns to credit, we calculated both the marginal capital output ratio and the gross rate of return to capital for eleven 3-digit industries between 1976 and 1981. Correlation of these measures with allocated shares of total loans and discounts of domestic banks indicated that bank lending preferences did not coincide closely with a rank ordering of industries based on marginal returns on investment. But the matchup of loan allocations with marginal returns to capital in each industry was only mildly eccentric -- the correlation coefficient for both efficiency measures being roughly .5. We also examined the variation of marginal returns to capital across industries. Over the six years included in the analysis, the interindustry variance in each case was not extraordinary in its magnitude, but it did show a significant decline of about 30 percent from 1976 to 1981. This reduction in variance indicates a movement in the direction of greater allocative efficiency over the period.

Riegg conducts a more extensive analysis of the efficiency of bank lending in Taiwan, which attempts to incorporate dynamic industrial efficiency as well as differences between private and social efficiency.²⁴ He constructs rankings of each three-digit industry based on its contribution to the marginal efficiency of capital, as well as to exports, employment and forward and backward linkages. Riegg suggests that although lending may not have been statically efficient across industries (in terms of the marginal

efficiency of capital), static inefficiency may have been offset by greater dynamic and social efficiency. In his estimation, "the banks lent a little more to agriculture, high-risk basic industries - like ship building, petrochemicals and steel - and to fledgling export industries - like electronics - than a purely private system would have lent." This, in the end, helped to promote "development potential." However, Riegg found it difficult to say much more because he lacked sufficient disaggregated data on which to base a more detailed analysis.

To recapitulate, it is clear from the evidence of outstanding bank loans that small enterprises have been subject to quantity rationing and statistical discrimination in formal credit markets in Taiwan. The evidence that such discriminatory lending patterns resulted in allocative inefficiency is less convincing, however, possibly for two reasons. First, allocative inefficiency is difficult to measure given the available data. Second, although intraindustry inefficiencies in bank lending were probably significant, interindustry inefficiencies were very likely not.

3. Taiwan's Answer to the Credit Intermediation Problem: Intermediaries and De Facto Intermediaries

Faced with a difficult credit intermediation problem, Taiwanese authorities pressed market forces into service of their financial policies by acquiescing to the unrestricted development of an active curb market as an efficient adjunct to regulated credit institutions. In adopting this compliant stance (and on occasion even intervening to support the curb market), the government permitted the existence of a series of "markets" for credit side by side, differing in types of borrowers and the terms of loans. These markets effectively sorted borrowers along dimensions of both "information intensity" and risk.

Borrowers with significant financial resources and reputations (e.g. public enterprises, large manufacturing and commercial firms) had access to "full-information" credit markets (such as commercial banks, official money markets and equities markets), while riskier borrowers with limited resources (mostly new entrants and many small and medium enterprises) were served by "information-intensive" loan markets (informal lenders and money markets, leasing and installment companies). The line of demarcation between segments of the credit market in Taiwan was quite pronounced because of heavy government regulation. Unlike the conservative, government controlled banks, curb market lenders were willing to develop new and innovative instruments for risky ventures, to offer loans where there were few assets available for collateral, and to meet the needs of borrowers where speed is essential.

As the system for credit intermediation developed in Taiwan,

the commercial banks directed their loans mostly to larger public and private enterprises ("upstream" heavy-industrial suppliers, "central" factories, large trading companies, leasing and installment companies and the like). In turn, larger firms (including some of the public enterprises) then often became de facto intermediaries, on-lending directly (through trade credit, equipment and working capital loans) to smaller "downstream" customers, subcontractors, and suppliers at interest rates well above bank lending rates.²⁵ At the same time, de facto intermediation was facilitated officially through various credit instruments available at banks and by government legal interventions in the curb market.

At banks, credit instruments, such as the domestic letter of credit, or LC, (sometimes called back-to-back LCs) were initiated to help larger firms secure commercial bank credit for their subcontractors and suppliers.²⁶ For example, a larger, well established manufacturer could use an export LC or a purchase order to his small suppliers to create a domestic LC or, in the case of a purchase order, a banker's acceptance. These financial instruments would then be discounted by the commercial bank and used to issue domestic LCs, which, in turn, would be used by the small subcontractor or supplier as collateral for working capital loans. Similarly, loans for larger trading companies were arranged based on export LCs. On-lending to small and medium domestic manufacturers was then facilitated through back-to-back credit instruments.²⁷

In the curb markets, the most important financial instrument facilitating de facto intermediation was the post-dated check. Post-dated checks were normally used to accommodate flows of trade credit and other financial transactions between firms. Transactions between upstream suppliers and downstream manufacturers, for example, were generally conducted with 30 to 45 day post-dated checks made out for an amount equal to principal plus interest for the agreed time period. These checks could then be discounted by the supplier through curb market brokers. Because trade credit was so important for doing business in Taiwan (anywhere from 30 to perhaps 80 percent of private enterprise credit depending on firm size),²⁸ the government intervened to secure the post-dated check market.

A negotiable instruments law was enacted, in the 1950s, making it a criminal offense to fail to honor a post-dated check. The penalty was tough: failure to redeem a post-dated check could result in as many as two years in prison. And the law was vigorously enforced. The great majority of criminal cases processed through the courts in the 1970s had to do with violations of the Negotiable Instruments Law. In fact, one of the reasons cited for abolition of the criminal penalty in 1987 was the amount of complaints from the courts regarding the number of cases that had to be prosecuted on behalf of the banks.²⁹ Unquestionably, the

Negotiable Instruments Law increased confidence in curb market transactions. Businessmen in Taipei will tell you that post-dated checks are widely used because "they are the only legal financial instrument."³⁰

Government involvement in the curb market to facilitate de facto intermediation also took other forms. In Taiwan, as in other East Asian countries, firms are heavily reliant on debt to finance business activities. This tends to make firms more vulnerable to economic downturns. As a consequence, government authorities often intervened in financial markets to foster greater stability and the curb market was no exception. For example, in 1985, the government initiated a program entitled "Special Provisions for Redeeming Bad Checks." Under this program, strategic industries, important exporters, enterprises with publicly traded securities, automated industries, and firms involved in the Center-satellite program were granted "a (six-month) grace period for redeeming bad checks (read post-dated checks) issued by them, leaving no bad records, and without referring them to courts for prosecution, provided their petitions, together with necessary documentary evidence is submitted and approved by the Industrial Development Bureau of the Ministry of Economic Affairs."³¹

The government-owned banks also played their part. Borrowers were often required to deposit loan funds in checking accounts, which had to be managed as current working capital accounts. The bank then issued the borrower a prescribed number of checks. Loans (which were granted for 3 to 6 months) could then be drawn down by writing checks up to certain limits. The number of checks handed out by banks was strictly limited to control credit in the post-dated check market. Checking accounts could not be drawn down all at once. As checks were written and cashed, drawing down the loan, repayments to the account were made as post-dated checks were received by the borrower from his business transactions, and so on.³² If the loan-based checking account was not managed in this fashion, the usual renewal of loan, 3 to 6 months, was not granted. Many borrowers with access to such loans maintained relations with three or four banks in this manner.

Through de facto intermediation and direct credit operations of other curb lenders, the curb market developed rapidly in both size and sophistication. Table 4 shows that by 1970, curb market assets represented almost 30 percent of total financial assets in Taiwan. At the time, this was larger than all the financial assets of regulated financial institutions. Even by 1980, the importance of curb market financing continued to be almost equivalent to financing by formal financial intermediaries. It wasn't until the late 1970s, when the official money market was given the freedom to expand, that curb market financing began to diminish somewhat. By 1985, curb lending as a percentage of total financial assets had declined to about 26 percent.

Table 4: Composition of Financial Assets, Taiwan: 1965-85

(percentage)

	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
<u>Loans by</u>					
Financial institutions	31.1	28.5	36.7	31.9	33.5
Enterprises and ^a households	19.6	29.0	29.2	30.9	26.5
Govt. agencies	9.7	4.6	1.8	1.5	1.8
<u>Securities</u>					
Government	2.6	2.7	1.0	.6	1.1
Enterprises					
Long-term	35.4	32.3	27.8	28.8	26.8
Short-term	--	--	--	2.1	3.8
Other Domestic assets (net)	1.5	2.9	3.5	4.2	6.5
TOTAL	100.0	100.0	100.0	100.0	100.0

^aincludes enterprise borrowing from friends and relatives, borrowing and lending between enterprises and trade credit (bills and accounts receivable).

Source: 1) Taiwan Statistical Data Book, 1987.
2) Flow of Funds in Taiwan District, the R.O.C.

4. A Reconnaissance of Taiwan's Curb Markets³³

As in other Asian countries, the unregulated financial market in Taiwan is made up of fragments that evolved from "traditional" financial intermediaries and others that emerged more recently, largely in urban areas. Thus money lenders, pawnshops, rotating credit associations, and loans from friends and relatives, which continue to play an important role, flourished before establishment of modern banks. While post-dated checks, deposits with firms, private savings cooperatives, financial lease companies, installment companies and enterprise trade credits arrived on the scene much later. This mix of traditional and modern forms of credit intermediation means that the curb market provides an assortment of financial instruments, tailored to a wide spectrum of savers and investors.

The size and nature of the curb market also means that a great deal of personal and business finance in Taiwan is conducted on a one-to-one basis, i.e. on a "bilateral" basis. Most transactions are governed by personal relationships that are part of the fabric of Chinese culture.³⁴ Even those transactions conducted at arms length in the curb market are carried out in submarkets, segmented by forms of social connection that allow for close screening of borrowers: by industry, by company, by social clubs, and by family connections and so on.

To help the reader understand more about how the curb market operated in Taiwan, a description follows of some of the most important institutions and financial instruments.

4.1 Post-dated Checks: Dee-Hua Street and Other Informal Money Markets

Trade credit in Taiwan is normally extended in three ways: on a straight accounts receivable plus daily interest basis from one enterprise to another, on the basis of the purchaser paying a higher product price to the supplier but at some specified later date, and, most commonly, by the purchaser issuing a post-dated check (based on the normal time limits of trade credits) on his business or personal bank account (or, if the businessman has no bank account, a simple promissory note) in favor of the supplier. In the majority of cases, suppliers are larger "upstream" firms extending credit to smaller "downstream" manufacturers. But this is not always the case; supplier credit is a ubiquitous part of doing business in Taiwan for firms of all sizes.

The postdated check and the third party check have come to be the most commonplace curb market financial instruments. They are so pervasive that Taiwanese businessmen use the words "paying by check" synonymously with getting credit: bills are either "paid at

once" or "by check." The third-party check ("dyan-pyan", exchange of third-party checks) sometimes called check transferring, is a preferred form of payment or collateral. Two parties will often exchange checks, endorsing each, so that they can then each approach third-party curb lenders (brokers) or suppliers, with checks guaranteed by two people.

Just as in a conventional regulated money market, a discounting market of small private brokers has grown up to facilitate the use of post-dated and third-party checks for supplier credit and other financial activities. These discounting markets are generally organized (fragmented) by industry to reduce information costs. Thus Dee-Hua Street in Taipei has long served as the site for discounting post-dated checks in the textile industry, as this is where many of the early textile shops were located. As the textile industry began to diversify its operations into other business activities, Dee-Hua Street also became the discounting hub for other industries.

The way the discounting system generally operates is that when large suppliers or middlemen (or any company in the industry holding a post-dated check) begins piling up a large amount of post-dated checks and needs additional liquid assets, these checks are endorsed and sold at a discount to the market in Dee-Hua Street. Discounted post-dated or third-party checks, in turn, are generally endorsed by other parties in the market and rediscounted many times (like bankers acceptances). The market is based on tight interpersonal relationships and everyone (or company) has a personal credit limit. One cannot enter the system without being known or personally recommended and/or secured by a known entity. Not all post-dated checks brought to the market are discounted. Brokers scrutinize each issuer and, if a check looks too risky, the party that brought the check to the market is asked to issue a postdated check on his own account to replace it.

Development of the post-dated check system was crucially dependent on Taiwan's Negotiable Instruments Law, as we stated earlier. The law specifically made all endorsers equally responsible for redeeming checks with the issuer. Government agencies policed the system, keeping records on bad check cases and referring malfeasors to the courts for prosecution. Commercial banks were also involved in regulating the system by tightly controlling the number of blank checks allowed per customer and by reporting violators to government authorities.

Annualized compounded interest rates on post-dated checks are set out in Table 5 for the period 1963 - 1986. In the 1960s and early 1970s, rate differentials averaged about 10 percent.³⁵ In the late 1970s and early 1980s, this differential increased to as much as 20 percentage points as the economy adjusted to the effects of the second oil shock and credit tightened. In 1986 the differential was still 18 percentage points.

TABLE 5: ANNUAL INTEREST RATES ON LOANS AGAINST POST-DATED CHECKS AND COMMERCIAL BANK RATES ON GENERAL LOANS: TAIWAN 1963-86

<u>Year</u>	<u>Loans Against Post-dated Checks^a</u>	<u>General Loans Commercial Banks</u>
63-69	23.0	14.9
70	22.6	12.5
71	22.3	12.5
72	23.2	11.7
73	24.3	13.7
74	32.8	15.5
75	28.9	13.8
76	29.3	12.5
77	28.5	11.2
78	28.2	11.2
79	32.6	14.2
80	34.6	14.2
81	34.6	13.0
82	31.1	9.0
83	28.7	8.5
84	27.4	8.0
85	26.2	6.2
86	23.0	5.0

Source: Financial Statistics Monthly, R.O.C., Various issues.

^a based on a compounded monthly rate.

Although the post-dated check continues to play a prominent role in Taiwan's financial transactions, several factors are causing a decline in the use of this instrument. First, since the late 1970s, the regulated money market has grown steadily, together with the average size and sophistication of business firms. Bankers acceptances and commercial paper are replacing more informal financial instruments. Second, after a recent major financial scandal involving the curb market, government moved to reduce the significance of the post-dated check system. In 1987, the criminal penalty for issuing bad checks was abolished. Expecting a major credit slump as a result of this action, the government expanded short-term credit accommodation at banks by promoting the use of commercial paper and discounted time-letters-of-credit; increased commercial banks' purchasing of accounts receivable; and eased conditions for opening commercial bank checking accounts.

4.2 "3:30 Financing"

Given the criminal penalty for bouncing a post-dated check, there arose a market for "3:30 Financing": last-minute borrowing for deposit in checking accounts before the bank closing hour of 3:30 pm, to cover checks written against insufficient funds. The available rates for 3:30 financing are advertised in the newspapers, and are extremely high. Local curb market lenders claim that this sort of financing has lost its popularity since the decriminalization of check bouncing.

4.3 "Car Loans"

The "Car Loan" ("chi che dai kuan") is a very popular type of loan transaction for which the borrower's car is used as collateral. The borrower and lender bargain and agree on a certain value for the car, and the lender lends that amount less the agreed-upon interest. The borrower turns over the car keys and registration to the lender, and then has a designated number of days within which to return the borrowed funds to the lender. Both lender and borrower can sue for breach of contract for failure to perform, although the legal system is quite cumbersome for this type of case and so most problems must be settled by other means. Car Loan "companies" are advertised publicly, and this is one of the most popular means of raising capital in a short period of time.

4.4 "Partnerships" and "Investors"

In the start-up financing of new business ventures, no practice is more commonplace than that of borrowing the necessary

paid-in capital funds to comply with corporate registration laws. The law requires that a business owner have capital of NT \$1,000,000 as paid-in capital for a new company in order to have the company duly registered and established. That amount of capital can be readily borrowed for deposit in the company account. Such capital is borrowed and deposited just long enough for the company accounts to be verified as complying with minimum capital requirements. Borrowers generally pay a daily percentage fee for use of the lender's money in this way. For example, for the use of the lender's NT \$1,000,000 for deposit in the start-up business owner's account for one day, as in the example above, the borrower might pay a fee of 3% per day, or NT \$30,000. It is thus often the case that the start-up business actually only has a very small percentage of the minimum start-up capital, as required by law for registration purposes, when the company is legally established.

This practice is illegal, yet so widespread as to be practically universal. A good personal relationship with a bank manager is often helpful to lenders in this business, as bank managers can and do knowingly assist in verifying the necessary account funds in order to help a friend make some money. There are thriving "companies" whose business it is to act as "investor" ("jin ju") for new companies. There are, obviously, no records kept of such business, and secrecy is maintained through the all-important and valuable integrity of the personal relationships involved.

Related to this practice is that of having friends or relatives act as "partners" or "investors" in new companies incorporated in a form which might legally require more than one shareholder. The start-up investment is most often arranged through the true sole shareholder, with the friends or relatives signing their names as partners. As one Chinese businessman put it, "Most companies have several so-called "investors" when the true investment and management is really in the hands of one or two people."

4.5 "Byau Hwei"

Though less significant a factor in business finance than the post-dated check system, the "byau hwei" is such a universally prevalent aspect of personal and business finance in Taiwan that it is important to mention. The "hwei" has a longstanding history in Chinese society. One Chinese businessman suggested that the Chinese people have been organizing such "hweis" since the time of the Ming dynasty.

Basically, a hwei, or group, is organized when one person decides he or she needs some money and others, his or her personal acquaintances, have money to invest. The originator, or "hwei tou" (literally "group head") takes responsibility for the hwei, which

works as follows:

Suppose there are ten hwei members, including the hwei tou, who has organized this group because he needs NT \$20,000 in a hurry. Each participant pays in NT \$2,000 for use by the hwei tou during this, the first month of the hwei. (The "lifetime" of a particular hwei is according to the number of members - e.g., with ten members, the hwei will go on for ten months.) One month later, the second month of the hwei, the remaining nine members have the opportunity to bid for that month's pool. By secret bid, they each tell the hwei tou how much "interest" they are willing to pay on that month's NT \$2,000 plus the interest rate at which he or she bid, during each successive bid collection for the remainder of the hwei's lifetime. Thus, if the hwei tou is Person 1, he or she receives NT \$20,000 at the first byau, and must pay NT \$2,000 into the pool each month for nine more months. The highest bidder at the second byau (one month later), collects the amount for which he or she bid, but then must pay in that amount plus interest each month for eight more months. Each person can only collect the byau once during the life of the hwei, and from then on pays back in at the interest rate at which he or she won the bid. Thus, the person who least needs money, and can afford not to bid or collect throughout the lifetime of the hwei, will end up making the most money.

4.6 Lease and Installment Companies

Leasing companies have grown up, particularly in the late 1970s, to finance the purchase of heavy equipment and machinery. In 1977, only three lease companies were registered as members of the Taipei Association of Lease Companies and these firms were financing only about 700 million NT in equipment. By 1983, the number of leasing firms had increased to 37 with a financing volume of 17 billion NT. Many of these new entrants are affiliated with large manufacturing companies and non-bank financial institutions. As much as 50 percent of the usable assets of leasing companies comes from commercial bank loans. In effect, leasing firms have become de facto intermediaries for the commercial banks, providing a financial channel to small and medium enterprises without access to regulated financial institutions.

Installment companies operate like leasing companies but generally deal in consumer durables - mainly cars. Specialized installment companies did not exist formally until 1978. Again commercial bank loans provide as much as 40 percent of the funds of installment companies.

4.7 Friends and Relatives

Particularly for start-up capital, loans and investments from

friends and relatives have been crucially important in Taiwan. In interviews with Taiwanese businessmen we found that more than 90 percent had received start-up capital from friends and relatives. In addition, new infusions of loans and investments from friends and relatives were important as small companies faced cyclical business problems or as they needed finance for expansion.

Since under Taiwan's bankruptcy law there is no such thing as subordinated credit, friends, relatives and investors who would normally be simple company shareholders preferred lending to firms rather than paying in capital. Because of the "insider" status of friends and relatives, their loans for all practical purposes were privileged. In the event of financial distress, they often got paid back first, as if their debt was subordinated. Also, many investors preferred to loan firms money rather than to buy equity because interest is treated better than dividends by the Internal Revenue Service: interest is tax deductible and is not double taxed by corporate income tax. For all of these reasons, equity finance is only about 35 percent of assets in Taiwan. In actual fact, a large portion of loans are from would-be "shareholders."

Bankers in Taiwan argue that these "shareholder loans" show up in statistics as curb market lending, inflating curb market volume. Also small and medium enterprises are defined by government according to their paid-in capital (less than NT\$40 M of paid-in capital). As "shareholders" keep paid-in capital low by lending money, many firms defined as small and medium are in fact much larger.

5. Why the Curb Market Matters in Taiwan

Emergence of a large and thriving curb market has been enormously important in Taiwan's industrial development for at least four reasons. First, the curb market complemented the formal credit market by providing "information-intensive," efficient credit facilities, what Scitovsky calls the "small loans" function of the curb market.³⁶ Second, the curb market helped to mobilize domestic savings by offering high returns (although riskier) on investable funds. Third, the presence of an active curb market increased the "fungibility" of financial resources by offering an alternative market-determined interest rate on investment funds: the "safety valve" function of the curb market.³⁷ Fourth, many curb market transactions facilitated business dealings ("contracting modes") between heterogeneous firms.

5.1 The "Small Loans" Function

By extending credit facilities to small, riskier borrowers more cheaply and efficiently than formal financial institutions could have, the curb market made a net contribution to allocative

efficiency. There is little doubt that judgments of credit-worthiness based on longstanding personal contacts among relatives and friends, and between small businessmen and equally small lenders or credit brokers who live nearby, can be better and less costly than those based on expensive investigating by loan officers at large commercial banking institutions. This was particularly true in Taiwan's case where bank lending officers tended to be overly conservative because of heavy government interference.

Efficiency of the curb market as a lender to small and medium enterprises has been noted at different times in many countries. Timberg and Aiyar³⁸ found in a study of India, for example, four characteristics of curb lenders that explain their lower administrative and default costs:

- (i) curb lenders are closer to and therefore know their clients better than commercial bank lenders;
- (ii) curb lenders have lower overall operating costs because they work from less elaborate establishments, pay lower wages, and require less paperwork;
- (iii) nonprice competition in curb markets is lower because interest rates are market determined;
- (iv) curb markets are not subject to the regulations of commercial banks, such as reserve requirements.

All of these characteristics are as descriptive of Taiwan's curb lenders as they are of India's. It is ironic that characteristics of curb lenders, often said to cause financial inefficiency (fragmented markets, the bilateral nature of transactions, high interest rates, and the short-term nature of most loans) in fact, seem to insure their efficiency as intermediaries to small and medium enterprises.

Aside from its contribution to allocative efficiency, the most important aspect of the small loans function was that it eased firm entry and exit. Easy entry and exit were at the heart of Taiwan's competitiveness. Analysis of industry and firm-level data indicate that industries which had the fastest productivity growth rates also had the highest rates of entry-exit turnover. In Taiwan, curb market institutions operated such that an entrepreneur could start up a business with almost nothing. After serving a short apprenticeship in a larger (often foreign) company to learn about production skills, technology and potential customers, aspiring Taiwanese entrepreneurs only had to obtain an export order from a foreign or local trading firm to be in business. With an order in hand, an array of informal credit possibilities opened up.

Start-up funds most often came from friends and relatives private savings and/or a mortgage-based private bank loan. With an LC from a foreign buyer, working capital could also be raised through friends and relatives, curb market money-lenders, and post-

dated or third-party checks. Thirty to forty-five day supplier credit based on a post-dated check was standard practice. And land, machinery and factory could easily be leased or rented.³⁹ Rented capital equipment also reduced start-up risk substantially, as it made it easy to exit business if sales did not materialize. All of this finance was provided quickly and flexibly with low collateral requirements.

5.2 Mobilization of Domestic Savings

By offering lenders and savers a higher return than they would have received in formal financial markets, curb markets in Taiwan added to the stimulus for domestic resource mobilization. This occurred in two ways. First, by virtue of their lower transaction costs, and by avoiding the implicit taxation of commercial banks through controls on lending and deposit rates and reserve requirements, curb markets mediate savings that otherwise would not have been saved at all. Second, the curb market induced very small savers to save amounts that otherwise would have been spent on trivial consumption, as evidenced by the "byau hwei" which, as indicated earlier, are an important vehicle for personal savings and investment in Taiwan.

5.3 The "Safety Valve" Function

The significance of the curb market's safety valve function depends on the extent to which the formal financial sector is regulated and repressed and consequently allocatively inefficient. As a safety valve, the curb market makes an ameliorative contribution to allocative efficiency by accommodating those borrowers rationed out by lower return projects on account of government-imposed restrictions on loan contracts and credit rationing. That is, if the credit of formal financial institutions is initially channelled to certain uses, in conjunction with disequilibrium interest rates or otherwise, and those uses are less profitable than other opportunities, the curb market is likely to assist with the reallocation of credit from the less to the more profitable uses at market-equilibrium rates of interest. Thus, comparatively the safety value function of the curb market has been more important in Korea, where government-directed financial subsidies were much larger, than in Taiwan. On the other hand, Taiwan has benefited more from the small loans function.

The presence of an active curb market in Taiwan added materially to the fungibility of financial resources. Coupled with the fact that curb market interest rates were market-determined, added fungibility meant that the prevailing opportunity cost of investable funds was ultimately guided by the higher curb market interest rate. Firms with access to commercial bank loans at controlled interest rates inevitably had to weigh returns on

planned investments against returns from on-lending the funds at higher curb market rates. Accordingly, the higher opportunity (curb-market-determined) cost of investable funds deterred entrepreneurs from undertaking lower yielding investments, even with access to cheap bank funds. This kept the average efficiency of aggregate investment high in Taiwan. In turn, higher aggregate investment efficiency resulted in higher rates of economic growth.⁴⁰ Shea and Kuo have estimated conservatively that the allocative efficiency contribution of the curb market in Taiwan raised GDP annually by an average of more than one percent during the 1965-1982 period.⁴¹

By the same token, the safety valve function of the curb market played a key role in making effective the subsidies implicit in low interest rated and concessional selective credit policies.⁴² If the banks issuing low-interest loans did not extract all the economic rents from the original borrowers through collateral requirements, compensating balances and side-payments, firms with access to loans at preferential interest rates had the opportunity to on-lend these funds in the curb market. Effective interest rate differentials between markets were anywhere from 15 to 30 percent, depending on the type and year of the loan. Without the curb market, the effective subsidy would have depended on the return on the firm's other activities or on the short-term savings deposit rate in commercial banks, which was much lower than the curb lending rate.⁴³

5.4 Interlinkage of Credit and Production Transactions

The flexible niche strategy, pursued so successfully by Taiwan's firms in many export industries, has been crucially dependent on the country's industry structure. To reduce cost, and most of all to enhance flexibility in the face of capricious international markets, Taiwan's businessmen specialized to the maximum degree and took up many forms of subcontracting in both supplier and producer activities. Most export producers became linked to tight networks of small independent "job-shoppers" each producing small parts of a product that would be finally assembled by the central factory and exported through foreign or local trading companies. Such an industry structure places heavy reliance on markets rather than hierarchies for organizing production and thus calls for ways to facilitate "contracts" that link players (firms) in the economy and that connect factor and product markets.

Williamson argues that the main purpose served by economic organization is transaction cost economizing.⁴⁴ Different modes of contracting have different costs, and it is the magnitude of these transaction costs that determine whether or not transactions will take place. Where, for one reason or another, transaction costs are too high, or, where the risk is such that the parties are

reluctant to invest in transaction-specific assets, there is a tendency to underinvest (i.e. transactions will not take place). Transaction costs comprise the costs of establishing and administering contracts, such as the costs involved in gathering and processing information, search costs, legal costs, organizational costs, and opportunity costs attributable to sunk assets, among others.

Two fundamental problems that arise in transactions (contracting) are bounded rationality and post-contracting opportunism.⁴⁵ Bounded rationality is a term used to convey the point that people have limited information and limited ability to process it. This implies incomplete information about market opportunities, limited ability to predict the future and derive implications from prediction, and limited ability to prespecify responses to future events. Opportunism follows from bounded rationality plus self-interest. Opportunism refers to the possibility that mutually reliant parties may mislead, distort, disguise, or confuse in order to expropriate wealth from one another. A contract promises future performance, typically because one party makes an investment, the profitability of which depends on the other party's future behavior. Under the circumstances, the party making the investment wants to protect against the possibility of being exploited by the other party (either wilfully or because of an honest disagreement). Accordingly transaction costs, include costs incurred in making contracts enforceable by law or by self-enforcement, and extends to the precautions against potential expropriation of the value of investments relying on contractual performance as well as costs of informing and administering terms of contractual relations.

With a legal system that had limited ability to enforce property rights, Taiwan's businessmen had to find creative ways to overcome high transaction costs. Integration of the production chain (vertical integration) under the roof of a single company was one possibility. Vertical integration reduces transaction costs by limiting the number of market transactions. But the Taiwanese preference for family-owned, independent firms rules out extensive vertical integration. And so does the flexible-niche strategic orientation of Taiwanese firms, which requires relatively small, fast-moving production establishments. So alternative mechanisms had to be improvised that could support innumerable and varied market transactions between heterogeneous enterprises. One of the most conspicuous vehicles in Taiwan for reducing transaction costs (i.e., reducing the possibilities of such factors as post-contract opportunism) was the linking of financial and production transactions.

Curb market financial activities were tremendously important in this respect and had at least two major affects on production transactions. First, the bilateral character of curb market finance reduced complexity and uncertainty in product market

transactions. That is, the existence of contracts (financial) in one market was an enabling condition for contracts (production) in the other.⁴⁶ And second, the availability of particular types of curb financial instruments, which eased firm entry and exit, also reduced the magnitude of transaction-specific (sunk) investments.

In the first case, exercising some control over the other contractual party's assets, through some form of dependence or side payment (incentive), can be a way to reduce the possibility of post-contract opportunism, and thus to reduce transaction costs. Accordingly, in Taiwan, where larger, well-established enterprises have access to bank credit and small firms do not, transactions between producers and suppliers and between large factories and subcontractors are almost always accompanied by finance. Motivation for these loans, apart from maintaining good relations within the industry, is to ensure subcontractor loyalty and dependability in terms of specifications of the production contract, product quality, timing of delivery, etc..

Loyalty and dependability of subcontractors are very important, particularly where larger firms invest in training subcontractors and where product quality and delivery schedules are crucial. Curb finance, in the form of extensive (and often preferential) trade credits, direct loans for equipment and working capital, acceptance of post-dated checks, recommendations and credit guarantees for small subcontractors at banks, and so on, was used to "buy" loyalty and dependability. Interlinkages between finance and production were found in each of the five industries we studied.⁴⁷ Linkages were found to be particularly strong in industries producing products of high complexity, requiring greater fixed entry costs in terms of physical and human capital. The machine tool industry is a good example. Many machine tool firms indicated that the main reason Taiwan was competitive in international markets was the tight networks of highly skilled subcontractors in and around the city of Taichung. Competition for good suppliers and subcontractors in this industry is substantial. And, in order for larger firms to ensure subcontractor loyalty and dependability, both loans and equity investments were made by the larger firms in the smaller subcontractors.

Production contracts also enabled financial contracts. But more important still were the inescapable social sanctions. On the large producer's side financial transactions were facilitated (post-contract opportunism reduced) importantly by strong "social" sanctions. That is, credible commitments (Williamson often uses the term "trading hostages") had to be created by both parties in order for large producers to enter into financial contracts with subcontractors. Large firms commit to lending money, small subcontractors and the like put their "hsin-yung" on the line. A businessman (or firm) in Taiwan who for whatever reason fails to meet his obligations, immediately loses his hsin-yung (reputation, reliability, credit rating). Hsin-yung is the most important

"currency" in Taiwanese business (the word also refers to the quality and reliability of a firm's products), a small firm's most valuable asset. To start and run a business one needs capital, but capital isn't enough. One must also have hsin-yung, and to have hsin-yung, one must know and be respected by people of one's industry. If someone, or some firm, for whatever reason fails to pay his debts when they are due, he immediately loses his hsin-yung. No one will advance him any more money (post-dated checks, etc.) or goods, and his creditors start demanding immediate repayment. "That's the end -- the firm goes kуст."⁴⁸

Lastly, curb market finance also reduced transaction costs and facilitated contracting by substantially lowering transaction-specific (sunk) investments and asset specificity. Large sunk investments and assets that are nonredeployable, in that their value crucially depends on the other contracting party's future behavior, increase transaction costs because they make the contracting parties vulnerable to holdup and moral hazard.⁴⁹ Each of these factors affects expectations about the costs of post-contract opportunism. Unregulated financial institutions, such as leasing companies, which allow firms to set up with rented factories and equipment, reduce vulnerability attributable to sunk investments because these investments much smaller. Likewise, extensive trade credit, post-dated checks, lease companies, loans and deposits from friends and relatives all substantially ease firm entry and exit, making assets more redeployable.

In summary, production and financial transaction linkages were crucially important because they facilitated contracting in a market-based (as opposed to hierarchical-based) economy. The ability to make contracts allowed small firms to participate in production and provided a "glue" that held together Taiwan's heterogeneous enterprise structure. Put simply, interlinked transactions supported industry structure, industry structure in turn facilitated competitive strategy and strategy made possible Taiwan's competitive edge in international markets.

6. Concluding Remarks

The fact that banks do not think of themselves as auctioneers, offering loans to the highest bidder, but rather as screening and monitoring institutions is important: It means that, when banks lack perfect information about borrowers, interest rates do not play the simple allocative role ascribed by conventional microeconomics, and as a result the equilibrating forces provided by market mechanisms can be weak or virtually absent. Credit market equilibrium under these circumstances can be characterized by discrimination against smaller borrowers, quantity rationing and interest rate rigidities.

In an economy such as Taiwan's, where government intervention

in financial markets is extreme and market structure is dominated by heterogeneous firms, formal credit market equilibrium can be characterized by even greater discrimination and quantity rationing. Taiwan solved its intermediation problem by allowing (and at times promoting) development of a dualistic financial system. The central core was rigidly regulated to serve government's policy interests -- limit economic power, promote industrial policy and control inflation -- and the flexible curb market edges took care of the information-intensive small borrowers that were so important to the country's competitive strategy in world markets. We question whether financial market integration through liberalization would have been the best solution for the combination of credit intermediation and macroeconomic problems Taiwan faced.

There are four good reasons to be wary of the orthodox financial market integration prescription when market structure is characterized by heterogeneous firms and high information costs.

First, as we have argued in this paper, abolishing interest rate controls may not be enough to reduce discrimination and quantity rationing of banks and raise the allocative efficiency of investable resources.

Second, neo-structuralist models of the financial system, which include active curb markets, show that liberalization can cause stagflation.⁵⁰ If liberalization brings an increase in real deposit rates, attracting investable funds into banks and away from the curb market, the fact that banks have reserve requirements (and the curb lenders do not) can reduce the total supply of loanable funds to business. This contractionary impact on credit can reduce economic growth. Moreover, as we have pointed out, curb market intermediaries in an economy with market distortions and imperfect information like Taiwan's generally have lower transactions cost and higher investment efficiency than formal financial intermediaries. Channelling funds into formal institutions away from curb markets in this case could raise intermediation costs and also cause a net decrease in available investable funds.

Third, linkages between curb market financial transactions and production transactions in a "transactions-based" economy like Taiwan's reduce costs on both sides of the market - i.e. linkages reduce transaction costs of lenders, facilitating financial contracts and reduce transaction costs of producers, facilitating production contracts. Particularly in an economy where the legal system is not yet well established and where fast, flexible production decisions are required to meet the conditions of capricious international markets, such informal ways to make transactions possible and reduce their costs are crucial for competitiveness. Premature disruption of informal financial activities because of financial liberalization could result in high costs of adjustment and reduced economic growth.

In short, Taiwan's rigid financial system with flexible curb market edges appears to be a "second best" solution for the intermediation problem it confronted. This is an important lesson from Taiwan's experience that other developing countries interested in supporting participation of small and medium enterprises might heed. In many countries, there has been an expansion of the formal financial sector through a buildup of specialized development banks, to provide an alternative to small enterprise informal credit. While the formal sector and its special programs may have succeeded in dealing with the more "bankable" borrowers in some cases, it has not generally been able to compete on a transaction costs basis or on a coverage basis with curb market lenders. Taiwan's experience indicates that policy-makers might think more about solving credit intermediation problems by enlisting (and assisting) active curb markets as an efficient, complementary adjunct to formal financial institutions.

ENDNOTES

1. A detailed analysis of Taiwan's concessional credit controls is set out in a companion paper "Concessional Credit Programs in Taiwan," EEPA Discussion Paper #17, August 1988, by Tyler Biggs and Ya-Hiew Yang.
2. For more detail on the structure and performance of Taiwanese industry, see T. Biggs and K. Lorsch (1989) "The Structure, Dynamics and Performance of Taiwan's Industry," Employment and Enterprise Policy Analysis Project Discussion Paper No. 21.
3. Medium and Small Business Administration, "Development Merit: A Collection of Papers on Small Business Development in ROC," Ministry of Economic Affairs, ROC, 1987.
4. For more on this subject see Tyler Biggs and Brian Levy, "Strategic Interventions and the Political Economy of Industrial Policy in Developing Countries", Paper prepared for HIID Conference on Development Reforms, Marrakech, Morocco, October, 1988; and Brian Levy and Wen-jeng Kuo, "The Strategic Orientations of firms and the Performance of Korea and Taiwan in Frontier Industries", EEPA Discussion Paper No. 12, October, 1987.
5. J.E. Stiglitz and A. Weiss (1981), "Credit Rationing in Markets with Imperfect Information." AER 71 (3) June.
6. See Michael Carter (1988), "Equilibrium Credit Rationing of Small Farm Agriculture," Journal of Development Economics, Vol. 28, pp. 83-103, for a stylized representation of the production and information environment in LDC agriculture and for formal mathematical proofs of some of the relationships cited in this section.
7. It is assumed that two distinct technologies are in use, one adopted by large enterprises and one by small enterprises.
8. That these average characteristics in fact do exist in Taiwan is reported in T. Biggs and K. Lorsch (1990), Ibid.
9. M.R. Carter (1988) Ibid., p. 88, shows that, in the case of the identical loan contract terms, bank expected profits are higher on large firm loans given the different average characteristics of large and small firms. Note that we have said nothing about the higher transaction costs generally involved in making loans to small borrowers. Taking account of lender transaction costs would increase the expected profitability differential between large firm and small firm loans. As a result, small firms would be offered even less favorable terms.

10. J.E. Stiglitz and A. Weiss, (1981) Ibid. See also J. Ordoover and A. Weiss, "Information and the Law: Evaluating Legal Restrictions on Competitive Contracts," AER, 71 (2), 1981; D. Jaffee and R. Russell, "Imperfect Information, Uncertainty and Credit Rationing," OJE, 90 (4), November 1976; J. Stiglitz and A. Weiss, "Incentive Effects of Terminations: Applications to the Credit and Labor Markets," AER, 73 (5), December 1983
11. J.E. Stiglitz and A. Weiss, (1988), "Banks As Social Accountants and Screening Devices for the Allocation of Credit," Working Paper No. 2710 NBER.
12. For more detail on Taiwan's financial system see T. Biggs, "Financing the Emergence of Small and Medium Firms in Taiwan: Financial Mobilization and the Flow of Domestic Credit to the Private Sector," 1988, Op. cit.
13. T.B. Gold (1981) "Dependent Development in Taiwan," Ph.D. Dissertation, Harvard University
14. It should be noted that the large gap between official loan rates and curb market rates is somewhat misleading as a measure of interest rate disequilibrium. Hidden are the added increments to official rates which derive from collateral requirements, requirements for compensating balances and other side payments involved in getting loans. See T. Biggs, "Financing the Emergence of Small and Medium Enterprise in Taiwan: Financial Mobilization and the Flow of Domestic Credit to the Private Sector," Op. cit., for more details on interest rate policies.
15. For a further discussion of Taiwan's selective credit controls, see Tyler Biggs and Ya-Hwei Yang (1989), "Concessional Selective Credit Programs in Taiwan," EEPA Discussion Paper No. 17, Harvard University.
16. Erik Lunberg (1979), "Fiscal and Monetary Policies" in Walter Galenson (ed.) Economic Growth and Structural Change in Taiwan: The Postwar Experience, Cornell University Press, p. 299.
17. J.D. Shea and P.S. Kuo (1984), "An Analysis of the Allocative Efficiency of Bank Funds in Taiwan," proceedings of a conference on Financial Development in Taiwan, Taipei Institute of Economics, Academia Sinica, Dec. (In Chinese.)
18. It should be noted that the figures in Table 2 are not normalized for the differences in asset levels in each industry. It would be better in each case to compare loan asset ratios. Unfortunately, such data were not available.
19. Top 500 largest corporations in the Republic of China, China Credit Information Service Limited, Taipei, ROC and Survey of

Financial Status of Public and Private Enterprises, Central Bank of China, ROC.

20. Keith Marsden, "Private Enterprise Boots Growth," Journal of Economic Growth Vol. 1, 1986. One has to be somewhat careful in ascribing the share of domestic credit to the private sector in Taiwan as all private. Government holds investments in some large, ostensibly private firms in some industries.

21. Liu, Tai-Ying et. al; (1984) "A Study on Ways and Means to Redirect the Underground Financial Activities in Taiwan." Taiwan Institute of Financial Research, Taipei, ROC. (In Chinese.)

22. Financial Statistics of Firms, Economic Research Department, the Central Bank, ROC, various issues; and author interviews in Taiwan, fall 1987.

23. Total factor productivity is an efficiency measure which relates factor inputs, capital and labor here, to measured firm output. The technical efficiency index is highest for firms producing more output with the same set of given inputs. See Biggs and Lorsch (1988) *Ibid.*, for the TFP indexes in Taiwan.

24. Nicholas H. Riegg, "The Role of Fiscal and Monetary Policies in Taiwan's Economic Development," Ph.D. Dissertation, University of Connecticut, 1979.

25. De facto intermediation from large firms to small subcontractors and suppliers, using credit obtained from banks, was also prevalent in Japan. The following is a description of the Japanese financial system from a paper soon to be published by David Cole and Philip Wellons, "The Role of the Financial System in Economic Development," Mimeo, August, 1988:

The smaller, riskier firms borrowed both from the large corporations and the banks at rates of interest that could discriminate among them on the basis of risk even though the government set interest rates on credit by banks. The big companies loaned on substantial bank-supplied funds to smaller businesses, especially their suppliers and customers. These loans were generally at much higher rates than the bank lending rates. Small businesses were willing to pay higher rates because the effective bank rates to them were well above the nominal bank rates. Banks required compensating balances from smaller and riskier borrowers. Their well-developed system of price discrimination pushed the effective rates for weaker borrowers up to high risk levels, which not only covered the greater risk and administrative cost of such loans but also assured that borrowers would use the funds for high-return investments in most cases. The higher effective

lending rates of the banks and the conglomerates to the smaller business also provided a cut-off or reference rate for the conglomerates in evaluating their own direct investment opportunities. If new investment projects of the conglomerates were not expected to earn higher rates of return than could be obtained from lending to small businesses at the so-called "grey market" rates, then the projects were not likely to be undertaken.

26. For a discussion of the domestic LC see Y.W. Rhee, "Instruments for Export Policy and Administration: Lessons from the East Asian Experience," World Bank Staff Working Papers, No. 725, 1985.

27. In spite of the ostensible usefulness of these credit instruments, however, interviews with Taiwanese bank officials indicated that domestic LCs never comprised much more than 3-4 percent of domestic bank lending portfolios. Interviews with five large commercial banks in Taiwan, November, 1987: Conservative bank lending practices had much to do with the low use of the domestic LC. Taiwanese banker argued that even with a foreign export LC in hand, there was still a good deal of loan risk involved. Local manufacturers or subcontractors may still default or the exporter might not ship the goods.

28. For a detailed discussion of the sources of private enterprise credit in Taiwan see T. Biggs, "Financing the Emergence of Small and Medium Enterprise in Taiwan: Financial Mobilization and the Flow of Domestic Credit to the Private Sector," 1988, Op. cit.

29. Interviews with Taiwanese authorities, November-December, 1987.

30. Interviews with firms in Taipei, November-December, 1987.

31. Small and Medium Business Assistance Center, "Financial and Management Services to Small/Medium Business in Taiwan, the R.O.C.," Annual Report, 1985.

32. Interest was charged on the full amount of the loan, which, of course, meant that actual interest rates were higher than official rates.

33. Thanks are due to Martha Fitzpatrick for research assistance on Taiwan's urban curb markets.

34. As one author argues in his description of credit relationships in the Taiwanese business community, "The very first thing to say about the structure of [credit] relations in Lukang, Taiwan, is that one does not do business with people one does not know. No one deals with strangers. Business relations are always, to some degree, personal relations, they need not be close, but both participants in a [credit] relation should be acquainted, familiar, 'siek-sai' as the Taiwanese say." Quoted in D.R. Deglopper, "Doing Business in Lukang" in W.E. Willmott (ed.) Economic Organization in Chinese Society, Stanford University Press, 1972.

35. The post-dated check rates in Table 4 are compounded annual rates. If bank loan rates were listed including the cost of collateral plus the cost of compensating balances and other hidden costs, the differential would be smaller.

36. Tibor Scitovsky, "Economic Development in Taiwan and South Korea, 1965-1981" in L.J. Lau (ed.), Models of Development: A Comparative Study of Economic Growth in South Korea and Taiwan, ICS Press, 1986.

37. T. Scitovsky, 1986, ibid., p. 183.

38. T.A. Timberg, and C.V. Aiyar, "Informal Credit Markets in India," Economic Development and Cultural Change, 33 (1), October, 1984.

39. Taiwan's government-funded system of industrial estates also played a role in this type of financing. Land and buildings could be rented in these estates, or, for those firms that could qualify for bank financing, low interest loans were available for land and factories from the Land Bank of Taiwan or from Taiwan Development Corporation that could be repaid in installments over 5 to 10 years.

40. The fungibility of financial resources and the curb market's role in keeping aggregate investment efficiency high has also been noted in the Korean case and in the case of Japanese development. D. Cole and Y.C. Park, Financial Development in Korea, 1945-1978, Cambridge, MA, Harvard University Press, 1983; D. Cole and H. Patrick, "Financial Development in the Pacific Basin Market Economies," in Tan and Kapur (eds.) Pacific Growth and Financial Interdependence, 1986, and T. Scitovsky, "Economic Development in Taiwan and South Korea, 1965-1981," 1986, Op cit.

41. Shea and Kuo, "An Analysis of the Allocative Efficiency of Bank Funds in Taiwan," 1984, Op. cit.

42. Cole and Patrick, "Financial Development in the Pacific Basin Market Economies," 1986, Op. cit., p. 59; and Cole and Park, Financial Development in Korea, 1945-1978, 1983, Op. cit.

43. T. Biggs, "Financing the Emergence of Small and Medium Firms in Taiwan: Concessional Selective Credit Policies," Op. cit. By comparison, Korea has treated firms, particularly export and heavy industrial firms, to large financial subsidies through such programs. Interest rate differentials in Korea (especially in real terms) between official and curb markets have been enormous. Explicit financial subsidies have been anywhere from six to nine times higher in Korea than in Taiwan.

44. O.E. Williamson, The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting, London, The Free Press, 1985.

45. A.A. Alchian and S. Woodward, "The Firm is Dead; Long Live the Firm: A Review of O.E. Williamson's The Economic Institutions of Capitalism," Journal of Economic Literature, Vol. XXVI, March, 1986. Alchian and Woodward distinguish two types of opportunism: moral hazard and holdup. Moral hazard deals with the problem of monitoring behavior of parties to a contract and holdup describes the problem of one party reneging on the contract after sunk costs are incurred.

46. The argument for linking transactions is often made the other way around, namely, production contracts enable financial contracts. Here we argue that the causal link runs in both directions.

47. Electronics, machine tools, motorcycle parts, furniture, and textiles and apparel were the industries we studied.

48. Interviews with businessmen, Taipei, November/December, 1987; and D.R. Deglopper, "Doing Business in Lukang" in W.E. Willmott (ed.) Economic Organization in Chinese Society, Stanford, Stanford University Press, 1972.

49. See Endnote 47.

50. Lance Taylor, Structuralist Macroeconomics: Applicable Models for the Third World, New York, Basic Books; Sweden Van Wijnbergen, "Credit Policy, Inflation and Growth in a Financially Repressed Economy", Journal of Development Economics, 13 (1-2), August-October; Sweden Van Wijnbergen, "Interest Rate Management in LDCs", Journal of Monetary Economics, 12 (2), September.

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