Motive of the study

The loan market in Japan shows different trends when segmented into the market for large companies and that for small and medium-sized enterprises (SMEs), a phenomenon that has been pointed out since around the 1960s. Specifically, the relationship between the economic condition and lending is different depending on whether the borrowers are large companies or SMEs. The major theories that explain this phenomenon include the capital-concentration hypothesis (Shinohara 1961; Kawaguchi 1964) and the credit-rationing hypothesis (Kaizuka and Onodera 1974). Also, an original theory was proposed that paid attention to bargaining power of companies (Teranishi 1974).

Let us look at the recent trends in these lending markets. The graphs in the following page show changes in lending and the industrial production index from 1964 through 1994. They indicate that, although there seems to be some correlation between borrowing by large companies or SMEs and the economic condition in the 1960s and 1970s, the link seems to have disappeared in the 1980s and 1990s.



Furthermore, as the following graph shows, there was a reversal of the pattern of growth in lending to large companies and SMEs.



II Purpose of this paper

In this backdrop, this paper attempts to answer the following questions:

- Has there been any change in the stance of the lenders toward the large companies?
- Has there been any change in the stance of the lenders toward the SMEs?
- Has there been any change in the stance of the large companies toward borrowing?
- Has there been any change in the stance of the SMEs toward borrowing?
- If such changes happened, since when?

III Empirical model

The Japanese lending market was most notably studied in the work of Itoh and Ueda (1982), on which improvements were made by Asako and Uchino (1987) and Shikano (1994). Some of the analytical methods proposed in their works are applied in this paper.

In the work of Asako and Uchino, the following system of simultaneous equations was used:

$D_t = \beta_0 r_t + X_t \beta + u_t$	(1)
$S_t = \gamma_0 r_t + Z_t \gamma + \nu_t$	(2)
$r_t - r_{t-1} = \theta_1 (r_t^* - r_{t-1}) + \theta_2 (\underline{r_t} - r_{t-1})$	(3)
$L_t = \min[D_t, S_t]$	(4)

where,

 D_t = Loan demand

 S_t = Loan supply

 L_t = Loans made

 $r_t = Market lending rate$

 $r_t^* =$ Equilibrium lending rate

- $r_t = \text{Bank rate (discount rate)}$
- X_t = Vector of exogenous variables in the demand function
- $Z_t =$ Vector of exogenous variables in the supply function

 u_t and v_t are mutually independent error terms

By applying the value of θ_2 obtained in the empirical analysis of Shikano, and by defining $\Delta r_t = r_t - r_{t-1}$ and $\Delta \underline{r}_t = \underline{r}_t - r_{t-1}$ according to the method used by Itoh and Ueda, we have the following equations:

<Simultaneous equation model used for estimation>

$$L_t = \beta_0 r_t + X_t \beta + (\beta_0 - \gamma_0) \frac{1 - \theta_1}{\theta_1} \Delta^d r_t - (\beta_0 - \gamma_0) \frac{\theta_2}{\theta_1} \Delta^d \underline{r}_t + u_t$$

$$L_t = \gamma_0 r_t + Z_t \gamma + (\beta_0 - \gamma_0) \frac{1 - \theta_1}{\theta_1} \Delta^s r_t + (\beta_0 - \gamma_0) \frac{\theta_2}{\theta_1} \Delta^s \underline{r}_t + v_t$$

where

$\Delta^d r_t = \begin{cases} r_t - r_{t-1} \\ 0 \end{cases}$	$\Delta r_t - \theta_2(\Delta \underline{r}_t) \ge 0$ $\Delta r_t - \theta_2(\Delta \underline{r}_t) < 0$
$\Delta^d \underline{r}_t = \begin{cases} \underline{r}_t - r_{t-1} \\ 0 \end{cases}$	$\begin{split} & \Delta r_t - \theta_2 \big(\Delta \underline{r}_t \big) \geq 0 \\ & \Delta r_t - \theta_2 (\Delta \underline{r}_t) < 0 \end{split}$
$\Delta^{s} r_{t} = \begin{cases} 0 \\ r_{t} - r_{t-1} \end{cases}$	$\begin{aligned} \Delta r_t &- \theta_2 \big(\Delta \underline{r}_t \big) \geq 0 \\ \Delta r_t &- \theta_2 (\Delta \underline{r}_t) < 0 \end{aligned}$
$\Delta^{s} \underline{r}_{t} = \begin{cases} 0\\ \underline{r}_{t} - r_{t-1} \end{cases}$	$\begin{aligned} \Delta r_t &- \theta_2 \big(\Delta \underline{r}_t \big) \geq 0 \\ \Delta r_t &- \theta_2 (\Delta \underline{r}_t) < 0 \end{aligned}$

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V Summary of the empirical results

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• Chow Test indicates a structural change in all of them, i.e., lending by financial institutions to large companies, lending by financial institutions to SMEs, borrowing by large companies, and borrowing by SMEs.

Such structural changes have taken place in the following sequence:

Supply function of lending to large companies (since 1977)

Supply function of lending to SMEs (since 1983)

Demand function of borrowing by large companies (since 1985)

Demand function of borrowing by SMEs (since 1988)

The changes can be described as follows:

Lending to large companies	Financial institutions became less inclined to lend t	
	large companies even with increased deposits.	
Lending to SMEs	Lending by financial institutions to SMEs became	
	more sensitive to fluctuations in net interest margins.	

Demand by large companies toLarge companies became less inclined to borrow fromborrowfinancial institutions even with increased sales.

Demand by SMEs to borrow The correlation between SMEs' sales and their borrowing used to be the opposite of that of large companies. But it is no longer the case.

VI Suggestions for future studies

- \bigcirc In this work, the value of θ_2 was exogenously determined. However, to obtain outcome more rigorously, it should be better to endogenously derive θ_2 .
- The supply function of lending to large companies experienced a structural change before the 1980s, the timing of which could not be explained. It is desirable to look into whether the empirical analysis in this paper has some faults or there were actually some factors that caused such structural change.