



# Balance sheet deterioration and credit allocations: Japanese evidence from the short-term economic survey of enterprises<sup>☆</sup>

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## ABSTRACT

This study is an empirical attempt to investigate the effects of balance sheet deterioration of Japanese firms and banks in the 1990s on credit allocation using the short-term economic survey of enterprises. This survey contains a unique item: proportion of firms perceiving the lending attitude as severe. After developing a theoretical model to link this item with the balance sheet conditions of borrowers and lenders, we estimate the relationship derived from the model. We find that credit was reduced when the balance sheet of firms and banks deteriorated. The effects are notably large for non-manufacturing industries.

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## 1. Introduction

One of the most salient characteristics of the Japanese economy during the 1990s is the deterioration of the balance sheets of both banks and firms. Massive loans supplied to the nonfinancial sector became non-performing when land prices fell sharply over the decade. From the debtors' side, non-performing loans constituted insolvent debt, arising from excessive borrowing in the late 1980s.

It is often argued that balance sheet deterioration of creditors and debtors caused credit misallocation, which in turn led to the long stagnation of the Japanese economy during the 1990s. The case is set out as follows. Banks had concentrated their managerial resources around the disposal of massive, non-performing loans, which in turn prevented banks from playing the intermediary role of allocating funds more efficiently. Thus, the malfunction of the credit allocation system plunged the Japanese economy into a severe, decade-long

stagnation. While few would refute this interpretation, a wide spectrum of opinion remains about the direction and magnitude of the effects of balance sheet deterioration on credit allocation. Therefore, the quantitative evaluation of balance sheet deterioration of banks and firms and the related effects on the allocation of bank credit is an important avenue of study.

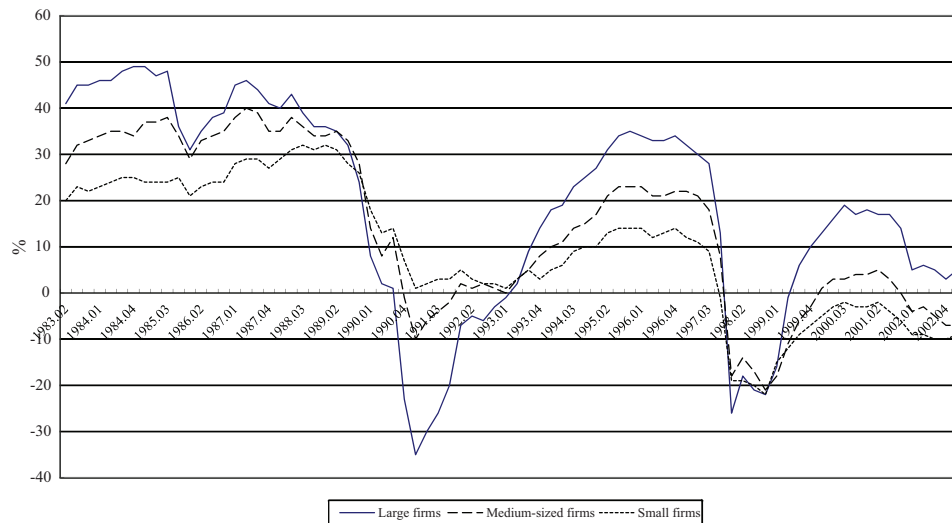
This paper presents an empirical attempt to examine the effects of balance sheet deterioration of banks and firms on credit allocation based on survey data from the short-term economic survey of enterprises (i.e., the Tankan survey), reported by the Bank of Japan. The Tankan survey is unique in the sense that it contains data concerning judgments of firms regarding the credit conditions they faced at that time. The firms were asked to answer the following question: How do you perceive the current lending attitude of financial institutions? Firms were asked to choose one of the following three items: severe, not too severe, and easy. Each item reflects the credit condition the firm perceived itself to face. The Tankan survey reports the proportion of firms responding to each choice by aggregating the responses of individual firms. The Tankan survey is an ideal data set for our study, which rests on a disequilibrium model of credit allocations across firms as will be discussed in Section 3.

Two benefits of the Tankan survey deserve special mention. First, it provides us with information on credit allocation from the firms' perspectives. It enables us to incorporate demand as well as

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Data Source: The Short-term Economic Survey of Enterprises, Bank of Japan

**Fig. 1.** Diffusion index of lending attitude of financial institutions by firm size: all industries. Data Source: The Short-term Economic Survey of Enterprises, Bank of Japan.

supply factors associated with loans in analyzing credit allocations. Second, survey results are available by industry and firm size, so we can examine differences in credit allocations across industries and firm size. The proportion of firms perceiving the current lending attitude to be easy minus those perceiving the current lending attitude to be severe is known as the diffusion index (DI) of lending attitude of financial institutions. Fig. 1 shows the DI of lending attitude of financial institutions by firm size (large, medium-sized, and small firms) for all industries during the second quarter of 1983 to the first quarter of 2003. The DI exhibits a more or less similar trend across the three groups of firms. The DI fell sharply twice during the sample period, implying that lending attitude, in general, became more severe. The first dive occurred soon after the price of land fell sharply at the beginning of the 1990s, while the second dive occurred in the midst of the financial crisis at around 1997–1998, when large financial institutions went into bankruptcy.

The main contribution of this study is that it relates information on credit allocation in the Tankan survey to factors underlying loan demand and supply. In particular, we are interested in the ways in which the deterioration of the balance sheets of firms and banks in the 1990s affected the allocation of credit.

To preview our main findings, massive non-performing loans in the banking sector significantly raised the proportion of firms perceiving the lending attitude of financial institutions to be severe. This tendency is notable for nonmanufacturing industries, especially the real estate industry. The deterioration of firms' balance sheets in the 1990s increased the proportion of firms perceiving the lending attitude of financial institutions to be severe. This is also notable for nonmanufacturing industries. Our results are robust to the choice of the balance sheet variable with respect to banks and firms. Our evidence indicates that the negative relationship between the deterioration of balance sheets in firms and banks and credit allocations (i.e., the credit-crunch interpretation) is more relevant than the positive one (i.e., the evergreening interpretation) in describing credit allocations at the industry level in the Japanese economy of the 1990s.

The paper is organized as follows. Section 2 reviews studies dealing with credit allocation and its association with the balance sheet conditions of Japanese firms and banks after the 1990s. We summarize previous findings on this issue. Section 3 sets up a simple theoretical model to analyze the relationship of credit allocations deduced from the Tankan survey with the factors underlying loan demand and supply. Section 4 derives equations that link the extent

to which firms perceive the lending attitude of financial institutions to be severe with some underlying factors, including balance sheet variables of firms and banks. The data set we use is also explained in this section. Section 5 shows the results of our estimations and explains the implications of the manner in which balance sheet conditions of banks and firms affected credit allocation at the industry level in the 1990s. Section 6 presents our conclusions.

## 2. Credit allocation and balance sheet conditions of firms and banks: literature survey

Here, we review empirical studies dealing with the effects of balance sheet conditions in Japanese firms and banks with respect to credit allocations during the 1990s. The empirical studies are divided into two positions. One position, that we term the credit-crunch interpretation, supports the idea that the deterioration of balance sheets in firms and banks had negative effects on credit allocation. These studies are numerous, including those by Yoshikawa et al. (1994), Miyagawa et al. (1995), Economic and Social Research Institute (1995), Maeda (1996), Peek and Rosengren (1997, 2000), Ito and Sasaki (2002), Horie (2001), Honda (2002), Hosono (2006), Ohkusa (2002), Woo (2003), Ogawa (2003) and Watanabe (2007).

These studies have several characteristics in common. First, almost all of the studies investigated the effects of banks' capital adequacy ratios and ratios of non-performing loans to total loans on credit allocation. Many of the studies obtained significantly positive effects with respect to the capital adequacy ratio and significantly negative effects with the non-performing loans ratio in relation to bank loans. In these studies the factors affecting demand for bank loans were partially controlled for; however, they only estimate the supply schedule of bank loans. One exception is Ohkusa's study (2002), in which the level and growth rate of firms' profits are shown to be important factors influencing the lending attitudes of financial institutions. Given that it is not an easy task to thoroughly identify demand and supply with respect to bank loans, it would be preferable to include not only factors affecting bank loan supply but also those affecting demand for bank loans.

Second, most of these studies examine total bank loans, with the exception of Miyagawa et al. (1995), Maeda (1996), and Ogawa (2003). In these studies, loans are divided into several components, and the relationships between banks' balance sheets conditions and bank loans to small firms are a major focus. Ogawa's study

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