



# The transmission mechanism of monetary policy in Japan: Evidence from banks' balance sheets <sup>☆</sup>

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We examine how banks' responses to monetary policy vary according to their balance sheet using Japanese bank data from 1975 to 1999. We find that the effect of monetary policy on lending is stronger for banks that are smaller, less liquid, and more abundant with capital. The effects of bank balance sheet on monetary transmission are different by bank types, policy stances and borrowers' industries. Our results imply that a lending channel of monetary transmission exists, that the effect of expansionary monetary policy is attenuated if banks' capital is scarce, and that the effect of monetary policy on the allocation of funds depends on banks' balance sheets. *J. Japanese Int. Economies* **20** (3) (2006) 380–405. Faculty of Economics, Gakushuin University Mejiro 1-5-1, Toshima-ku, Tokyo 171-8588, Japan.

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## 1. Introduction

Do the effects of monetary policy depend on banks' balance sheets? The recent Japanese experience has drawn renewed attention to this issue. Some economists argue that Japan's expansionary monetary policy during the 1990s was less effective than in earlier periods because banks' non-performing loans and scarce capitals put constraints on their ability to extend new

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loans (e.g., (Nagahata and Sekine, 2002)), while others argue that such a credit crunch is not warranted (e.g., (Krugman, 1998)). In addition to the volume of loans, the allocation of loans has also attracted economists' attention. Hoshi (2000), for example, suggests that non-performing loans distorted banks' allocation of loans and restrained the flow of funds towards growing firms. But empirical evidence on these issues is still scarce.

To analyze the link between banks' balance sheets and the effects of monetary policy, the so-called "bank-lending view" of monetary transmission is a useful benchmark. According to this view, monetary policy shifts banks' loan supply schedules and thereby affects the expenditures by bank-dependent borrowers (e.g., (Bernanke and Blinder, 1988; Kashyap and Stein, 1994)). Shifts in loan supply are not identical among banks but dependent on their balance sheets. For example, when the central bank drains a bank's reserve, the bank must decrease loans unless they make up for a shortfall in deposits by selling their securities or financing by nonreservable instruments. Banks with less liquid assets tend to decrease loans by a greater extent if nonreservable liabilities are not available or available only at higher costs than deposits. Stein (1998) develops a formal model of credit rationing in bank financing markets based on the observation that most of the bank liabilities that escape reserve requirements are not covered by deposit insurance and hence are likely to be subject to adverse selection. Our purpose is to test this micro implication of the bank-lending view using a set of panel data for Japanese banks from 1975 through 1999.

With this microdata set, we can overcome the problem of distinguishing loan supply from loan demand. For example, a tight monetary stance restrains corporate investment through a rise in interest rates and/or currency appreciation and thereby decreases the demand for bank loans. We can regard such policy-induced changes in loan demand as a macro shock. On the other hand, if there are differences among banks in changes in loans, we can safely regard these microlevel differences as differences of shifts in the loan supply. It is an advantage of microdata analysis that we can overcome an identification problem. In contrast, time series analysis using macrodata potentially suffers from identification problems (e.g., Romer and Romer, 1990; Bernanke and Blinder, 1992; Kashyap et al., 1993; Hoshi et al., 1993a; Ueda, 1993; Hosono, 1995; Ramey, 1993; Hatakeda, 1997, 2000; Miyagawa and Ishihara, 1997).

The first to analyze monetary transmission mechanisms in the US using a microdata set for banks were Kashyap and Stein (2000). They found that the impact of monetary policy on lending is stronger for banks with less liquid balance sheets. Using bank data for four European countries, France, Germany, Italy, and Spain, Favero et al. (1999) found that the effect of monetary contraction in 1992 depended on banks' size, liquidity, and the countries in which they operated.

The present study contributes to this literature in four ways. First, we analyze the monetary transmission in Japan using banks' balance sheet data. Japanese banks, until recently, were subject to stricter regulation of nonreservable, uninsured financing when compared with US banks. It is interesting to examine the nature of bank-lending channels under different regulatory environments, because regulations are likely to affect monetary transmission mechanisms by restricting financial instruments that are available to banks. Because the Japanese banking sector has been burdened with huge non-performing loans since the early 1990s, our analysis also helps to reveal whether and to what extent a weak banking sector strengthens or weakens the effects of monetary policy.

Second, we develop a new approach that focuses on capital ratios as well as sizes and liquidity ratios. Banks with abundant capital are less likely to be subject to asymmetric information problems such as adverse selection or moral hazard (Holmstrom and Tirole, 1997) and hence tend to be less sensitive to monetary policy. On the other hand, if capital adequacy requirements are imposed, banks with scarce capital cannot increase loans as a response to expansionary monetary

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