Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance: Reply

By ANIL K KASHYAP, JEREMY C. STEIN, AND DAVID W. WILCOX*

Stephen Oliner and Glenn Rudebusch's (1996) comment on our paper—Kashyap et al. (1993), henceforth KSW—has been circulating in unpublished form for some time now, and in our view, it has engendered a great deal of confusion. In this reply we try to clarify things somewhat.

Oliner and Rudebusch conclude their comment by stating: "... during the 1974–1991 period ... the bank lending channel does not appear to have been an important part of the monetary transmission mechanism." Unfortunately, this conclusion has absolutely nothing to do with the data that they examine. The Oliner-Rudebusch data do suggest that there are some noteworthy heterogeneities across small and large firms in terms of their response to monetary policy, but these types of heterogeneities in no way contradict the so-called "lending view" of monetary policy transmission.[1]

Our response is in two parts. First, we make a purely logical argument—that even if one accepts the Oliner-Rudebusch empirical results at face value, they do not in any way cut against the existence of a bank lending channel. Second, we question the empirical results themselves, and show that they are misleading. In particular, if one uses the same mix variable as we did in KSW, our key conclusion—that commercial paper rises relative to bank loans in the wake of a monetary contraction—remains even when one disaggregates the data. Indeed, the magnitude of the effect in the large-firm subsample is almost as large as that seen in the aggregated sample.

I. Problems with Oliner and Rudebusch's Logic

Let us begin by supposing that the key empirical claims made in the Oliner-Rudebusch comment are completely correct. The sorts of differences between large and small firms that they discuss could arise in a number of ways, and therefore do not cut against the lending view. Here is one very natural and plausible interpretation of the Oliner-Rudebusch findings that fits nicely with the lending view. When the Fed tightens, loan supply to small firms is cut back. In an effort to find other sources of financing, these small firms stretch their accounts payable. This shows up as an increased demand for receivables at the large firms, who must then raise more external finance via the commercial paper market to meet this demand. Effectively, the surge in commercial paper at the large firms is indicative of the fact that they are partially (and imperfectly) taking over the intermediation function of the banks, which has been compromised by the Fed tightening.[2]

The ambiguities surrounding the interpretation of the large-firm/small-firm differences

* Kashyap: Graduate School of Business, University of Chicago, Chicago, IL 60637, and National Bureau of Economic Research; Stein: MIT, Sloan School of Management, Cambridge, MA 02142-1347, and National Bureau of Economic Research; Wilcox: Federal Reserve Board, Washington, DC 20551. We are grateful to Stephen Oliner and Glenn Rudebusch for sharing their data with us.

[1] Similar heterogeneities have been documented recently by Mark Gertler and Simon Gilchrist (1994). They emphasize—as do Oliner and Rudebusch—that small firms take on less external financing in the wake of a monetary contraction, while large firms take on more. But unlike Oliner and Rudebusch, Gertler and Gilchrist do not claim that one can use this observation to decisively answer the question of whether or not there is a lending channel of monetary policy.

[2] This accounts-payable story has been around in one form or another for a long time. A variant of it is discussed in Allan Meltzer (1960). More recently, evidence supporting the story has been produced by Jeffrey H. Nilsen (1993), and Charles W. Calomiris et al. (1995). See also Mitchell Peterson and Raghuram Rajan (1994) for evidence that accounts payable are only an imperfect substitute for bank debt.

do highlight a weakness of the identification strategy pursued in KSW. The KSW strategy—which relies on aggregate data—will allow identification of loan supply effects only if there are not certain sorts of heterogeneities in credit demand across firms.[3] Oliner and Rudebusch are thus correct in emphasizing that, in the presence of heterogeneities, the KSW evidence is not by itself decisive. But it does not follow that there is no lending channel. Moreover, we agree completely with the sentiment that aggregate data alone will never settle this debate. Indeed, we view the approach taken in KSW as just a starting point, and our research over the past few years in this area has been devoted exclusively to analyzing micro-level data (see, e.g., Kashyap et al., 1994; and Kashyap and Stein, 1995).

II. Problems with Oliner and Rudebusch's Empirical Work

The key empirical result in the Oliner and Rudebusch comment is the finding that, when one disaggregates across large and small firms, the mix no longer responds to changes in the stance of monetary policy. Two observations are in order. First, this result is unsurprising for the small firms, since, in the Oliner and Rudebusch sample, they are almost completely bank financed. Thus the small firm mix is unlikely to change much, no matter what happens to bank loan supply.

Second, with regard to large firms, where the result is on the face of it more striking, we found it curious that Oliner and Rudebusch chose to use a different measure of the mix variable than we did in KSW. (Recall that we looked at the ratio of bank debt to bank debt plus commercial paper, while they add an "other" debt category to the denominator of their measure.) After all, if their main point is that disaggregating the data makes our mix results go away, why not simply do the disaggregation, and avoid tampering with the definition of the mix variable?

TABLE 1—THE RESPONSE OF KSWMIX TO MONETARY POLICY

Specification	Sum of coefficients on policy variable: Aggregate sample	Sum of coefficients on policy variable: Large firms only
1. Multivariate, 8 lags		
A. Romer dates	−0.132	−0.118
	(2.48)	(2.01)
B. Federal funds rate	−0.0135	−0.0087
	(1.62)	(0.95)
2. Bivariate, 8 lags		
A. Romer dates	−0.122	−0.091
	(2.62)	(1.77)
B. Federal funds rate	−0.0108	−0.0075
	(1.58)	(1.04)
3. Multivariate, 4 lags		
A. Romer dates	−0.068	−0.070
	(2.15)	(1.91)
B. Federal funds rate	−0.0082	−0.0056
	(1.49)	(0.94)
4. Bivariate, 4 lags		
A. Romer dates	−0.059	−0.057
	(1.92)	(1.65)
B. Federal funds rate	−0.0097	−0.0056
	(2.03)	(1.08)

Notes: Results from ordinary least squares regressions of KSWMIX on lags of itself, a monetary policy indicator, (and in the multivariate specifications, real GDP). All variables except the Romer dummy are differenced. The KSWMIX is the ratio of bank loans to loans plus commercial paper. The data and sample period are identical to Oliner and Rudebusch. The *t* statistics are in parentheses.

Table 1 presents the results of this pure disaggregation experiment, using our original mix variable ("KSWMIX"), and the Oliner-Rudebusch data and sample period. Rows 1A and 1B employ exactly the same specification as in their Table 2—a multivariate specification (including a GDP control) with eight lags.[4] In Row 1A, we use the Romer dates as our monetary policy indicator. In the aggregate sample, the sum of the coefficients on this indicator is −0.132. For the large-firm subsample, the sum is −0.118, or just about 90 percent of the aggregate-sample value. The sum also

[3] For example, yet another (perfect-capital markets) reinterpretation of our mix results is that large firms for some reason actually do well in recessions, so that their demand for investment in plant and equipment, and hence their demand for external finance, rises at the same time that the demand of small firms falls.

[4] Using this specification, we were able to replicate the results their Table 2 exactly.

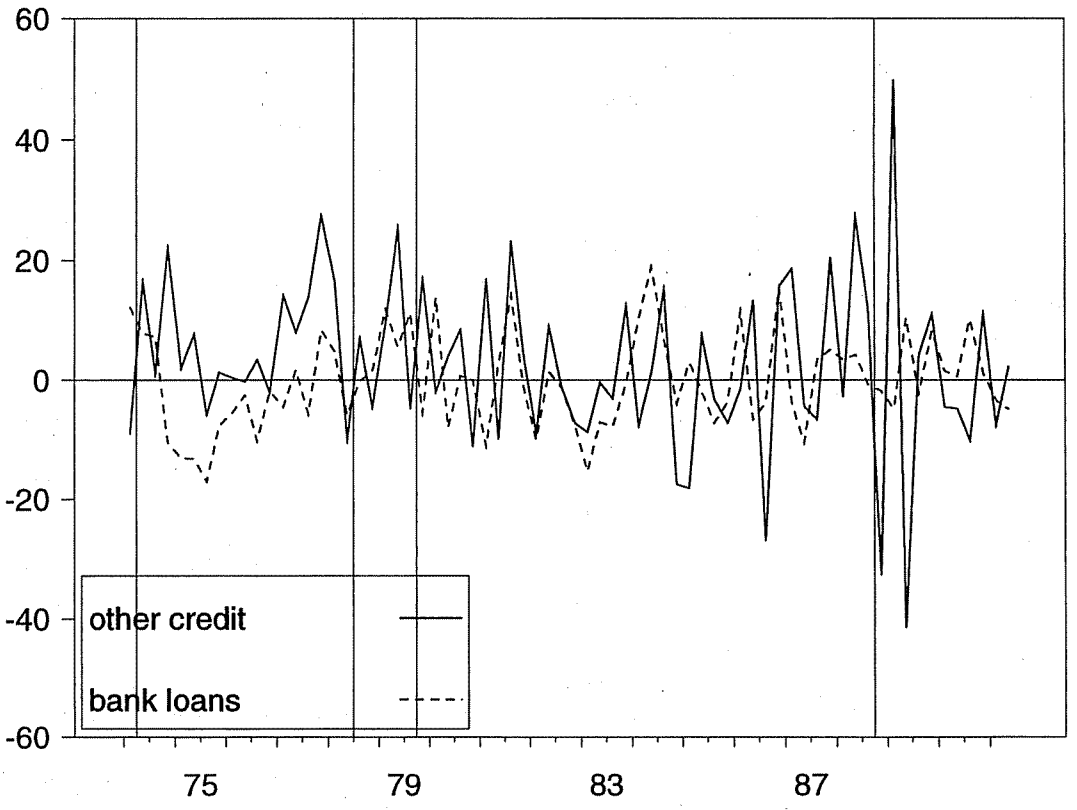

FIGURE 1. PERCENTAGE CHANGE IN OTHER CREDIT AND BANK LOANS FOR LARGE FIRMS (VERTICAL LINES SHOW ROMER DATES)

continues to be statistically significant. Thus disaggregating hardly changes the KSWMIX results at all! To put it mildly, this runs directly counter to the strong Oliner-Rudebusch claim that "the aggregate results of KSW are spuriously generated by the heterogeneous response of small and large firms to monetary policy" (p. 307).

In Row 1B, we replace the Romer dates as a measure of monetary policy with the change in the fed funds rate. Here, as in Oliner-Rudebusch's Table 2, the foreshortened sample period leads to somewhat larger standard errors. However, the point estimates suggest a similar conclusion: the sum of the coefficients in the large firm subsample is roughly two thirds that for the aggregate sample. We also obtain very similar results—for both Romer dates and the funds rate—in the remaining rows of the table, where we try a variety of other specifications.

How then does one account for Oliner and Rudebusch's diametrically opposed findings? Apparently, they come not from simply disaggregating the sample, but rather from introducing the "other" debt category to their revised definition of the mix variable. The question then becomes: what is it about the behavior of this "other" category that causes the results to change so significantly? At this point, we have no clear answer. However, we can offer the following tentative conjectures:

1) The first thing to note about the "other" variable is that it is extremely volatile, much more so than bank loans or commercial paper. Figure 1 illustrates this volatility, plotting quarterly growth rates of both the "other" and the bank loan series for the large firm subsample. There are several especially pronounced spikes in the "other" series in the late 1980's. For example, in the four quarters beginning in

1988:Q3, the series takes on the following consecutive values: 17666, 11875, 17805, and 10428—that is, percentage movements on the order of 40–50 percent per quarter. A related point is that if one attempts to estimate the response of the "other" variable to changes in the stance of monetary policy (using the same specifications as in Table 1) the resulting standard errors are extremely large. Unlike with bank loans or commercial paper, nothing resembling a coherent pattern emerges from such regressions.

We do not know what accounts for the apparently anomalous behavior of the "other" variable. Perhaps the enormous fluctuations do indeed reflect a meaningful economic phenomenon. Or maybe they are simply an artifact of the construction of the data series. However, it seems that the burden of proof in this case rests squarely on Oliner and Rudebusch.

2) Even if the "other" series is free of measurement problems, there remains the issue of its appropriateness for the sort of mix experiments introduced in KSW. Oliner and Rudebusch are certainly correct in principle when they argue that one should compare movements in bank loans to movements in all substitutes for bank loans. However, there are subtle questions associated with exactly *how substitutable* different forms of financing are for one another.

Specifically, Oliner and Rudebusch note that the "other" category is composed of things such as finance company lending. It is possible that this lending is more likely to be tied to the purchase of particular types of equipment, or is more likely to involve a secured interest in such equipment. Now suppose the accounts-payable story sketched above is at work, and in the wake of a monetary contraction a large firm finds itself scrambling to raise funds to finance an increase in its receivables. It may be easier for such a firm to do so with unsecured commercial paper than with a finance company loan. If so, commercial paper is a closer substitute for bank lending than is finance company lending, and using a narrower definition of the mix (as we did in KSW) may be more informative.

Of course, both of the above arguments are somewhat speculative, and would greatly benefit from some careful empirical investigation. The honest answer is that we simply don't know at this point why the "other" variable seems to affect the disaggregated results so much. However, it is important not to lose sight of the key point: Oliner and Rudebusch are effectively claiming that everything is due to variations in financing patterns across size categories, and that within a given size category, all forms of financing respond similarly to a monetary shock. This claim is demonstrably false, as our results in Table 1 show.

III. Conclusions

We conclude by restating a couple of general observations. First, the basic fact documented by both Gertler and Gilchrist (1994) and Oliner and Rudebusch—that a monetary contraction leads to a general reallocation of funds away from smaller firms and towards larger firms—is not in dispute. However, we hope it is clear by now that this fact does not in any way cut against the existence of a lending channel. Indeed, it may turn out to be an important piece of a more detailed story of how the lending channel plays itself out.

Second, while we view our original KSW mix results as strongly consistent with the existence of a lending channel of monetary policy, and while it is comforting to us that these results hold up to some disaggregation of the data, we do not mean to suggest that this sort of mix-based empirical approach can by itself provide the definitive last word. At this point, there is probably much more to be learned from careful analysis of a variety of micro data, at the level of both individual banks and individual firms.

REFERENCES

Calomiris, Charles W.; Himmelberg, Charles P. and Wachtel, Paul. "Commercial Paper and Corporate Finance: A Microeconomic Perspective." *Carnegie Rochester Conference Series on Public Policy*, June 1995, *42*, pp. 203–50.

Gertler, Mark and Gilchrist, Simon. "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms." *Quarterly Journal of Economics*, May 1994, *109*(2), pp. 309–40.

Kashyap, Anil; Lamont, Owen and Stein, Jeremy. "Credit Conditions and the Cyclical Behavior of Inventories." *Quarterly Journal of Economics*, August 1994, *109*(3), pp. 565–92.

Kashyap, Anil and Stein, Jeremy. "The Impact of Monetary Policy on Bank Balance Sheets." *Carnegie Rochester Conference Series on Public Policy*, June 1995, *42*, pp. 151–95.

Kashyap, Anil; Stein, Jeremy and Wilcox, David W. "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance." *American Economic Review*, March 1993, *83*(1), pp. 78–98.

Meltzer, Allan. "Mercantile Credit, Monetary Policy, and the Size of Firms." *Review of Economics and Statistics*, November 1960, *42*, pp. 429–37.

Nilsen, Jeffrey H. "Trade Credit and the Credit Channel of Monetary Policy Transmission." Working Paper, Princeton University, 1993.

Oliner, Stephen and Rudebusch, Glenn. "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance: Comment." *American Economic Review*, March 1996, *86*(1), pp. 300–9.

Peterson, Mitchell and Rajan, Raghuram. "The Benefits of Lending Relationships: Evidence from Small Business Data." *Journal of Finance*, March 1994, *49*(1), pp. 3–37.