

A Federal Reserve Innovation: One-Week Settlement Period for Country Banks

September 12, 1968, is a date likely to be footnoted in banking textbooks for many years to come. This date marked the inauguration of several changes in reserve accounting procedures including the conversion of so-called country banks from two-week to one-week reserve settlement periods.

Compared with many other actions taken by the Federal Reserve System, this innovation passed relatively unnoticed except by the banks directly concerned. Though unspectacular, changes such as the conversion of country banks to one-week settlement periods are of interest. They illustrate the type of small, unspectacular innovation which the Federal Reserve System makes from time to time to improve the efficiency of the nation's banking system.

Accordingly, this article discusses the conversion of country bank settlement periods in some detail, covering in the process—the basics of reserve settlement and the problems associated with the two-week settlement periods earlier required of country banks. The article concludes with a quantitative assessment of how successful last September's conversion has proved to be.

The Mechanics of Reserve Settlement

As every banker and student of the Federal Reserve System knows, we have a "fractional reserve" banking system. Banking law requires every member bank to set aside assets at least equal to specified fractional proportions of deposit liabilities. Reserve assets are either bal-

ances held by the member banks at District Federal Reserve Banks or the cash each bank holds in its vaults.

Implementing the law, the Board of Governors of the Federal Reserve System specifies the reserve accounting rules in its own regulations, which define both reserve assets and deposits that are subject to reserve requirements. In addition, the Board specifies, within legal limits, the fractional reserve requirement applying to each class of deposit. The Board's regulations not only spell out how required reserve totals and reserve asset totals are to be calculated but also specify the time period during which reserve accounts must be settled.

Reserve regulations impose penalties against banks whose reserve assets fall short of their reserve requirements. Excesses are permitted, but they are costly simply because excess reserve assets earn no interest but may be exchanged for earning assets that do. In other words, every dollar of excess reserve assets represents a dollar on which interest could have been earned but was not. Profit-conscious bankers, therefore, have an incentive to keep their excess reserve assets close to zero.

Bankers can adjust their holdings of reserve assets in several ways: acquiring additional reserve assets, when necessary, to meet the reserve requirements against their deposits, or getting rid of reserve assets in excess of these requirements. The most important means for adjustment is the so-called Federal funds market, in which banks

lend reserve assets to each other overnight. The borrowing of reserve assets from the Federal Reserve's discount window and the exchange of interest-bearing securities for reserve assets are other ways in which bankers adjust their reserve asset positions.

Bankers make these adjustments within the framework of the reserve settlement timing specified by the Board's regulations. The reserve settlement period is presently one week. This means that each member bank, regardless of size or location, must maintain reserve assets each week sufficient to cover the average of its required reserves.¹ A bank may fail to meet its reserve requirements for one or more days during the week,

¹Since September 1968, reserve requirements have been calculated on the basis of deposit liabilities outstanding two weeks earlier; vault cash assets are also counted as of two weeks prior to the reserve settlement week.

provided this deficiency is offset by an excess at some other point in the settlement week.

Each bank's level of reserve assets fluctuates from day to day for technical reasons associated with the cashing of checks through the teller's window and the collection of checks through the Federal Reserve System. This type of fluctuation, though difficult for a banker to predict accurately on a day-to-day basis, tends to even out somewhat over longer periods. The length of the reserve accounting period determines both the degree to which bankers feel they must guard against hard-to-predict fluctuations of reserve assets and the amount of time bankers have to adjust their reserve asset positions. If reserve accounts had to be settled very frequently, bankers would have to adjust their loan and deposit activity very quickly in order to respond to temporary changes in reserve assets. The result would be erratic behavior in the banking system.

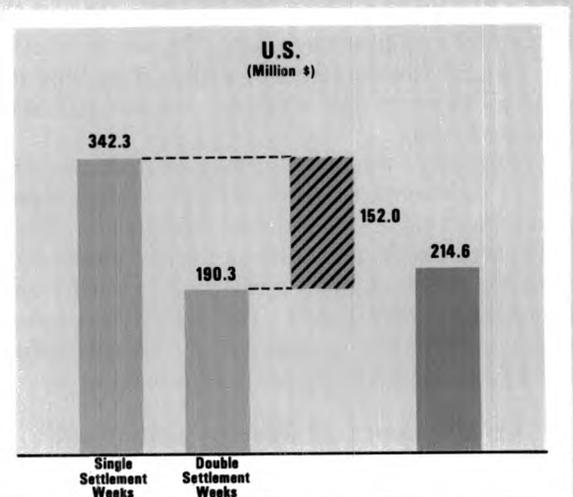
Settlement Periods For Country Banks— Before and After

Before September 12, 1968, "country" banks settled their reserve accounts every two weeks; "reserve city" banks every week. This difference in reserve settlement timing, together with the tendency of country banks to maintain reserve assets well in excess of the reserve requirements, produced a persistent biweekly pattern of excess reserves.

Reserve city banks had a tendency to experience alternating weeks of reserve scarcity and reserve glut, complicating the reserve management activities of reserve city banks and the reserve stabilization activities of the Federal Reserve System. The change from two-week reserve settlement periods to one-week reserve settlement periods was designed to eliminate these biweekly swings.

Chart I shows that during September 1967 to July 1968, (the period in which these banks had two weeks to settle their reserve accounts) the 5,796 country banks maintained excess reserve assets averaging \$342.3 million in single settlement weeks. In double settlement weeks, they averaged only \$190.3 million. The difference—\$152.0 million—was the alternating buildup and rundown of excess reserve assets. The biweekly pattern has disappeared since

Chart I



KEY TO CHARTS

- Pre-conversion two-week settlement periods for country banks—September 1967 to July 1968.
- After conversion of country banks to one-week settlement periods—September 1968 to July 1969.

On the other hand, the policy link between changes in reserve assets and changes in deposit and loan activity might be significantly weakened if the reserve settlement period were very long. For all these reasons, the timing of reserve settlement importantly affects the way banks do business.

The History of Reserve Settlement Timing

Partly because the Federal Reserve Act of 1913 imposed no specific requirements for reserve settlement timing, the individual Federal Reserve Banks set up requirements for themselves in the period from 1914 to 1919. Different Districts decided on different specifications, ranging from daily settlements to settlements on the basis of daily averages calculated each month. Other Districts required their banks to settle weekly or semi-monthly.

These disparities were further complicated by

the existence of three classes of member banks, each of which was subject to different reserve accounting rules. Larger banks in the cities with Federal Reserve Banks and branches, comprising the so-called central reserve city and reserve city bank classifications, were expected to settle their reserve accounts relatively frequently. Their size and their proximity to Federal Reserve facilities presumably offered them means to adjust their reserve balances more efficiently than other banks.² The remaining banks were included in the reserve accounting category of so-called country banks.

It was not until 1919 that the Board of Governors published regulations designed to standardize reserve computation periods among the

²Central reserve city banks were absorbed into the reserve city classification in 1962.

conversion. No biweekly fluctuation is associated with this average.

Chart II illustrates a similar pattern for the 546 country banks in the District. In the pre-change period, these banks' excess reserves fell, on average, from \$42.3 million in single settlement weeks to \$33.5 million in double settlement weeks—a swing of \$8.8 million. In the post-change period, excess reserve assets have averaged \$30.2 million.

Chart II

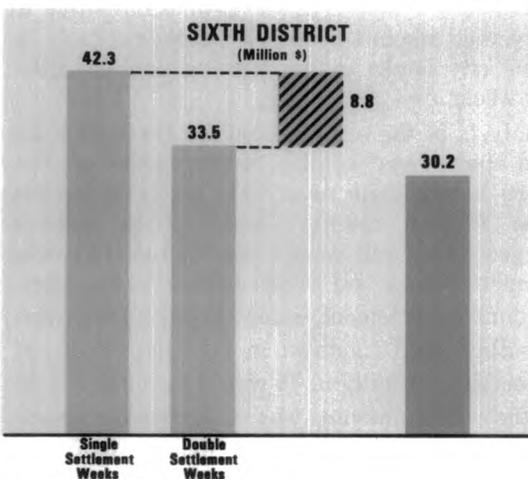
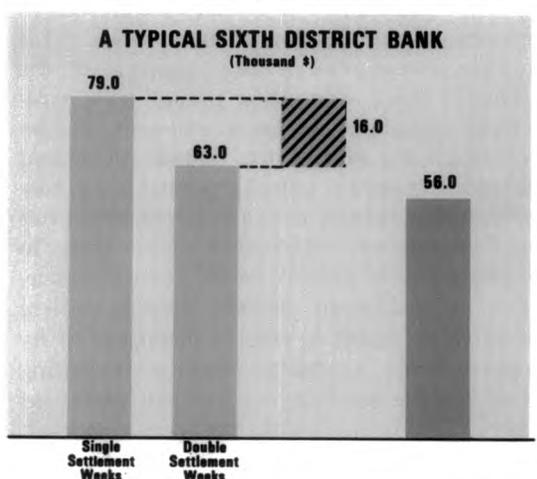


Chart III shows a comparable change in average excess reserve assets at a "typical" Sixth District country bank.

Chart III



twelve Federal Reserve districts. By 1923, all central reserve city and reserve city banks were settling their reserve accounts every week, whereas country banks were required to settle over semi-monthly periods. In 1962, country bank computation periods were made biweekly. All country banks settled every other week; all reserve city banks settled weekly. This was the situation immediately prior to the reserve accounting changes put into effect in September 1968.

Why the Change?

The historical trend toward uniformity in the timing of reserve settlement suggests one reason why country banks were converted to one-week accounting periods last September: Reserve city banks were already settling weekly; therefore, the move made the reserve settlement timing uniform for the two groups of banks, country and reserve city.³

But uniformity of reserve accounting rules, as such, was not the main reason for the September conversion. The main reason was a persistent biweekly seesaw pattern in reserve availability, a pattern attributable to the difference in accounting periods. When country banks settled every other week, they piled up excess reserves during the "single settlement" week, so called because only the single class of reserve city banks settled their reserve accounts. Excess reserves that were stockpiled at country banks in the single settlement weeks were withheld from the reserve city banks, who sought to balance their own reserve accounts.

During the ensuing double settlement weeks, when *both* groups of banks settled their accounts, the country banks chose to release excess reserve assets accumulated in the previous week. This offset their excess reserve asset position in the first week of their accounting period with a reserve asset deficiency in the second half. Particularly toward the end of the double settlement weeks, excess reserves became plentiful as they flowed from the country banks into money market centers, and reserve city banks were likely to experience a glut of reserve assets. The difference, therefore, in settlement periods, coupled with a conservative approach to reserve management by the country banks, tended to produce alternating weeks of reserve scarcity and reserve plenty at the reserve city banks and in the money market.

The alternating pattern of scarcity and plenty was partially counteracted by the Federal Reserve System's open market operations. During single settlement weeks when reserve assets moved out of the money markets and into the balances of cautious country banks, the System injected compensating reserve assets by buying securities. When the piled-up reserves reentered the money markets in each double settlement week, the System then reabsorbed the injected reserves by selling securities. Although the rise and fall of reserves was regular, the sizes of the flows were not easily predictable. Therefore, one more significant complication was added to the System's management of total banking system reserves. It was hoped that the elimination of the reserve period disparity would remove the seesaw pattern and the problems associated with that pattern.

The Results

A study made at the Federal Reserve Bank of Atlanta helps to quantify this biweekly reserve availability pattern. During the 21 single settlement weeks from September 1967 to July 1968, country bank excess reserves across the nation averaged \$342 million per day. In the alternate double settlement weeks, however, their excess reserves were only \$190 million per day—a significant difference of \$152 million per day on average. Nationally and on average, country banks built up their excess reserves by approximately \$150 million during the first half of their settlement period. Then they ran them back down by a similar amount in the following double settlement week. An average of about \$150 million in reserve assets was withheld from reserve city banks in single settlement weeks, relative to the average amount of reserve assets available to reserve city banks in the ensuing double settlement weeks.

Analysis of the same period for Sixth District banks shows very similar results, although the pattern is not quite as striking as it is for the nation. District country banks' excess reserves averaged \$42.3 million per day in the 21 single settlement weeks and \$33.5 million in the alternate double settlement weeks, implying an average buildup and rundown in the District of approximately \$9 million. It would be incorrect to say that this amount was alternatively made available and withheld from Sixth District reserve city banks, however, since the financial markets through which excess reserves are redistributed are national rather than local in scope.

This biweekly pattern of reserve availability, clearly evident before September 1968 in both the

³Differences remain, however, in the reserve requirements applying to reserve city and country banks. For every dollar of demand deposits in excess of \$5 million, for instance, a reserve city bank must maintain 17-1/2 cents of reserve assets, a country bank 13 cents (as of November 30, 1969).

nation and the Sixth District, was expected to be reduced when country banks converted to one-week accounting periods. Was it reduced? The results of further studies suggest that it was.

Analysis of the period from September 1968 to July 1969, a year later than the coverage of results mentioned earlier shows no significant buildup and rundown. The average swing was \$3.5 million in the post-changed period, compared with the \$152-million average buildup in the period prior to the change. Country bank excess reserves after the conversion averaged about \$214 million, slightly higher than the pre-change double settlement week average of \$190 million but much less than the corresponding single settlement week

average of \$342 million. The results, in other words, make good sense. The post-change \$214-million average may be lower than "normal," however, because excess reserves in the banking system as a whole have been scarce during the recent period of monetary restraint.

Sixth District data yield the same conclusion: Conversion of the country bank settlement periods has successfully eliminated the earlier biweekly reserve pattern. After the change, the excess reserve buildup for country banks in the District was \$0.3 million, compared with \$8.8 million previously.

WILLIAM N. COX, III

Appendix

This study employed regression analysis of the simple model:

$$(1) XR_c = a + bD + e$$

where XR_c is weekly country bank excess reserves (averaged over the days in each week); D is a dummy variable equal to one in single settlement weeks and zero in double settlement weeks; and (e) is a stochastic term. The model presumes that each week's aggregate of country bank excess reserves may be linearly decomposed into the constant (a) , the adjustment single settlement week status (b) , and the random term (e) .

This study makes use of a fundamental property of regression analysis: that the mean of the residual—the regression estimate of (e) —is zero. This implies that the estimate of (a) is the average of country bank excess reserves during the double settlement weeks covered by the regression, and that $(a+b)$ is the average of country banks' excess reserves during the single settlement weeks.

The results are shown in the accompanying table. Regression N-1, covering national country banks during the September 1967 to July 1968 period prior to the conversion of country banks to one-week accounting periods, shows that the above model offers a highly significant explanation of excess reserve behavior. The biweekly pattern of buildup and rundown, captured by the estimate of regression coefficient (b) , is both large and significant. Results of similar quality were drawn from Sixth District data for the same period; these are shown in regression D-1.

To see whether the biweekly pattern persisted after the reserve period change, the same model was applied to the September 1968 to July 1969 period. As expected, results of regression N-2 and D-2 for the nation and the District show that the biweekly coefficient (b) , instead of being large and significant as it had been previously, had become small and insignificant.

COUNTRY BANK EXCESS RESERVE BEHAVIOR—REGRESSION RESULTS

Regression Number	Period	Number of Observations	Estimate of (a) (\$ millions)	Estimate of (b) (\$ millions)	Σe^2	$R^2(\text{adj.})$	Durbin-Watson
N-1	Sept. '67-July '68	42	190.3	152.0** (5.61)	308,957	.65**	2.23
N-2	Sept. '68-July '69	42	212.9	3.5 (0.24)	86,360	.00	1.07
N-3	Both Periods	85	203.4	75.3** (4.15)	580,027	.40**	2.22
CHOW TEST OF NATIONAL DATA: $F = 18.7^{**}$							
D-1	Sept. '67-July '68	42	33.5	8.8** (2.81)	4,083.5	.38**	2.03
D-2	Sept. '68-July '69	42	30.1	0.3 (0.05)	14,099.7	.00	1.60
D-3	Both Periods	85	32.0	4.6 (1.36)	20,045.6	.10	1.63
CHOW TEST OF DISTRICT DATA: $F = 3.49^*$							

* significant at 5% level.

** highly significant at 1% level.