

FINANCING THE CROP CYCLE
SEASONALITY, SOUTHERN FINANCIAL UNDERDEVELOPMENT,
AND THE FOUNDING OF THE FEDERAL RESERVE SYSTEM

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ABSTRACT

The postbellum South lagged the rest of the nation in terms of financial development. Interest rates were comparatively high, per capita bank assets were low, and regional interbank networks were slow to develop. We attribute these features of the Southern economy to highly seasonal credit demands arising from the region's extreme specialization in cotton production. The crop cycle created a mismatch between local deposit supply (high in the off season) and local loan demand (high in the production season). Banks borrowed from their correspondents in the production season (at high rates) and invested surplus funds with them during the off-season (at low rates). This mismatch meant higher loan rates and a lower equilibrium number of banks and bank assets in the region. Our analysis is consistent with that of contemporary reformers who hoped to use the Federal Reserve Act to improve Southern credit arrangements.

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As described in current Fed publications, the Federal Reserve System was founded to address three problems with postbellum monetary and banking arrangements: frequent panics, a slow and expensive payment system, and inadequate bank regulation.¹ Our paper takes up a fourth contemporary concern: high agricultural credit costs in peripheral areas. The high costs of agricultural production credit had long been a focus of farm discontent and support for monetary reform was strongest in high rate regions. Among other Populist proposals, the goal of the subtreasury plan was to reduce farm interest costs, and Progressive reform initiatives such as the Indianapolis Monetary Commission also sought to address the issue.² In addition, this concern is reflected in the academic literature on monetary and banking reform – including the publications of the National Monetary Commission – in the provisions of the Federal Reserve Act, and in the political campaign to promote its passage.

Among U.S. regions, the problem of agricultural credit and financial underdevelopment of the Cotton South received the greatest attention. Bank loan rates in the Cotton South were higher than in other major U.S. regions after about 1900. In 1913, average rates were 5.43

¹See, for example, *The Federal Reserve System: Purposes and Functions* (Washington, D.C.: Board of Governors of the Federal Reserve System, 1994).

²For the origins, provisions, and politics of the subtreasury plan, see John D. Hicks, “The Sub-Treasury: A Forgotten Plan for the Relief of Agriculture,” *The Mississippi Valley Historical Review* 15:3 (December 1928): 355-73; and James C. Malin, “The Farmers’ Alliance Subtreasury Plan and European Precedents,” *The Mississippi Valley Historical Review* 31:2 (September 1944): 255-60.

Progressive proposals were presented in the *Report of the Monetary Commission of the Indianapolis Convention* (Chicago: University of Chicago Press, 1898). The preliminary report was adopted on December 17, 1897, and a bill incorporating its recommendations was introduced in Congress shortly thereafter.

percent in the Northeast, 6.20 percent in the Midwest, 7.15 percent in the West, 7.94 percent in the Cotton South, and 6.08 in other parts of the South.³ Table 1 shows the number of people per bank in different regions of the country by decade from 1880 to 1909. In 1880, the Southern regions stand out as having the highest population per bank. By this measure, the two regions remained relatively financially underdeveloped until sometime between 1900 and 1909. However, in 1909, they still lagged well behind other regions in bank assets per capita.

The sources of Southern financial underdevelopment have been much debated by economic historians. Commonly cited is the impact of the National Banking Act and accompanying Civil War monetary and banking legislation on the development of banking in agricultural areas. National banks had to meet high minimum capital requirements, were restricted in their ability to lend on real estate security, and faced significant restrictions on their ability to finance their operations with banknote liabilities. State banking was restricted by the prohibitive tax placed on state bank notes. According to Richard Sylla and John A. James, the result was that those banks that did organize in agricultural areas were able to exercise market power and charge higher loan rates.⁴ However, loan rates in the Cotton South were considerably higher and levels of financial development considerably lower than in other agricultural areas. Roger L. Ransom and Richard Sutch attribute this to other factors that accentuated the impact of

³For more information on the rate series and the behavior of bank loan rates over the period, see Scott A. Redenius, "New National Bank Loan Rate Estimates, 1887-1975," *Research in Economic History* 24 (2006): 55-104. The Cotton South is defined in Table 3.

⁴See Richard Sylla, "Federal Policy, Banking Market Structure, and Capital Mobilization in the United States, 1863-1913," *Journal of Economic History* 29:4 (December 1969): 657-86; Richard Eugene Sylla, *The American Capital Market, 1846-1914: A Study of the Effects of Public Policy on Economic Development* (New York: Arno Press, 1975); James, "Banking Market Structure, Risk, and the Pattern of Local Interest Rates in the United States, 1893-1911," *Review of Economics and Statistics* 58:4 (November 1976): 453-62; "The Development of the National Money Market, 1893-1911," *Journal of Economic History* 36:4 (December 1976): 878-97; and *Money and Capital Markets in Postbellum America* (Princeton: Princeton University Press, 1978).

the legal changes on the South. Sparse population made it difficult to realize economies of scale and, in combination with widespread illiteracy, limited the use of deposits as substitutes for banknotes and increased the costs of clearing and settlement.⁵

Higher loan rates could also have resulted from higher loan risk, a factor emphasized in some of the literature on historical bank loan rates.⁶ Contemporaries also appreciated the role of risk. Many saw limited diversification in a local economy as increasing loan risk, and hence loan rates, with particular blame directed at “one-crop” agriculture.⁷ Extreme specialization made farm income, and hence intermediary income, more sensitive to individual commodity price fluctuations. Few agricultural areas were as specialized in a single crop, and offered such a limited range of nonagricultural activities, as the Cotton South.

This paper focuses on a second characteristic of one-crop areas: the highly seasonal nature of economic activity. Because seasonality created a mismatch between deposit supply and loan demand, regions where seasonal economic activities predominated were costly

⁵“Debt Peonage in the Cotton South After the Civil War,” *Journal of Economic History* 32:3 (September 1972): 641-69. See also *One Kind of Freedom: The Economic Consequences of Emancipation* (Cambridge: Cambridge University Press, 1977), ch. 6. John A. James likewise believes low population density limited economies of scale. “Financial Underdevelopment in the Postbellum South,” *Journal of Interdisciplinary History* 11:3 (Winter 1981): 443-54.

⁶Hugh Rockoff, Howard Bodenhorn, and Brian C. Gendreau have emphasized the role played by risk in regional variation in bank loan rates, though their analysis has not focused specifically on the South. Rockoff, “Regional Interest Rates and Bank Failures, 1870-1914,” *Explorations in Economic History* 14:1 (January 1977): 90-5; Bodenhorn, “A More Perfect Union: Regional Interest Rates in the United States, 1880-1960,” ch. 12 in Michael D. Bordo and Richard Sylla, eds., *Anglo-American Financial Systems: Institutions and Markets in the Twentieth Century* (Burr Ridge, Illinois: Irwin Professional Publishing, 1995); and Gendreau, “Risk Structure of Postbellum U.S. Deposit Rates,” *Explorations in Economic History* 36:4 (October 1999): 409-27.

⁷See, for example, Ivan Wright, *Bank Credit and Agriculture under the National and Federal Reserve Banking Systems* (New York: McGraw-Hill Book Company, 1922; reprinted New York: Arno Press, 1980), p. 237; and Virgil P. Lee, *Principles of Agricultural Credit* (New York: McGraw-Hill Book Company, 1930), p. 288.

environments for bank intermediaries. Periods of peak seasonal activity, and hence credit demand, coincided with low local deposit supply and vice versa. As a result, banks could not finance their desired asset portfolios in the peak season with deposits but had to rely on more expensive external financing or forego lending opportunities. Banks faced the opposite problem of finding profitable investment opportunities in the off-season.⁸ This problem was compounded by the seasonal behavior of national interest rates, which was itself largely a product of financing the cotton crop cycle. When loan demand in the South was high, the South faced high interest rates in the interbank loan market. In the off-season, Southern banks could only earn low rates of return on their surplus funds. By implication, even though Southern banks had to charge higher average loan rates in order to cover their costs, the South could support fewer banks.

This explanation is not new. It was offered by a number of contemporaries and was most thoroughly developed by J. Laurence Laughlin of the University of Chicago. Laughlin was involved in the major Progressive monetary and banking reform initiatives that preceded passage of the Federal Reserve Act, and his student, H. Parker Willis, was an aide to Senator Carter Glass. However, this explanation has been lost in the recent literature on the relationship between the economy-wide seasonal pattern of interest rates and financial panics.⁹ Yet, Laughlin and his contemporaries viewed Southern financial underdevelopment, high loan rates, and

⁸The implications are similar to those of the model in Anil K. Kashyap, Raghuram Rajan, and Jeremy C. Stein, "Banks as Liquidity Providers: An Explanation for the Coexistence of Lending and Deposit-Taking," *Journal of Finance* 57:1 (February 2002). However, their model explains bank intermediary's joint production of loan and deposit services in the face of random shocks. The synergy between the two is compromised to the extent that the correlation between random reserve outflows from loans and deposits differs from zero. Here, seasonal changes in loans and deposits were largely predictable rather than random.

⁹For discussion of the recent literature, see Jeffrey A. Miron, "Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed," *American Economic Review* 76:1 (March 1986): 125-40.

financial panics as part and parcel of the same problem associated with the undiversified nature of the Southern economy and its specialization in a highly seasonal agricultural commodity: cotton. The Federal Reserve Act attempted to alleviate this problem by making agricultural paper eligible for rediscount with the Federal Reserve Banks, which allowed Southern banks to borrow at low rates from the discount window during periods of peak demand, by providing for interdistrict borrowing between Banks, by supporting the creation of market for money market instruments that would pay higher rates during the off season, and facilitating seasonal monetary policy.

The paper is organized as follows. The next section presents a model designed to capture the impact of seasonality on bank profits and loan rates. Section II provides a description of the crop cycle. Section III discusses the problem faced by bank intermediaries in the Cotton South. Section IV examines the impact of seasonality on the banking system and national economy during the postbellum period. Econometric results are presented in Section V. The organization of the Federal Reserve System and its impact on agricultural credit are discussed in Section VI.

I. THE MODEL.

David will present the paper's model in Atlanta. The model shows how the seasonality of economic activity affected bank funding costs. Higher funding costs in areas with highly seasonal patterns of economic activity implies that banks had to charge higher interest rates and that the affected regions would tend to have lower levels of financial development.

II. PRODUCTION SEASONALITY.

The seasonality of a region's economic activity can be viewed as a weighted average of the seasonal components of the region's economic activities.

$$(1) \quad S = \sum_{i=1}^N w_i S_i$$

where S = the region's seasonal index,
 w_i = the relative amount of activity i in the region,
 S_i = the seasonal index for activity i in the region.

As illustrated in Figure 1, agricultural output is much more seasonal than mining and manufacturing. Different agricultural products also vary in the timing and extent of their seasonal patterns. Figure 2 shows that each major category of agricultural output has a unique seasonal pattern. Shipments of animal products (20 percent of the agriculture index) peaked in June. Grain production (25 percent) was more seasonal and peaked in August. Among the crop categories in Figure 2, however, cotton (20 percent) had the strongest seasonal component. Cotton shipments began to increase in September, peaked in October, remained high in November, and declined thereafter.¹⁰ The pattern for livestock (20 percent) was similar to cotton

¹⁰The grain index masks significant differences in harvest times for different grains. Of the less important crops included in the Fed's index of agricultural movements, fruits (4 percent), vegetables (5 percent), and tobacco (3.5 percent) were also highly seasonal. October was the month of peak shipments of fruits and vegetables while tobacco shipments were strong into the winter.

but much less pronounced. A comparison of Figures 1 and 2 shows that cotton played a major role in generating the seasonal pattern in overall U.S. agricultural production, with both the cotton and agriculture indexes peaking in October.

Seasonality was more significant in the postbellum period than today because of the greater importance of agriculture. This was particularly the case in the Cotton South, which was less urbanized and industrialized than most northern states. In most of the states where it was grown, cotton was a dominant crop and represented a significant share of economic activity. As shown in Table 3, cotton was 57.0 percent of the value of agricultural output and 24.9 percent of the value of agricultural and manufacturing output in the Cotton South. To the extent that manufacturing activity was tied to cotton production, the 24.9 percent figure understates its true importance. The impact of the cotton crop cycle varied among cotton-growing states. Cotton was most important in Mississippi but was less important in North Carolina, Tennessee, Florida, and Oklahoma, which were located on the periphery of the cotton-growing region of the South.

The data on agricultural shipments – including shipments from warehouses throughout the year – provides information on the shipping and processing of the crop. For cotton, the full production cycle extended over much of the year. In the states included in the Cotton South, planting began in late March and continued through mid-May. Cultivation of the crop continued into July. Picking began in late August and continued through the end of the year. Both planting and picking tended to be later as one moved north.¹¹

The financial impact of the crop cycle was reflected in payment activity over the year. Figure 3 presents a seasonal index of deposits made in national banks in the Cotton South and the

¹¹James R. Covert, “Seedtime and Harvest: Cereals, Flax, Cotton, and Tobacco,” U.S. Department of Agriculture, Bureau of Statistics, *Bulletin* 85 (Washington, D.C.: GPO, 1912); and Fogel, *Without Consent or Contract*, p. 161.

rest of the United States for the year ending 30 June 1899.¹² The impact of the period during which the crop was harvested, processed, and marketed is evident. After reaching a low point in August, payment activity increased through November, declined slowly through January, and declined precipitously between January and February. Payment activity during November was over twice that of August. The planting period slowed this decline in the spring. Figure 4 shows that payment activity at country national banks, which helped finance the harvest, picked up earlier than for reserve-city national banks, which played a greater role in financing the subsequent processing and shipment of the crop. By contrast, payment activity in the rest of the economy was low through much of the cotton harvest. The greater variation in payment activity in the Cotton South is also evidence in Table 2, which reports the coefficient of variation for monthly deposits received and checks paid for the Cotton South and non-South regions. The coefficients of variation for the Cotton South were much larger but declined over the period.

Figure 5 provides a comparison between the Cotton South and other agricultural areas. The greatest payment seasonality was in cotton and wheat growing areas. The earlier peak for wheat reflected earlier harvest dates. Planting of spring wheat in the Northern Plains began at the beginning of April and was completed in early May, with the harvest completed in August. However, although their harvest periods did not coincide, payment activity relating to the harvesting, shipping and processing of the wheat and cotton crops overlapped. Seasonal indexes for clearings for representative cities in the regions are given in Figure 6. The clearing statistics likewise show the greater seasonality in cotton and wheat growing areas. Here the peak in Savannah (cotton) precedes that in Fargo (wheat). However, the peak for New Orleans was later

¹²Clearinghouse statistics were employed for this purpose in Kerry Odell and David F. Weiman, "Metropolitan Development, Regional Financial Centers, and the Founding of the Fed in the Lower South," *Journal of Economic History* 58:1 (March 1998): 103-25.

and for the Twin Cities earlier than for the cities included in Figure 6.

III. SEASONALITY AND THE INDIVIDUAL BANK.

According to Laughlin and other contemporaries, the seasonal nature of the crop cycle presented unique challenges for bank intermediaries. The nature of the problem was described by Laughlin as follows:

The problem of the bank in the agricultural community is two-fold – how to get additional means of accommodation at the crop-moving time, and how to dispose of its surplus funds at other times. The bank during a large part of the year now has difficulty in disposing of the funds which are left with it. When farmers are paid for their crops and have liquidated their loans at the bank from which they borrowed, there is a surplus which represents their remuneration for their own labor and the use of their land during the producing season. This surplus is deposited, while at the same time the demand for loans falls off heavily.¹³

This section uses national bank call data to explore how banks in seasonal areas financed the crop cycle.

Figure 7 reports a seasonal index of loans and deposits of Cotton South national banks for 1885-1892.¹⁴ The impact of the crop cycle is clearly evident. Loans were paid off from the

¹³*Banking Reform*, pp. 320-1.

¹⁴The call dates for this period allow a clear view of the impact of the crop cycle.

proceeds of the harvest and surplus funds deposited in the banks. As a result, loans were at low points and deposits at high points after the harvest had been completed. Deposits began to decline and loans increase during planting. Loans then peaked in the fall at the same time deposits reached their minimum. As Laughlin described, this seasonal pattern meant that banks had surplus funds after the harvest and had to find other means of financing harvest lending.

How did Southern banks address these problems? This is illustrated in Figure 7. In the Figure, loans and deposits are not represented but rather loans minus deposits. Higher values imply that banks were more reliant on nondeposit sources of funds. At low values, Southern banks had surplus funds that were invested in nonloan assets after funding their loan portfolios. Three other balance sheet categories are included. Interbank borrowing represents loans from other banks, typically from New York correspondents. Holding bankers' balances (deposits with correspondent banks) was one way in which Southern banks invested their surplus funds. Such balances held in New York paid 2 percent during the period considered here.¹⁵ Also included are bank cash holdings. While Figure 8 does not provide a full decomposition of bank sources and uses of funds over the year, it summarizes the movements of the dominant seasonal variables.¹⁶

The seasonal indexes in Figure 8 show that Southern bank operations over the year reflected the seasonality of their customers' business activities. After the harvest, banks paid off the loans from correspondents and increased their holdings of cash and bankers' balances. During the planting season, the difference between loans and deposits increased, financed by drawing down cash and bankers' balances and some new borrowing. This accelerated during the

¹⁵See James, "A Note on Interest Paid on New York Bankers' Balances in the Postbellum Period," *The Business History Review* 50:2 (Summer 1976): 198-202.

¹⁶In principle, banks could have adjusted their security holdings over the year, but this was not the case during the period considered here.

harvest season. Seasonality was most pronounced in those states in which cotton was a greater share in the value of output.¹⁷ The extent of seasonality in the financial series declined considerably over the postbellum period. Figure 9 shows the decline in the seasonal variation in Cotton South loans-deposits over the postbellum period. While the wheat-growing states of Minnesota and the Dakotas and some of the Border and Western states continued to exhibit seasonal patterns of loans - deposits, the Cotton South was to some extent unique among regions by 1913.

There are several reasons to think that the national bank statistics used here understate the true extent of the impact of seasonality on Cotton South banks. Data limitations are partly to blame. Since there were only five call dates per year, the seasonal indexes will not represent the full range of values over the year. In addition, bank loans include commercial paper banks purchased in the off season and loans placed directly in the New York call market. Some interbank borrowing was also reported as deposits or in other balance sheet categories. In addition, alternative employment of resources from seasonal activities during seasonal troughs will damp seasonal fluctuations.¹⁸

Another reason is that the cotton crop cycle was financed partly from outside of the region. Banks in New York, for example, were large purchasers of cotton bills. This was a

¹⁷In his early postwar investigation of lending by federal production credit associations, Lawrence A. Jones found that the timing of loans and their repayment varied by agricultural specialization. Areas where cotton, wheat, and livestock were important products exhibited the strongest degree of loan seasonality, whereas borrowing and repayments were spread relatively evenly throughout the year in dairy and general farming areas. "Trends and Characteristics of Loans of Production Credit Associations in Selected Farming Areas," *Agricultural Finance Review* 15 (1952): 14-28. In keeping with our interpretation, Jones also noted that "seasonal variations in PCA advances and repayments were regularly most pronounced in areas that specialize in one cash crop" (p. 17).

¹⁸Some other reasons are considered in Section III.

reflection of another impact of seasonality on the Southern financial system: it limited Southern financial development. This was described by Lockhart as follows,

[W]here there are extreme seasonal variations in the demand for money and loans, these [local] resources are likely to be insufficient at the height of the demand; for it may be impractical to provide banking facilities adequate to the largest demand without loss during the periods of inactive demand. This situation is most marked in the southern states, where the virtual one-crop system tends to concentrate the demand within a comparatively short period.¹⁹

III. SEASONALITY AND IN THE NATIONAL ECONOMY.

The impact of the seasonality of Southern agriculture was transmitted to the larger national economy. In the peak season, Southern banks borrowed from their New York correspondents and the New York banks extended credit to other agents involved in marketing the cotton crop. James estimated that in the case of the South, after accounting for understatement in official sources, seasonal loans to Southern banks totaled 10 percent of their assets from 1892 to 1897, and Southern banks did nearly half of all interbank borrowing from

¹⁹Lockhart, "The Development of Interbank Borrowing in the National System, 1869-1914," Part I, pp. 141-2. The same assessment appears in Wall, "Demand Deposits of Country Banks"; and "Agricultural Credit and the Economic Organization," *Journal of Farm Economics* 14:1 (January 1932): 138-51. See also Earl Bryan Schwulst, *Extension of Bank Credit: A Study in the Principles of Financial Statement Analysis as Applied in Extending Bank Credit to Agriculture, Industry, and Trade in Texas* (Boston: Houghton Mifflin Company, 1927), p. 263; and J. Laurence Laughlin, "A National Reserve Association and the Movement of Cotton in the South," *Journal of Political Economy* 20:2 (February 1912): 135-52.

1897 to 1914.²⁰ This concentrated borrowing imposed strains on a national financial system that was poorly designed to handle seasonal stress. As shown in Figure 10, the monetary base was relatively inelastic in the postbellum period. It did increase somewhat in the fall, and under some Treasury Secretaries, the Treasury sought to increase the base in the fall by increasing its balances with bank depositories.²¹

Many contemporaries also suggested there was an increased relative demand for currency during peak periods of seasonal activity. Currency was a convenient media for paying temporary farm workers and for making other small payments required during such periods.²² Figure 11 shows the distribution of the monetary base between the banking system and the public over the course of the year.²³ Currency in banks (reserves) fell in the spring and more dramatically in the fall, while currency held outside of the banking system followed the opposite pattern. This should, all other things equal, have decreased deposits, the money supply, and bank loans during the period of peak seasonal demand.

However, during the postbellum period, the monetary base was relatively unresponsive to

²⁰*Money and Capital Markets in Postbellum America* (Princeton: Princeton University Press, 1978), pp. 161-4.

²¹Attempts by Treasury Secretaries during the period to offset these movements by increasing government deposits with the banks are discussed by A. Piatt Andrew, "The Treasury and the Banks Under Secretary Shaw," *Quarterly Journal of Economics* 21:4 (August 1907): 519-68; and Richard H. Timberlake, Jr., "Mr. Shaw and His Critics: Monetary Policy in the Golden Era Revisited," *Quarterly Journal of Economics* 77:1 (February 1963): 40-54. Scott placed movements in currency between the subtreasury and the banks after interior and local movements. "Rates on the New York Money Market, 1896-1906," pp. 286-9.

²²See the discussion in J. Laurence Laughlin, ed., *Banking Reform* (Chicago: The National Citizen's League for the Promotion of a Sound Banking System, 1912; reprinted New York: Arno Press, 1980), pp. 311-4.

²³Since there were only five call dates per year during this period and these dates varied from year to year, it is only possible to get a general sense of the movements over the course of the year.

seasonal changes in the level of economic activity. Though there is insufficient data to compute a seasonal index for the monetary base, it is possible to examine seasonal movements in circulation and national bank reserves. The seasonal indexes of the components of U.S. circulation in Figure reveal only modest seasonality. The world stock of monetary gold at any particular time was fixed, but gold was shipped internationally in response to relative changes in national demands.²⁴ On net, gold flowed into the United States during the spring and fall and out during the summer and winter. This source of expansion was, however, limited by the fact that the U.S. agricultural cycle coincided with that of other northern hemisphere producers. The other large component of the monetary base was the federal government's legal tender notes. These did not have a strong seasonal component either.

Alternatively, seasonal currency demands could have been met with national bank notes. However, the provisions of the National Banking Act made the seasonal expansion and contraction of the money supply cumbersome. The result was that the outstanding volume of circulation issued was determined by the long-term profitability of issue. The seasonal index given in Figure 10 exhibits a slight increase in spring and fall, with an intervening decrease in the summer months.²⁵ In addition, national bank circulation suffered a relative decline such that by the end of the period, national bank notes would have needed to be very seasonal to make up for the lack of seasonality in other components of the circulation.

As a result, the increase in the relative demand for currency was met by the decrease in

²⁴See the discussion of the relative importance of international gold flows in William A. Scott, "Rates on the New York Money Market, 1896-1906," *Journal of Political Economy* 16:5 (May 1908): pp. 288-9. To some extent, international credit substituted for specie flows.

²⁵The origin of the seasonal pattern is not obvious. Since organization of national banks was seasonal, it seems likely that the same was true of bond purchases for circulation. Also, banks in New York redeemed some of the notes deposited with them.

bank reserves noted above. In Figure 11, currency in the hands of the public rose to about 4 percent above average in the fall, offset by a roughly comparable fall in bank reserves. This change implies that bank loans and deposits would have decreased in the absence of any offsetting change in bank excess reserve holdings. Figure 12 shows that excess cash reserves exhibited a strong inverse relationship to seasonal demands. Aggregate excess reserve holdings in the fall were as much as 20 percent below their average for the year.

Whereas the monetary base was relatively fixed and bank loans exhibited little seasonality, money and credit were reallocated between regions in response to seasonal demands. This task was handled primarily by the major New York banks. Figure 11 shows the seasonal distribution of reserves between New York City and outside banks from 1901 to 1913. In the fall, the reduction in New York reserves below the annual average (8 percent) far exceeds that for other banks (less than 3 percent). See also Figure 12. Edwin Walter Kemmerer's investigation of currency shipments between regions of the country revealed seasonal patterns consistent with those in the Figures.²⁶

In the absence of an increase in reserves or the issue of additional banknotes to make loans and meet deposit withdrawals, the impact of seasonal peak demands was higher interest rates. The resulting seasonal pattern of New York call loan rates is given in Figure 13. The general pattern of interest rates is consistent with that for payments, with the larger increase in

²⁶*Seasonal Variations in the Relative Demand for Money and Capital in the United States* (Washington, D.C.: GPO, 1910), ch. 4. See also Scott, "Rates on the New York Money Market, 1896-1906," pp. 273-98. For additional discussion of the sources of seasonality in postbellum banking aggregates, see E.W. Kemmerer, "Seasonal Variations in the New York Money Market," *American Economic Review* 1:1 (March 1911): 33-49; Lockhart, "The Development of Interbank Borrowing in the National System, 1869-1914," *Journal of Political Economy* Part I: 29:2 (February 1921): 140-1; Miron, "Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed," p. 129; and A. Piatt Andrew, "The Influence of Crops on Business in America," *Quarterly Journal of Economics* 20:3 (May 1906): 323-52.

rates coming in the fall and a smaller increase in the spring. Rates for time loans and commercial paper experienced similar, but less pronounced, seasonal swings.²⁷ Seasonal indexes for call and time loan rates in New Orleans are given in Figure 14. The call loan series is less volatile than that for New York. The timing of the movements in the series closely match the evidence from national bank balance sheets presented earlier. This evidence indicates that call rates varied about 40 percent over the year and time rates by 20 percent. The seasonality of both series declined over time.

The implication for southern agriculture is as follows. Southern borrowing during the crop-moving period generated high interest rates in national money markets. This in turn increased the cost of credit to Southern banks. In the off season, their deposits with their New York correspondents (a portion of which were lent out in the New York money market) helped to lower national interest rates. This limited their profit opportunities from investing directly in money market instruments in the off season. The combination tended to reduce Southern bank profits, all other things equal. Of course, like the impact of seasonality itself, the effect was to reduce investment in Southern banking and increase loan rates.

However, the effects of the seasonal crop cycle also extended to the bank's agricultural customers. Burgess described the effect on agriculture as follows,

[I]n the old days business men were subject to a constantly fluctuating price for funds. This, perhaps, was no disadvantage for those businesses whose borrowing was so flexible that it could be done at any time of year. But it was hard on the

²⁷Based on analysis of rates from *Bradstreet's*, 1886-1913. For analysis of the 1874-1913 period, see W.L. Crum, "Cycles of Rates on Commercial Paper," *Review of Economic Statistics* 5:1 (January 1923): 17-29, especially p. 26.

man who had to borrow in the fall or the spring, and it was particularly hard on agriculture, because money was tight just at the time when seed had to be planted and when crops had to be harvested.²⁸

IV. ECONOMETRIC TESTS.

The analysis in the previous sections suggests that seasonality contributed to the postbellum rate differentials, and the high rates prevailing in the Cotton South in particular. In our econometric analysis, we estimate the impact of seasonality on bank loan rates. In addition to seasonality, the model includes variables to capture the effects of differences in bank costs and loan risk.²⁹ The econometric model is

$$(2) \quad R_i = \beta_0 + \beta_1 \cdot CV_i + \beta_2 \cdot COSTS_i + \beta_3 \cdot LR_i + \beta_4 \cdot LRSD_i + \varepsilon_i$$

where R_i = average bank loan rate (percentage);
 CV_i = coefficient of variation of monthly payments (percentage);
 $COSTS_i$ = expenses and taxes (percentage of loans, discounts, and overdrafts);
 LR_i = five-year loss rate (percentage);
 $LRSD_i$ = standard deviation of semiannual loss rate for the five years preceding the current period (percentage); and
 ε_i = random error term.

²⁸W. Randolph Burgess, *The Reserve Banks and the Money Market* (New York: Harper & Brothers Publishers, 1927), pp. 292-3.

²⁹Most of the estimations in the literature have used the variable definitions used by John A. James in "Banking Market Structure, Risk, and the Pattern of Local Interest Rates in the United States, 1893-1911," *Review of Economics and Statistics* 58:4 (November 1976): 453-62. The underlying theoretical model extends the CAPM to include a market power premium. "Portfolio Selection with an Imperfectly Competitive Asset Market," *Journal of Financial and Quantitative Analysis* 11:5 (December 1976): 831-46. While their variable definitions have followed James, most subsequent researchers have not retained James' portfolio framework.

The analysis consists of cross-sectional regressions for the years 1889, 1894, 1899, and 1902.

Data sources and variable definitions.

Interest rates. The interest rates are the rates for country banks by state from the Comptroller's 1899 survey of bank interest rates and 1902 bank cost survey.

Seasonality. The tabulated returns to the Comptroller's 1903 payments survey can be used to construct a reasonable proxy for economic seasonality: the coefficient of variation of monthly payments for each survey year. This variable should capture the impact of implicit and shadow costs associated with seasonality. Two such series are constructed for country banks by state: one for the average amount of daily deposits received and one for the average amount of daily checks paid. The seasonality premia are therefore given by $\beta_1 \cdot CV_i$. The similarity between regions in the timing of seasonal peaks and troughs over the year indicate that there is no significant loss in using the coefficient of variation rather than an alternative measure sensitive to the timing of seasonal movements. The 1903 seasonality data are used in the 1902 analysis.

Costs. In addition, a variable is included to control for differences in operating, taxes, and interest costs between markets. This variable does not include the implicit costs associated with excess reserve holdings or currency in transit but does include explicit costs associated with managing reserve positions. Cost premia are given by $\beta_2 \cdot COSTS_i$. We expect $\beta_2 = 1$ since rates should fully reflect cost differentials.

Risk. Current loss rates are used as proxies for expected loss rates. Therefore, default

premiums are given by $\beta_3 \cdot LR_i$.³⁰ We expect $\beta_3 = 1$ since rates should fully reflect differences in default rates. The standard deviation of the loss rate [period] is included as a proxy for risk. Therefore, risk premiums are given by $\beta_4 \cdot LRSD_i$.

All variables are computed for country national banks by state. Comptroller survey data are tabulated for states and reserve cities as constituted at the time of the surveys, not those current at the dates for which the information was requested. This complicates the task of matching the survey data with that from the income statements and balance sheets used to construct the independent variables. To the extent possible, reserve-city banks have been removed from the state observations. However, given the definition of $LRSD_i$, this was only feasible when there were approximately six years of data available following a city's designation as a reserve city. For consistency, other reserve cities from the surveys were consolidated with country banks in the state.³¹

The data have a number of limitations. The survey tabulations report average loan rates by state. Thus, some portion of the rate differentials may also reflect regional differences in loan classes and in borrower composition. There are possible nonresponse biases, and the 1889 and 1894 data may suffer from survivorship bias. That different numbers of banks answered the

³⁰There are several problems with this measure. (1) The standard deviation of the loss rate understates the risk facing each of the banks in a state because the idiosyncratic loss experiences of individual banks will average out to some extent. To compensate for this downward bias, James used the variance rather than standard deviation of the loss. "Banking Market Structure, Risk, and the Pattern of Local Interest Rates in the United States, 1893-1911," p. 455. (2) Losses on nonloan assets and other aspects of bank operations are included. There were regional differences in bank portfolios and, therefore, presumably in nonloan losses. However, during the period covered by the estimations, this was much less of an issue than it would later become. (3) The relationship between bank income and bank shareholders' other income sources is of more direct relevance than loss volatility.

³¹This formulation yielded very similar results to an alternative in which all cities that were designated reserve cities under the Act of March 3, 1887, were consolidated with their respective states.

survey questions in the 1899 interest rate and 1902 cost surveys and in the 1903 payments survey suggest any biases in the two surveys may differ. Also, given that the survey years are not consecutive, it is not possible to remove trend or cyclical effects that may obscure the seasonal effect. With one possible exception discussed below, this last issue should not pose a significant problem.

Results.

The regression results are reported in Tables 4.1 - 4.4. For each year, the analysis was performed for each of the seasonal proxies in unweighted and weighted versions, with the sum of loans, discounts, and overdrafts serving as weights. The overall explanatory power of the models is quite high and reasonably consistent across the four years. R^2 values for the unweighted regressions range from 0.549 to 0.809 and for the weighted regressions from 0.724 to 0.839. In all cases, the F -statistics are significant at the 0.1 percent level.

In interpreting the results for the independent variables, multicollinearity appears to be an issue. Correlations between the CV and $COSTS$ ranged from 0.25 to 0.55, and there is usually a significant correlation between CV and $LRSD$.³² Between $COSTS$, LR , and $LRSD$, correlations approach 0.85 in a few cases.

Among the independent variables, $COSTS$ has the greatest impact. The coefficients are significantly different from 0 at the 0.1 percent level in all cases and only statistically significantly different from 1 at the 5 percent level in some of the 1889 and 1894 regressions. LR has the correct sign in all except the unweighted 1902 estimations but is not statistically

³²If losses had a seasonal component, it would appear that $LRSD$ would create multicollinearity. Repeating the analysis using the standard deviation of the annual loss rate did not materially alter the results or the degree of multicollinearity.

significantly different from 0. The variable is statistically different from 1 in all except the 1889 regressions. *LRS*D also has the correct sign in all but one case, but it is statistically significant only in the weighted 1894 regressions.

CV appears to perform reasonably well as an explanatory factor. It is uniformly statistically significant in the 1899 and 1902 regressions, though results for other years are mixed. It is somewhat surprising that seasonality was not of greater importance (and statistical significance) in the earlier years given the discussion in Section II and the decline in observed seasonality over time. On the other hand, the data for 1889 suffer most heavily from the problems mentioned above. Relatively few banks in high-rate states answered the payments survey questions for that year, and there were relatively few banks in those areas relative to the later years. The period covered by the 1894 data marks the beginning of the 1890s depression.

Ignoring the interpretive problems created by multicollinearity, we can estimate the impact of *CV* on *R* using the partial regression coefficients. Analysis is restricted to the Cotton South. For 1899 and 1902, across the four specifications, seasonality explains an average 31 percent (1.12 percent) and 21 percent (0.71 percent), respectively, of the rate differentials between the Cotton South and the Middle Atlantic regions. While by no means sufficient to fully explain the rate differentials, the estimated impact of seasonality is sufficient to explain the anomalously large rate differentials between the Cotton South and other agricultural regions that have received so much attention in the literature. These estimates understate the impact of seasonality since some portion of explicit costs was also the result of seasonality.

V. THE FEDERAL RESERVE SYSTEM.

As momentum was building for monetary and banking reform, the issue of agricultural production credit took on increased importance. The Populists had shown the issue had political traction. Bank credit was also displacing store credit in the late postbellum period. Though there is no direct evidence on the extent of agricultural lending during the period, many banks opened in small towns that had not previously supported banks. To survive in this environment, banks almost certainly had to expand into agricultural lending. Evidence from the interwar period suggests banks in such towns did a substantial farm business. Although the literature has emphasized sharecroppers' dependence on store credit, this trend was also evident in the Cotton South.

Though the organizational elements and functions of the Federal Reserve System was designed to address the demands of many constituencies, in this section, we discuss the Federal Reserve System from the perspective of its ability to contribute to meeting demand for agricultural production credit. The discount rate, rather than open market operations, was to be the main tool of Fed policy. Discounting of agricultural and other paper were to eliminate interest rate seasonality by allowing seasonal expansion of the monetary base. The discount window also provided Southern member banks access to an alternative, lower-cost source of credit. Though regional banks were allowed to set their own discount rates, it was believed that the Fed would typically offer a uniform discount rate throughout the country. Federal Reserve Banks and their branches were to be located conveniently in regional banking centers and thereby reduce reserve-management costs and eliminate transactions costs incurred in rediscounting with New York banks. The Federal Reserve Act also contained provisions designed to address the problem of insufficient investment opportunities during the off season. The creation of a more active market for acceptances and other open market instruments would allow Southern banks to

earn higher rates of return during non-peak periods. In Laughlin's view this would also encourage Southern financial development and allow Southern banks to finance the crop cycle rather than relying on New York.

The reformers were also self-conscious actors in the political process. They were interested in finding a politically feasible resolution to postbellum monetary problems. From the outset, they viewed agricultural credit as an issue with which to attract support in those areas that had supported Populist candidates in the 1890s. Prominent reformers advised influential Democratic and Republican lawmakers. When debate began on what would become the Federal Reserve Act, representatives of the National Citizens' League for the Promotion of a Sound Banking System made tours of the South to drum up political support for reform. However, the reformers appear to have tried to keep the issue of monetary and banking reform separate from the growing pressure for more direct government intervention in agricultural credit markets, which many disapproved of. Their focus on the impact Fed operations would have on production credit costs in high-rate regions was one means to this end.

Taken at face value, Laughlin believed that, by addressing the issue of seasonality, bank loan rates throughout the United States could be equalized:

As we have seen, the local institution has to charge an exceptionally high rate because of the irregularity of business, which is abundant at some times and deficient at others. If it could be relieved of this irregularity, and enabled to employ its funds at about the same rate, and on about the same terms, throughout the year, it would be able to supply accommodation at a charge that was practically uniform throughout the year and that varied only as the general supply

of, and demand for, loans varied throughout the country.³³

As it turned out, the operations of the Federal Reserve System did not eliminate the rate differentials. In the early years of its operations, concern over this issue is evident in Fed data collection efforts and discussions in Fed publications. However, in the 1920s, the Fed appears to have concluded that the goal itself was unrealistic, and it ceased to attract attention. While the Fed's operations did not eliminate the rate differences between the South and the Northeast, the rate differentials declined substantially between 1914 and 1921.³⁴ This is consistent with Laughlin's explanation of the rate differentials and our econometric results.

There are a number of factors behind the failure of the Fed to further reduce the rate differentials. As Laughlin anticipated, the discount operations of the Federal Reserve Banks in the Southern districts exhibited significant seasonal variation. This was supplemented by open market operations and seasonal production credit extended by the federal farm credit system.³⁵ Miron found that the Fed was successful in eliminating interest rate seasonality in the New York call market. Examination of the interest rates for Federal Reserve Bank and branch cities published in the *Federal Reserve Bulletin* indicates that this was also the case in other money centers, including those of the Cotton South. While the Fed could eliminate the problems associated with seasonality described in Section III, it could not eliminate the structural problems

³³*Banking Reform*, p. 321. See also Burgess, *The Reserve Banks and the Money Market*, pp. 292-93.

³⁴Redenius, "New National Bank Loan Rate Estimates, 1887-1975." The decline was concentrated in the western part of the Cotton South.

³⁵Norman J. Wall, "Demand Deposits of Country Banks," U.S. Department of Agriculture, *Technical Bulletin 575* (August 1937), pp. 21-23.

described in Section II. In addition, the analysis conducted above suggests that factors the reformers did not consider, especially other sources of bank costs, played a major role the variation in regional loan rates.

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TABLE 1

REGIONAL FINANCIAL DEVELOPMENT

Region	Population per bank				Assets per capita (\$)	
	1880	1890	1900	1909	1900	1909
New England	6,059	7,177	8,507	9,812	342	418
Middle Atlantic	6,637	11,174	10,752	8,356	300	443
Cotton South	26,082	21,629	16,727	5,109	24	67
Border South	19,805	15,141	11,454	5,159	37	79
Old Northwest	7,315	9,613	8,057	4,305	99	189
Eastern Plains	6,353	5,399	4,755	2,623	92	210
Western Plains	5,715	2,235	2,398	1,348	68	161
Mountain	5,678	7,017	6,754	3,019	109	171
Pacific	8,920	5,845	6,945	4,029	186	291
United States	8,541	8,646	8,100	4,336	142	233

Notes:

The 1909 population figures were computed via geometric interpolation from the 1900 and 1910 figures reported in the source. Oklahoma is included in the U.S. totals but no in any of the regions.

The regions are defined below. For the criterion for determining which states are included in the Cotton South, see Table 3.

Region	States
East	
New England	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut
Middle Atlantic	New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia
South	
Cotton South	South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, and Arkansas
Border South	Virginia, West Virginia, North Carolina, Kentucky, and Tennessee, and Florida
Midwest	
Old Northwest	Ohio, Indiana, Illinois, Michigan, and Wisconsin
Eastern Plains	Minnesota, Iowa, and Missouri
Western Plains	Dakota Territory, North and South Dakota, Nebraska, and Kansas
West	
Mountain	Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Arizona, and Nevada
Pacific	Washington, Oregon, and California

Sources:

A. Piatt Andrew, *Statistics for the United States, 1867-1909* (Washington, D.C.: GPO, 1910), Part II, Table 6; and U.S. Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970*, Bicentennial Edition, Part I (Washington, D.C.: GPO, 1975), series A195.

TABLE 2

DEPOSITS RECEIVED AND CHECKS PAID
NATIONAL BANKS, COEFFICIENT OF VARIATION

Year Ending June 30	Deposits Received		Checks Paid	
	Cotton South	Non-South Regions	Cotton South	Non-South Regions
1889	24.3	7.3	24.0	7.2
1894	32.1	6.8	31.0	7.8
1899	27.0	10.4	26.1	14.7
1903	16.1	6.0	16.8	7.1

Notes: Coefficients of variation are expressed as percentages. Figures reported in the source are daily averages by month.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1903), Table 76.

TABLE 3

THE ECONOMIES OF COTTON-GROWING STATES, 1900

State	Cotton as a % of the value of agricultural output	Agriculture as a % of the value of output	Cotton as a % of the value of output
South Carolina	50.6	53.7	27.2
Georgia	47.0	49.4	23.2
Alabama	46.0	53.1	24.4
Mississippi	52.7	71.7	37.8
Louisiana	37.2	37.5	13.9
Texas	40.3	66.8	26.9
Arkansas	35.2	63.8	22.5
Cotton South	43.7	57.0	24.9

Notes: Included in the Table are those states for which at least 30 percent of value of agricultural output was from cotton. The value of output is the sum of the values of agricultural and manufacturing output.

Source: Michael R. Haines and the Inter-university Consortium for Political and Social Research, Historical, Demographic, Economic, and Social Data: The United States, 1790-2000 (computer file); and U.S. Bureau of the Census, *Twelfth Decennial Census of the United States*, Volume V: *Agriculture* (Washington, D.C., GPO, 1902).

TABLE 4.1
SUMMARY STATISTICS, 1889

Variable	Unweighted		Weighted	
	Mean	Std. Dev.	Mean	Std. Dev.
<i>R</i>	8.56	2.42	7.21	1.77
<i>CV</i> , deposits received	15.26	10.59	10.19	6.84
<i>CV</i> , checks paid	14.57	10.20	9.73	6.76
<i>COSTS</i>	3.92	1.47	3.26	1.06
<i>LR</i>	0.87	0.38	0.98	0.33
<i>LRSD</i>	0.68	0.41	0.53	0.28

REGRESSION RESULTS

Independent Variables	Dependent Variable: Country national bank loan rate by state			
	Unweighted		Weighted	
	Deposits	Checks	Deposits	Checks
Intercept	2.462*	2.529**	1.719**	1.789**
<i>CV</i>	0.014	0.004	0.044*	0.039
<i>COSTS</i>	1.291***	1.315***	1.315***	1.323***
<i>LR</i>	0.902	0.849	0.583	0.550
<i>LRSD</i>	0.059	0.112	0.340	0.352
R^2	0.652	0.649	0.730	0.724
Adjusted R^2	0.616	0.613	0.702	0.695
<i>F</i> -statistic	18.259***	18.047***	26.352***	25.540***
<i>N</i>	44	44	44	44

* 5 percent significance.

** 1 percent significance.

*** 0.1 percent significance.

Notes: Except for the intercept, *t*-tests are for the one-tailed hypotheses: $H_0: \beta_i = 0$ vs. $H_A: \beta_i > 0$.

TABLE 4.2
SUMMARY STATISTICS, 1894

Variable	Unweighted		Weighted	
	Mean	Std. Dev.	Mean	Std. Dev.
<i>R</i>	8.35	2.24	6.99	1.72
<i>CV</i> , deposits received	16.88	12.79	10.95	7.76
<i>CV</i> , checks paid	16.18	12.33	10.70	7.70
<i>COSTS</i>	3.93	1.94	3.01	0.83
<i>LR</i>	1.39	0.82	1.33	0.71
<i>LRS</i>	0.45	0.34	0.30	0.21

REGRESSION RESULTS

Independent Variables	Dependent Variable: Country national bank loan rate by state			
	Unweighted		Weighted	
	Deposits	Checks	Deposits	Checks
Intercept	4.760***	4.775***	1.351**	1.376**
<i>CV</i>	0.023	0.021	-0.023	-0.017
<i>COSTS</i>	0.582***	0.590***	1.599***	1.582***
<i>LR</i>	0.196	0.204	0.319	0.310
<i>LRS</i>	1.426	1.398	2.204**	2.102**
R^2	0.549	0.546	0.769	0.766
Adjusted R^2	0.506	0.502	0.747	0.744
<i>F</i> -statistic	12.768***	12.612***	34.867***	34.343***
<i>N</i>	47	47	47	47

* 5 percent significance.

** 1 percent significance.

*** 0.1 percent significance.

Notes: Except for the intercept, *t*-tests are for the one-tailed hypotheses: $H_0: \beta_i = 0$ vs. $H_A: \beta_i > 0$.

TABLE 4.3
SUMMARY STATISTICS, 1899

Variable	Unweighted		Weighted	
	Mean	Std. Dev.	Mean	Std. Dev.
<i>R</i>	7.65	2.07	6.35	1.44
<i>CV</i> , deposits received	15.87	10.01	11.18	6.75
<i>CV</i> , checks paid	15.66	10.48	11.10	6.83
<i>COSTS</i>	4.56	1.54	3.61	0.99
<i>LR</i>	2.04	1.66	1.62	1.10
<i>LRS</i>	1.06	1.01	0.59	0.64

REGRESSION RESULTS

Independent Variables	Dependent Variable: Country national bank loan rate by state			
	Unweighted		Weighted	
	Deposits	Checks	Deposits	Checks
Intercept	2.279***	2.266***	1.738***	1.749***
<i>CV</i>	0.055***	0.061***	0.057***	0.054***
<i>COSTS</i>	0.900***	0.883***	0.997***	1.014***
<i>LR</i>	0.066	0.064	0.228	0.195
<i>LRS</i>	0.247	0.253	0.016	0.050
R^2	0.786	0.809	0.839	0.835
Adjusted R^2	0.766	0.791	0.824	0.819
<i>F</i> -statistic	39.393***	45.489***	56.056***	54.298***
<i>N</i>	48	48	48	48

* 5 percent significance.
 ** 1 percent significance.
 *** 0.1 percent significance.

Notes: Except for the intercept, *t*-tests are for the one-tailed hypotheses: $H_0: \beta_i = 0$ vs. $H_A: \beta_i > 0$.

TABLE 4.4
SUMMARY STATISTICS, 1902

Variable	Unweighted		Weighted	
	Mean	Std. Dev.	Mean	Std. Dev.
<i>R</i>	7.22	1.74	6.31	1.29
<i>CV</i> , deposits received	12.67	7.14	9.31	4.61
<i>CV</i> , checks paid	12.53	6.64	9.71	5.07
<i>COSTS</i>	3.94	1.15	3.39	0.73
<i>LR</i>	1.12	0.62	1.04	0.44
<i>LRS</i>	0.98	1.01	0.61	0.67

REGRESSION RESULTS

Independent variables	Dependent Variable: Country national bank loan rate by state			
	Unweighted		Weighted	
	Deposits	Checks	Deposits	Checks
Intercept	2.580***	2.655***	1.778**	1.728**
<i>CV</i>	0.064**	0.065*	0.082**	0.076***
<i>COSTS</i>	0.986***	0.956***	1.106***	1.116***
<i>LR</i>	-0.149	-0.163	-0.099	-0.070
<i>LRS</i>	0.106	0.164	0.209	0.222
R^2	0.682	0.672	0.737	0.744
Adjusted R^2	0.653	0.642	0.713	0.721
<i>F</i> -statistic	23.070***	22.054***	30.192***	31.284***
<i>N</i>	48	48	48	48

* 5 percent significance.

** 1 percent significance.

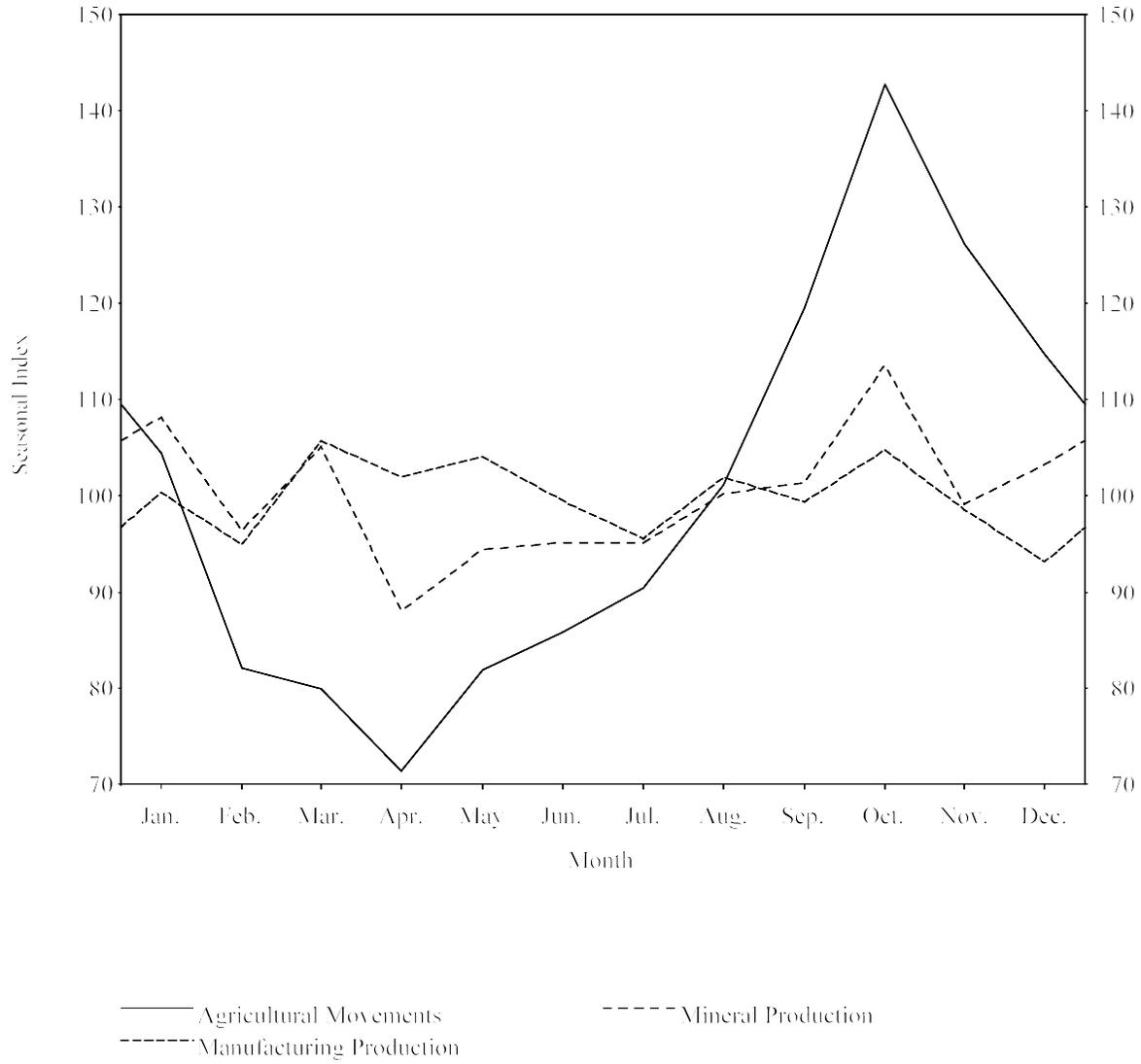
*** 0.1 percent significance.

Notes: Except for the intercept, *t*-tests are for the one-tailed hypotheses: $H_0: \beta_i = 0$ vs. $H_A: \beta_i > 0$.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1884-1903).

FIGURE 1

THE SEASONALITY OF ECONOMIC ACTIVITIES, 1919 - 1924

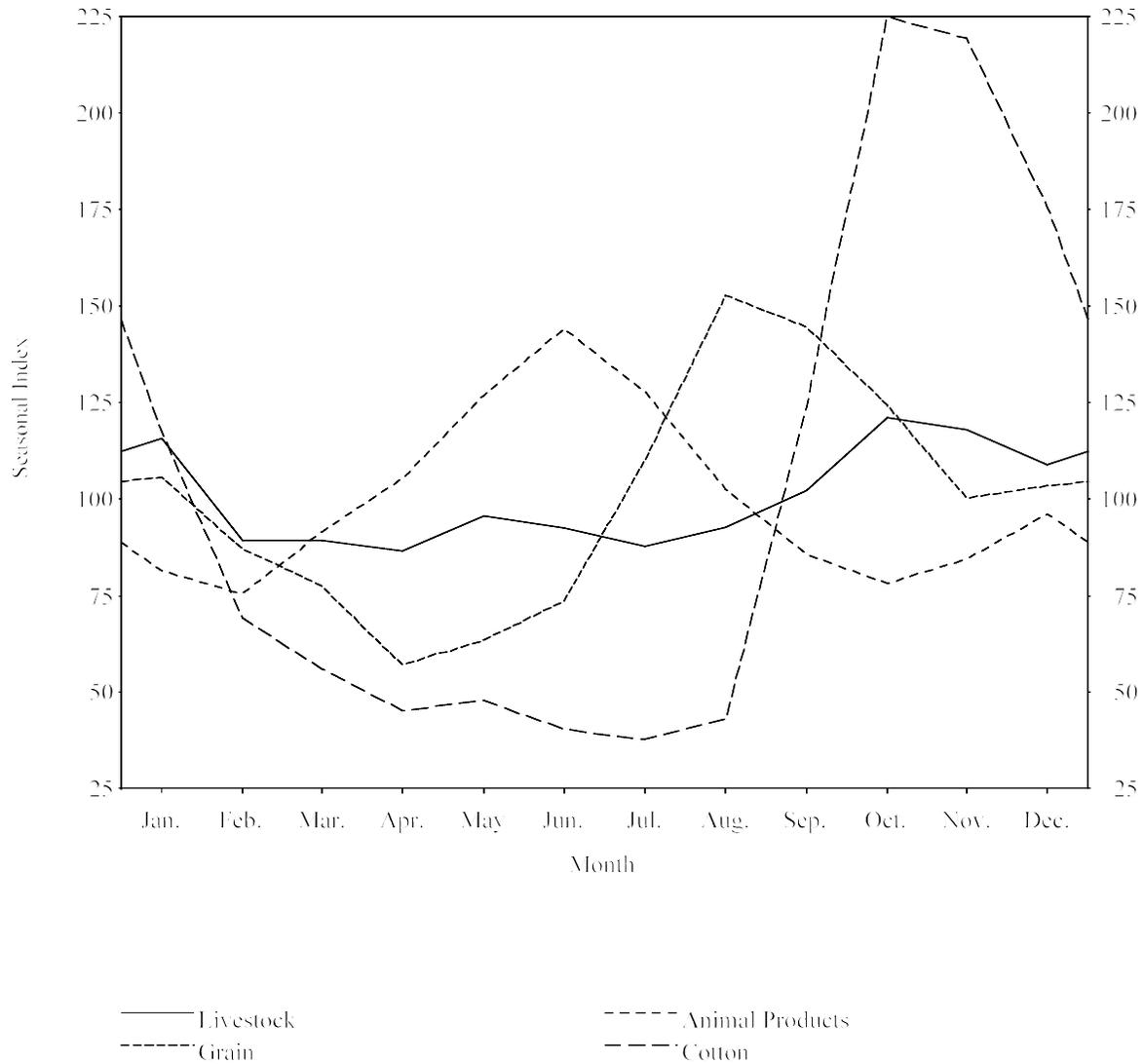


Notes: The seasonal indexes are computed as the percentage of a linear trend from the Fed indexes of economic activity (1919=100).

Source: *Federal Reserve Bulletin* (1924-1925).

FIGURE 2

THE SEASONALITY OF AGRICULTURAL ACTIVITIES, 1919 - 1924

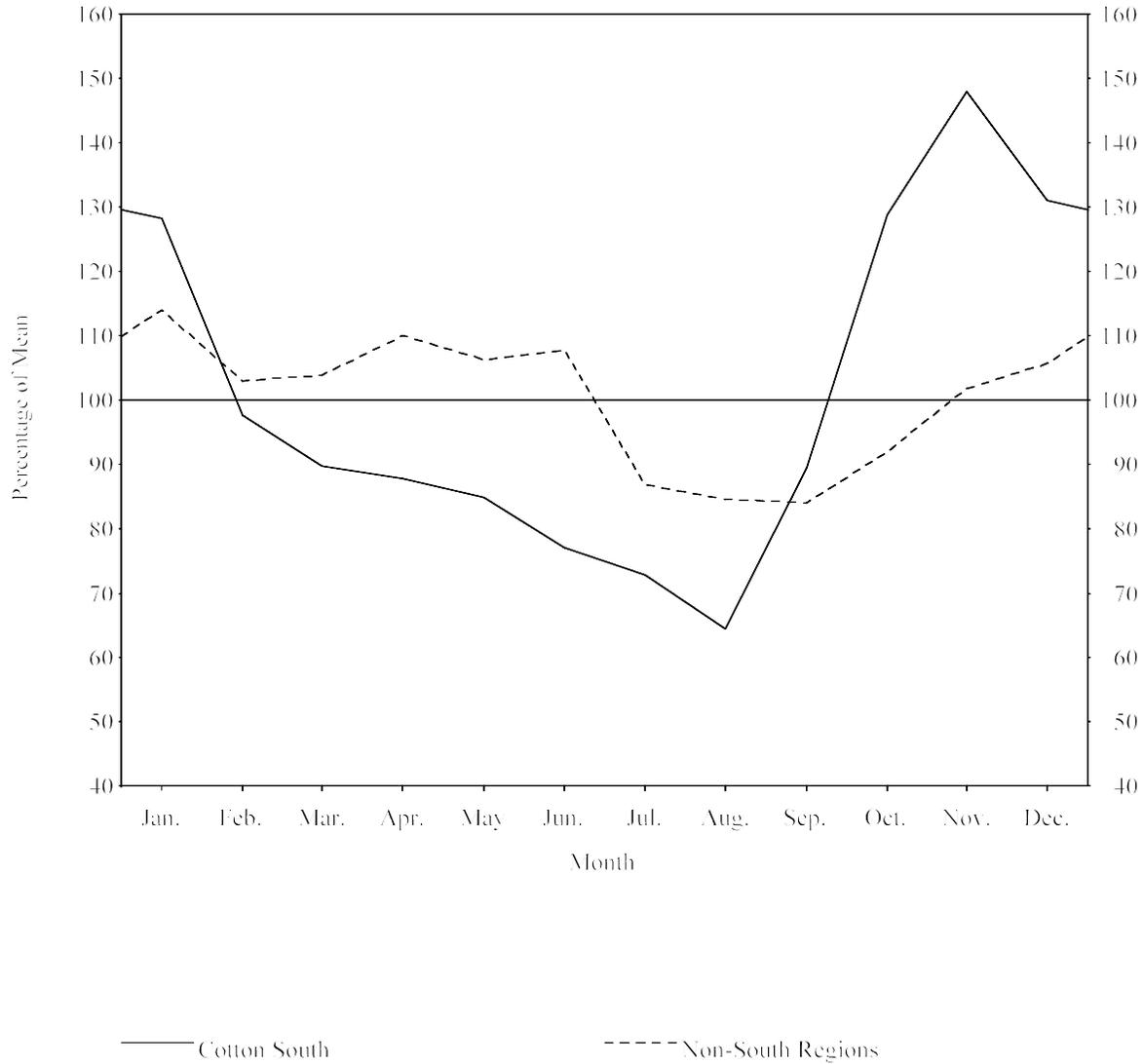


Notes: The seasonal indexes are computed as percentages of a linear trend from the Fed indexes of economic activity (1919=100). The cotton index includes cotton (85 percent) and cotton seed (15 percent).

Source: *Federal Reserve Bulletin* (1924-1925).

FIGURE 3

DEPOSITS RECEIVED
ALL NATIONAL BANKS, YEAR ENDING JUNE 30, 1899

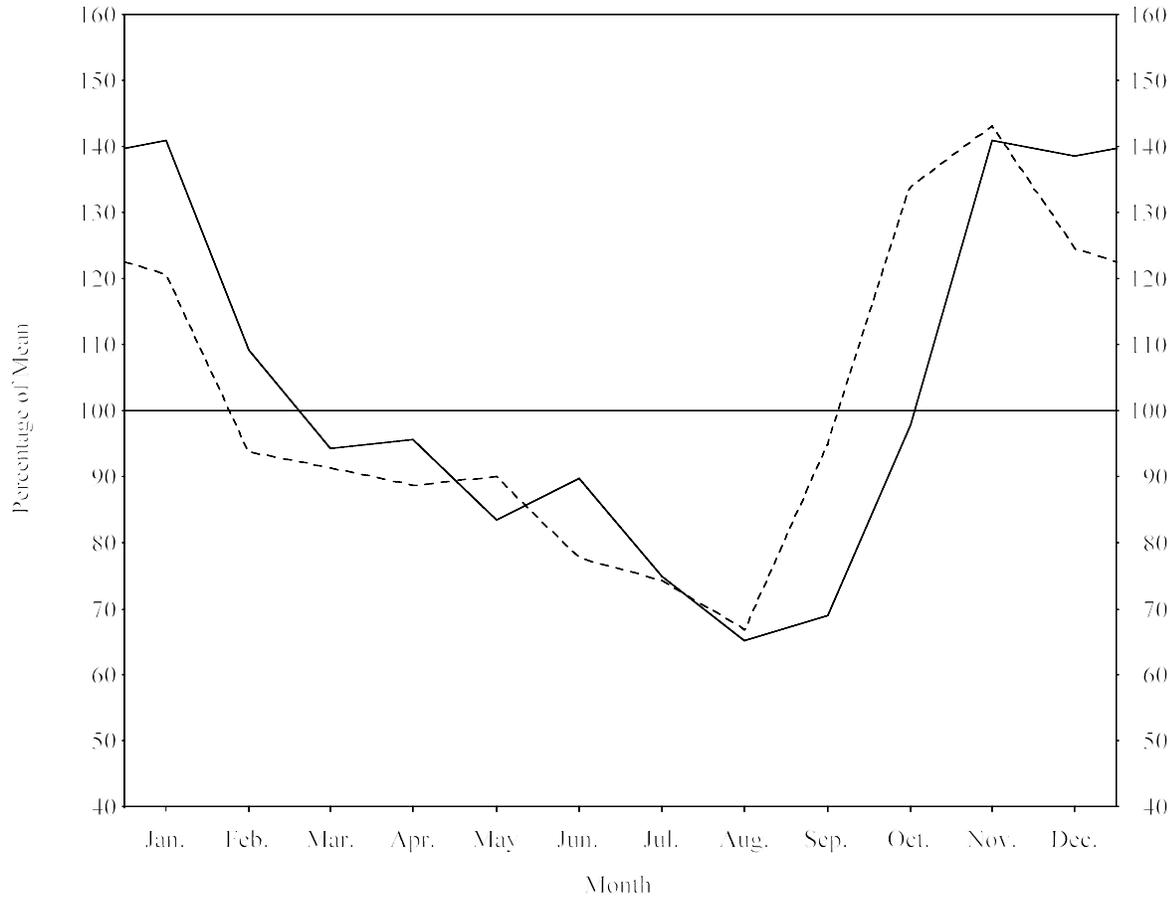


Notes: The seasonal indexes are computed as the percentage of the mean. The data are the average amount of daily deposits of survey respondents.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1903), Table 76.

FIGURE 4

DEPOSITS RECEIVED
NATIONAL BANKS, YEAR ENDING JUNE 30, 1899



— Reserve-City Banks

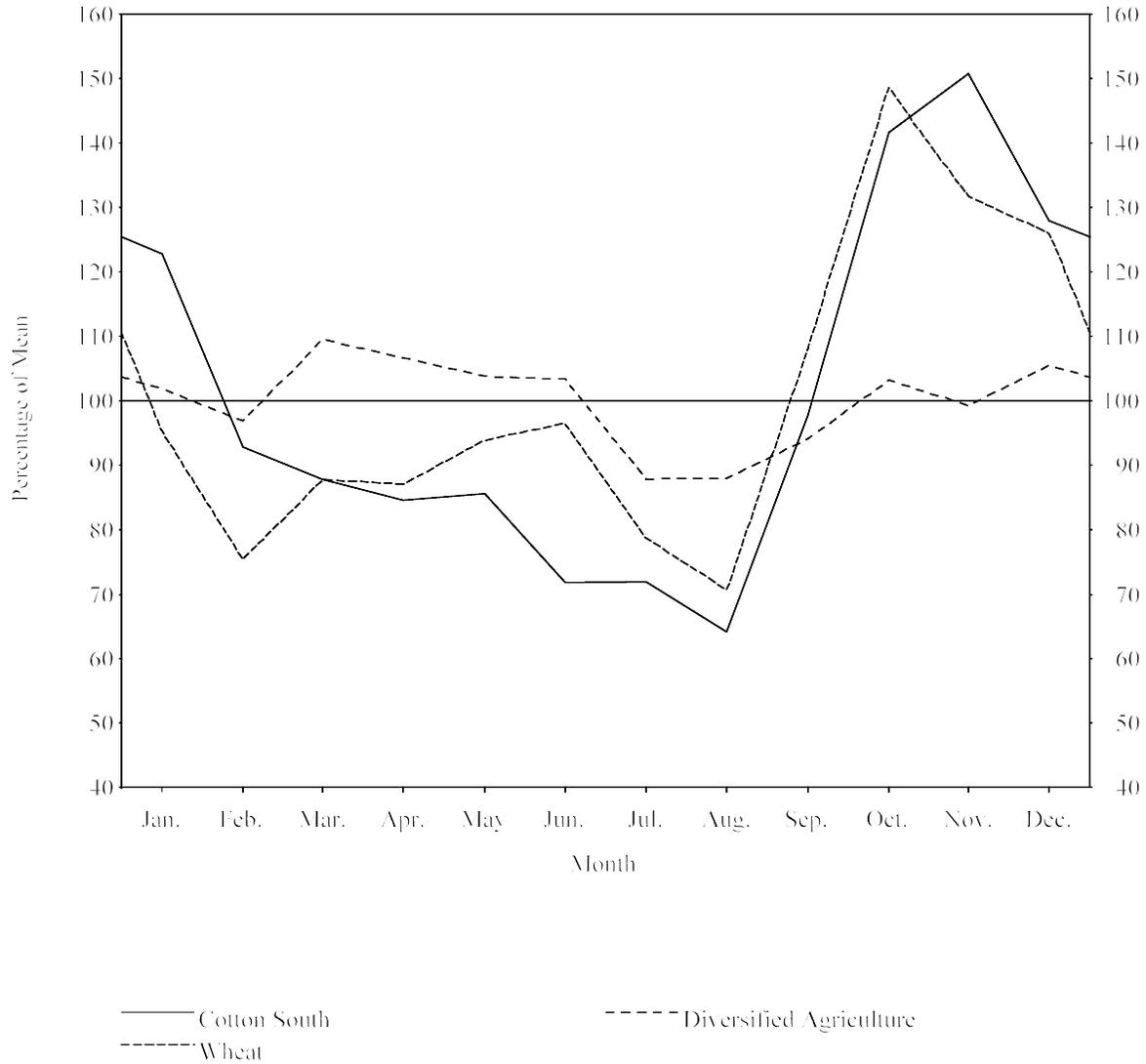
- - - Country Banks

Notes: See Figure 3.

Source: See Figure 3.

FIGURE 5

DEPOSITS RECEIVED
COUNTRY NATIONAL BANKS, YEAR ENDING JUNE 30, 1899

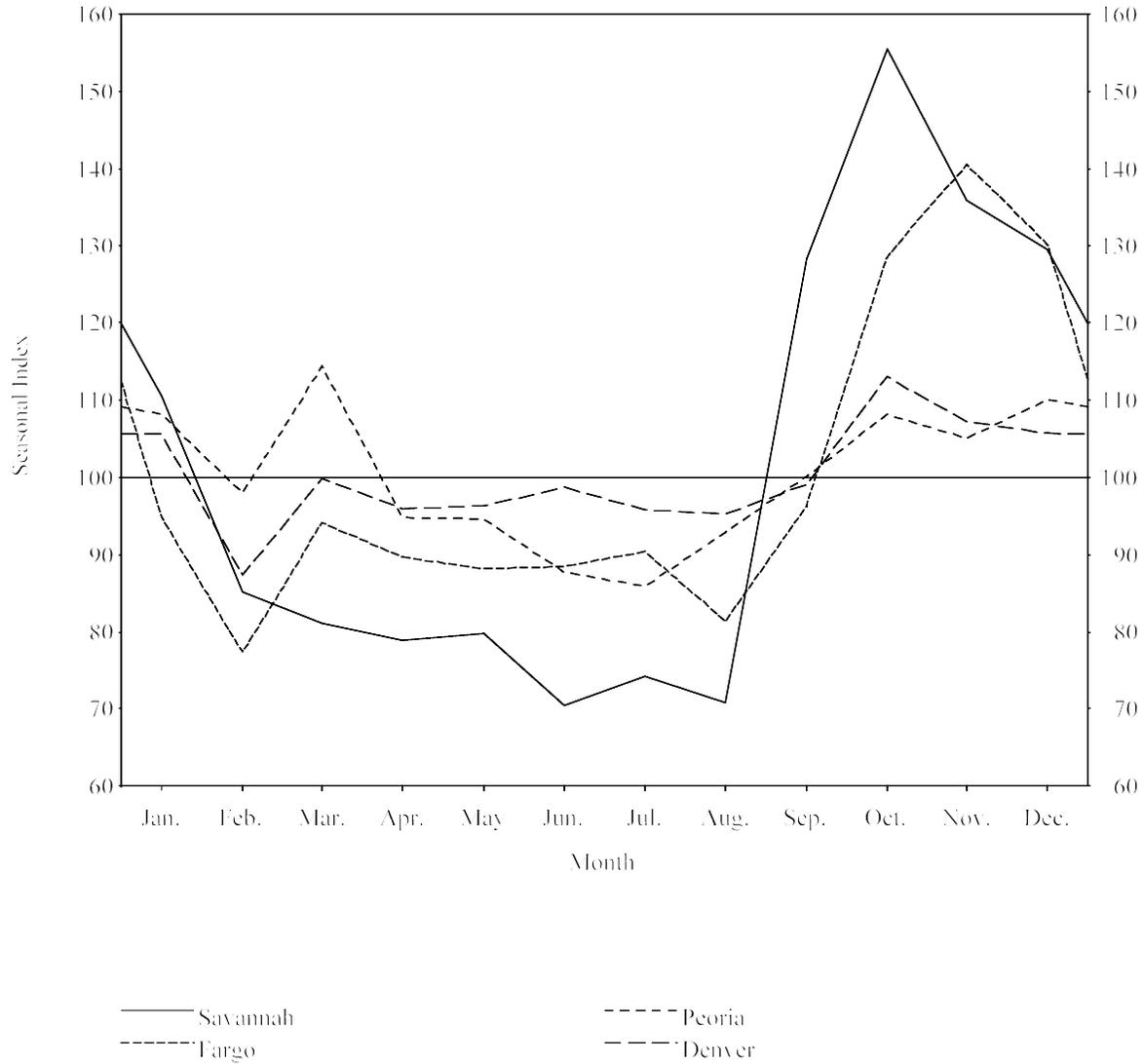


Notes: The diversified agricultural states included are Indiana, Illinois, and Wisconsin. Wheat-growing states are North and South Dakota. Reserve cities are as existed at the time of the survey, 1903.

Source: See Figure 3.

FIGURE 6

CLEARINGS AT REPRESENTATIVE CLEARINGHOUSES, 1900-1914

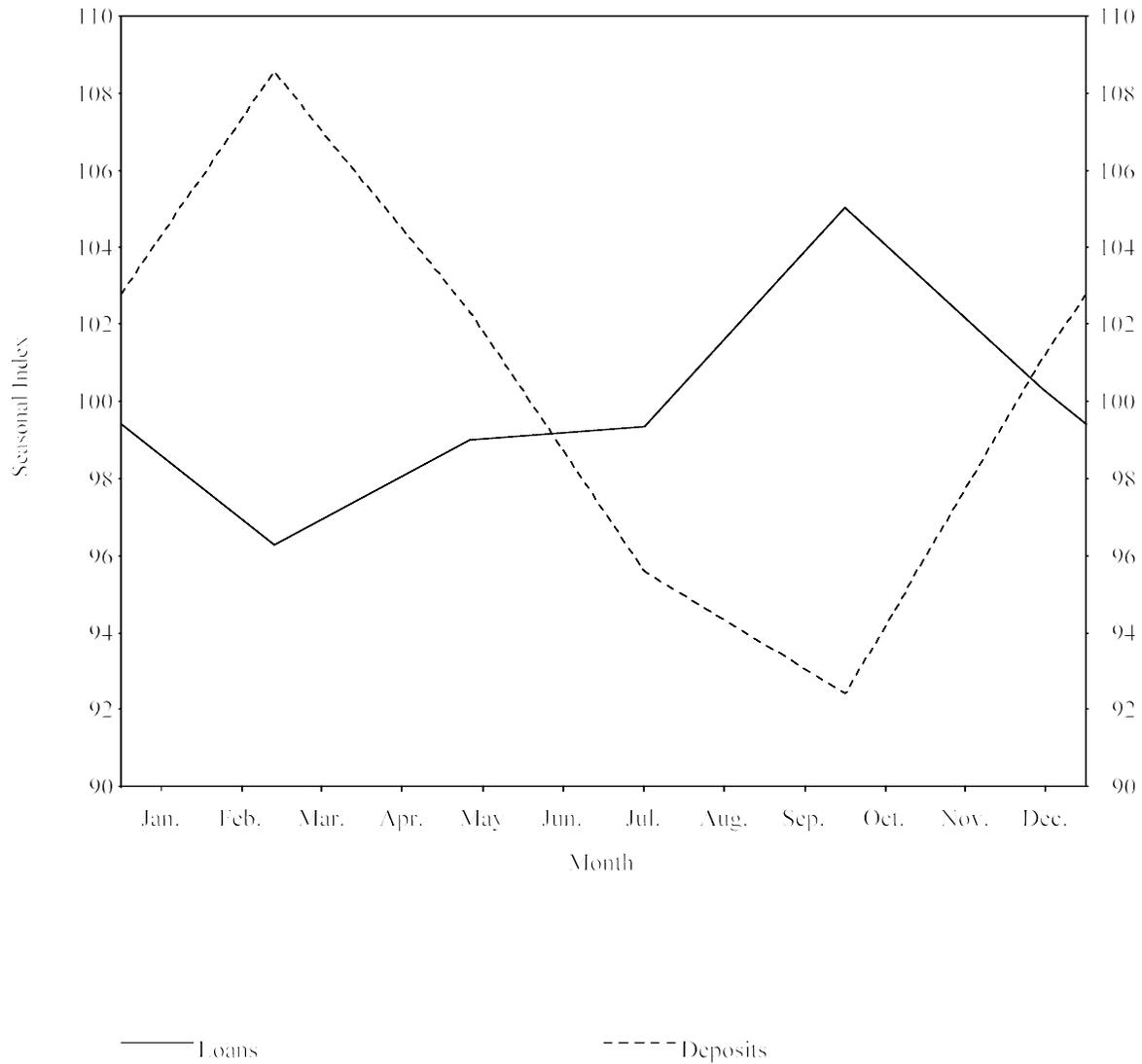


Notes: The seasonal indexes are computed as percentages of a linear trend.

Source: Bradstreet's.

FIGURE 7

LOANS AND DEPOSITS, COTTON SOUTH
ALL NATIONAL BANKS, 1885 - 1892

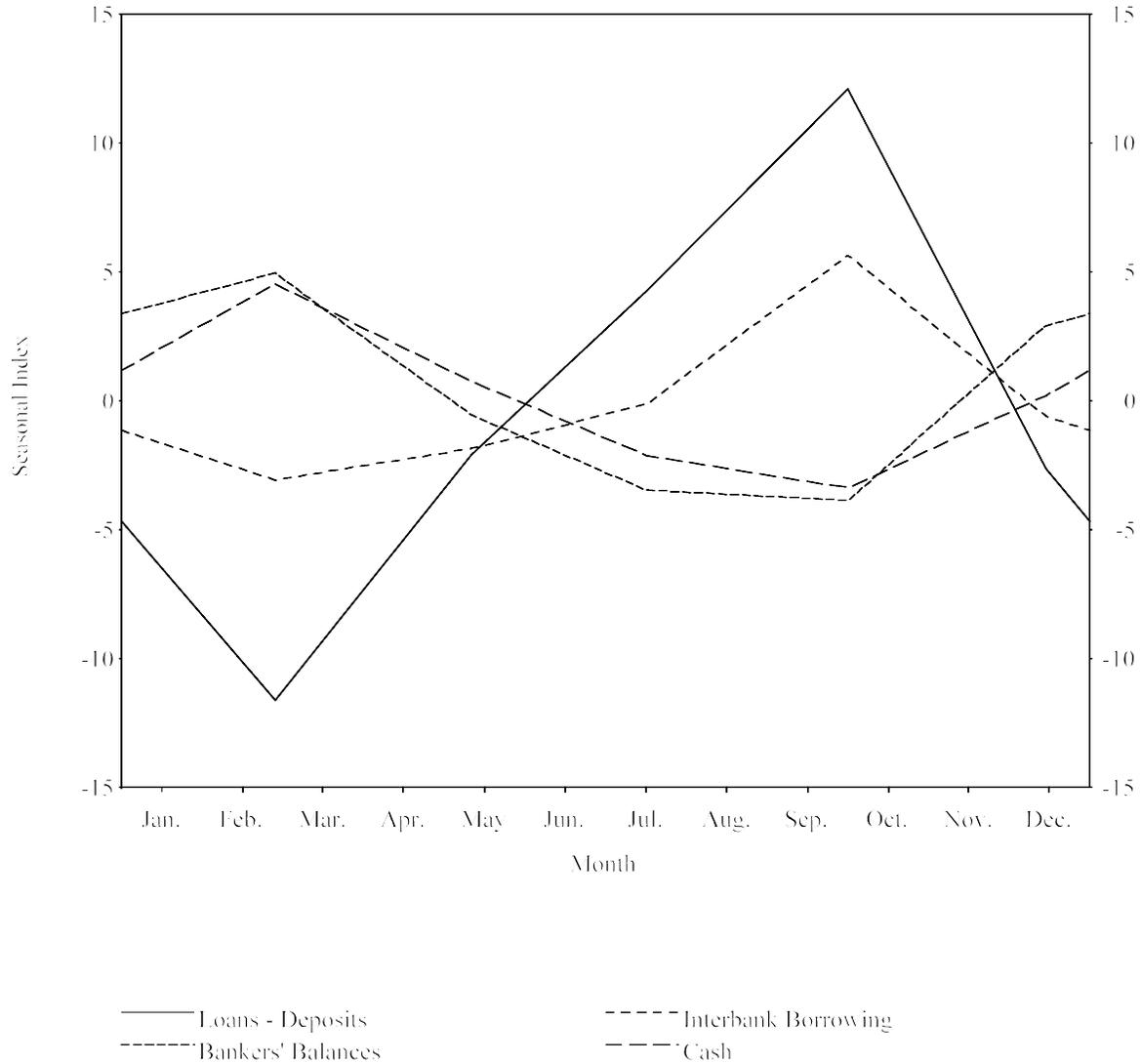


Notes: The seasonal indexes are computed as percentages of a 5-period moving average. Dates used on the x-axis are averages of the call dates.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1885-1893).

FIGURE 8

LOANS - DEPOSITS, INTERBANK BORROWING, BANKERS' BALANCES, AND CASH
ALL NATIONAL BANKS, 1885 - 1892

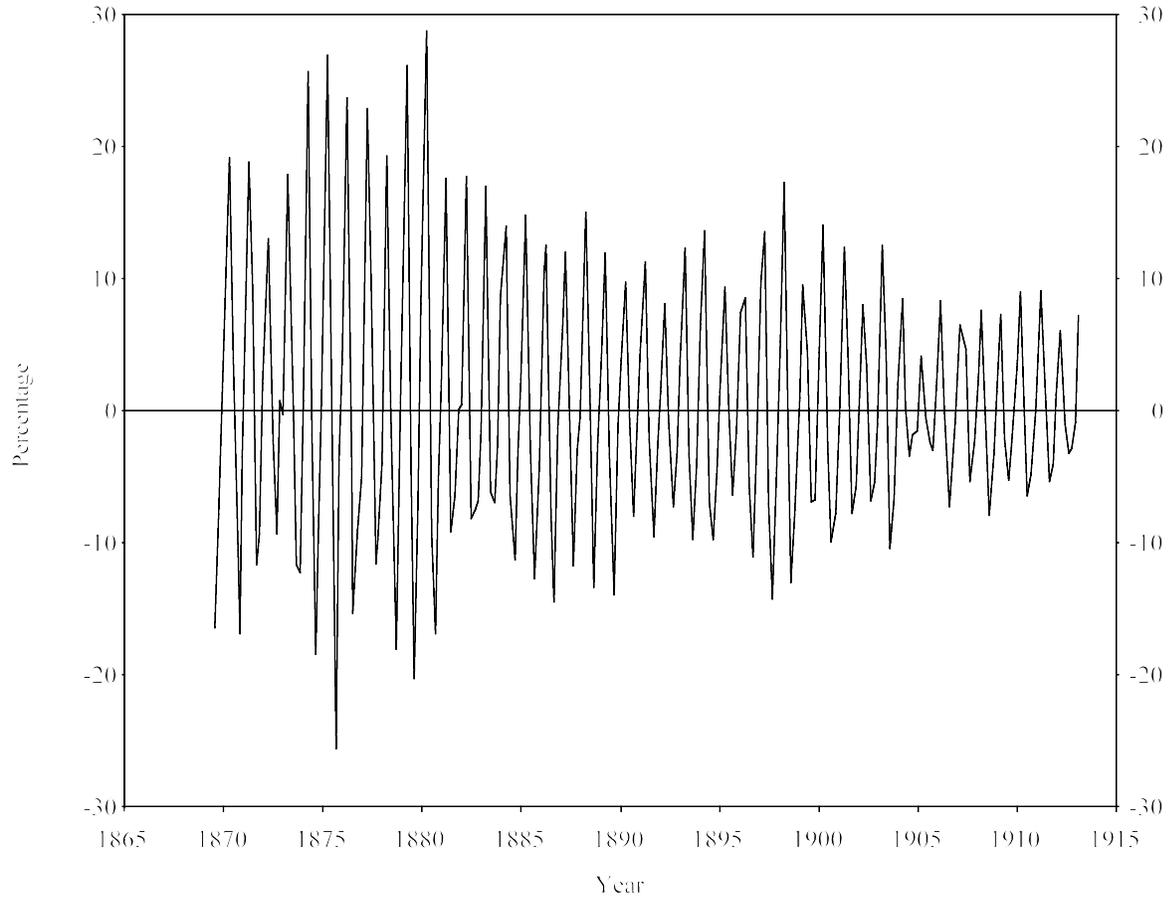


Notes: The seasonal indexes are computed as percentages of a 5-period moving average. To make the indexes comparable, each seasonal index is computed using loans in the denominator. Dates used on the x-axis are averages of the call dates.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1901-1913).

FIGURE 9

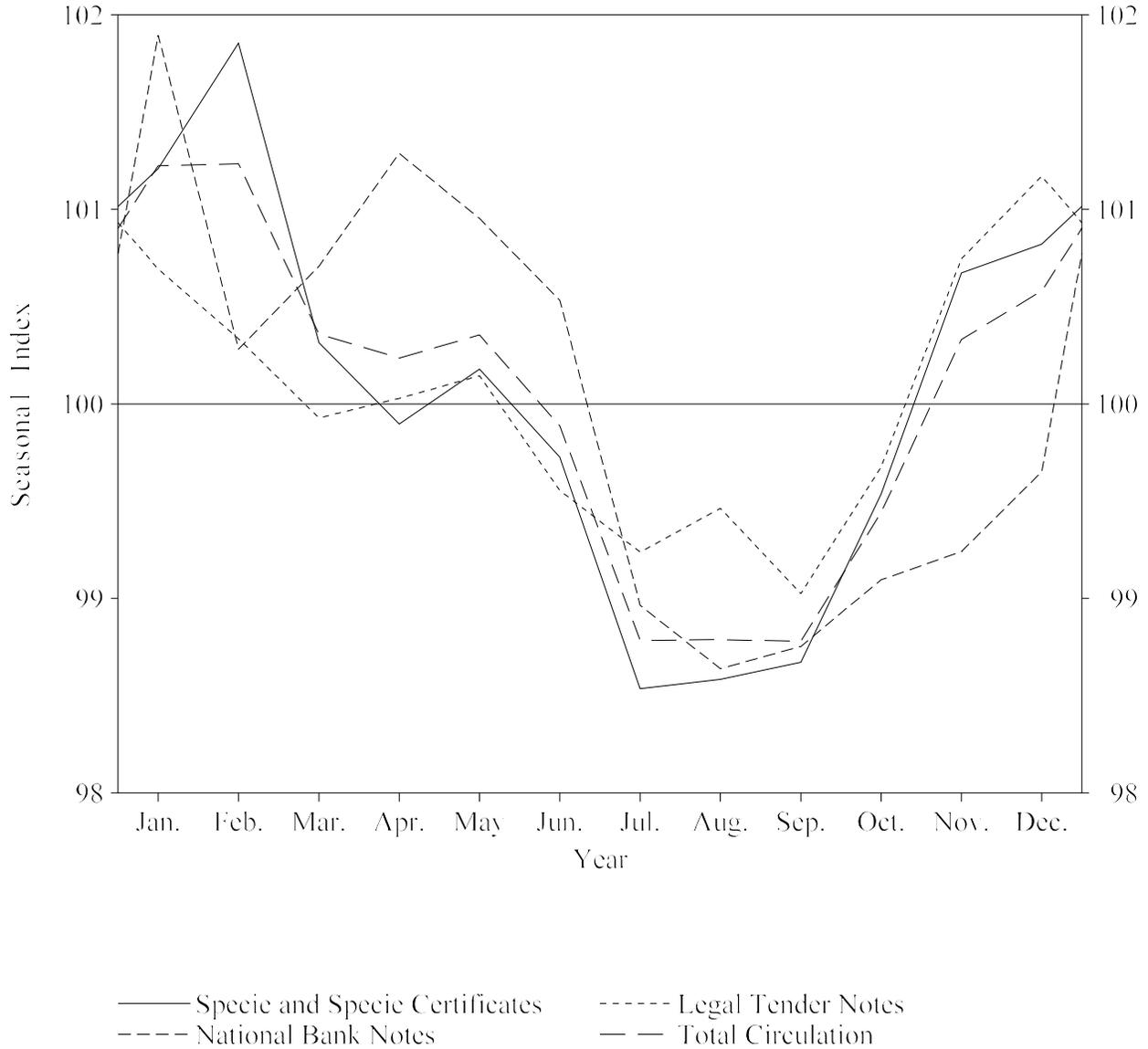
LOANS - DEPOSITS, COTTON SOUTH
ALL NATIONAL BANKS, 1870 - 1913



Notes: The seasonal indexes are computed as percentages of a 5-period moving average. To make the indexes comparable, each seasonal index is computed using loans in the denominator. Dates used on the x-axis are averages of the call dates.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1870-1913).

FIGURE 10
 COMPONENTS OF CIRCULATION
 JANUARY 1880 - JUNE 1910



Notes:

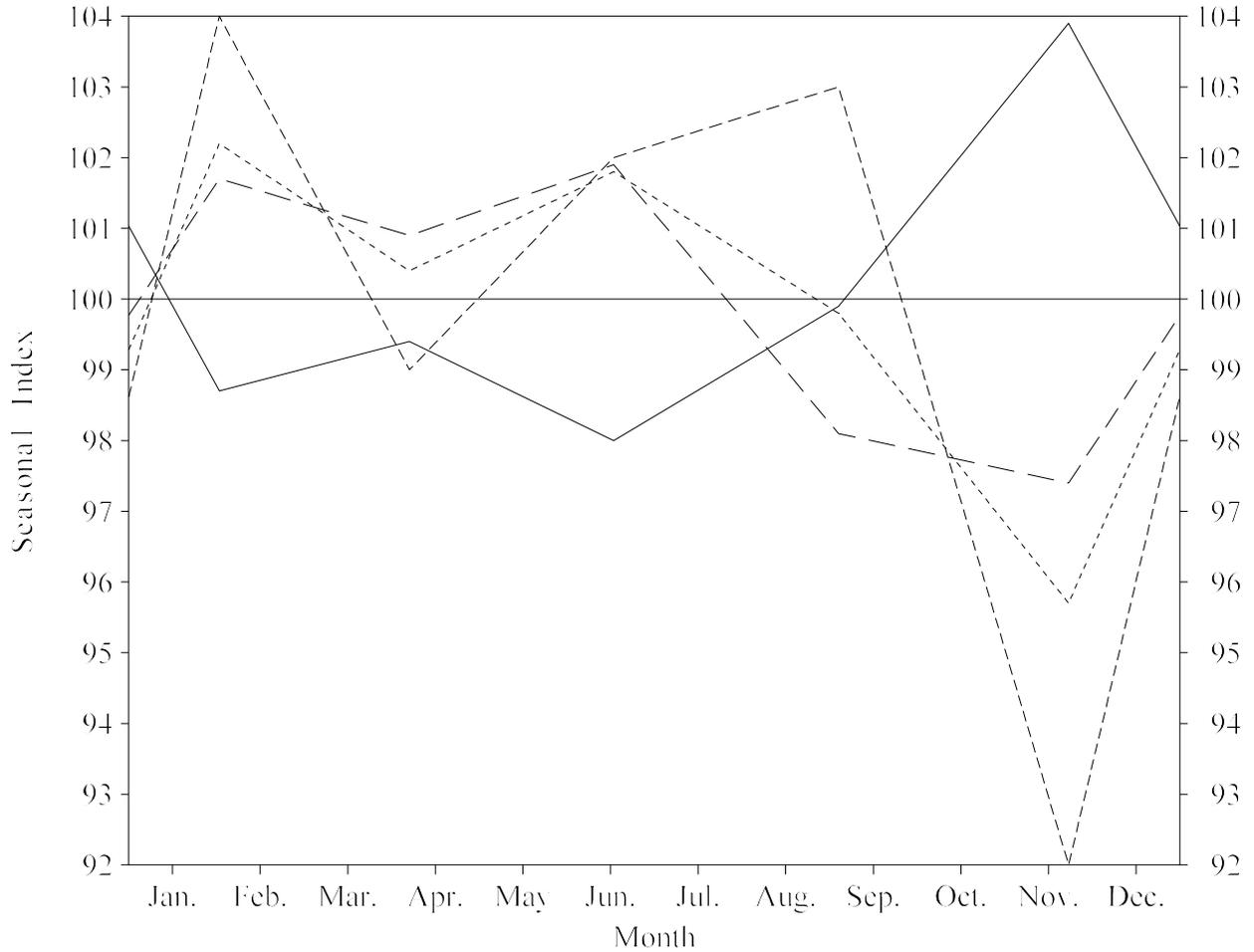
The seasonal indexes are computed as the percentage of a linear trend.
 Specie and specie certificates consist of gold and silver coin, including fractional currency, and gold and silver certificates. Legal tender notes consist of United States notes, Treasury notes, and currency certificates.

Source:

A. Piatt Andrew, *Statistics for the United States, 1867-1909* (Washington, D.C.: GPO, 1910), Part III, Table 5.

FIGURE 11

DISTRIBUTION OF MONEY
1901 - 1913



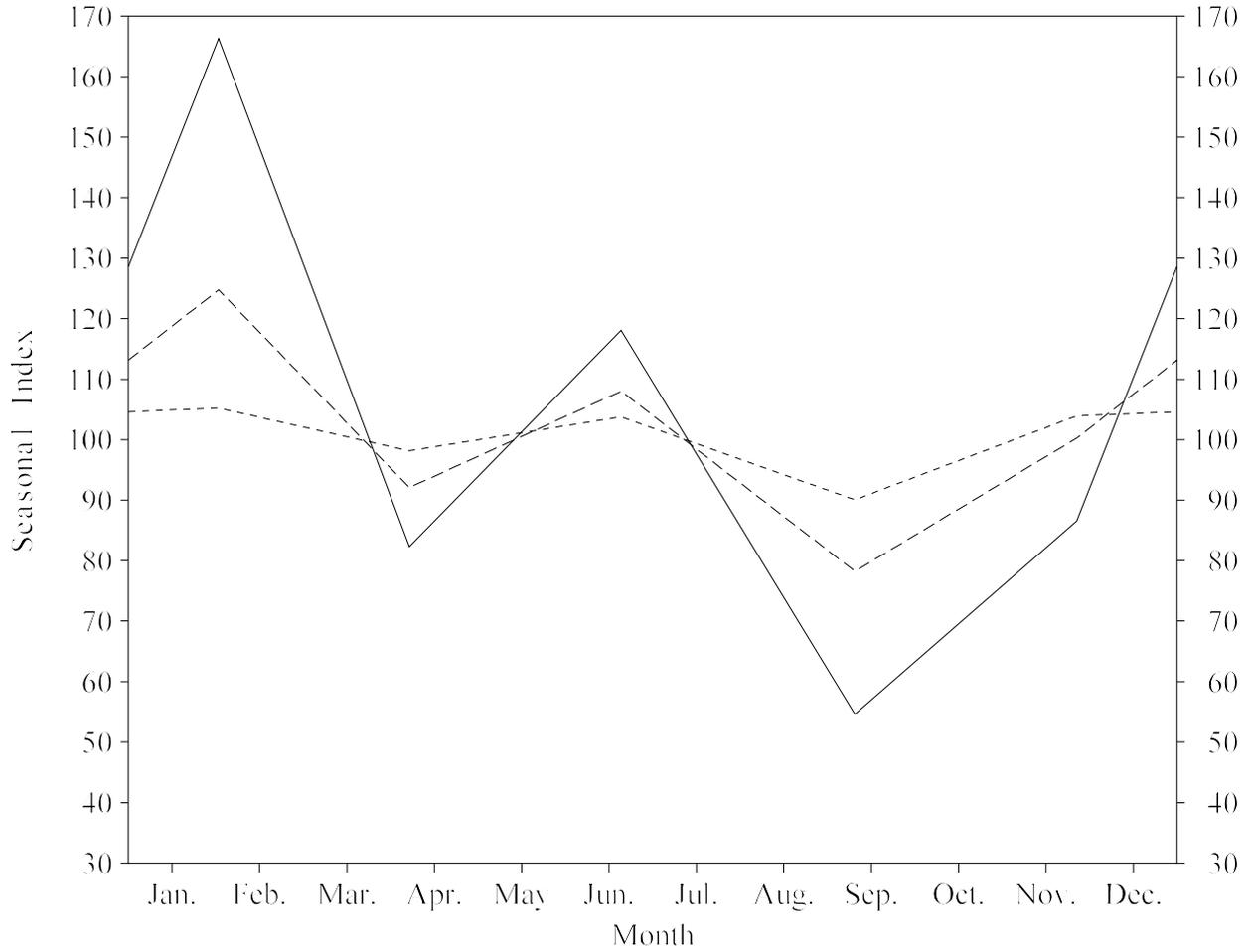
— Circulation Outside Banks - - - - - Money in National Banks
 - . - . - Money in New York City - - - - - Money Outside New York City

Notes: Dates used on the x-axis are averages of the call dates as given in U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1901-13).
 Variable definitions and methods used to compute the seasonal indexes are given in the source.

Source: Allyn A. Young, *An Analysis of Bank Statistics for the United States* (Cambridge: Harvard University Press, 1928), Part II, Tables 1 and 2.

FIGURE 12

NATIONAL BANK EXCESS CASH RESERVES
1901-1905



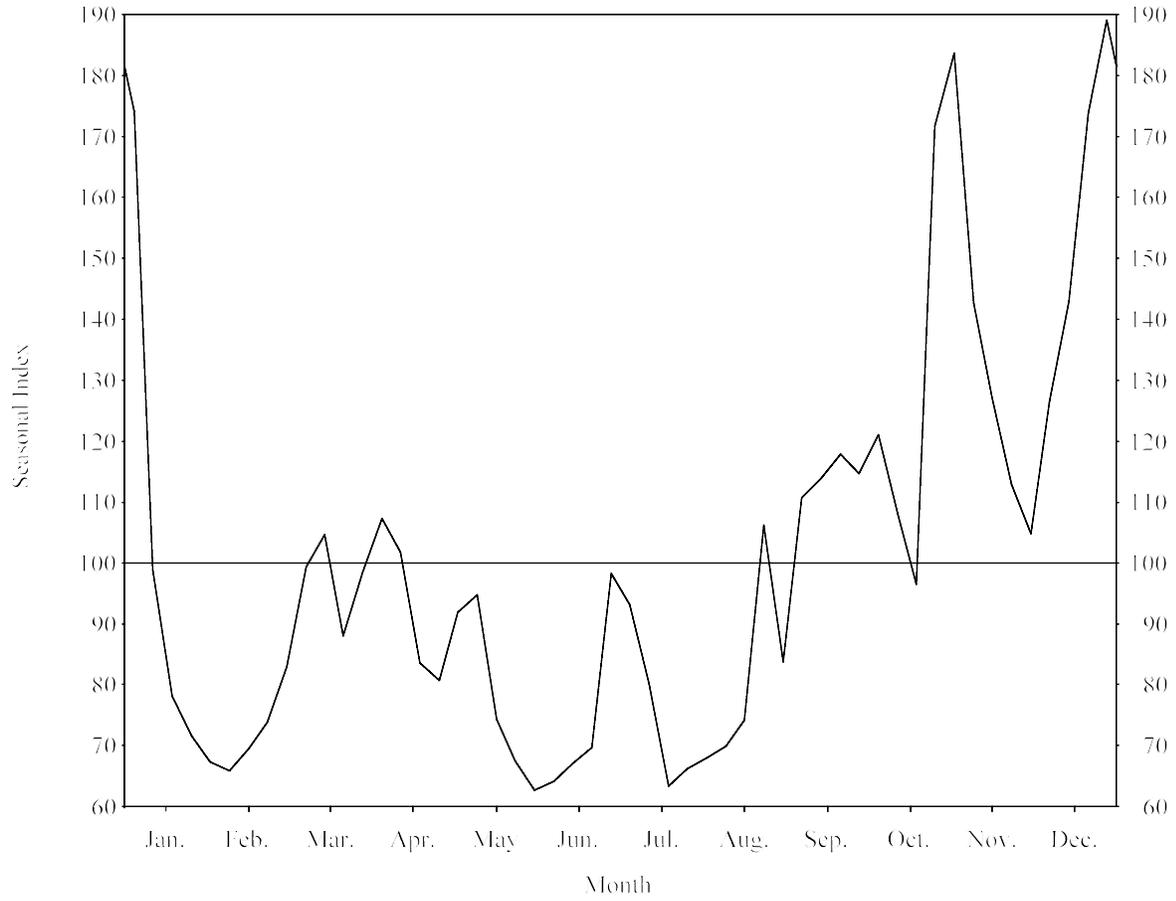
— Reserve-City National Banks ····· Country National Banks
- - - - All National Banks

Notes: The seasonal indexes are computed as the percentage of a linear trend. Dates used on the x-axis are averages of the call dates.

Source: U.S. Comptroller of the Currency, *Annual Report* (Washington, D.C.: GPO, 1901-1905).

FIGURE 13

NEW YORK CITY CALL LOAN RATES
1890 - 1908

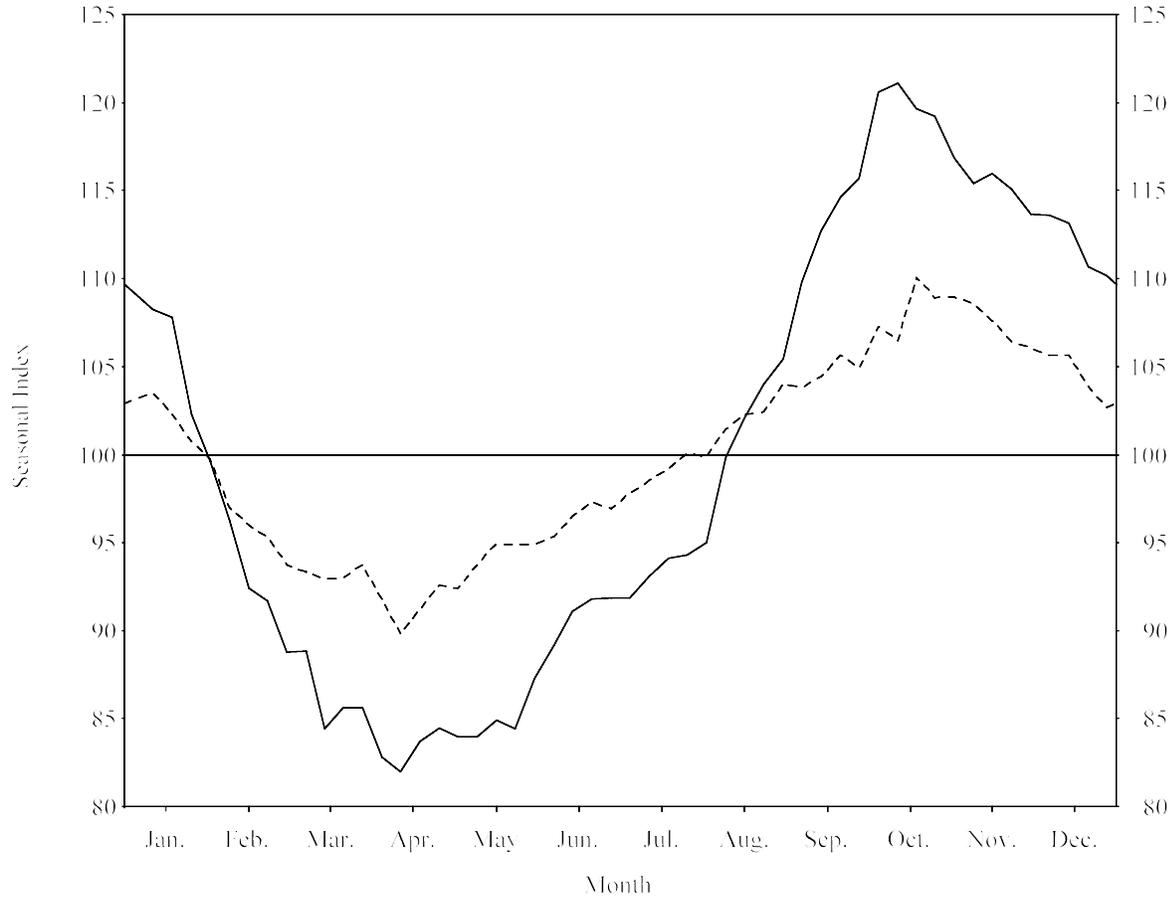


Notes: The seasonal index is computed as the percentage of a linear trend.

Source: Edwin Walter Kemmerer, *Seasonal Variation in the Relative Demand for Money and Capital in the United States: A Statistical Study* (Washington, D.C.: GPO, 1910), Appendix A, Table 1.

FIGURE 14

NEW ORLEANS INTEREST RATES
1887 - 1906



— Call Loan Rate

- - - - Time Loan Rate

Notes: The seasonal indexes are computed percentages of a linear trend.

Source: Bradstreet's.