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Chapter Author: Manuel Gottlieb

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CHAPTER 4

The Behavior of the Real Estate Market in Long Local Cycles

A. INTRODUCTION

The shifts in demand which generate building cycles are by no means confined to new building alone. The preparation of building sites and the development and subdivision of land are necessarily involved.

The demand for building on new sites is rarely isolated from demand for old realty, which is competitive with the new. Ownership of parcels of old realty is continuously changing; in terms of volume and value these transfers will outnumber sales of newly built property. Do improved realty sales as a whole rise or fall with building cycles? Is an increase in demand for new building a spillover from a surging tide of demand for improved realty? Or does the demand for new realty alternate with that for the old and run inversely to it? These questions will concern us in this chapter.

Both new and old realty are subject to common financial constraints. Realty sales are rarely financed solely out of equity capital; a mortgage loan is usually required also. The equity-loan ratio is highest with industrial and commercial and lowest with public and residential construction. All equity capital is saved out of the proceeds of past income and is managed predominantly by owners. Loan capital can be shifted more readily from where it is accumulated to where it is needed; it will usually be advanced and managed by thrift intermediaries; and it may be created by commercial banks through credit expansion.

A high proportion of capital invested in new residential construction—up to 80 to 90 per cent in pre-1914 Europe and somewhat less in the United States—was borrowed.[1] Much of this loan capital could be drawn from loan repayments and hence would not constitute a charge on outside capital flows.[2] But to individual realty buyers access to mortgage funds was crucial.

Mortgage funds drawn from the capital market are applied with near impartiality to new and old realty purchases and to business, farming, residential, and miscellaneous personal uses. Thus, to determine the effect on building cycles of long-wave movements in mortgage markets, the different uses of mortgage credit must be distinguished.

Mortgage credit is extended at relatively low interest rates on the assumption that prospects of default and loss are relatively low. The risk of foreclosure is difficult to gauge, and lenders will generally be influenced unduly by recent experience with foreclosures in the community or elsewhere. A rise in foreclosure rates will thus render lenders more cautious and tend to divert loan capital to nonmortgage uses or slow up investment activity generally. We cannot adequately trace the rise and fall of new building and realty and mortgage movements without extending our survey to include a canvass of foreclosure experience.

The purpose of this chapter is to throw light on the character and scope of fluctuations in land development and subdivision, realty sales, uses made of mortgage credit, and foreclosure experience.

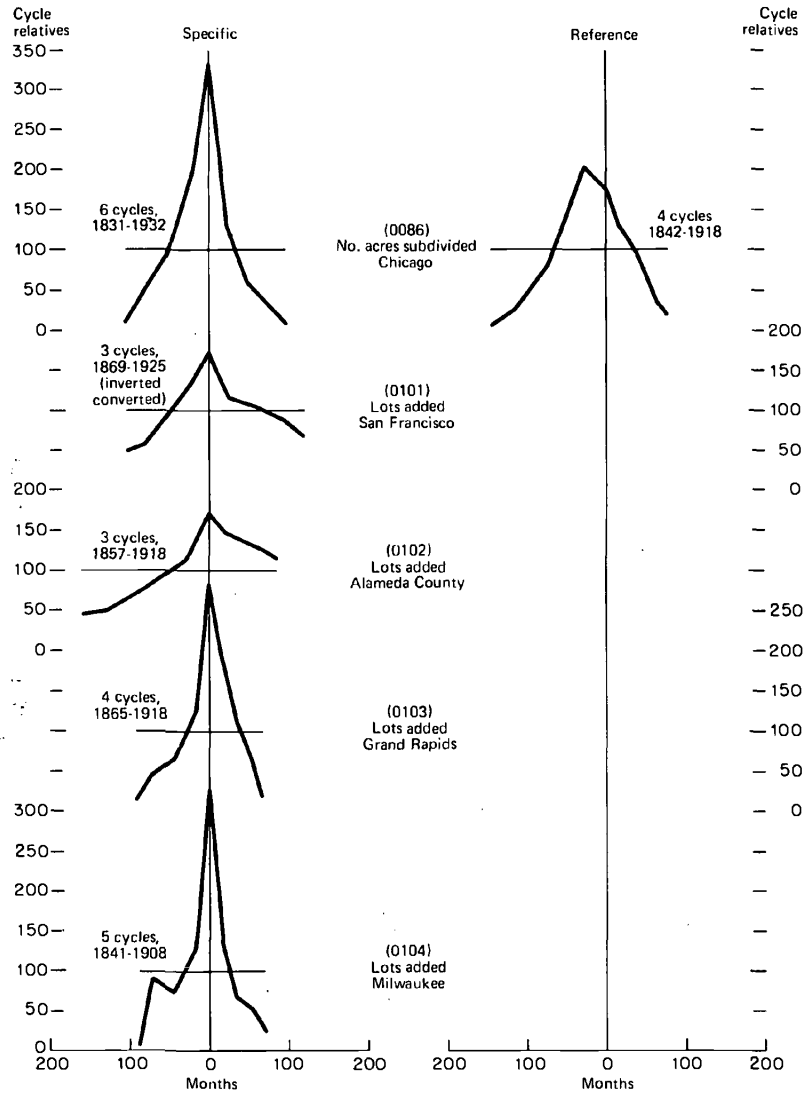
B. LAND DEVELOPMENT

Our information on land development is drawn wholly from American records, reflecting perhaps its more fateful role in American experience. The phase of land development for which our statistical information is fullest is subdivision activity, that is, the number of lots added or acres subdivided for use in building. Two of the available time series cover Ohio cities; six additional surveyed cities are located in the Middle West or Far West. Average specific and reference cycle patterns for these series are shown in Chart 4-1; and summary tabular measures are presented in Table 4-1.

The high specific amplitude of subdivision activity has often been noted and stands out prominently in our records. Mean total specific amplitude for the eight series is 681.5, or approximately double that of residential building itself. Equally significant is the relatively high proportion of this variability which was coordinated with, and which shows up on, reference chronologies. For the four cities for which reference measures are available, participation—as gauged by the ratios of total

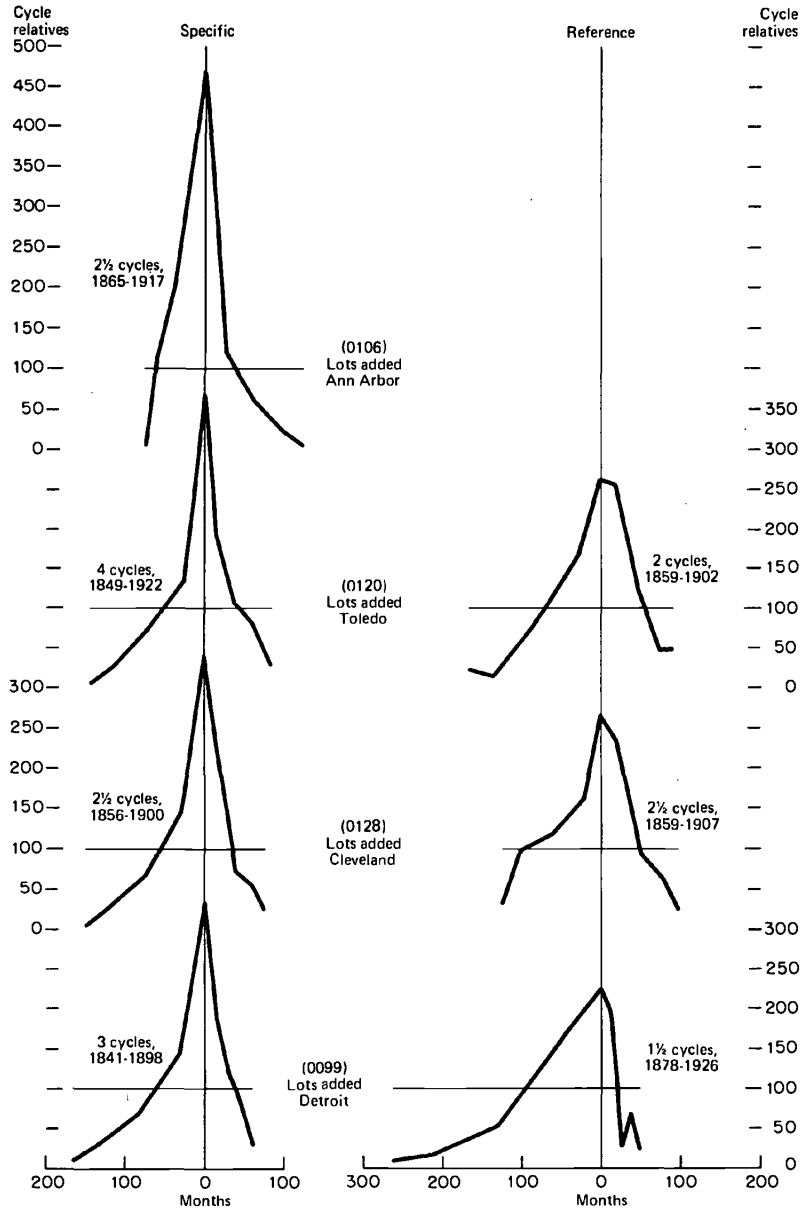
CHART 4-1

Long Cycle Activity Profile of Town Lots—Chicago, Grand Rapids, Milwaukee, San Francisco, Alameda, Detroit, Ann Arbor, Ohio Statewide, Toledo, Cleveland—Specific and Reference



reference amplitude to total specific amplitude—ranged between .583 and .718 (with a mean of .661), indicating that even reference amplitudes of subdivision activity exceeded that of residential building by nearly a third.

CHART 4-1
(Concluded)



In part this greater amplitude reflects the accelerator relationship between vacant lots and building. An upward wave of new building will excite an even faster rate of growth in subdivision. The equilibrium stock of vacant lots varies in rough proportion

TABLE 4-1
Summary Measures, Local Long Cycles, Subdivision Activity

Measures	*Ohio*[a] *Mean*	*Non-Ohio*[b] *Mean*	*Non-Ohio*[b] *Median*	*All*	
Full specific duration (years)	18.6	17.0	16.7	17.38	(2.9)
Specific cycle amplitude (cycle relatives)					
Full	681.5	644.0	626.4	653.6	(122.4)
Full per year	36.81	38.35	39.77	37.98	(4.9)
Fall per year	−52.44	−45.25	−45.26	−47.07	(9.5)
Full reference amplitude (cycle relatives)	472.3	398.6		435.5	(40.0)
Lead-lag turning points (years)	.10	.01[c]		.055	(.23)
Average deviation (years)	1.24	1.38[c]		1.31	(.15)
Lead-lag reference pattern (years)	.63	.60[c]		.61	(.61)

NOTE: Figures in parentheses are standard deviations.

[a] Includes series 0120, 0128, which had 6.5 specific long cycles, ten matched turning points, and one unmatched turning point.

[b] Series 0086, 0103, 0104,0106, 0099, which had 26.5 specific long cycles. Series 0086 and 0099 had fifteen matched, and no unmatched turning points. Series include Pittsburgh, "Net Increase in Building Lots" 1831–1932, with six long specific cycles, having a mean duration of 202 months ± 46.0.

[c] Includes only series 0086, 0099.

with the stock of housing and with the volume of new building.[3] Hence, on an upward trend, each new building erected must be accompanied by more than one lot produced.

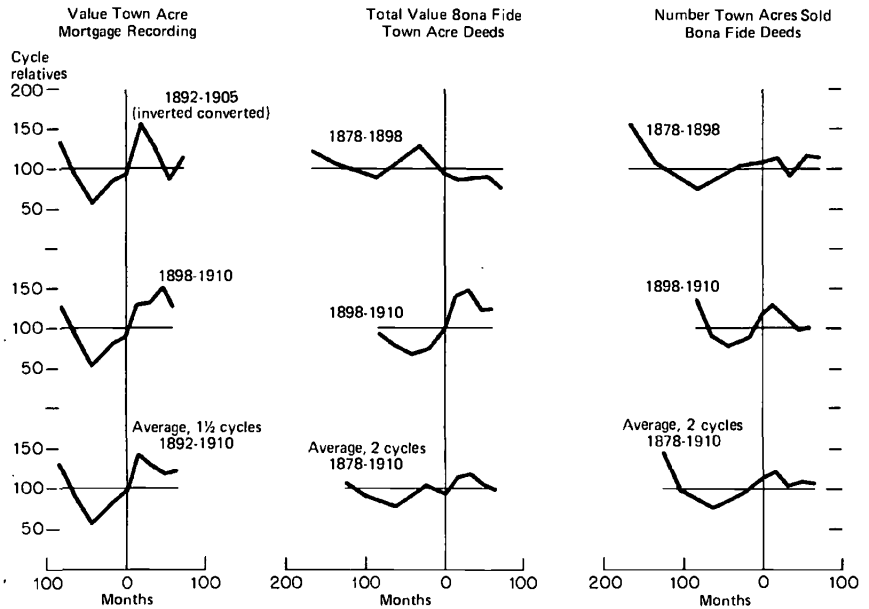
Timing is nearly synchronous. The four subdivision series for which a reference comparison was available exhibit, on twenty-five matched turning points, a mean slight lead of a month or so; reference cycle patterns indicate a short mean lag of six months. While considerable variability is indicated, this points to substantial synchronization. Building and subdivision turn at or near the same time and tend to move together.

The act of subdividing breaks up land originally acquired on an acreage basis into smaller lots prepared more or less for building. Transactions in acreage at the wholesale level should also reflect the wavelike process of subdivision activity. These transactions transfer land from farmers to speculative investors or would-be developers. Developers could buy either from farmers or from speculative investors, and the latter can, of course, sell to each other.

We were unable to sort out the total mass of wholesale transactions by transactor group or purpose. But fortunately Ohio conveyance statistics shed light on sales of acreage at the wholesale level. Statistics were collected from records of transactions in land located within municipal corporate limits but unimproved and unplatted, i.e., not built upon or divided into lots. These transactions included deed transfers and the mortgage loans which usually accompanied them. Deeds on which information on consideration or sales price was recorded are labeled "bona fide"; other deeds are labeled "nominal." A record was made of the number of acres involved. The three statewide series—value of consideration in bona fide deeds, number of acres sold, and dollar value of mortgage loans—were tabulated on a statewide basis. Individual and average patterns are presented in Chart 4-2. Though the mortgage series misses half a long cycle, and though the deed value has a definite downward bias (see Appendix E), the three sets of patterns all exhibit clear-cut neutral timing. On a statewide level, wholesale transactions in acreage respond with a long lag to the variations in housing demand which generate the long-wave process. Throughout the first half of the expansion, wholesale demand for land is still falling, possibly in response to the previous cyclical decline of realty values. By the fourth or fifth year speculative or

CHART 4-2

Successive and Average Reference Cycle Patterns, Statewide Ohio Sales and Mortgages of Acreage Land, 1878–1910



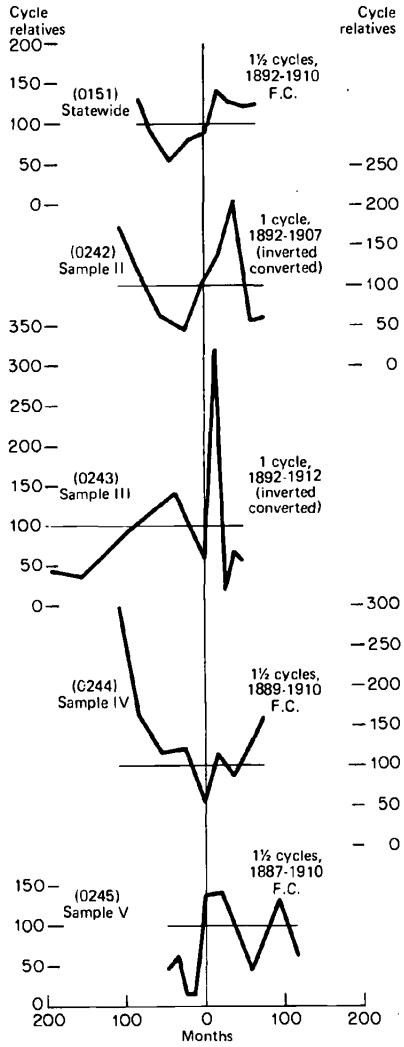
developmental interest in raw land commences to become stronger. As the building expansion reaches its climax, sale and purchase of land are accelerated; and not until a variable period has elapsed—from ten to fifty months—will the boom in land reach its climax.

On the local level these movements seem to develop extreme amplitudes and considerable irregularity, due possibly to the placing of a few large transactions and to special features of value which bring high- and low-valued land into the same field of development. Our two local measures are subject to different limitations. The most reliable measure, funds borrowed on mortgage recordings for town acres, is only available from 1885 onward and hence covers only one pre-1914 long reference cycle (1890's to 1910). The local reference cycle patterns and the statewide aggregate are shown in Chart 4-3.

The other local measure, that of number of town acres sold in bona fide deeds of record, is available back to 1878 and hence covers two full pre-1914 reference cycle periods. Moreover, the number of acres is a comparatively simple statistic to compute and to record. The yearly returns were irregular, however,

CHART 4-3

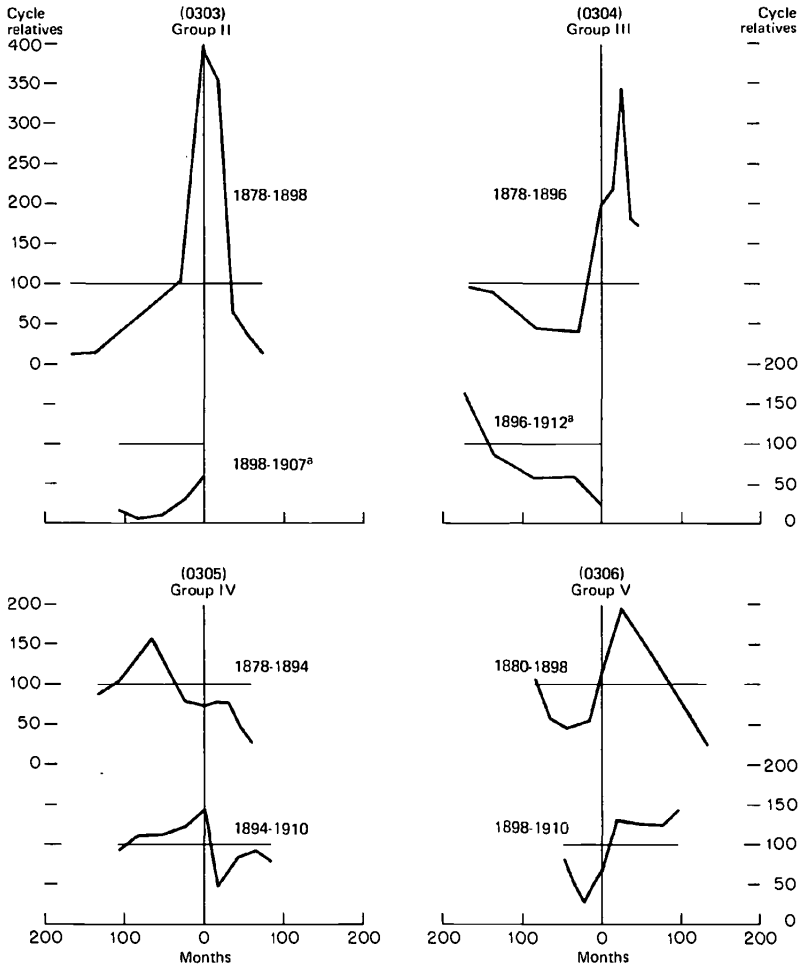
Patterns of Average Reference Long Cycles, Ohio and Samples, Value Town Acre Mortgages



partly because of variations in reporting either total sales and/or the fraction of sales which were recorded for nominal consideration only. Since the practice of recording deeds on a nominal consideration basis gradually increased during the period under review, our results are subject to a downward bias difficult to erase, though some irregularities were smoothed by a three-year moving average (Chart 4-4). For only two of the groups (IV and

CHART 4-4

Individual Reference Cycle Patterns, Number of Town Acres Sold, Ohio Groups II–V, 1878–1912



[a] Taken from inverted base.

V) were two reference periods available; for the other two groups, only one and one-half cycles are available.

On an acres sold basis, the tendency to neutral timing in a disturbed field shows up more clearly. Of the seven reference patterns graphed in Chart 4-4, five and one-half either lead or lag. Only one pattern is clearly positive; the remaining half-phase is inverted. Group V, which was ambiguous on the mortgage recordings, exhibits a tendency to neutral timing on

the acreage basis, while group II, which was clearly neutral in the mortgage value, shows up as positive in the acreage. Considering the statistical imperfections of the material, the tendency toward neutral timing, both leading and lagging, seems clearly indicated. As Table 4-2 indicates, on matching turning points lags dominated, with a mean lag of 4.83; on reference cycle bases, a mean lag of 2.99 prevailed. As expected, the specific amplitudes of acreage sales and mortgage loan cycles are enormous, averaging 602.9 for 8.5 long specific cycles. The corresponding mean amplitude on six series with reference cycles is 409.9. Of the eight series, three were ranked as inverted and three positive; two were ranked as irregular.

C. REALTY SALES

Some reflection of new building activity should be found in realty sales, because a significant proportion of new structures are erected by operative or speculative builders and are then sold. The 1956 and 1961 surveys of realty sales disclosed that 36 to 40 per cent of residential property sales involved properties not previously occupied [261, 1957, Table 13; 1962, Table 14]. Even when new buildings are erected without conveyance, a chain of realty transfers may be generated, i.e., a builder may have to sell an old property before moving into a new one, and buyers may likewise make a purchase contingent upon a sale.

A change in realty sales will be reflected in the number of real estate transfers recorded as warranty deeds in local records. This presupposes that the relative number of warranty deeds which do not accompany bona fide sales, arising out of gifts, intrafamily transfers and bequests (recent surveys indicate that 33 to 34 per cent are of this character) does not fluctuate to an appreciable degree in long swings [261, 1959, p. 18].

Though deed records are available nearly everywhere in America, few long time series met our requirements for pre-1914 coverage. Altogether eight such series were available, five for Ohio groups and three for other urban communities, plus a series for the entire state of Ohio. Summary measures are presented in Table 4-3 and average reference patterns are presented in Chart 4-5. Between 1862 and 1910, three clear-cut specific cycles are exhibited and, with only minor variations in datings, three reference cycles.

TABLE 4-2

Summary Measures, Local Long Cycles, Town Acreage Sold or Mortgaged[a]

Item	Units	Mean or Total	Median	High	Low
A. Totals					
1. Number of series		8			
2. Number of specific long cycles		8.5			
3. Number of turning points (TP)					
a. Matched		19			
b. Unmatched		4			
B. Mean or other values					
4. Full specific duration	Years	21.5	17.5	31.0	12.5
5. Specific cycle amplitude					
a. Full	Cycle relatives	602.9	589.8	831.5	352.7
b. Full per year	Cycle relatives	30.75	26.82	47.18	17.99
c. Fall per year	Cycle relatives	−28.11	−21.42	−46.11	−18.29
6. Full reference amplitude	Cycle relatives	409.9	400.0	721.6	134.3
7. Overlapping short cycle change per year[b]	%	5.39	5.98	11.84	−2.25
8. Lead-lag (LL) TP:[c]					
a. LL	Years	4.83	3.25	13.30	1.25
b. Average deviation	Years	2.32	1.56	5.25	.80
9. LL reference pattern[c]	Years	2.99	3.35	7.50	−2.25

[a] Including series 0242-5, 0306; series 0242 included only in items 6, 7, 9; 0244 included in items 6 and 7 only.

[b] Includes only series 0242-5.

[c] Using 0242, 0304 on positive rather than inverted basis to allow for uniform timing analysis.

TABLE 4-3
Summary Measures, Local Long Cycles, Number of Deed Instruments Recorded

Measures	*Ohio*[a]		*Non-Ohio*[b]
Full specific duration (years)	n.a.		18.97
Specific cycle amplitude (cycle relatives)			
Full			185.7
Full per year	2.62	(1.00)	9.77
Fall per year	−1.09	(1.68)	−7.89
Full reference amplitude (cycle relatives)	58.6	(15.8)	124.0[c]
Secular weighted average growth per year (per cent)	2.459	(1.13)	3.53
Lead-lag reference pattern (years)	.57	(.94)	n.a.
Optimal serial correlation, trend adjusted			
Lead-lag (years)	.50	(.45)	n.a.
Correlation coefficient (r)	.671	(.17)	n.a.

NOTE: n.a.—not available. Figures in parentheses are standard deviations.

[a] Including series 0216–0220, which had 12.5 reference long cycles (specific cycles were not analyzed). The number of turning points was not available.

[b] Including series 0089, 0101, 0102, which had nine specific long cycles. Series 0089 had eight matched turning points and no unmatched turning points; data on turning points for the other series were not available.

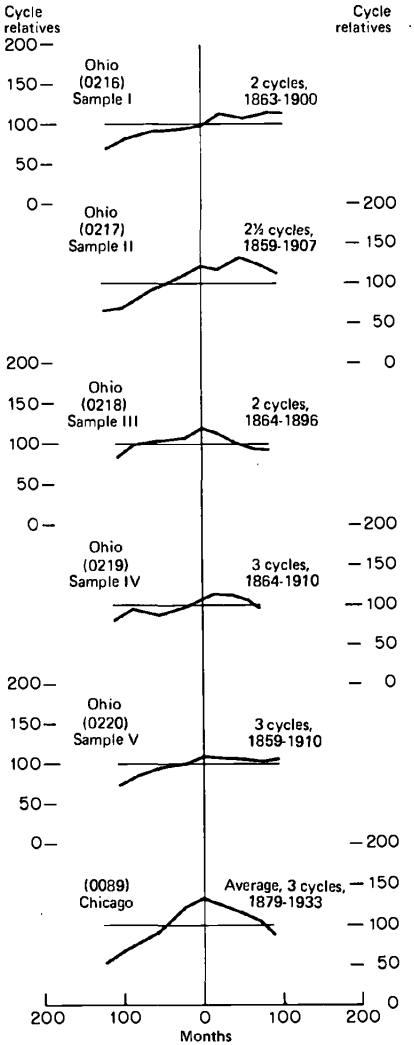
[c] Computed from mean specific amplitude by applying the Chicago relation of specific to reference amplitude.

The data indicate that deed turnover varies systematically with long swings in building, though with a much dampened amplitude. The three non-Ohio communities—Chicago, Alameda County, and San Francisco—exhibited considerably more amplitude than the Ohio communities, with San Francisco leading (a mean specific amplitude of 226.2) and Chicago lowest (146.7). Mean amplitudes of Ohio communities are only about half those of Chicago. This divergence may be partly a function of secular growth rates, since Ohio's are about a third under those of the other areas, and the more rapidly growing Ohio sample groups tend to have higher amplitudes. Other unknown influences, however, predominate in the outcome.

The Ohio and Chicago patterns of deed activity exhibit greatly

CHART 4-5

Patterns of Average Reference Long Cycles, Ohio Statewide, Sample Groups, and Chicago, Number of Deeds[a]



[a]For Chicago, number of real estate instruments.

dampened amplitude of fluctuation as compared with the pattern of residential building. For the Ohio areas, total mean amplitude of deed activity was barely 26 per cent of the corresponding amplitude for residential building. For Chicago and for Ohio as a whole, corresponding percentages are 36 and 31. Since part of deed amplitude is attributable to turnover of properties in

transactions linked to new building, it is apparent that the true amplitude of transfers of old property in long swings is not very considerable, except in cases where a strong boom occurs. In those cases timing at turns, as in the case of Chicago, is coincident; but in three out of five Ohio sample groups a building contraction has been under way from ten to fifty months before a turn in deed activity begins.

D. MORTGAGE CREDIT AND FUND USES

The relative intensity of the different uses made of mortgage credit in the course of long swings is more difficult to sort out than the tracing of deed activity. Outside of Ohio our statistical record of mortgage flows is confined to Berlin, where a series of new mortgage recordings was developed, and to Germany as a whole, where we have a series showing annual growth in institutional mortgage portfolio holdings. The record of information from Ohio is more detailed. It includes mortgage recordings for the state as a whole and for its sample groups, by number and by the amount of mortgage credit extended. From 1857 to 1879 no distinction was made between farm and nonfarm mortgages. From 1880 onward, or for substantially two of these cycles, we have separate series for nonfarm and farm mortgages, by number and by value.

New mortgage instruments can be recorded either by number or by value of consideration involved. Variation in the number of nonfarm mortgage recordings will result primarily from variation in mortgage loans growing out of sales of residential property and lots. In the 1880's this was indicated by the relatively small unit value of the great bulk of nonfarm mortgage loans; only 4.05 per cent of them were in excess of $5,000, and over two-thirds were under $1,000 in amount. The 1965 survey of real estate nonfarm sales showed that 97.1 per cent involved residential properties or vacant lots, and in roughly a 3-to-1 proportion [270, p. 1005; 261, 1957, Tables 7, 9, 10, and 13]. The proportion of vacant lot transactions was probably greater in earlier decades and more use was made of mortgage loans to raise funds for purposes other than the purchase or improvement of realty. Some 19 per cent of mortgages on owner-occupied homes in 1890 raised funds for business purposes or for other nonhousing needs.[4]

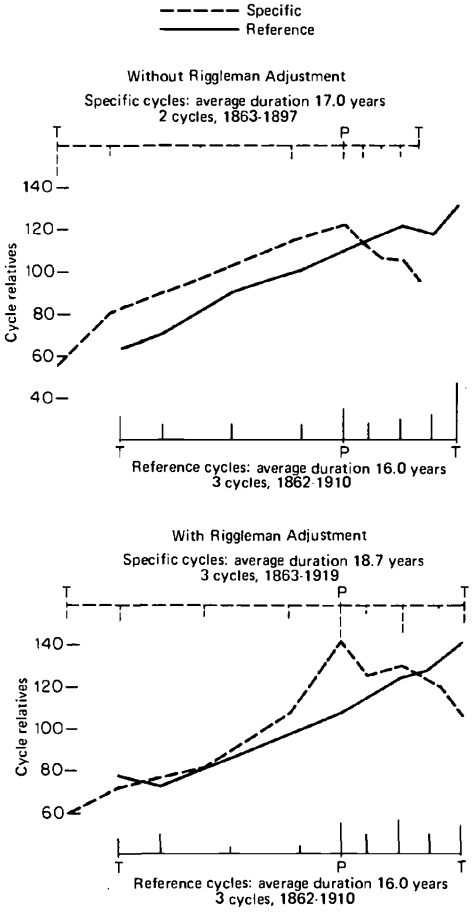
Any value series of mortgage loans will be only slightly affected by transactions on vacant lots. The major influences on the series are mortgage recordings for new houses, with their relatively larger unit values, and mortgage loans on business properties. In the 1956 real estate sales survey, sales of business property accounted for 2.2 per cent of the number, but for 9.2 per cent of the value, of all sales. The relative proportion of nonfarm mortgage recordings for business use is somewhat greater, 17.5 per cent. In earlier decades the percentage of both nonfarm sales and of mortgage funds for business use was larger. The share of nonfarm mortgage funds for business purposes in 1890 is estimated at 40 per cent. Mortgage loans contracted in the 1880's with an individual amount in excess of $5,000 accounted for some 40 per cent of funds borrowed, while loans in excess of $25,000 accounted for 15 per cent of funds borrowed [270, p. 1005; 114, Appendix L]. The value of mortgage loans must therefore reflect a mixture of residential and business use of credit.

The Ohio patterns of mortgage fund flows between 1857 and 1914 ran their course amidst powerful price movements which pulled down values between 1880–97 and pushed them up thereafter. The deflated value series exhibits two bursts of growth, between 1866 and 1877 and between 1900 and 1914. These patterns demonstrate that while mortgage lending experienced a definite specific cycle with duration and amplitude characteristics similar to building cycles, the timing of this movement varied so widely and randomly from reference chronologies that all cyclical characteristics were eliminated from reference cycle behavior, creating a nearly straight-line trend. Since divergent price trends partly offset each other, the average cycle patterns of the undeflated totals (Chart 4-6) have the same cyclical and trend characteristics as the deflated series. Because of this, and to avoid problems of bias in deflation, we have used the undeflated value series for the more detailed analysis which follows.

The comparative stability of average mortgage lending flows on a statewide level indicated that total mortgage borrowing in Ohio as a whole did not systematically vary with the building cycle. However, *local* mortgage recordings exhibit clear-cut reference as well as specific cycles with distinct phases of reference contraction. Summary measures are presented for Ohio local groups and for Berlin in Table 4-4 and Chart 4-7. Unlike those for

CHART 4-6

Value Total Mortgages, Ohio, With and Without Riggleman Adjustment, Specific and Reference Cycle Patterns



Berlin, the local Ohio reference patterns show a delayed peak, with a mean lag at all turns of nearly two years and an average lag at peaks of nearly four years. Reference amplitudes of local Ohio cycles are nearly half their Berlin counterpart. The all-German movement had a specific total amplitude which was more than double that of residential building and a reference cycle amplitude some 96 per cent of national residential building (see App. H). In the United States over the same stretch of years, the distinct impress of a long cycle was rubbed out in the process of aggregating at the regional level. This indicated that the over-all flow of mortgage credit was steady in the United States, at least

TABLE 4-4
Summary Measures, Local Long Cycles, Value of Mortgage Lending

Measures	*Ohio*[a]			*Berlin*[b]
	Mean		*Median*	
Full specific duration (years)	19.4	(4.6)	17.7	17.0
Specific cycle amplitude (cycle relatives)				
Full	260.9	(139.1)	177.0	277.0
Full per year	12.75	(4.74)	10.41	16.28
Fall per year	−17.92	(9.12)	−14.14	−14.94
Full reference amplitude (cycle relatives)[c]	110.4	(46.3)	93.9	189.5
Secular weighted average growth per year (per cent)	5.25	(1.40)	4.94	6.39
Lead-lag turning points (years)	1.88	(.73)	1.33	−1.12
Average deviation (years)	1.99	(1.26)	2.17	.42
Lead-lag reference pattern (years)	1.86	(.89)	1.75	−.75
Optimal serial correlation, trend adjusted				
Lead-lag (years)	1.0	(.8[d])	1.0	−1.0
Correlation coefficient (*r*)	.685	(.134[d])	.735	.873

NOTE: Figures in parentheses are standard deviations.

[a] Including series 0119, 0127, and 0207 through 0209. These series had twelve specific long cycles with twenty-six matched and four unmatched turning points.

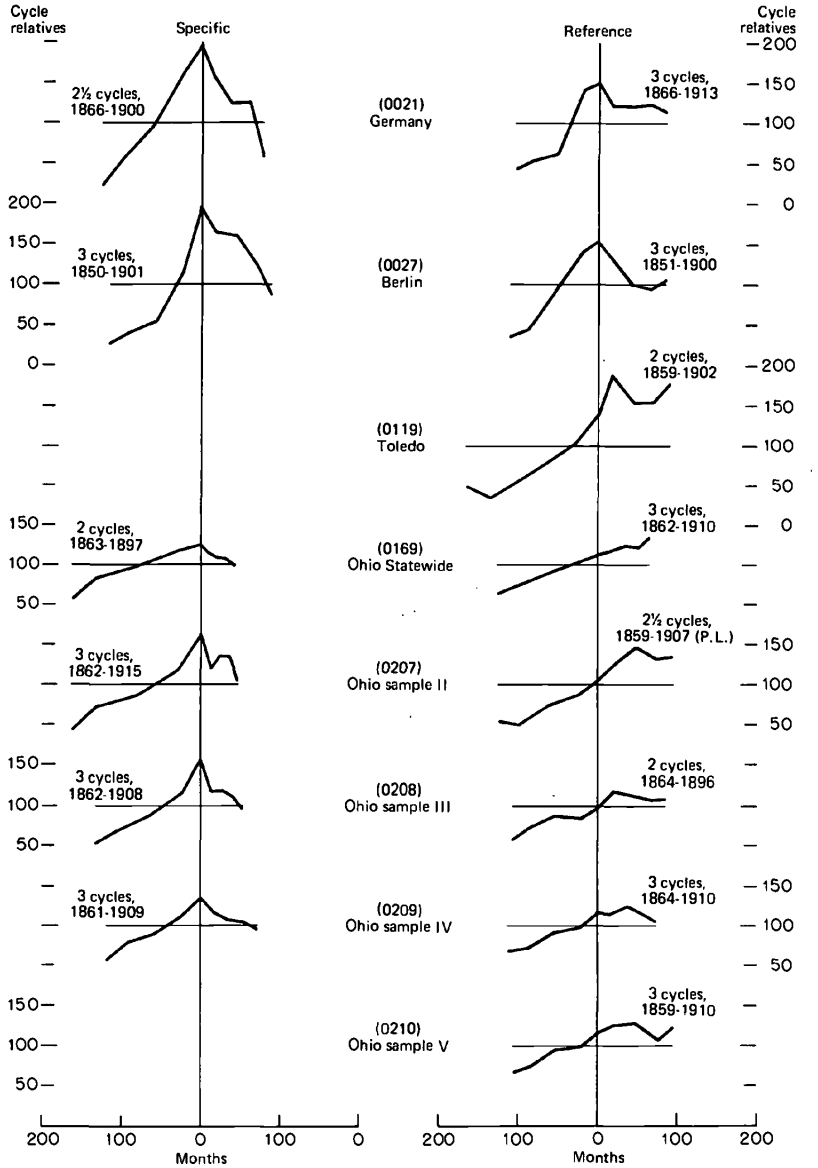
[b] Series 0027, with three specific long cycles, eight matched and no unmatched turning points.

[c] Excludes series 0127.

[d] Excludes series 0119 and 0127.

CHART 4-7

Patterns of Average Specific and Reference Long Cyles, Value, Mortgage Lending, Eight Areas



on a statewide basis, though in its local applications or in its various uses mortgage credit had a cyclical movement. It will be worthwhile to attempt to trace out the pattern of offsetting movements which developed either in local applications or in divergent uses.

Mortgage borrowing to finance new building must have declined in reference contractions. The number series shows a clear-cut tendency for reference declines, which, as previously indicated, would reflect personal loans and turnover in residential properties and in vacant lots. The cycle patterns set forth in Chart 4-8 show three clear-cut reference declines which are still recognizable in the average cycle pattern. The mild character of these declines indicate that the increase in the number of old residential properties or vacant lots traded has partly offset the decline in mortgage loans on new residential building. The onset of decline is delayed, and long lags are indicated. With greater amplitude of movement but equally extended lags, the same distinctive cyclical movement of mortgage numbers shows up in the local average cycle patterns for Ohio sample groups (Chart 4-9 and Table 4-5).

In the light of this behavior of number of mortgages series, a direct comparison of these series with those for deeds may be

CHART 4-8

Patterns of Successive Long Cycles and Their Average, Number Total Mortgages, Ohio, 1862–1910

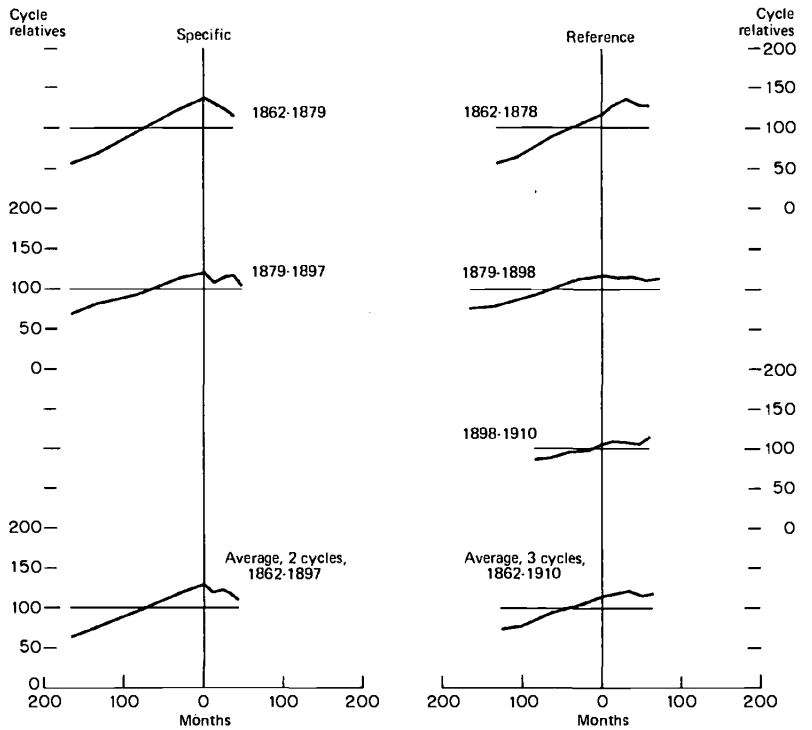


CHART 4-9

Reference Cycle Patterns, Ohio Statewide and Samples, Number of Mortgages and Deeds

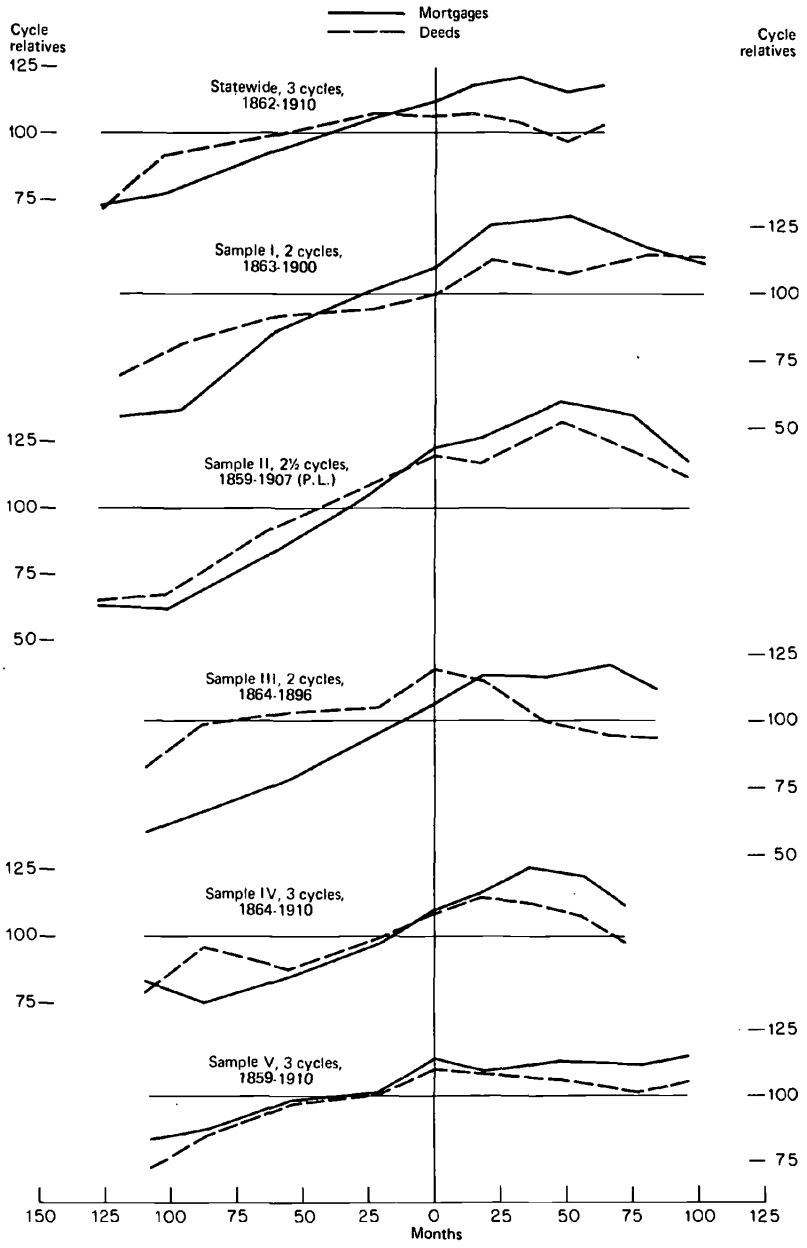


TABLE 4-5
Summary Measures, Local Long Cycles, Ohio Mortgages

Measures	*Number of Mortgates*			
	Mean, Total Mortgages[a]		*Mean, Nonfarm Mortgages*[b]	
Full specific duration (years)[c]	17.14	(1.72)	n.a.	
Specific cycle amplitude (cycle relatives)[c]				
Full	130.0	(31.9)	n.a.	
Full per year	7.51	(1.39)	5.18	(3.59)
Fall per year	−8.62	(2.55)	−8.98	(12.04)
Full reference amplitude (cycle relatives)	78.5	(28.4)	87.7	(9.6)
Secular weighted average growth per year (per cent)	3.261	(1.15)	2.923	(1.94)
Lead-lag turning points (years)[c]	2.03	(.56)	n.a.	
Average deviation (years)	2.04	(.30)	n.a.	
Lead-lag reference pattern (years)	1.52	(1.04)	.45	(1.93)
Optimal serial correlation, trend adjusted[d]				
Lead-lag (years)	1.38	(.4)	n.a.	
Correlation coefficient (r)	.722	(.17)	n.a.	

NOTE: n.a.—not available. Figures in parentheses are standard deviations.

[a] Series 0113, 0126, 0202 through 0205. These had fourteen specific long cycles, twenty-nine matched and three unmatched turning points.

[b] Series 0230 through 0233. These had seven long reference cycles (specific cycles not analyzed). The number of turning points was not available.

[c] Series 0205 excluded.

[d] Includes only series 0202 through 0205.

helpful. If the proportion of realty sales involving a mortgage loan behaves as a constant for long cyclical purposes, the differential behavior between deed and mortgage numbers should indicate the relative movement of nonrealty borrowing, which includes distress borrowing for personal and business needs. This differential behavior is exhibited in Chart 4-9, which shows average statewide and local reference patterns of the number of deed and mortgage recordings. The divergences are systematic and cumulative. In reference expansions, deeds accelerate and reach an early peak which leads the peak of residential building by twenty months. The number of mortgage loan recordings continues to rise and reaches its peak only some thirty-two months after the reference peak. In part the difference in timing reflects the stronger trend growth in number of mortgage loans (3.3 per cent) over deeds (2.5 per cent). But the number of mortgage loans in reference contractions increases, though realty sales are declining. This is because mortgage funds are used for purposes not correlated with real estate purchase or improvement. In the expansion phase of the building cycle, mortgage loans would appear to be used primarily to finance realty transfers; in the contraction phase the role of other borrowing increases.

Until now we have attempted to trace out the mortgage fund flows in relation to movements of building and real estate sales. During this entire period, however, agricultural mortgages played an important role in mortgage finance.[5] It may be presumed that some, perhaps many, farm mortgages were negotiated in connection with family succession or quasi-partnership arrangements which have little direct bearing on, or competition with, fund flows in capital markets.[6] Hence, it may be deceptive to use mortgage data aggregating farm and nonfarm recordings.

In Chart 4-10 the behavior of farm and nonfarm mortgage patterns is contrasted. The number of farm loans exhibits a cycle pattern with essentially random variation, without the strong upward growth trend characteristic of numbers of nonfarm loans. The pattern for nonfarm mortgages evinces a cyclical character because during reference contractions loan activity levels off or declines, reflecting in part the decline in sales of used and newly built houses and vacant lots.

The average value cycle patterns for town lot mortgages (shown in Chart 4-11) shifts this relationship. The mean value of a nonfarm mortgage evinces a distinct acceleration or rise in the

CHART 4-10

Average Long Reference Cycle Patterns, Ohio Statewide, Number and Value of Mortgages, Farm and Nonfarm, 1878–1910

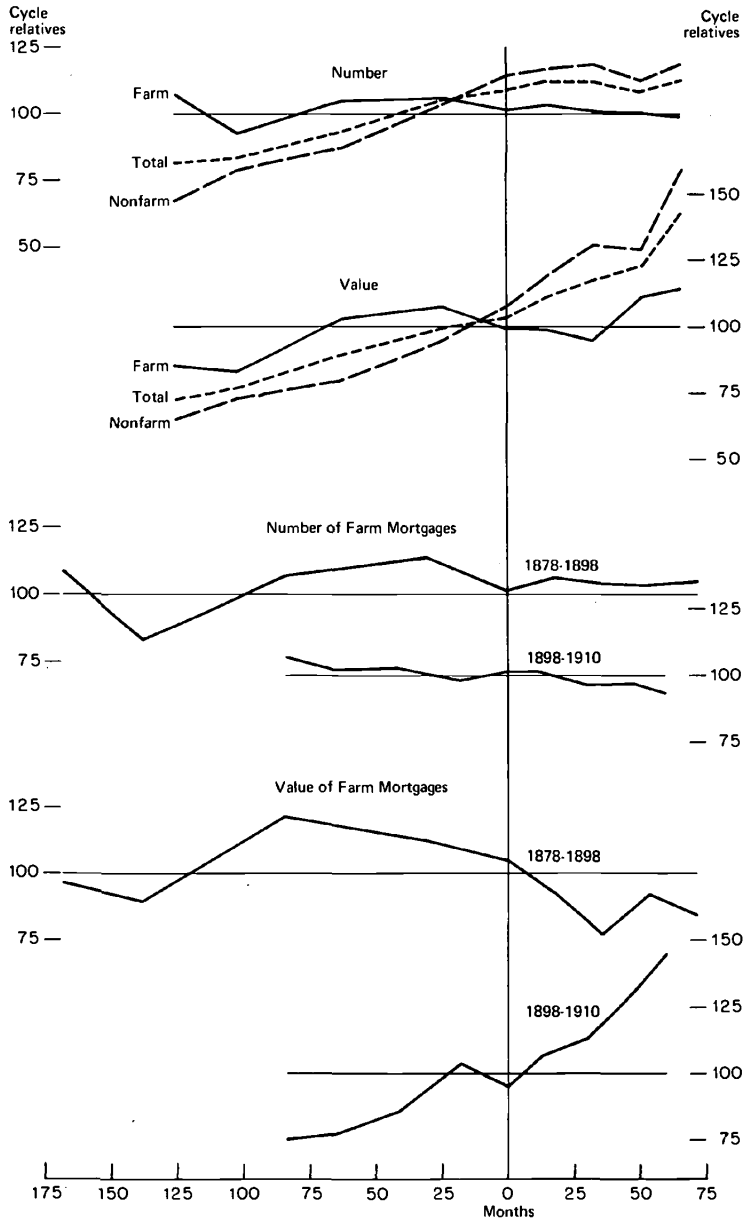
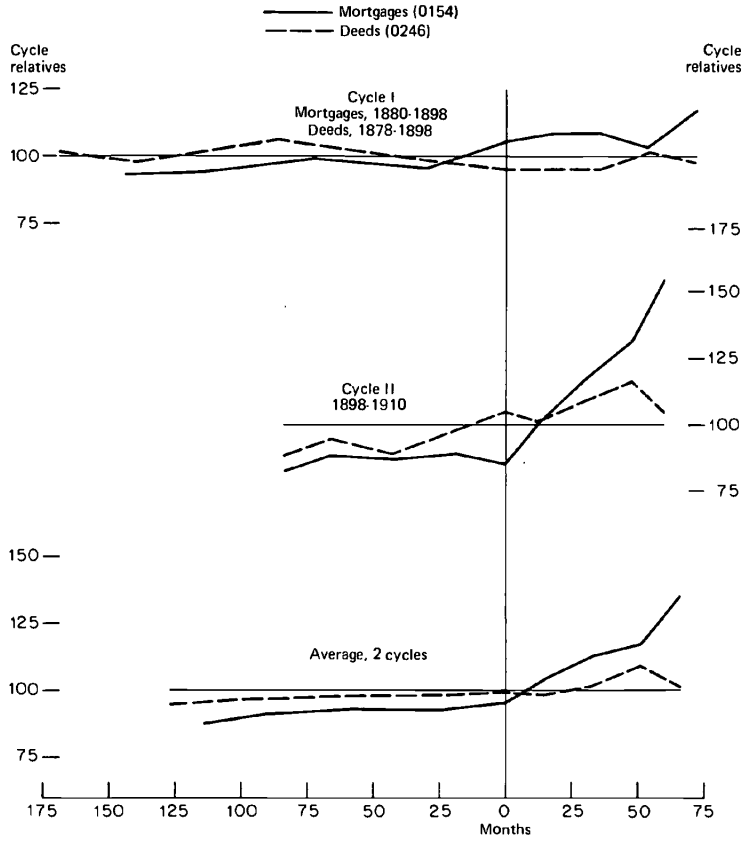


CHART 4-11

Reference Cycle Patterns, Ohio Statewide, Average Value Town Lot Deeds and Average Value Town Lot Mortgages



reference contraction. Since new building and mortgage lending associated therewith have declined during reference contractions, we infer the existence of an increased demand for mortgage credit for other uses. This is indeed indicated in the contrast of nonfarm deed and mortgage value behavior (see Chart 4-11). These patterns cover the two pre-1914 reference cycle movements which began in the late 1870's. The same element of price movements—downward to 1897, upward to 1910—runs through both series. Both deed and mortgage values per unit are relatively stationary or are subject to a very moderate upward drift during the reference expansions. Reference contractions are conspicuous for a lift in these values, reflecting a relative increase in higher-valued transactions and a widening differential in favor of

per-unit mortgage over per-unit deed values. This differential increases in the last phase of the reference contraction, indicating that nonrealty mortgage transactions have become especially prominent. This statewide outcome was doubtless subject to local variation depending upon the demand for different credit uses.

E. FORECLOSURES

One ground for cyclical variation grows out of foreclosure experience. Mortgage credit is extended on the assumption that such loans are comparatively safe investments. A foreclosure weakens this assumption; a wave of foreclosures should dampen willingness to extend mortgage credit.

Unfortunately our Ohio data do not include tabulations on mortgage foreclosures. However, this information is available from two other cities—Berlin and St. Louis.

Our two series on foreclosure have the same logical form as our development series. They should reach peaks at building troughs and vice versa. This clear-cut inversion is found in our cycle patterns for Berlin and St. Louis, as shown in Chart 4-12. Amplitude even exceeds that of residential building and suffers very little erosion in reference chronology (see Table 4-6). The

CHART 4-12

Patterns of Average Specific and Reference Long Cycles, Foreclosures, Two Cities

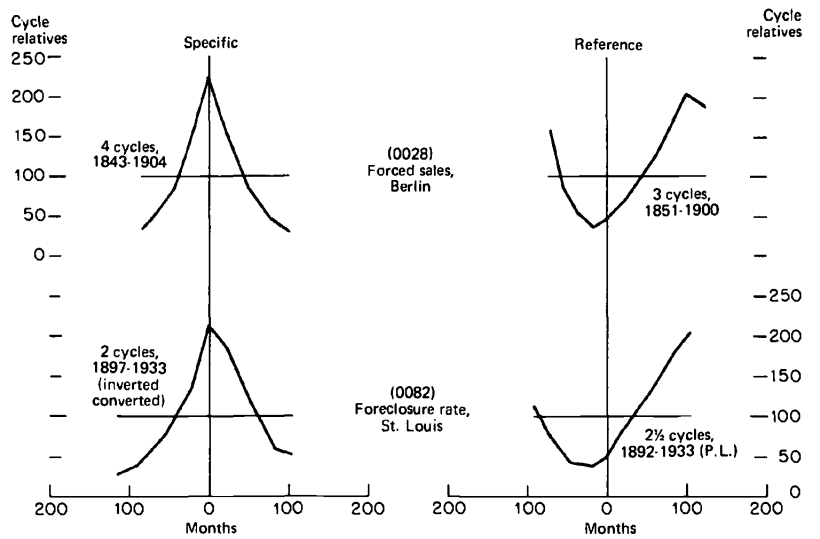


TABLE 4-6
Summary Measures, Local Long Cycles, Foreclosures

Measures	*St. Louis*[a] *Mean*	*Berlin*[b] *Mean*
Full specific duration (years)	18.0	15.2
Specific cycle amplitude (cycle relatives)		
Full	344.4	386.9
Full per year	19.13	25.37
Fall per year	−18.92	−23.58
Full reference amplitude (cycle relatives)	239.4	275.9
Secular weighted average growth per year (per cent)	−2.695	1.902
Lead-lag turning points (years)	−1.60	−1.67
Average deviation (years)	1.28	1.33
Lead-lag reference pattern (years)	−.75	−1.65
Optimal serial correlation, trend adjusted		
Lead-lag (years)	−3	−3
Correlation coefficient (r)	−1.000	−.428

[a] Series 0082, which had two specific long cycles, with five turning points matched and none unmatched.
[b] Series 0028, which had four specific long cycles with nine matched turning points and none unmatched.

definite tendency to lead on reference downturns in both Berlin and St. Louis and on reference upturns in Berlin only—with a mean lead of about seventeen months—could not fail to exert a psychological influence. The correlograms clearly point to an over-all lead of some three years. Foreclosures are even more visible than vacancies; and the increase in the foreclosures rate should tend to reduce willingness to invest in building ventures or willingness of bankers to lend on them. Interpreting them in this way, as a distress signal, Roos [224, pp. 69–110] found through multiple correlation analysis that foreclosures were highly influential. The influence was nonlinear. At a very low foreclosure rate (under 250 per year), the influence of a change in the foreclosure rate is potent, and capital flows freely to satisfy demand for building. At relatively high foreclosure rates, credit flows are slower and are not directly sensitive to small variation in rates. An increase in foreclosure rates over (say) 1,000 per year has little additional inhibitive effect. Thus, within a limited range of values the relationship is sensitive. But these results describe only a limited experience in one city and have not been tested in other areas or in the same city for later time periods.

While detailed data have been analyzed for only two cities here, a shorter series of foreclosures for Paris exhibited the same characteristics. The series was clearly inverted with a mean lag of one year on three matched turning points (mean deviation of 2.66 years). Correlation with building activity produced a mean negative correlation of −40.2. Amplitude of Paris foreclosures is less than amplitude of variation of building activity—as in Berlin and St. Louis—but exceeds amplitude of real estate selling price as was the case elsewhere.[7]

F. SUMMARY

Since the demands for new and old building compete, the market behavior for realty vitally influences demand for new building. This rival demand, in turn, translates into a joint demand for long-term mortgage capital required to finance most purchases of realty. Not all realty transactions use mortgage capital, and mortgage loans can be used to spread purchase payments over time or to raise funds for purposes other than realty purchase or improvement. And of course, our mortgage data include farm as well as nonfarm transactions. Variations in demand for mortgage

funds generated by new building are measured by our reference chronologies and amplitudes. Variation in mortgage use for farm and nonfarm purposes can be directly determined. Variations in business use of nonfarm mortgage loans are reflected chiefly in movements in the value of mortgage recordings. Variations in used and new residential realty and vacant lots transactions are more fully reflected in number of mortgages series. Comparative analysis of mortgage, deed, and building behavior indicated that the total value of mortgage recordings between 1858 and 1914 in Ohio shows no long-term reference cycle contraction and only faint traces of a relative reference slowdown in growth rates. Hence, a cyclical impulse was not imparted from the "funds" or supply side to capital flows in any sector; demand influences in a given sector are indicated to be dominant. Oddly enough, farm mortgage recordings by value exhibited a clear-cut reference contraction (IV–VII), so that nonfarm mortgage credit accelerated in its rise during reference contractions. In Germany, mortgage recordings and institutional portfolios for the nation as a whole and for Berlin showed clear-cut and relatively high amplitude reference swings, indicating possible supply pressure at work in mortgage credit markets during reference contractions.

Deeds and number of mortgages series exhibit reference expansions and contractions of comparable amplitude, allowance being made for divergent trends, but with a clear-cut lead at reference peaks for deeds and a lag for number of mortgages. Nonrealty use of mortgage funds is accelerated in reference contractions, while realty use is accelerated in reference expansions.

If mortgage credit activity as a whole only weakly reflected building cycles, land development reflected them to an exaggerated degree. At the wholesale level in sales or mortgage recordings on town acreage, extremely high mean specific total amplitudes, 602.9 ± 157.3, are exhibited, nearly double that of residential building itself. These exhibit a clear-cut tendency to disturbed neutral timing, showing up as a collection of leads and lags which tend to offset each other in the aggregates. Moderate regularity is indicated by a relatively low-valued mean turning point deviation (1.56 years) and a relatively high ratio of reference to specific amplitude (.674).

Once acreage is prepared for a building site it must be graded, dedicated for public use, improved, and subdivided into lots. This

work of subdivision also develops extremely high specific total amplitudes (654.0 cycle relatives) of the order of magnitude exhibited by developers at the wholesale level. These amplitudes also show up on the reference scale with fair regularity, having a reference-specific ratio of .661 and a low mean deviation (1.31 years) at matched turning points. As would be expected, at the retail level, timing tends to be concurrent, with a slight tendency to lag from one to six months. The high amplitudes on development activity testify to the speculative impulse, which will overstate the rise but will promptly adjust new supply to changing currents of demand.

Foreclosures are to realty markets what failures are to commercial markets. Foreclosures signal distress; they frighten institutional suppliers of long-term funds and speculative builders. Hence, though our recorded total amplitude—in the 300's—does not reach the intensity of development amplitudes, the consequences of the fluctuation may be significant. As expected, behavior is inverted and with a clear-cut lead from .75 to 1.7 years. Our two sampled foreclosure series were consistent in their timing, with relatively low mean deviations and a high ratio of reference to specific total amplitude.

NOTES

1. Pre-1914 German loan-shares were 80 to 90 per cent. See [33, pp. 167 ff.]. In the English capital market of the late nineteenth century, British builders could borrow 70 per cent on a first mortgage loan at a rate of 1 per cent above Consols, while a second mortgage loan was obtainable at 6 per cent [28; 165]. German second mortgage financing was more difficult and expensive, as was true elsewhere. See [166, XXIII ff.]. The American share of equity capital has been reported at higher levels: 50 to 55 per cent was typically covered by a first mortgage loan, 20 to 25 per cent was often covered by a second, and between 4 and 22 per cent of all purchases were without loan financing. See [13, I, 347 ff.; 91, pp. 357 ff.].

2. Grebler et al. [114, pp. 184 ff.] estimate that on a sector basis between 1911 and 1920, 51.5 per cent of total new housing expenditures was covered by equity funds and for 1948–52, some 27.3 per cent. They term "an optical illusion" the assumption that "investment in new residential construction has been generally and uniformly characterized by extremely low proportions of equity capital." The assumption is not an illusion for the individual builder or investor, only for financial institutions. Thus, higher rates of amortization of mortgage loans would not reduce the dependence of home buyers on mortgage finance but would reduce the dependence of mortgage institutions on fresh savings or "outside funds." Goldsmith's survey of the capital market in the postwar period

shows that about three-fifths of new mortgage recordings are offset by mortgage repayments, of which again three-fifths were full prepayments of the mortgage indebtedness outstanding on properties at the time of sale [104, Table 101].

3. See discussion in Chapter 5.

4. [270, p. 1075]. The loans raised were some 17.89 per cent by number and 18.78 per cent by value of all mortgage loans on encumbered owner-occupied nonfarm homes in 1890.

5. Some 40.5 per cent of mortgage funds raised in the 1880's in the United States involved mortgages on farm lands [270, p. 995]. Comments by both Goldsmith and Kuznets indicate awareness that their summary statistical measures may underrate the role of agriculture in financial markets of the late nineteenth century [161, pp. 236 ff.; 105, Vol. II, pp. 409 ff.].

6. Goldsmith [105, Vol. I, p. 749] estimated that in 1896–97 financial institutions held only 12 per cent of outstanding farm mortgages. When detailed comprehensive statistics on holders of farm mortgage debt recordings first became available in 1910, they showed that financial institutions were making from 25 to 29 per cent of farm mortgage loans. See [255, pp. 156 ff.].

7. Measuring amplitude by the coefficient of variation, we have for the entire 1860–1935 period: building activity, 7.1; foreclosure, 5.6; real estate selling prices, 2.7. These and related measures for Paris were derived from [93, Fig. 1, Table V and text]. It is interesting to note that the coefficient of correlation of foreclosures with real estate price level was somewhat higher than that with building. The two sets of coefficients are as follows:

	Correlation of Foreclosures with	
	Building	*Real Estate Prices*
1886–96	−.25	−.08
1895–1903	.31	−.88
1902–09	−.50	−.67
1908–13	−.95	−.78
1927–35	−.62	.10
Mean	.402	−.462