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CHAPTER 5

Marriage, Migration, and Vacancies in Long Local Cycles

A. INTRODUCTION

Fluctuations in real estate and urban building are commonly believed to be accompanied by, and to a certain extent grounded in, corresponding fluctuations in the growth of urban population. Housing and building are, after all, designed to serve the needs of people. That there is a "constant proportion" between people and building was classically argued nearly three centuries ago and has been reiterated by a long train of investigators who have pointed out the close relations between building swings and migration swings.[1]

Urban population growth has in the first instance derived from inflows of migrants from farms and villages seeking work opportunities in urban communities undergoing industrialization. But a growing labor force through in-migration must involve at some stage the forming of new households by acts of marriage which have been cogently held to be, "as a voluntary and controlled action, the most important factor in population growth as it can be related to economic development" [83, p. 45]. The activity of both migration and marriage grows out of decisions which involve appraisal of economic conditions, the search for better opportunities, and the quest for personal maturity. Hence we will in this chapter seek to trace out the mutual interrelations between migration and marriage activity and long swings in building, real estate market activity, and urban development.

These interrelations are many sided and complex but so far as housing markets are concerned they will involve shifts in rates of utilization of dwelling stocks or, the inverse of these rates, in vacancy rates. As we shall see in the next chapter, this sensitive market indicator exerts a potent influence on valuation and price making in real estate and building markets and tends to guide the activity of new building and land development. Hence the study of vacancies and of rates of building utilization is pursued in this chapter together with related demographic processes.

B. DEMOGRAPHIC ACTIVITIES

The demographic activities of migration and marriage have their similarities and differences with regard to economic fluctuations. Migration is, for example, both a responsive and determining force. The changing state of the business cycle and employment opportunities will induce changes in migration, and a migratory shift will exert a reflex influence on the business cycle by increasing the capacity to produce. With marriage rates, the short-term relationship is more one-sided. Changes in business conditions over the short cycle regularly induce changes in marriage rates. However, no reflex influence of marriage rates on business cycles is ordinarily envisaged. This is not so in long waves of building. The demand for shelter will be significantly influenced by changes in the rates of marriage, and by resultant delayed changes in the rates of birth. Changes in the demand for shelter will play an important determining role in building waves. Thus, in short cyclical analysis, marriage rates appear primarily in the character of a determined series; in long building swings, marriage rates appear more in the character of a determinant. In both cases, the influence is reciprocal.

Demographic data—like our other time series—may be recorded and analyzed by a direct count of events, e.g., marriages performed, or passengers going overseas, or by taking the rate of enumerated events to the population of total possible events.[2]

For marriages this population constitutes a class of persons normally eligible for marriage or an aggregate of the age-generation cohorts within given eligibility-class bounds (i.e., 18 to 45 years), inclusive of all age-eligible persons not living in institutions or in a married state. The class is steadily dissipated by emigration, by new marriages, by death, by institutionalization, and by retirement of eligible persons out of the age bounds. The class is augmented by immigration, by separation of marriages of eligible persons, and by maturation of youngsters into the eligible age categories. The sustainable magnitude of this class will vary proportionately with total population. But over short-term or transition periods, total population can be an unreliable guide to the population of marriageable adults. With a constant total population the composition of the marriage class can become unfavorable, e.g., by shift to older-age distribution or by dispersion in localities with unequal sex composition or sex-eligibility matching.

Major wars and waves of migration exert profound effects on marriage potential and may change its course for an extended time period. The ratio of marriages performed to an appropriate measure of marriage potential constitutes net marriage rates; gross marriage rates are marriages reduced to a per capita basis.

Changes in the rate of marriage would probably exert little influence in long swings if they were accompanied by parallel changes in the rate of marriage dissolution (through divorce or death or rejoining with another family) so that the total number of mated pairs occupying households remained constant. If, however, population is growing, so that both the employed labor force and total number of households are growing, new marriages in excess of marriage dissolutions will, within the span of time covered by building cycles, lead to an expansion of births and to an increase in the number of families with young children seeking shelter. If the rate of marriage dissolution is more stable than the rate of new marriages, then the impulse of fluctuation imparted by the marriage rate will be amplified as it affects new household formation.

Even with constant marriage rates, demand for shelter would be affected by altered headship rates or tendencies to form independent households. In the recent phase of building expansion in post-1946 America, these alterations played an appreciable role in generating demand for housing.[3] In past building cycles, their relative weight was minor compared with changes induced by new marriages in excess of marriage dissolutions.

C. MARRIAGE AND MIGRATION SWINGS

Although consideration of demographic processes is thus of special interest, it was hard to find actual data applicable to our surveyed local communities. A population count is difficult and expensive to administer; few communities outside of Sweden have maintained detailed housing registries which would keep track of annual movements of population arising out of internal migration or birth or death. Since the event of marriage usually involves some form of public recording, the count of marriages in local communities is more frequently encountered and is more accurate than the enumeration of population. We have analyzed marriage series for eight of our surveyed local areas: the five Ohio sample groups, Chicago, Stockholm, and Paris. Population or migration series are available only for Berlin, Amsterdam, and Chicago. Two series measure net population change, a third measures net migration, which should vary in close correspondence to it. Since natural population growth will have an amplitude of movement much less than growth induced by migration, the Berlin migration series, as expected, behaves more sensitively than the other two series. We have also included in our charts population patterns for some Swedish towns and for a composite of seventeen American cities.

Local marriage and migration series were analyzed in unadjusted form, i.e., without conversion into rates of utilization of marriage potential, because data measuring the potential was not available. Our resulting patterns thus have growth trends incorporated within them. A decline in rates of utilization of marriage potential may, in our series, assume the form of plateaus in absolute numbers. If allowance is made for this possibility, the unadjusted data may be serviceable.

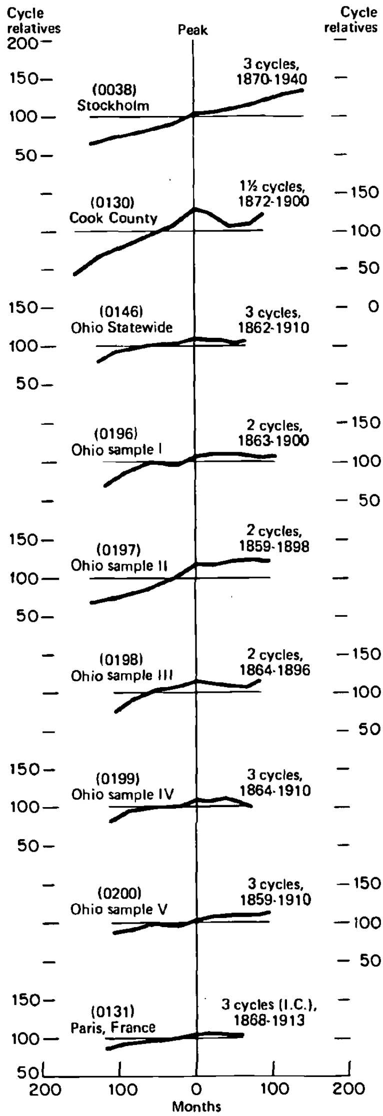
Charts 5-1 and 5-2 present the average cycle patterns, both specific and reference, for our surveyed areas.

Table 5-1 shows our standard summary measures for long-cycle behavior, covering duration, amplitude, growth, and timing. Since few series are available for survey, the measures of central tendency will need to be interpreted with regard to the range of dispersion of the surveyed activity.

No trace of reference long-swing rhythm was found in Stockholm marriage activity, as is clearly indicated in Chart 5-1, possibly due to the unusually high average age of marriage and proportion unmarried and the tendency for the marriage ceremony to be "less valued" than in other countries.[4] As expected, population growth and migration patterns apparently have a much wider range of amplitude than marriage patterns. This is vividly indicated by inspection of our charts and it is brought home in the mean amplitude, both on a total and per-year basis. Mean amplitude for the former patterns is 321 and total movements per year are 18.07, i.e., at a level of variation of the same order of magnitude as was experienced for building operations. It is not

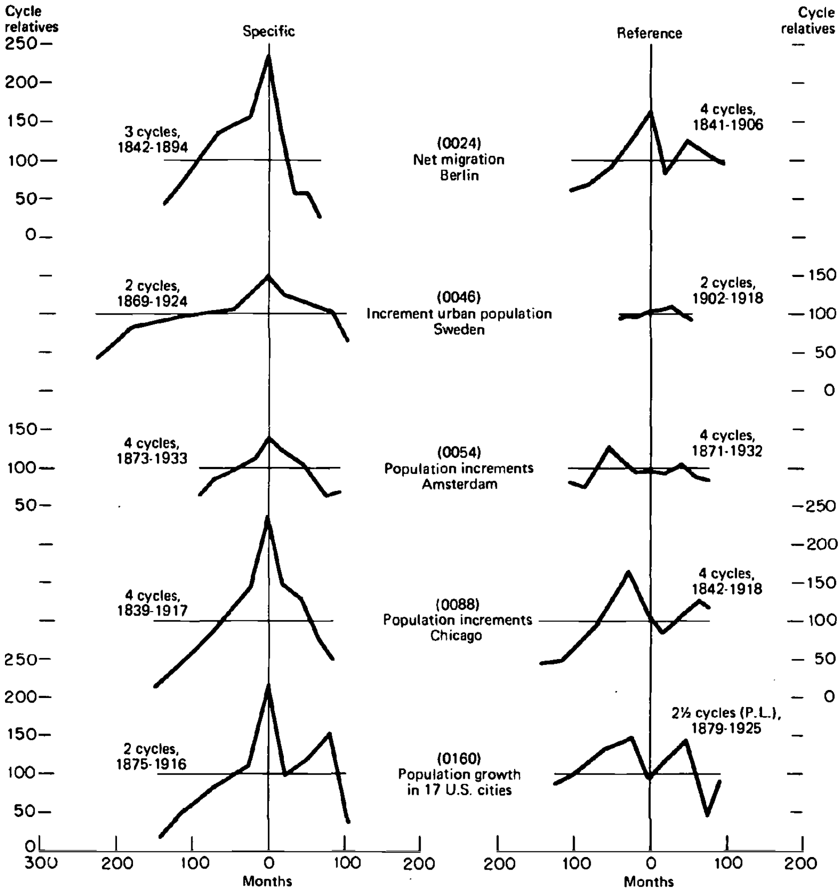
CHART 5-1

Patterns of Average Reference Long Cycles, Marriages for Chicago (Cook County), Stockholm, Paris, Ohio Statewide and Five Samples



easy to make similar comparisons for marriage patterns, since it was found possible to ascribe specific cycle behavior to only three of the eight marriage series. Using these three as a basis for comparison, the total specific amplitude for the marriage series is estimated at 87.4, or only one-fourth of population amplitudes.

CHART 5-2
Patterns of Average Specific and Reference Long Cycles, Population Factors, Five Urban Areas, 1839–1933



The rate of annual fall of the population series is formidable, but barely perceptible in our marriage series, though in terms of rates of change the slowdown is clear.

A similar order of variation is found in respective amplitudes of short cycles. Thus, the mean amplitude of British marriage rates over the nineteenth century was from 15 to 17 per cent of the corresponding amplitude for British migration.[5] German marriage patterns experienced an amplitude of fluctuation only 7 per cent that of migration.[6]

Similar relationships show up in the Paris time series available for the same period in the form of five-year totals. Chart 5-3 shows building, migration, and per capita rate of marriage. The use of a per capita rate eliminated the influence of the strong upward growth trend of marriages (nearly threefold between 1851 and 1911), and brings out variation in the rates of utilization of marriage potential. The migration series are smoothed with a three-term moving average because of erratic behavior. The absolute magnitudes of migration and marriages over the period are comparable: net migration to Paris amounted to 80 per cent of the number of marriages between 1851 and 1911; yet unsmoothed migration is extremely volatile compared with either building or marriages. In terms of standard deviations, when marriage rates are equal to 1.0, building activity fluctuates at a rate of 2.65 and migration at a rate of 9.97.[7]

Delayed timing seems to go with dampened amplitudes or, conversely, high amplitudes are here associated with a lead. On turning points, all three of our population series led by a reasonably stable mean of 1.22 years. Two of the three sets of reference cycle patterns exhibited leads, with an over-all mean value close to turning points. Berlin reference patterns point to synchronous timing, but this is belied both by the form of the time series and by the correlogram. Timing patterns in Berlin, as in the other areas, were complicated by the clear tendency of reference-cycle patterns to separate into eight- to twelve-year segments. These segments reflect the rhythm of the "major" or so-called Juglar process previously noticed in our cycle patterns of industrial building (see Chapter 2). Making allowance for disturbed timing relationships, it seems clear that population "leads" from one to two years.

Marriage volumes, however, seem to be characterized by a tendency to lead on long upturns and to lag at peaks. Turning-point and reference-cycle analyses do not clearly point to a statistically significant net lead or lag because of sampling variability. Correlograms exhibit the same divergence, with perhaps the tendency to lag predominant. Thus, the mean correlation coefficient (trend unadjusted) for all Ohio sample-group lag periods is 0.8372 and for lead periods 0.8036. However, the extreme leads exhibited by the Stockholm and Paris correlograms are not significant, and probably reflect the strong trends running through the series.

The general conclusion pointed to by these results—that population and migration significantly lead and marriages either synchronize on balance or tend to a short lag—are confirmed by correlation analysis performed on the Paris five-year aggregates

TABLE 5-1
Summary Measures, Local Long Cycles, Demographic Activity

Item	Units	*Marriage Activity*[a]				*Population Growth Non-Ohio*[b]		
		Ohio[c]	*Non-Ohio*[d]	*All*				
		Mean or Total	*Mean or Total*	*Mean or Total*	*Median*	*Mean or Total*	*High*	*Low*
A. Totals								
1. Number of series		6	2	8		3		
2. Number of specific long cycles		15	4.5	19.5		11		
3. Number of turning points (TP):								
a. Matched		10[f]	n.a.	14[g]		25		
b. Unmatched		2[f]	n.a.	2[g]		2		
B. Means or other values								
4. Full specific duration	Years					17.3	19.5	15.0
5. Specific cycle amplitude:								
a. Full	Cycle Relatives					321.1	414.9	144.9
b. Full per year[h]	"	2.26	2.67	2.36±1.25	2.23	18.07	23.27	9.66

c. Fall per year[h]	"	−.005	.005	−.003±.97	.19	−24.42	−36.98	−9.33
6. Full reference amplitude	"	54.5[k]	56.9	55.2±25.1	43.7	218.4[l]	244.5	192.3
7. Secular weighted average growth per year	%	2.659[f]	2.619	2.084±2.05	2.62	2.296	5.643	.583
8. Lead-lag (LL) TP:								
a. LL	Years	.21[f]	n.a.	−.11[g]		−1.22	−.56	−1.80
b. Average deviation	"	1.34[f]	n.a.	1.47[g]		2.29	3.34	1.24
9. LL reference pattern	"	.02[k]	−.075	−.007±.52	0	−1.90[l]	0	−3.80
10. Optimal serial correlation, trend adjusted:								
a. LL	"	.63	−1.33[j]	−.21±1.1[j]	0[j]	−2.0[l]	0	−4.0
b. Correlation coefficient	r	.650	.805[i]	.716±.170[j]	.682[j]	.508[l]	.622	.394

n.a.—not available.

[a] For all marriage series reference cycle measures for lines 2, 5b, c are substituted for specific.

[b] Series nos. 0024, 0054, 0088.

[c] Series nos. 0197, 0198, 0199, 0200, 0117, 0112.

[d] Series nos. 0130, 0131.

[e] Mean values are presented plus or minus standard deviations.

[f] For only series 0117, 0112.

[g] For only series 0117, 0112, 0130.

[h] Using I–V reference timing for marriage activity.

[i] Based on 0130, a St. Louis and a Berlin marriage series.

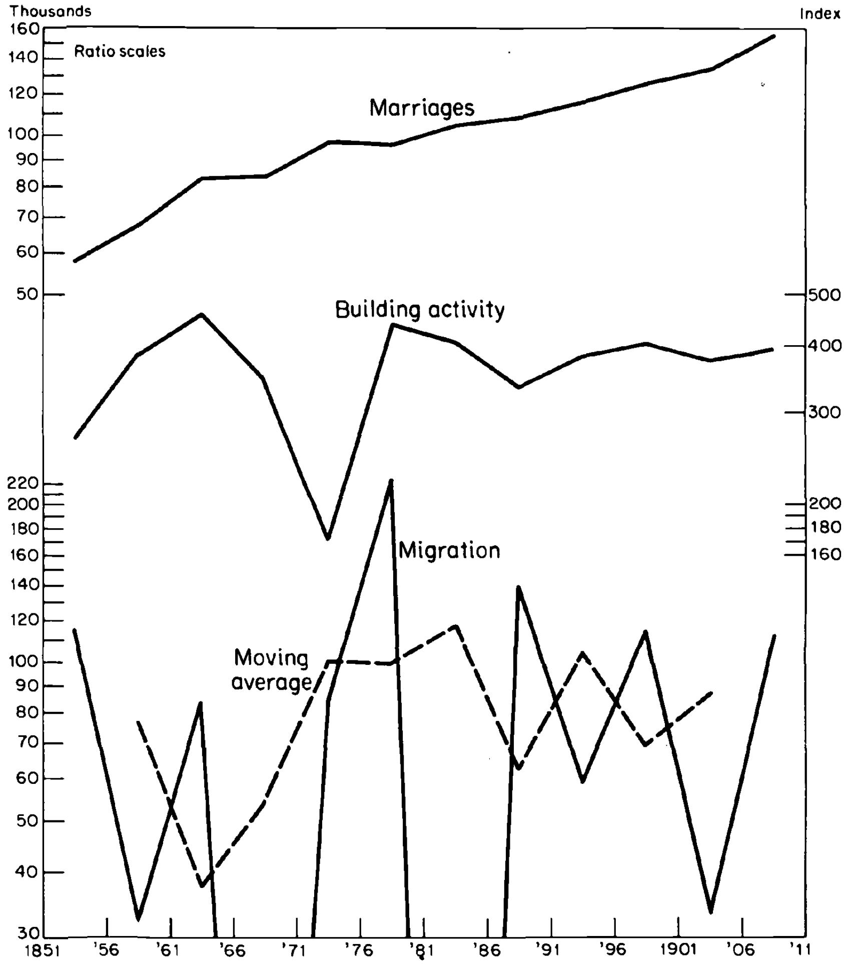
[j] Excluding 0117, 0112, but including 0130, a St. Louis and a Berlin marriage series.

[k] Excluding 0200.

[l] Excludes series 0054.

CHART 5-3

Marriage Rates, Migration (Net), and Building Activity, Paris, France, 1851–1911, Quinquennially



SOURCE: L. Flaus [93] and letters.

for marriage rates, building, and migration (see Chart 5-3) between 1851 and 1911. On the lead of a five-year period, both marriage rates and migration show a high total correlation with building. A converse high, inverted correlation is shown with the lag. The partial coefficients and cross-correlation indicate a tendency for migration and marriage rates to influence each other at a ten-year lag.

With twelve observations, the linear multiple regression equations yielded normalized correlation coefficients (adjusted for degrees of freedom) significantly above zero only for a one-period lead and lag (out of five lead-lag pairs computed). With X_1 as building, X_2 as migration and X_3 as marriage rates per capita, we obtained (with $\bar{X}_1 = 364.3$, $\bar{X}_2 = 83.3$, $\bar{X}_3 = 49.4$):

$$X_{t-1} = 781.7 - .7451X_2 - 7.352X_3$$

$$R1.23 = -.64$$
$$R12.3 = -.66$$
$$R13.2 = -.46$$

$$X_{t-1} = -220.2 + .396X_2 + 11.47X_3$$

$$R1.23 = .59$$
$$R12.3 = .43$$
$$R13.2 = .62$$

Equally significant is the pattern of correlation coefficients for different lags:

Correlated Variables	*Correlation Coefficients Lead-Lag of First Correlated Variable*				
	$t-2$	$t-1$	t	$t+1$	$t+2$
$X_1/X_2, X_3$ (normalized)	0	.64	0	.59	0
X_1/X_3	.10	.26	0	.53	0
X_1/X_2	0	.63	0	.23	0
X_2/X_3	−.33	−.07	−.12	−.07	−.07

Since marriage rates would lead marriage volumes, the Paris experience with both migration and marriage data confirms our tentative finding. The Paris lead on marriage *rates* would probably characterize our long marriage series generally and, as we have shown elsewhere, it characterizes national rates for five out of six surveyed countries. This would be consistent with synchronous timing on *actual marriages,* as disclosed by our local time series. There is a notable contrast, in this regard, with marriage-rate behavior during short cycles. As is well known, many tests both on an annual and on a monthly basis have found that marriage *rates* exhibited synchronous timing in short cycles.[8]

Migratory flow will tend to generate a counterpart flow of marriages over time. Like marriage, migration is concentrated in the young adult population [259, pp. 290 ff.; 235, Chap. 24; 247, pp. 40, 49, 75, 78]. Although the marital state of emigrants has not generally been recorded, it predominantly appears that the young adult migrated unattached and sought to get married only after becoming settled.[9] Sex disparities among migrant groups would stretch out the lag and reduce the number of marriages.[10] However diluted or lagged, any migratory flow which is large relative to the marriage potential of the emigrant and immigrant countries, will generate fluctuations in crude marriage volumes and, to a lesser degree, in per capita and net rates. The American experience, since the restriction of immigration, shows that a considerable range of variation in net marriage rates remains to be explained by changes in economic conditions [77].

Does the pattern of movement in our marriage series reflect a composite of influences affecting migration and levels of per capita income? A tendency for a strong lead in marriage volume in long-wave reference upturns could grow out of the improvement of job opportunities that simultaneously elicits the recorded upward wave of migration. Conversely, the tendency of marriage-volume reference peaks that occur synchronously with building or that show a lag long after migration has turned downward may reflect the delayed marriages contracted by migrants who have become settled and whose incomes hold up, even though the growth of job opportunities has declined.

D. VACANCY RATES

The expansion of the labor force through migration and the formation of households through marriage will obviously affect the demand and supply for building in many ways. The most immediate impact of both the influx of additional workers and their formation into new households will be on the margin of vacant housing. To some extent the inflowing migrants will fill up the rooming houses and hotels or private households which, to a greater degree in the past than currently, provided shelter for hire.[11] In the contemporary American world, the number of married couples "doubled up" with another household probably reached its normal level by 1960.[12] Increased demand for shelter, generated by immigration or new marriages, tends to step up housing densities at the same time that it reduces the number of vacant dwellings.

The relative proportion of vacant dwellings will normally vary directly with the mobility of population in and out of dwellings. Modern industrialized populations have been characterized "as truly nomadic, shifting about almost incessantly from locality to locality'' [234, p. 407]. Some of this mobility springs from change in business life. Thus, about 10 per cent of retail service and small business establishments are discontinued each year. From 3 to 4 per cent of the employees in manufacturing industries will be "separated'' and hired monthly [236, pp. 48 f.; 14, p. 398; 103, pp. 171 ff.; 226, pp. 9 ff.]. Many changes run their course within a city; others involve migration. Any given migratory impulse will induce adaptive migrations from adjacent areas. This high state of social mobility is not purely or even predominantly an American characteristic. There was the same need elsewhere for the continual sorting out of persons between town and country, from job to job, and through the personal life cycle. The lesser role of home ownership in European cities and a relatively short term rental contract for smaller dwellings facilitated the continuous movement of persons [258, pp. 472 f.; 8, pp. 164 f., 171 f.].

These shiftings and migrations give rise to an extensive movement in and out of urban residential dwellings. It has been estimated that the average term of occupancy of an American urban owner-occupant ranges from fourteen to twenty-four years. The average term of property ownership elsewhere seems to be of the same order of magnitude. One out of three tenants in America and in London before rent control, but two or three out of five Berliners, moved each year [106, Vol. 1, p. 316; 219, pp. 34, 59; 90, p. 141; 91, p. 240].

Both in rental and sale property, incoming occupants may or may not follow quickly on the heels of the outgoing. Thus, the vacancy needs of an area in the first instance will be proportional with its characteristic rates of turnover: "the more mobile people are, the greater is likely to be the demand for house-room [and] there will be on the average a larger number of houses standing empty'' [46, p. 216].

However, given the rate of turnover, there will also be an independent tendency for vacancy to depend upon the average age of structure. A city with a higher mean age of structures will have relatively more properties in a deteriorating or dilapidated condition. When vacancies tend to concentrate in older buildings, the greater the proportion of these buildings, the higher the vacancy rates. Thus, the relatively higher average rate of vacancy in Glasgow (1870–1914), 6.29 per cent, is due in part to the carry-over of a reserve of dilapidation maintained partly because vacant dwellings in Great Britain were generally exempt from local property taxation [98]. So also the nationwide British decennial record of vacancies between 1801 and 1911 showed a rising trend, which nearly doubled in absolute level.[13]

Since average age or dilapidation of dwellings, mobility of persons or turnover of property, and relative composition of home-owners and tenants—as well as still more underlying forces, such as average family age, marital condition, and pattern of industry—vary among urban areas, so normal vacancy rates will vary. In 1950, Miami, Wichita, and Los Angeles had net vacancy rates of 8.1 per cent, 4.0 per cent, and 3.0 per cent, respectively, while the national average for all metropolitan areas was 1.6 per cent. Similarly, by size of dwelling unit there appears to be a tendency for vacancy rates to vary inversely with size, but directly with age of structure [91]. There are many reports indicating an unusually low range of vacancy rates for many European cities in the pre-1914 period and persistent reference to a standard 3 per cent rate in Europe and a 5 per cent American "norm."[14] It can only be said that these "norms" lie within the range of realized statistical vacancy time series and near some measure of central tendency.

E. SURVEY RESULTS

Long series were available for seven cities: Stockholm, Glasgow, London, Hamburg, Berlin, St. Louis, and Paris. Supplementary data on other experience with vacancies will be presented when relevant. The respective average specific and reference patterns are individually presented in Chart 5-4. Tabular data are presented in Table 5-2. The tabulated series all refer to vacancy rates, except for Berlin. For that city, the number of vacant units, with a mean average growth per year of 1.319 per cent, was analyzed. Consequently, Berlin cycle patterns have a slight upward tilt because of the lack of trend adjustment. No specific allowance for this was made because trend rates were slight and widely divergent. The correlogram of absolute numbers rather than rates takes on a different form, though it discloses the same periodicity.

Observations of both the correlograms and reference cycle patterns indicate a common structural form for six of our series. Paris stands out as a deviant on reference cycle patterns. Whether

CHART 5-4
Average Specific and Reference Vacancy Patterns Seven Cities, 1841–1945

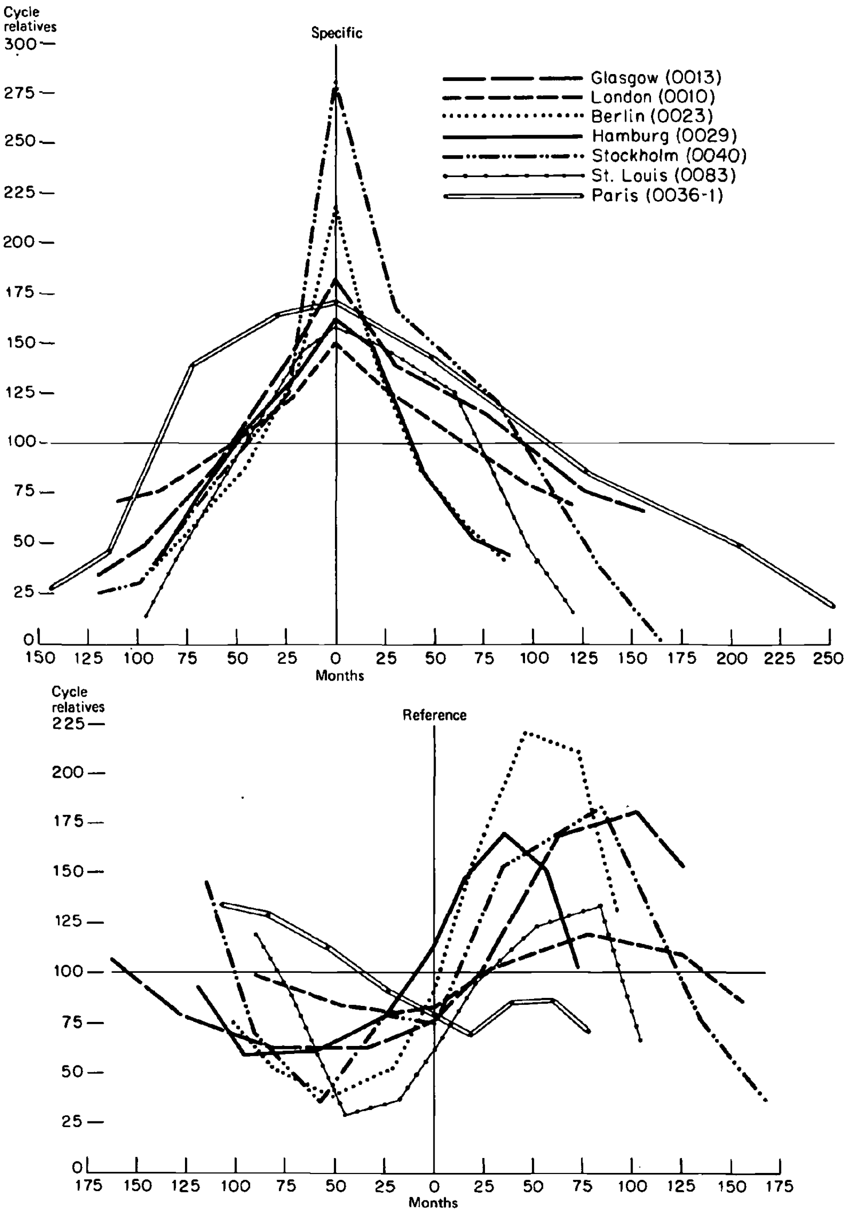


TABLE 5-2
Summary Measures, Local Long Cycles, Vacancy Rates[a]

Measures	*Mean*		*Median*	*High*	*Low*
Full specific duration (years)	21.0	(5.62)	19.0	33.0	14.7
Specific cycle amplitude (cycle relatives)					
Full	305.6	(108.2)	288.0	533.3	161.6
Full per year	15.31	(5.65)	16.00	23.92	8.50
Fall per year	−14.06	(6.01)	−13.60	−24.41	−7.25
Full reference amplitude (cycle relatives)[b]	242.9	(95.8)	238.5	402.8	91.9
Secular weighted average growth per year (per cent)	.311	(1.52)	0	3.169	−2.151
Lead-lag turning points (years)	−3.83	(2.01)	−3.75	.33	−8.0
Average deviation (years)	2.25	(.75)	1.76	3.60	1.56
Lead-lag reference pattern (years)[b]	−3.93	(1.16)	−4.00	−2.40	−5.90
Optimal serial correlation, trend adjusted					
Lead-lag (years)	−3.0	(1.19)	−3.25	−.5	−4.0
Correlation coefficient (r)	−.769	(.127)	−.752	−.956	−.589

NOTE: Figures in parentheses are standard deviations.

[a] Series 0013, 0010, 0023, 0029, 0040, 0080, 0036-1. All series are for rates except 0023 which is expressed in dwelling units. Timing analysis matched reference against specific series on an inverted basis, with regard to turning points, reference cycle timing, and negative or positive optimal coefficient used. There were 15.5 specific long cycles, with thirty-six matched and two unmatched turning points.

[b] Excludes Paris.

this is related to the shorter span of cyclical time available for the Paris average (only 1.5 reference cycles), to the statistical imperfections of our Paris series eked out from three primary sets of vacancy data, or to structural peculiarities of the Paris real estate market, cannot be determined. It seemed desirable to consider the Paris patterns a special case and to combine the other six patterns into a common average. The mean value of this average is graphed, though median values were very close to it and could have been used. For the same cities a specific mean residential building pattern was also computed; the two patterns appear in Chart 1-3.

In smoothed form the timing of our vacancy pattern is perfectly neutral, with peaks and troughs nearly midway in the reference phase. The five-year gap somewhat exceeds the mean lead at turning points (4.45 years), indicating the possibility that vacancy rates responded more quickly to the movement of an expansion and contraction than to residential building itself. It is believed that if the correlograms had been extended to the higher serial orders, smoothing nearer to a five-year lead-lag would have resulted. In any case, the true lead-lag would fall in the range of four to five years.

Since timing is perfectly neutral, vacancies can be said either to lead or to lag. They lag behind building in the sense that an increase in the rate of building, if sustained over time at a rate exceeding change in demand, will induce a rise of vacancies. But a high or low level of vacancies in turn will stimulate or restrain decisions to build. In this context, vacancy leads.

The distinctive form and regularity of movement of vacancies, as disclosed in Charts 5-4 and 1-3 is arresting. Formally, too, the smoothness of our average pattern reflects the fact that our vacancy series have experienced less variability than has generally been indicated in our surveyed series. Thus, the mean deviation from the mean lead was only 2.25 years or 1.6 years less than the mean lead itself. This performance put the series in the top decile of all our series ranked for variability by this measure. Restrained variability is also exhibited in the comparatively high fractions of specific cycle amplitude, which carries over into reference amplitude. The mean ratio of reference to specific total amplitude, 0.740, exceeds the mean ratio of all surveyed nonbuilding series (0.651). Optimal correlation coefficients adjusted for trend are high.

To conclude: the variability that exists in vacancy behavior should not be allowed to dim our view of a structural mechanism, which apparently operated in the nineteenth and in the twentieth centuries with great uniformity in many different cities, located in four different countries.

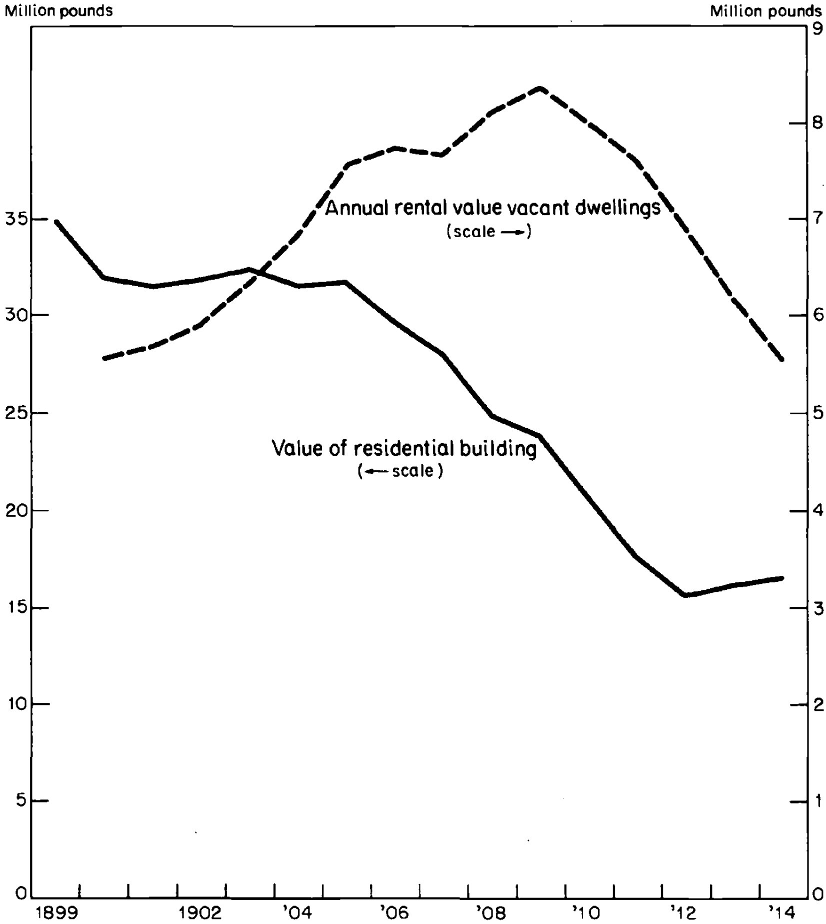
Both structural mechanism, with its long lead-lags and nearly neutral timing, and variability, reflective of other influences, are also indicated by our few available nationwide measures of vacancy rates and residential building. The national time series for England (1900–1914), for Germany (1890–1913), and for the United States (1945–62), are shown in Charts 5-5, 5-6, and 5-7. The results both confirm expectations and raise questions. The English vacancy rates are completely in step, with an inverted lead of some five years.[15] The American peak on vacancies is true to form in coming five or more years after a long-term building peak in 1955. The German movement is more irregular and indicates, after 1900, a greater variety of influences at work. Vacancies shift from a synchronized inverted status, as in the early period (1890–97), to a synchronized positive relationship, and keep cyclical step with residential building, faintly suggesting a lead (1900–1913). In this period builders are apparently overresponding to demand signals without appreciable lag on both the rise and fall.

F. SUMMARY

Both the data, though meager, and the expert judgment expressed in the literature concur in the finding that the building cycle is, in the words of Cairncross, "little more than a migration cycle in disguise." More urban building was undertaken to meet the needs of more people, and these additional people were primarily migrants from rural and farm communities. Our migration and population growth series exhibited powerful and specific cycles, with a total long specific amplitude of the same order of magnitude and range as urban residential building. However, correspondence with residential building cycles was relatively loose. The mean trend-adjusted correlation coefficient for optimum lead-lag was 0.51, reference cycle amplitudes were only some 53 per cent of specific cycle amplitudes, and the average turning-point deviation on twenty-five matched turning points was 2.3 years. This variation in timing occurred around a

CHART 5-5

Annual Rental Vacant Dwellings for 1900–1914 and Value of Residential Buildings for 1899–1914, England and Wales



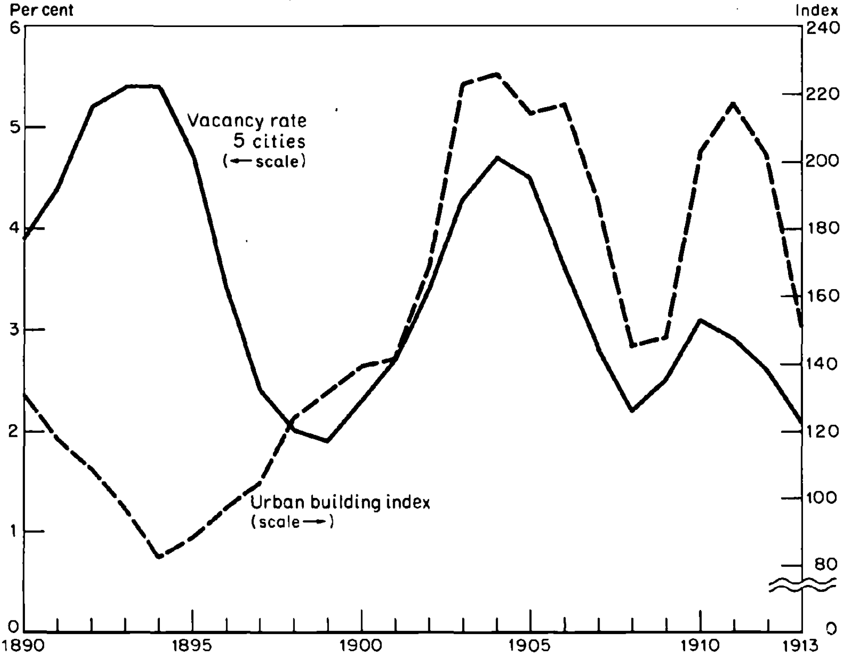
SOURCE: Cairncross [46], Tables 32 and 35

clear-cut tendency to lead, between 1.2 and 2.0 years, particularly on upturns.

Some of this variability in the relationship between new residential building and population growth may have been due to an underlying variability between population growth and marriages. Buildings are used by people but homes are chiefly lived in by families, and the rate at which new families are formed —minus the rate at which old families are dissolved—would exert some specific influence on the course of residential build-

CHART 5-6

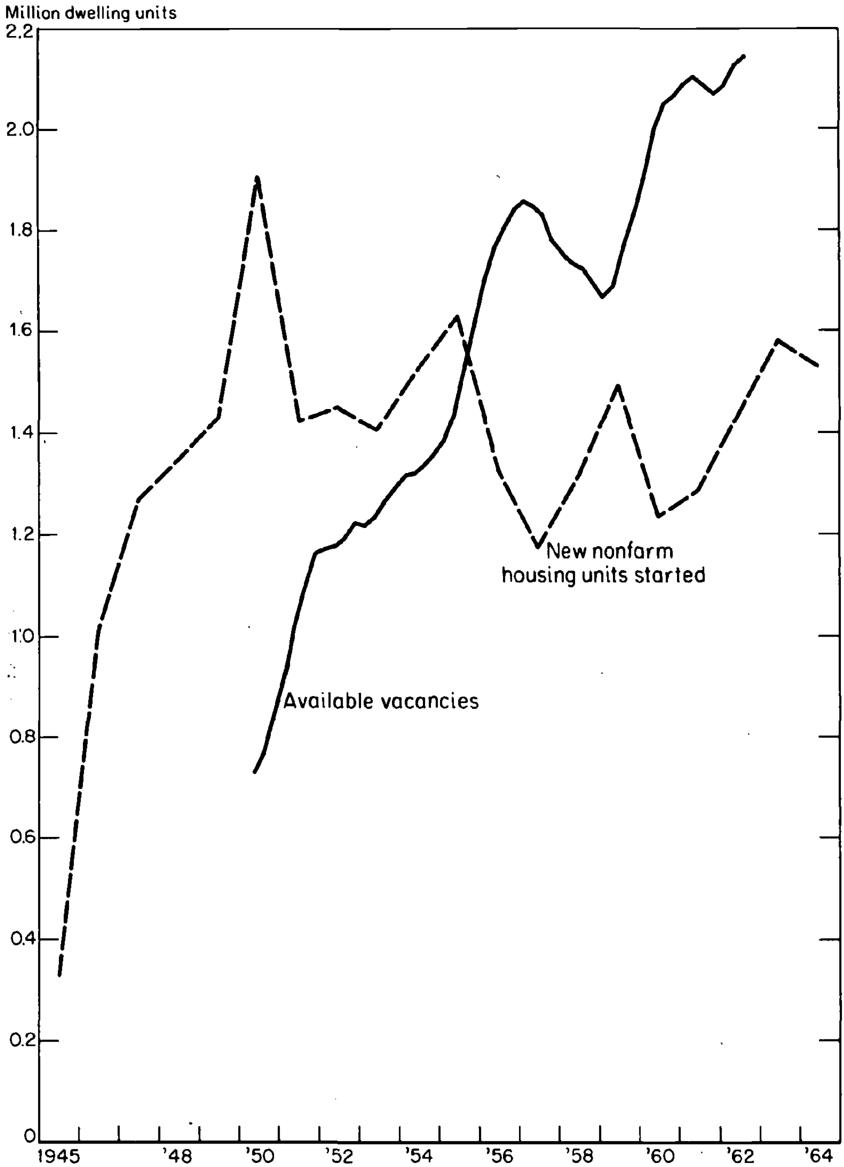
Metropolitan Vacancy Rates for Five Cities and Urban Building Index, Germany, 1810–1913 (1890–1900= 100)



ing. Our analyzed records for eight marriage series showed that people married at a much more steady rate over time than they migrated. The amplitude for our marriage series ran to one-sixth and one-seventh of that of our population series. Accordingly, total marriages fluctuated nearly concurrently with building cycles, with a relatively low measure of variability at matched turning points (mean deviation of 1.03 ± 0.77 years) and a trend-adjusted correlation coefficient of 0.65 ± 0.05. Most of the single people who migrate ultimately marry, but they marry over a long distributed time lag. The distribution steadies the annual rate and scales down amplitude of fluctuation.

Both migrations and marriages directly add to the demand for housing. Augmented demand, in the first instance, reduces available vacancies and serves to signal changing conditions in the shelter market. Vacancy rates fluctuate systematically over a specific total amplitude, nearly matching that of residential building, 305.6 cycle relatives. There is an equilibrium stock of vacancies, adjusted to turnover or movement rates of tenants and owner-occupants, the age distribution of dwelling stocks,

CHART 5-7
U.S. Dwelling Production, 1945–1964 (Annually) and Vacancies, 1950–1962 (Quarterly)



and the tendency to dilapidation. The lag in local cycles of new building behind vacancies at turning points ranges from three to five years; the lag is very consistent, with relatively small lead-lag deviations (mean 2.25 years) on thirty-six matched individual turns, a trend-adjusted mean correlation coefficient of −0.77, and a ratio of reference to specific total amplitude of 0.78. On a nationwide level the relationship of residential vacancies to new building appears more irregular and for an extended period in Germany vacancy rates and new building fluctuate concurrently.

NOTES

1. "The cause of the increase of building is from the natural increase of mankind, that there are more born than die" (N. Barbon, 1685). See also [46, p. 25]; [206, p. 33]; [134, p. 368]; [233, pp. 373–383]; [231, pp. 12 ff.]; [161, pp. 317–319]; [40, p. 67]; [245, Chap. 3, 7, 9]; [50, p. 41].

2. Marriage potential may be statistically approximated by the stock of unmarried women, from age 14 to 44, as in recent American vital statistics reports (see [24, p. 240]). "Marriage eligibles" have been counted as all single persons over 15, plus all divorced or widowed persons [145, p. 21]. For a weighted marriage rate see [59, pp. 205–210].

3. See [126, pp. 508–518].

4. [197, p. 47 (see also data on age of marriage and illegitimacy, pp. 35 ff., 41 ff.)]. John Hajnal, in his celebrated study, characterized Sweden as a country "where both the age at marriage and the proportion who remain permanently single are high" [119, p. 249].

5. See [248, App. B; and 97, Vol. II, p. 943].

6. [136, p. 10]. Spiethoff [239, p. 15] reported that the amplitude of cyclical movements for marriages is numerically much more limited than for migrations. He noted however that marriages moved in step with cycle movements.

7. The respective percentage ratios of standard deviations to means are: marriages, 7.8; building, 20.7; migration, 73.7.

8. D. S. Thomas in her valuable investigation of American and British marriage rates and business cycles found that a synchronous correlation of indexes of marriage and business activity yielded the highest correlation coefficient and that lagging a year reduced the coefficient by 29 per cent for the United States and by 33 per cent for Great Britain [248, pp. 64f., 81ff.]. Hexter found synchronous timing with monthly data for Boston between 1903 and 1916. The maximum correlation is found when marriages lag one month behind wholesale prices; Hexter noted how steadily "the coefficients diminish on both sides of concurrence." The relationship was tested for fifty-three different pairings [125, pp. 151 ff.].

9. See the authoritative and comprehensive collection [88, II, pp. 156f., 175f., 360ff., 304ff., 464ff.; 24, p. 365]. A recent illuminating study of migration

indicates that migration affected marital status differently for the manual worker, student, business, or professional person. See [138, pp. 115–143].

10. Sex disparities were prominent in both short and long migrations. Between 1868 and 1910 nearly two male immigrants into the United States were counted for every female immigrant. Since return migratory flows were predominantly male (and single), the net sex cumulative balance improved; but by 1910 female foreign born numbered only 77.6 per cent of their male counterpart. See [162, Table B-4]. Sex disparities were of course compounded by regional and urban size-class disparities, which together tended to reduce the proportions of males marrying [250, pp. 223ff.].

11. The monumental field survey of wage-earner families carried out by the Immigration Commission disclosed that between 10 and 11 per cent of native-born wage-earning families kept 1.5–1.6 lodgers per household; 30.1 per cent of foreign-born households kept 3.53 lodgers per household [272, pp. 423–425]. A similar survey of 25,440 wage-earner families in 1901 showed that 9 per cent of families took in lodgers [271, p. 22]. In Berlin the fraction of households with lodgers fluctuated cyclically around a trend which, between 1861 and 1905, fell from around 20 per cent to 10 per cent. Amplitude of fluctuation is indicated by the fall in the percentage share of lodging families in 1875 (a cycle peak) of 20.9 per cent and 1880 (a cycle trough) of 15.3 per cent. The absolute number of lodgers between the two dates fell 26 per cent [219, p. 133]. For European urban areas generally, subletting or sharing has involved as many as 15 to 30 per cent of dwelling units [141, pp. 25ff., 103, 123, 157, 266, 303].

12. The Census rate of 6.8 per cent in 1940 reflected depression levels, while the 6.6 per cent rate of 1950 reflected acute housing shortages; the 1960 rate of 2.2 per cent probably reflects a structural level which will tend to persist. On this whole issue, see the account in [114, pp. 79–85].

13. The vacancy rate averaged 3.28 for the first two decades (1801–21) and 6.57 for the closing two (1891–1911). See [223, p. 106].

14. [142, p. 30]; [140, pp. 110ff., 267ff.]; [141, p. 103]; [282, p. 22]; [239, p. 62]; [136, p. 17]. In America, many analysts have examined the "normality" of a 5 per cent vacancy rate. See [137, p. 354]; [257, p. 442]; [128, pp. 252ff.]; [230, p. 3]; [133, pp. 22ff.]; [124, p. 5].

15. This deals with only one turning point, the 1909 peak; but available data given in Cairncross suggest that the trough in vacancies came somewhere near the middle of the 1890's, as required for "lead" consistency.