The Geography of Wartime Demographic Change: Japan, 1944-47

Keywords: Migration; war; demographic change; Japan; census; World War II

Abstract

This study examines the geography of demographic change in Japan at the end of World War II (1944-47) in relation to its preceding population growth trajectory. The trajectory is estimated using Japanese Census data at the prefecture level between 1920 and 1940, and subsequent annual population counts for 1944, 1945, 1946, and 1947 are compared to this trajectory to characterize and understand the impact of the War. The findings illustrate and highlight the highly unusual geographic and temporal patterns of population change at the close of the War. Key findings include a systematic characterization of prefectures according to their experience over the four years in four groups, the two largest cities, other urban prefectures, a ring of rural prefectures surrounding these urban prefectures, and peripheral rural prefectures. Similarly, each of the four years is characterized based on the unique pattern of population change specific to that year. In keeping with broad pre-War patterns, 1944 reveals a slight loss of population in rural areas and a slight gain in urban areas. 1945 is dominated by urban-to-rural migration as urban dwellers fled the cities to take refuge in rural areas from the Allied strategic bombing campaign. 1946 shows a partial reversal of the trend seen in 1945. The highlight of 1947 is the repatriation of large numbers of Japanese citizens from the territories lost by Japan in the aftermath of the War.

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Introduction

In terms of loss of life, World War II was "history's deadliest quarrel" (Clodfelter, 2008, p.581). The death toll "surpasses 30 million --- with 40 million a more likely figure and some estimates going up to 55 million" (Ibid). In demographic terms, therefore, the Second World War was one of the most significant (if not the most significant) human-made events in history. To date, the majority of the demographic literature on World War II has focused on death caused by war battles and the subsequent baby boom (Clodfelter, 2008; Ellman & Maksudov, 1994; Frank, 1999; Gruhl, 2007; Werrell, 1996). This focus precludes a holistic approach to the War's impact on population dynamics that were characterized not only by deaths and, later, births, but also by massive migration. Moreover, there is a dearth of studies on wartime population change in non-Western countries. For example, little is known about how World War II affected the Japanese population, despite Japan's deep involvement in the war as a member of the Axis powers (Bix, 2001). Past research on the consequences of World War II for Japan's population has tended to focus on comparisons of population change between the 1930s (i.e., before the outbreak of the war) and the late 1940s, after the war ended (Taeuber, 1958). By contrast, the current study adopts a prospective approach and employs prefecture-level population data from 1920 to 1947 to evaluate the demographic impact of World War II on Japan's population in relation to its long-term growth trajectory. Specifically, we compare estimated prefecture-level population counts using a trajectory based on quinquennial census data from 1920 to 1940 to the observed population counts obtained through published annual population data for the period 1944-47 to gauge the geographic and temporal nature and extent of the demographic impact of World War II on Japan.

The Demographic Impact of World War II on Japan

While Japan's population had increased rapidly from 55.96 million in 1920, when the first national population census began, to 73.114 million in 1940 (Sōrifu Tōkei Kyoku, 1940), World War II had a devastating impact on it. The estimated total population of Japan after its surrender in 1945 was approximately 71 million (Economic and Social Commission for Asia and the Pacific, 1984; Taeuber, 1958). Demographers have focused their attention on the mortality caused by the war. A recent study suggests that Japan lost about 2 million soldiers and 1 million civilians during the war, approximately 4% of the pre-war Japanese population (Kesternich *et al*., 2014). Despite numerous scholarly efforts to reconcile the numbers, the accuracy of the death counts remains contested (Dear & Foot, 1995). Moreover, because of the focus of the U.S. strategic bombing campaign on major cities such as Tokyo, Osaka, Yokohama, Kobe, Nagoya and Kawasaki, and the atomic bombing of Hiroshima and Nagasaki, these figures present conspicuous regional differences (Craven & Cate, 1948; Dower, 1986; Gruhl, 2007; Hall, 1998; United States Strategic Bombing Survey, 1947; Werrell, 1996). Figure 1 presents a map of the Japanese cities that were targeted in the strategic bombing campaigns.

[Figure 1 about here]

A second major demographic phenomenon caused by World War II that has received much less attention than wartime mortality is the large-scale annual fluctuation in prefecture-level population during the period 1944 to 1947, caused by internal and international migration. Prior to early 1944, Japan's population had followed a pre-war urbanization trend, with a continuous influx of people from rural areas to urban centers (Cole, 1943; Division of Far East Intelligence, 1946a). The arrival of the war in the

Japanese home islands in early 1944 precipitated a reverse pattern of urban-to-rural migration as urban dwellers escaped to rural areas to seek refuge from the intensifying air raids targeting major cities such as Tokyo and Osaka (Havens, 1978; Kornhauser, 1958). Accounts of this pattern estimated a movement of 8-10 million people (Division of Far East Intelligence, 1946b; Air University (U.S.), 1987). This war-induced phenomenon has been referred to as "one of history's greatest migrations," and is so massive as to be comparable in scale to other historic population movements such as the southward migration of the Han Chinese in the third century or the Great Migration of African Americans in the U.S. from 1940 to 1970 (Havens, 1978, p. 167). A third demographic phenomenon that has also received little attention is the large-scale repatriation of overseas military personnel and civilians back to Japan after 1945. Approximately 6.6 million Japanese are estimated to have returned to Japan proper from overseas, including the territories controlled by the then Soviet Union (Havens, 1978; Nimmo, 1988). This repatriation comprised approximately 45 percent of a post-war increase in Japan's population between 1945 and 1950 (Steiner, 1952).

While the demographic impact of World War II on Japan has been the subject of numerous studies, to date there has not been much systematic research on it (an exception is Davis & Weinstein (2002) which focuses on economic consequences of the War, which stemmed in part from demographic change). The studies referenced above have relied on anecdotal data which, while very valuable for describing localized phenomena, do not provide a countrywide portrait of change. In addition, those studies that have reported changes in population have done so using the simple arithmetic of increase or decrease. Such calculations, while revealing in their own right, do not capture true demographic impact in the following sense. Consider a large city of, say, 10 million people. An annual

increase in the population of that city of 5,000 would amount to a far less significant change than the same increment would for a city with a population of 25,000. Similarly, if a city has historically experienced very rapid population growth, then, given its trajectory, a modest increase in population should not be considered as significant as the same increase for a city of the same size but with a much slower rate of population growth. All of this is to say that, absent some demographic context, evaluation of a simple change in the total number of people in a city can lack meaning. None of the above studies have attempted to evaluate the changes in population in the demographic context of the affected areas.

To address the overemphasis in past research on World-War-II-related deaths in Japan and the relative inattention to overall changes in population, we use prefecture-level population data from 1920 to 1940 to estimate a long-term growth trajectory of the populations of Japan's prefectures. We then project this 'normal' population growth trajectory forward in time and compare the estimates obtained for the period 1944-47 to the observed annual population counts for those years. Our study adds to the current literature in the following ways. First, we demonstrate how Japan's population was impacted by World War II over time during and after the war. Second, the results show patterns of population loss or gain at the prefecture level, thereby illuminating the demographic consequences of the war in a geographically nuanced manner. Finally, we use the observations gained from the above exercises to understand how some of the short-term demographic consequences of war may be mitigated through deliberate measures.

Data and Methods

To assess the impact of World War II on Japan's population growth and geographic distribution, we estimate prefecture-specific population growth trajectories using data from

1920 to 1940, and compare prefecture-specific projections of this trajectory into the war years with the observed population enumerations available for the years 1944, 1945, 1946, and 1947. Our analytic strategy is detailed in the method section.

Data

The data used in the estimation of prefecture-specific population trajectories range from 1920, when the first national population Census became available in Japan to 1940, including five censuses (1920, 1925, 1930, 1935, 1940) for 46 prefectures (Okinawa is not included). All census data were obtained from the census reports published by the Japanese government except for the 1940 data, which we downloaded from the website of the Statistics Bureau of Japan (Statistics Bureau, 2015). Population counts for the censuses were generally computed on a *de facto* basis. According to the 1950 census report, the 1920, 1925, 1930 and 1935 censuses were all conducted on a de facto basis and included all persons in Japan at the time of the census (Bureau of Statistics, 1950). The original 1940 census enumerated the civilian population on a *de facto* basis and military personnel on a *de jure* basis. For the military personnel, married males were reported to be at the place where their wives resided, and unmarried males were reported to be at their parents' residence regardless of their actual whereabouts (Bureau of Statistics, 1950). Because of the two different enumeration systems in the original 1940 census, we opted to use updated data available from the website of Japan's Bureau of Statistics, which were adjusted by deducting the estimates of military personnel and military civilians outside Mainland Japan (i.e. *naichi*), rendering it more consistent with the *de facto* system adopted by the previous censuses. The 1945 census was also conducted on a *de facto* basis, excluding all military

personnel and foreigners except persons previously categorized as extra-territorials (Bureau of Statistics, 1950).

Methodology:

In order to contextualize the population statistics reported for the population counts of 1944, 1945, 1946, and 1947, we estimate a panel data model of population growth at the prefecture level using data from the quinquennial censuses of 1940 and earlier (Chandra *et al.*, 2012; Chandra, 2013). Projecting the prefecture-specific population growth trajectories forward in time enables us to evaluate the observed populations of the various prefectures in 1944-47 in the context of the pre-war population growth trajectories of those prefectures, thereby providing an appropriate demographic context for understanding the changes in population that occurred during the War. The proposed model treats the 46 prefectures of Japan as individual units, each with its own population growth trajectory. In this manner, the panel data methodology leverages the information available at the prefecture level to generate a robust and detailed picture of population change and the impact of the War on that process. This method is also flexible enough, given the size of the dataset, to accommodate prefecture-specific heterogeneity. The general panel specification of the model allows for the estimation of prefecture-specific growth processes, each with a prefecture-specific estimate of population loss from the War, while still leveraging the entire set of observations to create an aggregate estimate for Japan. The model estimated in this paper is, therefore, the panel form of the standard population growth model with the end-point coinciding with the outbreak of the War:

$$LPOP_{it} = \pi_{0i} + \pi_{1i} T_t + \varepsilon_{it}\,.$$

In the general model, $LPOP_{it}$ is the natural logarithm of population in prefecture *i* at time *t*, T_t is the linear time trend, ε_{it} is a random error term, and π_{0i} and π_{1i} are coefficient estimates representing initial (logged) population level and the rate of population growth. This specification yields the standard exponential population growth rate process, allowing for prefecture-specific variation. SAS software was used to estimate the model (SAS, 2011b; 2011c). While numerous specifications are available for modeling purposes (one- or two-way fixed or random effects models, with various specifications for the random error term), for the purposes of ease or exposition and interpretation, we elected to use a model in which the prefecture was modeled as a fixed effect both individually and interacted with the time trend. Note that the point estimates defining the population growth trajectory would be identical to those generated by, say, a prefecture-specific random intercepts model. The broad results of the paper are not sensitive to the choice of model specification. The prefecture-specific population trajectories obtained from the above model were used to compute estimated population for the years 1944, 1945, 1946, and 1947 based on the pre-war trajectories. These projections were then compared with the observed population for each prefecture for each of the years to arrive at an estimate of unaccounted-for population in each year and each prefecture (Figure 2).

[Figure 2 about here]

Because the pattern of unaccounted-for population in each prefecture in each year varied substantially based on the location of the prefecture, we then used SAS/STAT® software to cluster the prefectures on the basis of four variables consisting of unaccounted-for population as a percentage of observed population for each of the four years 1944, 1945,

1946, and 1947 (SAS, 2011a). The k-means clustering method using Euclidean distances was selected and implemented using PROC FASTCLUS to create a prefecture-level typology of wartime demographic change.

Results:

Our analysis shows how the Japanese population deviated from the expected (pre-war) trend during the War. Table 1 contains prefecture-specific estimates of unaccounted-for population in numbers and as a percentage of prefecture population. These figures show starkly varying patterns of population loss for each of the four years between 1944 and 1947.

[Table 1 about here]

[Figures 3a-d about here]

The maps in Figures 3a-d demonstrate a clear temporal pattern of demographic change during this period. The pattern in the 1944 map (Figure 3a) is one of generally lower population relative to the trajectory for the vast majority of Japan's prefectures. Relative to the pre-war trend, we see gains for only seven of the 46 prefectures. These prefectures include four surrounding Tokyo (Chiba, Ibaraki, Kanagawa and Saitama) and three others in southern Japan (Hiroshima, Yamaguchi and Nagasaki). By 1945, however, the picture has taken a dramatic turn (Figure 3b). Now, the large majority of rural prefectures show a gain relative to where they should be according to the pre-war trajectory. These gains are especially pronounced in the vicinity of the major metropolitan areas of Tokyo, Yokohama, Nagoya, Osaka, and Kobe, all of which show population deficits relative to the trend. Examples of such rural prefectures include Saitama, Yamanashi, Nagano and Nara. This picture is consistent with the aftermath of the US strategic bombing campaign of 1944-45,

which targeted major Japanese cities, causing millions of urban dwellers to flee to neighboring rural prefectures. Figure 3c, for 1946, shows a partial reversal of the pattern seen in Figure 3b for 1945. A year after the cessation of the War, we see the return of some (but not all) of Japan's urban populations to the major cities, lessening the positive deviation of population from the trend for a number of neighboring rural prefectures including Nagano, Tochigi and Yamanashi. While repatriation of Japanese from the territories of the former Japanese Empire (Korea, Manchuria, and Taiwan) was already under way at this time and likely contributed to increases in the populations of a number of rural and urban prefectures, this dynamic was clearly overshadowed by the phenomenon or rural to urban return migration. It is also clear from Figure 3c, however, that the cities (e.g. Tokyo, Osaka, Hiroshima and Nagasaki) have not completely recovered from the devastation of the War --- their populations are still below the pre-war trend. Finally, the 1947 map (Figure 3d) shows an interesting change over 1946 --- the rural prefectures appear to gain from another population influx, propelling a number of them, such as Ishikawa, Tochigi and Oita, well above the trend. Given the timing of this last change, it is very likely due to the repatriation and return of large numbers of Japanese from the overseas territories that formed part of the pre-war Empire of Japan, including Korea, Manchuria, and Taiwan.

As is evident from the Figures 3a-d, different prefectures in Japan experienced very different demographic changes during the 1944-47 period. The four clusters (two urban and two rural) of prefectures based on the deviation of population from the trend as a percentage of total population differed markedly from each other in terms of the percentage deviation from the trend in each of the four years. The two urban clusters, furthermore,

perfectly match in membership the ‘Metropolitan’ (Osaka and Tokyo) and ‘Other Industrial’ (Aichi, Fukuoka, Hyogo, Kanagawa, and Kyoto) clusters of prefectures identified in Taeuber’s industrial typology of prefectures (1958; Map 6, p.88) based on the 1930 census of Japan.

[Figure 4 about here]

Figure 4 shows the mean characteristics of each of the four clusters obtained. Each cluster shows its own interesting demographic pattern. The first urban cluster, consisting of Tokyo and Osaka, shows the most dramatic decline in population relative to the trend during the strategic bombing campaign of 1944-45. The second cluster, likewise, shows a negative deviation, albeit a less dramatic one than the Tokyo-Osaka cluster, during the campaign. Both urban clusters show a gradual recovery of population relative to the pre-war trend in the subsequent years. The pattern in the rural clusters is the opposite of that in the urban clusters, with both clusters showing sustained gains in population after 1944. There are interesting contrasts between the two rural clusters. In one rural cluster, the prefectures experience a jump in the deviation from the pre-war trend from close to 0% in 1944 to 20% in 1945, followed by a continued gradual increase in the positive deviation from the trend in 1946 and 1947. The second rural cluster also shows increase in population relative to the trend, though this is much smaller in magnitude. Figure 5 is a map showing the locations of the prefectures by cluster membership. Prefectures in the rural cluster showing the dramatic jump in population relative to the trend in 1945 tend to be located in the vicinity of the large cities that experienced declines in population, hence the cluster is named the “Rural Ring” cluster. Prefectures in the other rural cluster tend to be located in

peripheral areas of Japan and far from the large metropolitan areas, hence the cluster is called the "Peripheral Rural" cluster.

[Figure 5 about here]

Discussion and Conclusion

The above results demonstrate, in a geographically detailed and systematic manner, both the temporal and the spatial distribution of population across Japan during the conclusion of World War II, within the context of the population growth trajectory of pre-War Japan. This contextualization enables us to assess the severity of the problems facing the Japanese people in a demographically robust manner. Specifically, we are able to assess whether changes in population were what one would expect given demographic trends in 'normal' years, or whether these changes were out of the ordinary and, if so, how unusual they were. Our findings indicate the unusual and geographically and temporally systematic changes that Japan experienced during and immediately after the War. Each of the four years analyzed shows a different set of dominant demographic forces, and the geographic analysis provides a coherent typology of prefectures based on these dominant forces.

Our focus on population deviations from expected levels based on the pre-war trajectory complements the extant literature, which emphasizes war casualties. The population deficits or surges we observed during the four-year period resulted from the interplay of the three fundamental demographic processes – mortality, fertility and migration. Our findings on prefecture-level population changes coincide with the existing but sparse and largely anecdotal literature on the large-scale migrations both during and after World War II and lay a foundation for future research that should endeavor to assess how the three demographic processes contributed individually and in combination to

population changes due to the war. Moreover, the positive deviations of population counts from the pre-war trend in numerous rural prefectures taps at least in part into a demographic phenomenon largely ignored in the literature (for a notable exception, see Nimmo (1988)) – the return migration of overseas population due to the loss of territories. Germany also experienced similar return migrations of refugees from former territories and several Eastern European countries after the defeat of World War II (Brackman et al., 2004). The adaptation of these returning migrants to and their potential impact on Japanese society deserve greater attention from scholars.

This study also bears important implications for countries at war. First, our prefecture-specific analysis of wartime population change illustrates the collective nature of civilian response to war. As military actions during wartime tend to focus on urban centers, as seen in the case of strategic bombings of targeted major cities in Japan, such targeted attacks will likely lead to large-scale urban-to-rural migration and the depletion of urban population as demonstrated by the data. More importantly, our analysis shows that urban refugees tend to relocate to rural areas in the immediate neighborhood of major urban centers instead of more remote rural areas, creating the "rural ring effect" seen in our typology.

Such patterned movements in response to war attacks have important implications for countries in frequent conflict situations in terms of civilian logistics. First, governments of conflict-ridden countries should have a carefully-designed and sustainable evacuation plan of urban populations. The experience of the Japanese government in World War II has demonstrated that evacuation of civilians (and schoolchildren in particular) from major cities before the war escalated in 1944 prevented even greater casualties from the war. Additionally, governments should consider enhancing the infrastructure of rural areas

adjacent to major urban centers in preparation for a large-scale influx of urban refugees. Finally, to the extent that such migrations can impose sudden and unsustainable burdens on these neighboring rural areas (Havens, 1978), the creation of transportation infrastructure to more evenly distribute such populations across a broader area is likely to yield benefits both for refugees and for their hosts.

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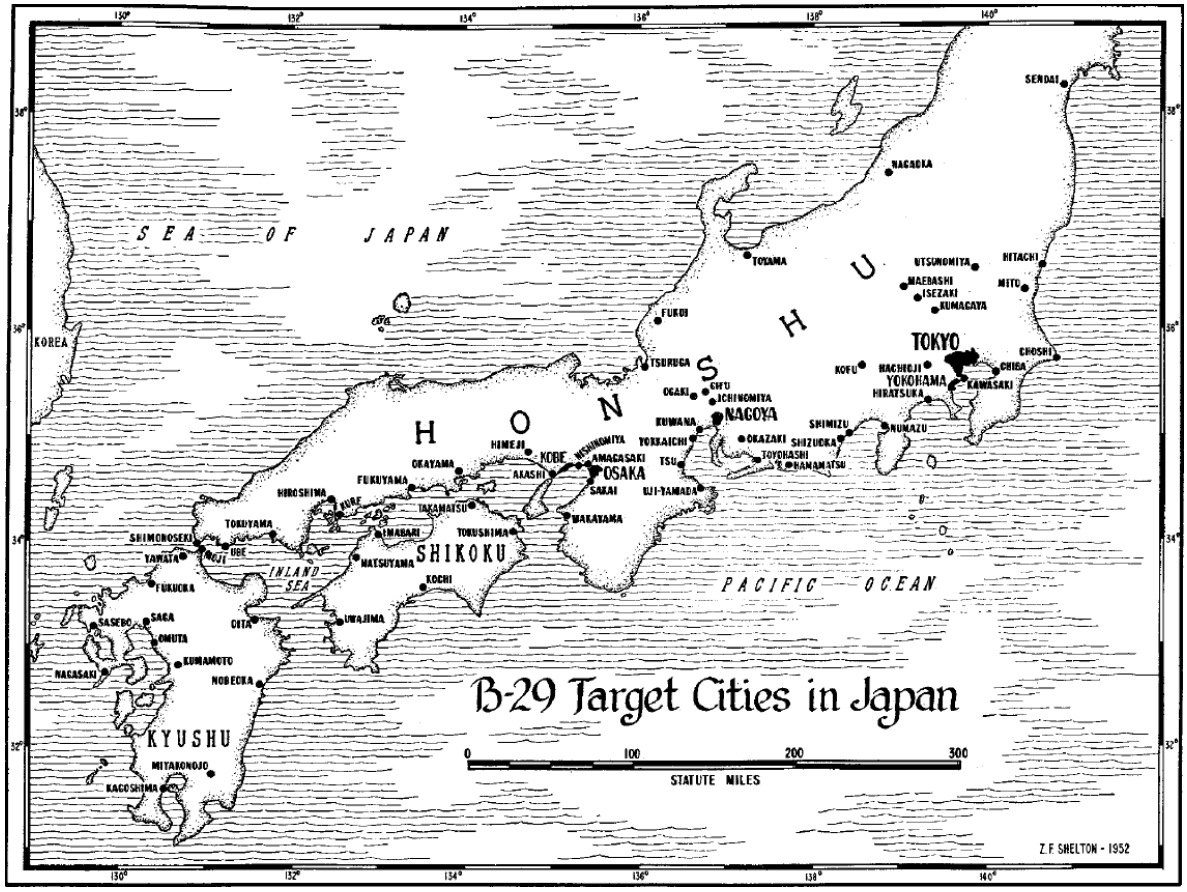
Tables and Figures

Table 1: Deviation of Population from the Pre-War Trend by Prefecture and Year

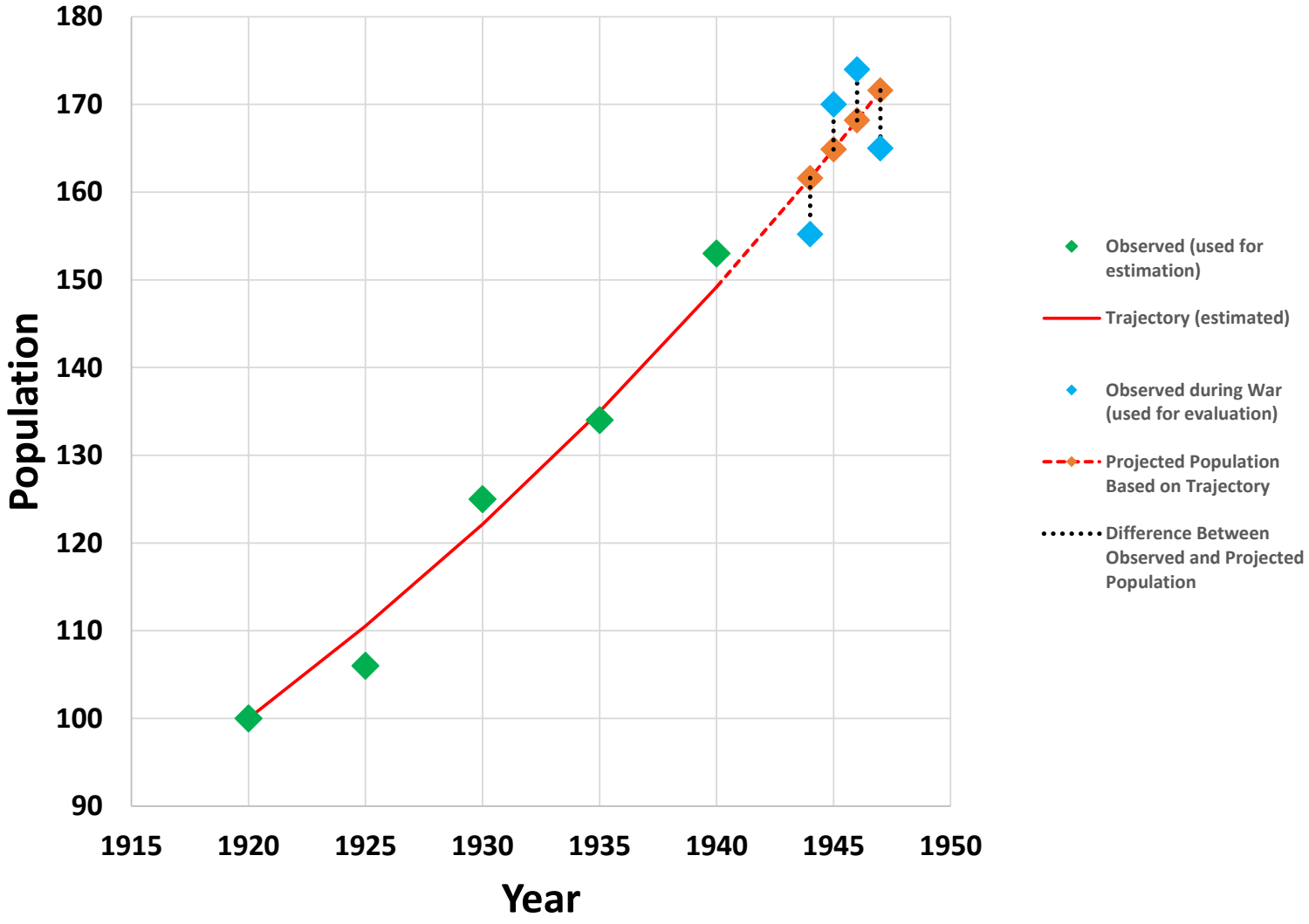
Prefecture ↓	1944		1945		1946		1947	
	Deviation from Trend ('000s)	Deviation from trend (%)	Deviation from Trend ('000s)	Deviation from trend (%)	Deviation from Trend ('000s)	Deviation from trend (%)	Deviation from Trend ('000s)	Deviation from trend (%)
Cluster 1: The Two Big Cities								
Osaka	-958.98	-19.81	-2857.46	-53.19	-2766.62	-48.89	-2666.25	-46.43
Tokyo	-1043.32	-14.06	-5312.88	-63.90	-4761.89	-54.11	-4385.49	-49.03
Cluster 2: Major Cities								
Aichi	-81.41	-2.59	-620.50	-18.46	-593.25	-17.06	-492.38	-14.02
Fukuoka	-124.79	-4.14	-536.99	-16.83	-404.06	-12.30	-213.68	-6.45
Hyogo	-117.89	-3.73	-614.62	-18.39	-637.65	-18.56	-488.88	-14.11
Kanagawa	168.07	7.94	-541.06	-23.46	-416.18	-17.29	-307.49	-12.62
Kyoto	-222.94	-12.62	-302.00	-16.25	-297.50	-15.61	-221.70	-11.55
Cluster 3: Rural Ring								
Akita	-34.63	-3.28	114.34	10.55	94.23	8.59	143.66	13.04
Aomori	-46.91	-4.66	2.04	0.19	0.74	0.07	69.81	6.41
Fukui	-30.66	-4.76	67.92	10.41	37.53	5.71	64.39	9.78
Gifu	-25.91	-2.06	210.23	16.27	130.84	10.00	166.31	12.66
Gumma	-18.86	-1.46	185.24	13.84	157.33	11.56	186.08	13.61
Hiroshima	57.29	3.10	-48.93	-2.57	-41.24	-2.13	44.06	2.27
Hokkaido	-208.73	-6.37	-45.11	-1.30	-104.08	-2.92	174.40	4.86
Iwate	-39.43	-3.60	59.61	5.21	41.85	3.58	65.99	5.61
Kagoshima	-33.78	-2.11	-103.84	-6.38	-16.70	-1.02	87.43	5.31
Kochi	-26.89	-3.76	52.80	7.33	74.29	10.28	122.34	16.91
Mie	-6.14	-0.51	168.56	13.87	143.18	11.68	178.99	14.57
Miyagi	-68.33	-5.32	86.89	6.46	77.73	5.65	155.34	11.22
Miyazaki	-47.12	-5.55	7.64	0.86	46.21	5.10	97.21	10.66
Nagasaki	105.00	7.81	-88.08	-6.36	5.34	0.38	101.13	7.16
Niigata	-97.34	-4.76	273.77	13.09	204.12	9.65	275.22	12.97
Shizuoka	-84.09	-4.16	62.51	2.96	88.96	4.12	142.04	6.54
Tokushima	-29.84	-4.11	98.68	13.46	91.19	12.37	113.20	15.33
Toyama	-13.74	-1.68	112.35	13.48	88.86	10.56	128.45	15.22
Wakayama	-43.56	-5.00	35.01	3.93	29.35	3.26	47.49	5.25
Yamagata	-72.59	-6.42	157.11	13.59	121.94	10.43	151.44	12.91
Yamaguchi	58.26	4.63	36.21	2.79	49.12	3.72	134.60	10.15
Cluster 4: Peripheral Rural								
Chiba	29.88	1.89	314.67	19.31	349.85	21.17	434.65	26.20
Ehime	-16.34	-1.38	147.93	12.30	164.07	13.52	228.09	18.75
Fukushima	-67.81	-4.18	267.00	16.01	221.73	13.12	275.52	16.24
Ibaraki	2.87	0.18	266.52	16.12	256.11	15.26	308.33	18.30
Ishikawa	-14.02	-1.85	129.33	17.07	118.88	15.68	169.02	22.29
Kagawa	-36.55	-4.93	109.54	14.61	116.87	15.50	158.41	20.97
Kumamoto	-33.91	-2.45	140.66	10.01	213.02	15.05	337.44	23.78
Nagano	-100.21	-5.80	358.66	20.49	262.92	14.92	284.32	16.10
Nara	-22.91	-3.69	145.42	23.09	108.81	17.16	140.47	22.10
Oita	-26.35	-2.68	115.30	11.53	137.66	13.64	213.97	21.15
Okayama	-18.26	-1.37	203.17	15.03	174.33	12.80	246.87	18.10
Saga	14.31	2.08	138.22	19.99	164.23	23.73	224.60	32.43
Saitama	5.37	0.34	379.56	23.11	353.53	21.20	403.49	24.09
Shiga	-26.00	-3.67	138.21	19.25	107.25	14.84	130.28	17.99
Shimane	-12.29	-1.66	116.60	15.71	104.87	14.10	148.81	20.00
Tochigi	-35.39	-2.92	292.90	23.64	246.04	19.63	264.39	21.02
Tottori	-16.24	-3.33	68.61	13.93	62.23	12.58	90.64	18.30
Yamanashi	-37.66	-5.71	159.84	23.77	115.85	17.06	120.42	17.68
ALL JAPAN	-3500.77		-5848.44		-5278.14		-1946.57	

Figure 1: Cities Targeted by Strategic Bombing Campaign (B-29 Aircraft only)



Source: Craven and Cate (1948; 1983 imprint), p.2.

Figure 2: Method Used to Evaluate Population Changes in Japan in 1944-1947



Figures 3a: Percentage Deviation of Observed Population from Pre-War Trend by Prefecture, 1944

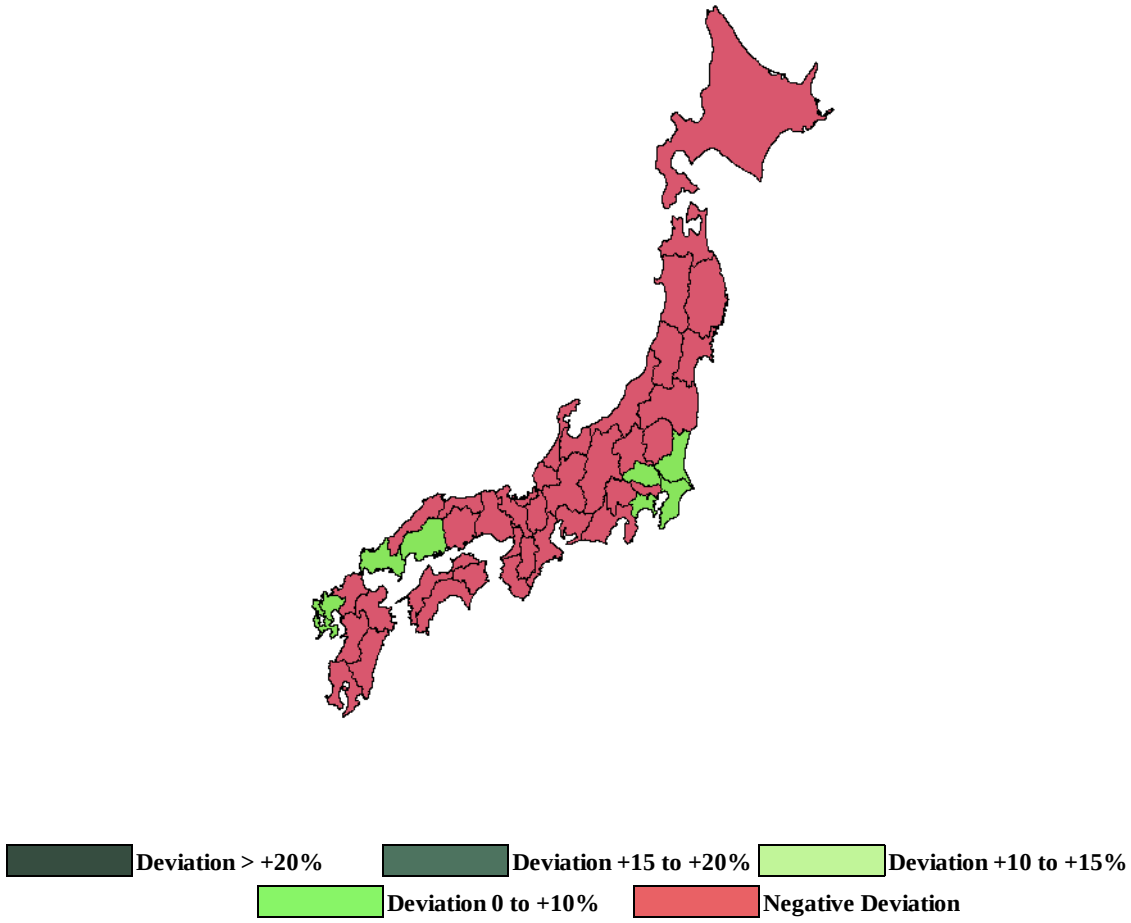


Figure 3b: Percentage Deviation of Observed Population from Pre-War Trend by Prefecture, 1945

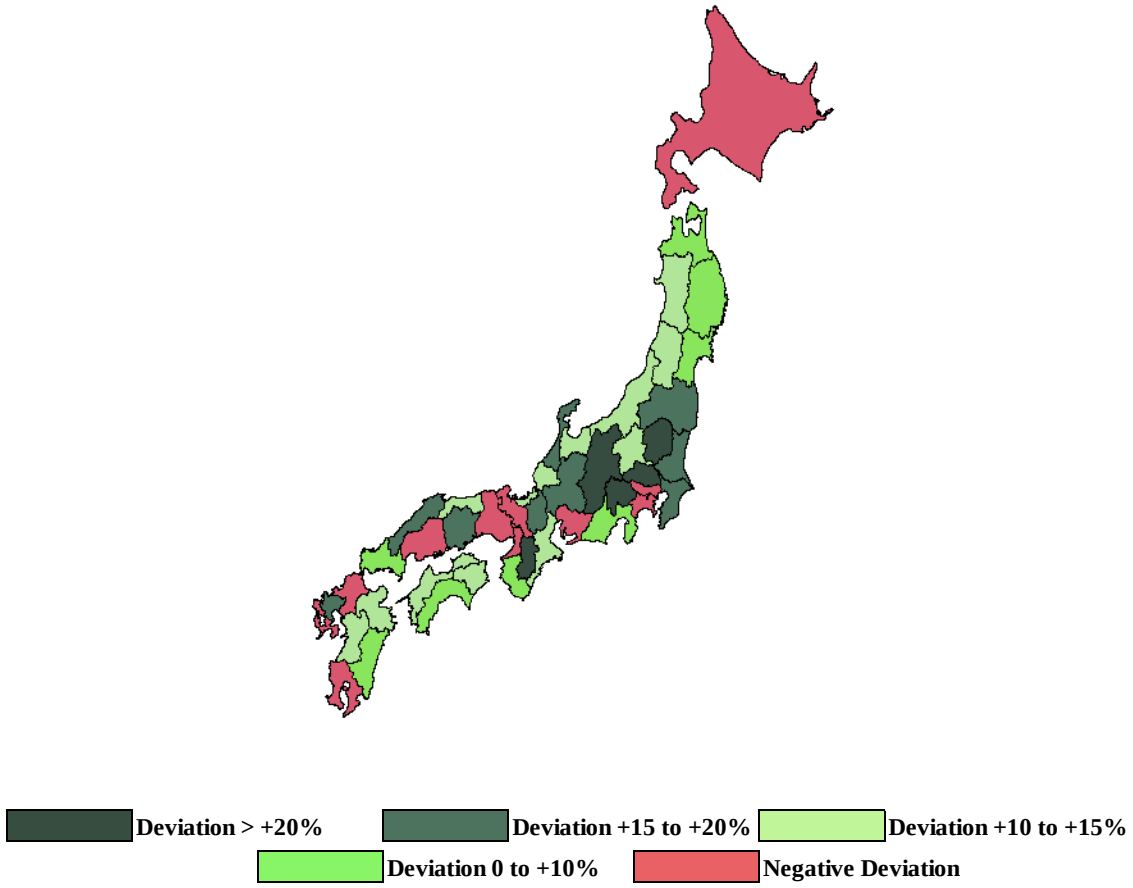


Figure 3c: Percentage Deviation of Observed Population from Pre-War Trend by Prefecture, 1946

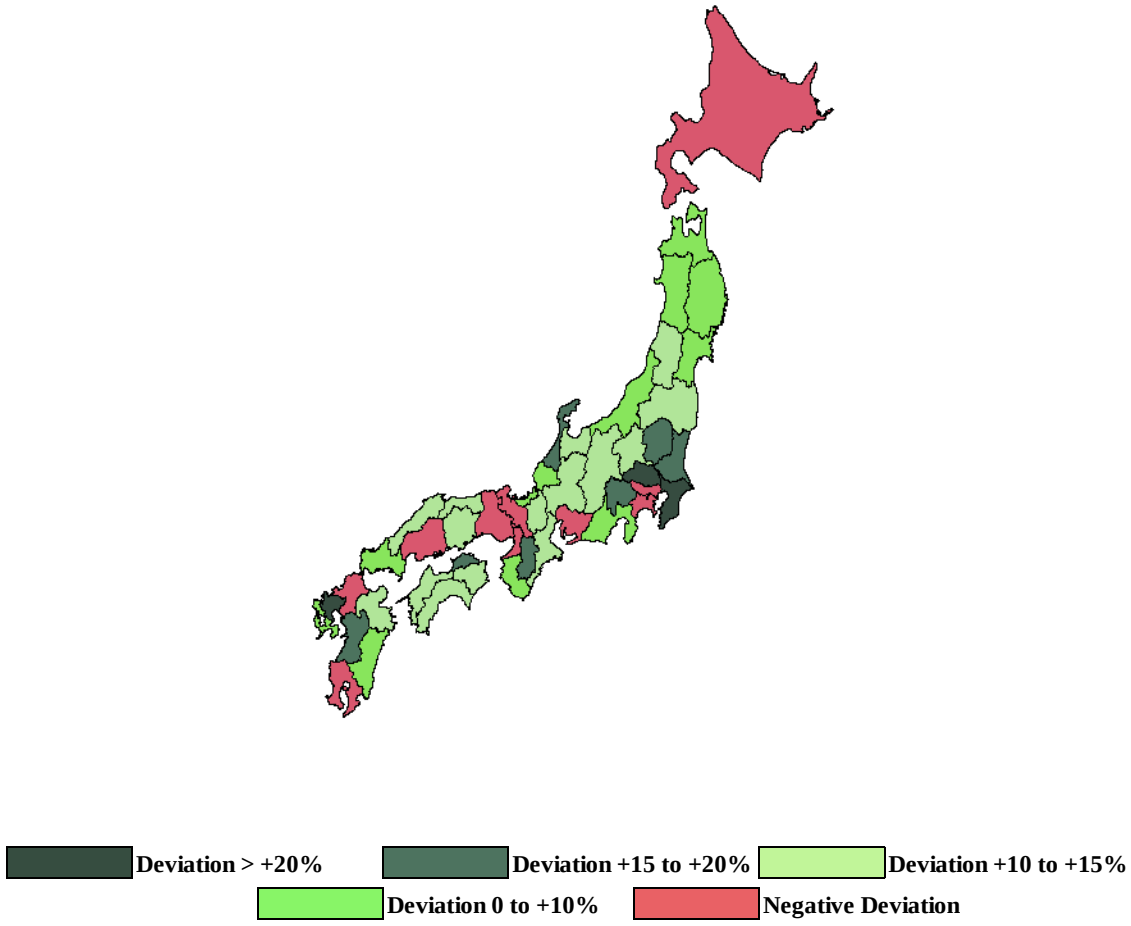


Figure 3d: Percentage Deviation of Observed Population from Pre-War Trend by Prefecture, 1947

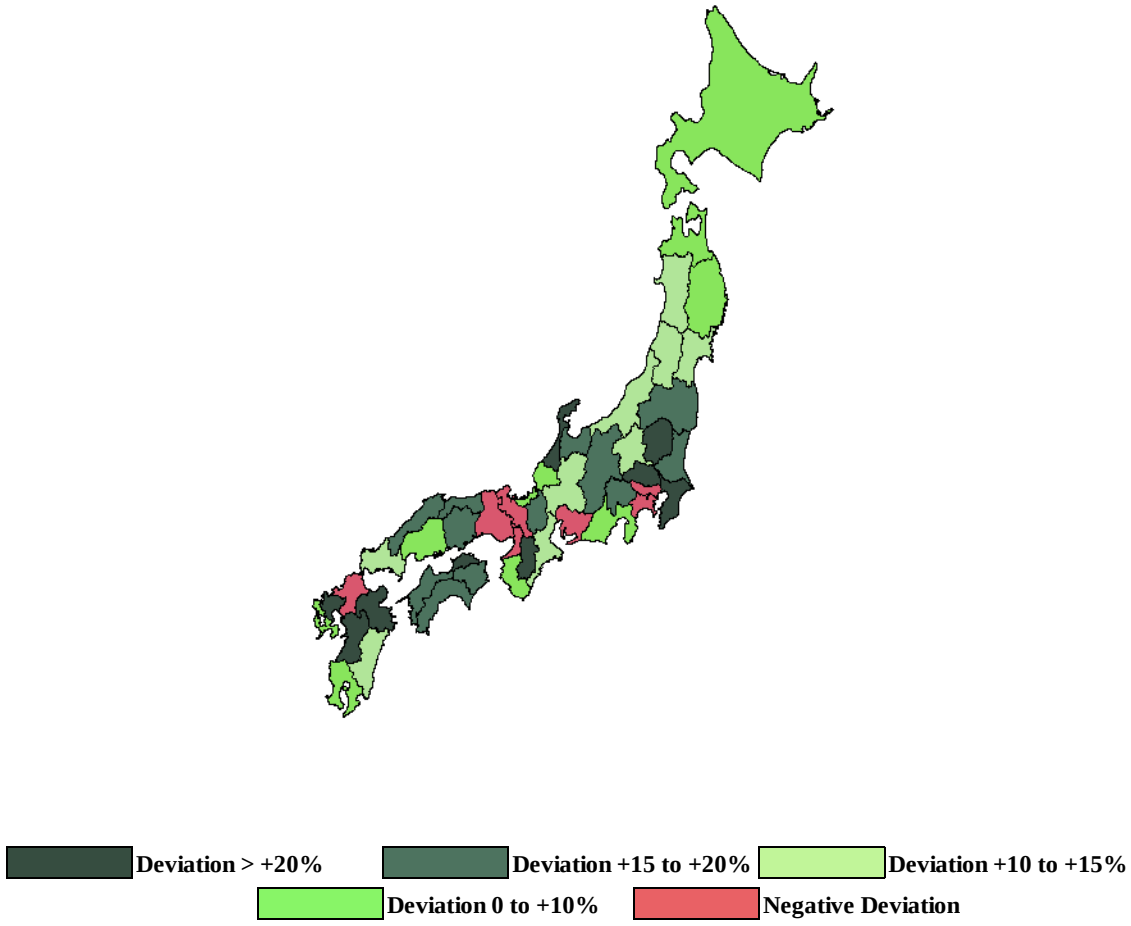


Figure 4: Deviation (%) of Population from Pre-War Trajectory: Prefecture Clusters (1944-1947)

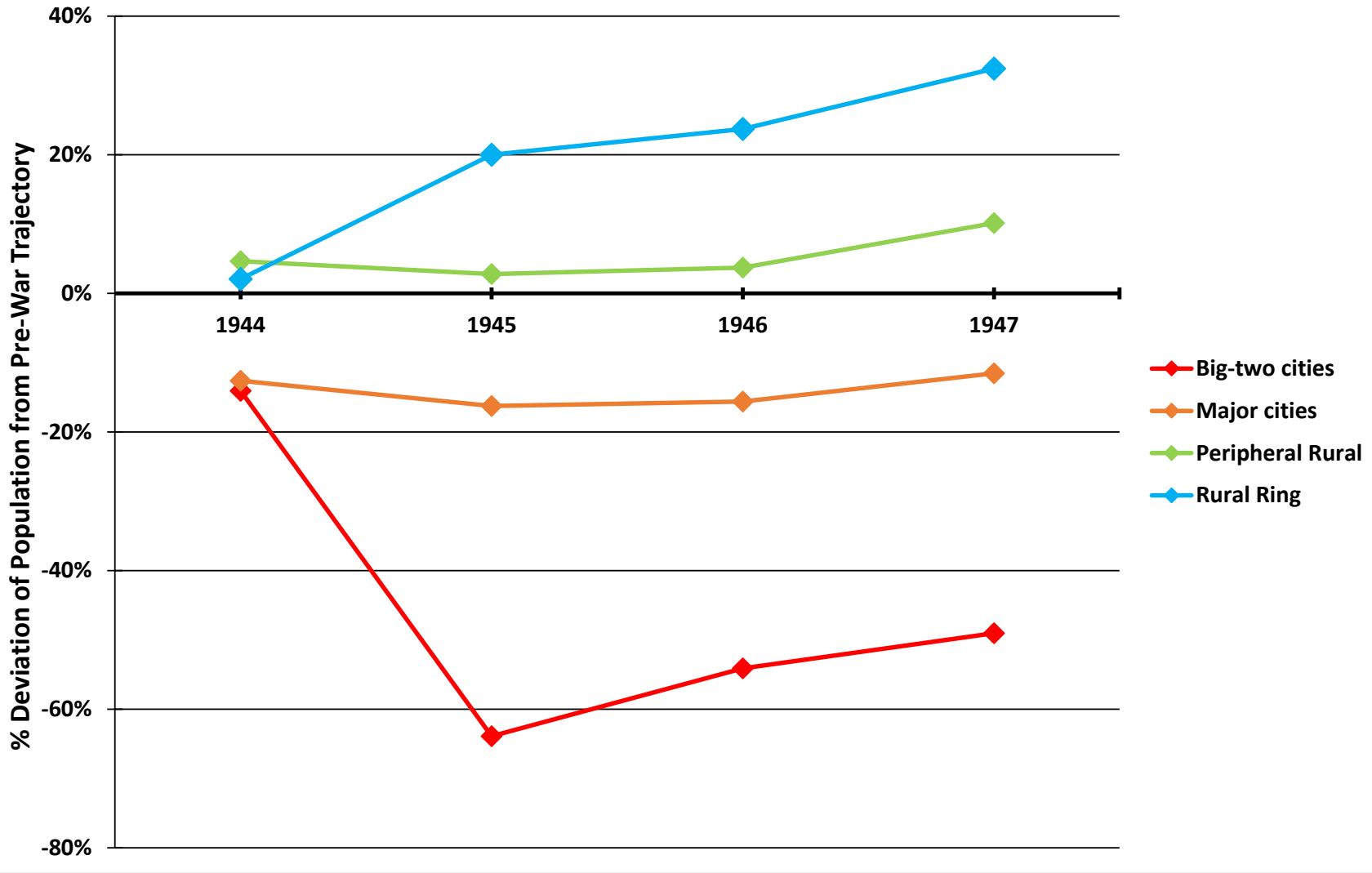


Figure 5: Prefectures by Cluster Membership