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Research Article

Beyond the exodus of May–June 1940: Internal migration in France during the Second World War

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Beyond the exodus of May–June 1940: Internal migration in France during the Second World War

Florian Bonnet¹

Abstract

BACKGROUND

Research on annual migration between regions of the same country is scarce because statistical sources are often lacking. Consequently, little is known about migration between French regions during the Second World War.

OBJECTIVES

Propose a new method to estimate the annual populations of each region and deduce the annual migration flows between regions of the same country. Use this method to present the chronology of inter-regional migration flows in France during the Second World War.

METHODS

Annual regional populations are estimated using census populations and death-by-cause statistics at the local level. Death-by-cause statistics can be used to dissociate symmetrical mortality, which trends in the same way in the national territory, from asymmetrical mortality, which trends differently. This makes it possible to deduce the trend in the mortality rate and populations at the local level.

RESULTS

Analysis of French migration reveals that (1) a large proportion of the population (up to 60%) was displaced from the north to the south in 1940 and 1941; (2) the demarcation line did not prevent population movements; (3) the demographic scars of war were still present in 1946 since not all the refugees from the northwest and northeast returned.

CONTRIBUTIONS

This new method for analyzing annual migration flows between regions could be replicated to study other specific historical events. This paper also proposes a quantitative historical analysis of migration in France during the Second World War and shows that some territories were emptied of more than half their population in a few months.

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1. Introduction

On 10 May 1940, the “Phoney War” ended abruptly in France. After eight months of little or no fighting with the French, the German armies created a new front in the west, attacking Belgium, the Netherlands, and Luxembourg before entering France near Sedan on 12 May. The Germans and their devastating air force defeated the French and English armies in just 15 days. The offensive reached a climax at Dunkirk on 4 June, when the encircled Allied soldiers were evacuated to the United Kingdom thanks to a fleet of small civilian boats requisitioned at the last minute. The Germans then moved south, encountering no significant resistance. Large columns of refugees appeared on the roads, fleeing south. The German armies had crossed half of the country by the time the armistice was signed on 22 June. This terrible defeat led to the Germans occupying France for 4 years. Until 11 November 1942, only the north of the country was occupied, up to a demarcation line with the south that in some places split villages in two for no particular reason. In the forbidden zone in the northeast, refugees were prohibited from returning to their abandoned homes until 18 December 1941. The whole of France was occupied from 11 November 1942 to 1944, when it was gradually liberated following the Allied landings in Normandy (6 June 1944) and Provence (15 August 1944).

Mapping these events, Figure 1 reveals how much France was affected by external shocks during the Second World War. These shocks drove significant migratory flows, with civilians fleeing the fighting in 1940 and 1944 and German oppression during the occupation. Yet no study in the literature has thus far proposed a quantitative analysis of internal refugee flows on an annual basis during the Second World War. This is because estimating these population flows requires access to accurate data and a specific methodological protocol. This paper therefore makes two major contributions.

The first is methodological. I propose a new method based on three kinds of data to estimate historical local populations for each year of an intercensal period: national intercensal populations, local census populations, and local intercensal births and deaths by cause. This method is based on the distinction between ‘asymmetrical mortality,’ affecting only specific parts of the national territory, and ‘symmetrical mortality.’ Assuming that the relative rates of symmetrical mortality (the ratio of departmental and national rates) trended in linear fashion between censuses, I distribute the national population between the *départements*.

Studies of recent internal migration in France have mainly covered intercensal periods and are based on a census question asking individuals where they resided at the time of the previous census. Examples include Courgeau (1978), Baccaïni, Courgeau, and Desplanques (1993), Baccaïni (1999), and Courgeau and Lelièvre (2004).² But none

² Census data can also be used to disaggregate population flows by sex or work category, as in Dean (1988). Other authors, such as Pumain (1986), have highlighted preferential migration flows between French regions.

of these studies provides estimates of internal population flows on an annual basis. The same holds for studies of earlier periods based on other sources of demographic data. Kesztenbaum (2014) tracked the movements of soldiers aged 20–46 using registers of their places of residence in military records. Houdaille (1971) and Farcy and Faure (2003) had previously used these registers to estimate intermunicipal and interdepartmental migration. Family surveys are also an important source. The TRA survey (Bourdieu et al. 2014) followed generations of families whose last name begins with “TRA.” This survey gave rise to many others, with Rosental (2004) studying female migration in the 20th century and Daudain, Franck, and Rapoport (2018) reconstructing interdepartmental migration flows to better understand the spatial convergence of fertility rates in France at the end of the 19th century. An increasingly used source for tracking internal migration is collaborative genealogy data, the advantages of which were outlined 20 years ago by Brunet and Bideau (2000). Compiled by thousands of people interested in the history of their family, they can be used to track each family’s path and provide interesting data such as local death and birth rates. For example, Charpentier and Gallic (2020) drew on these data to estimate migration flows to Paris in the 20th century. In other countries studies of internal migration use net migration between two census dates and do not estimate annual migration.³

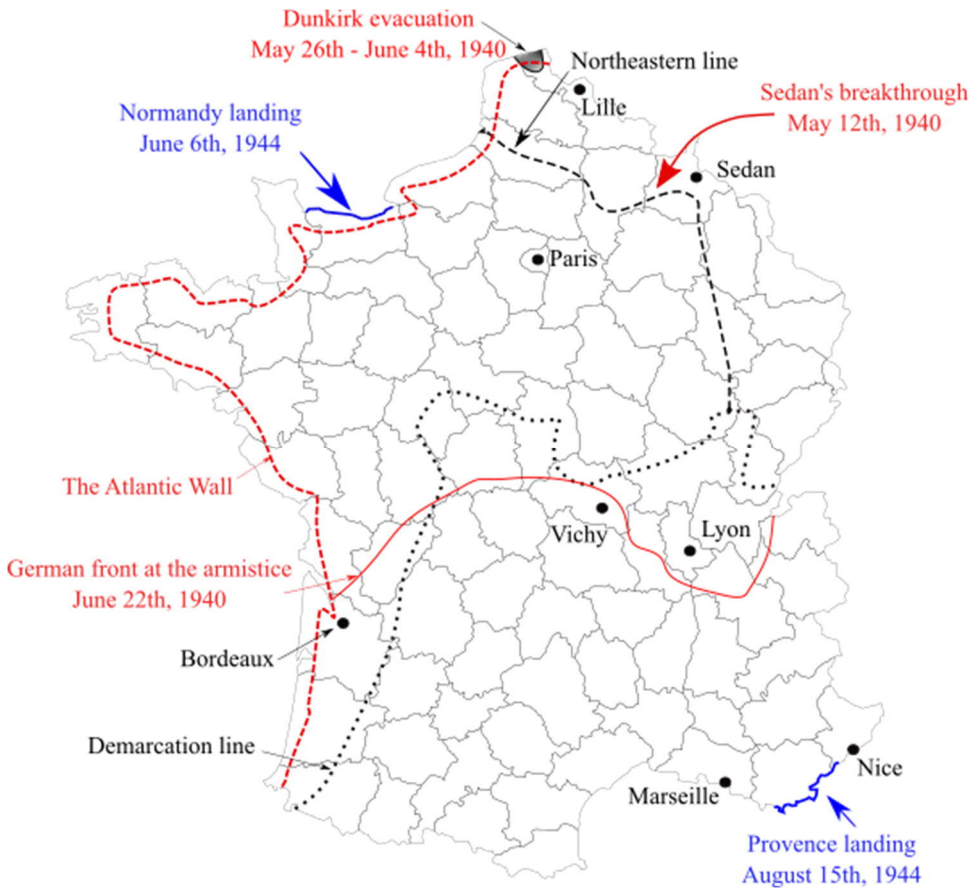
The second contribution of this paper is analytical. I use this new method to compute the annual populations of each French *département* between 1939 and 1946 and to track internal flows of refugees over this period. Historical work on this question has hitherto been based on qualitative archives, photos, and administrative documents and has focused mainly on the massive exodus of May–June 1940. Because of its intensity in a very short period, this event remains etched in France’s collective memory. Jackson (2003), Diamond (2008), and Alary (2013) reconstructed the events that occurred. For example, they show how the French government allocated a reception *département* in the south and the west to each of those in the north and east, and how the flows of people fleeing to the south disrupted the arrival of French reinforcements as the Germans pushed through the Ardennes. These authors also describe the slowness of the refugees’ return, hindered as it was by the disruption and destruction of the railway system. Jackson (2004) and Alary, Vergez-Chaignon, and Gauvin (2006) shed light on everyday life in France under the German occupation, emphasizing the difficult cohabitation with enemy soldiers, especially with the Italians in the southeast of the country. Furthermore, Alary (2001) highlights the economic disruption caused by the demarcation line, which until 1943 separated the German-occupied north from the south, raw materials being on one side of the line and manufacturing plants on the other.

Qualitative studies such as these are important to establish the sequence of events, but quantitative history is also useful. For example, Schmeidl (1997) has analyzed the

³ See for example Silvestre (2005) for Spain.

causes of recent mass migration during conflicts, while Salehyan and Gleditsch (2006) have shown how the population flows caused by wars can destabilize host territories. One would assume that this kind of study is impossible for a conflict as old as the Second World War, because the raw data were never gathered, were destroyed or are no longer available. However, the collection of demographic information did continue during the war, with births recorded in 86 of the 90 metropolitan *départements*, as well as deaths by age group and cause. These data have not been lost and are freely available in official publications.

Figure 1: War timeline in France, 1940–1944



Computing these internal flows of refugees shows that they were substantial in the northeast, especially from the Ardennes and Meuse *départements*. More than 40% of the female population fled the Ardennes *département* between 1939 and 1940, and a further 20% left between 1940 and 1941. The return of these refugees was particularly slow, owing mainly to the creation of a forbidden zone in the northeast intended for German settlement and to which returns were prohibited until December 1941. I also show that refugees typically relocated several times during the war. Initially, in 1940, they were mainly in the center and the west, before moving south of the demarcation line until 1943. By the end of the war, the main concentrations of refugees were in the rural central *départements*. These results show that the *départements* can be divided along the north–south demarcation line into those in which the population increased as a result of migratory flows from 1940 to 1943 and those in which the population decreased. While the Germans wanted this new border to be closed, it did not stop population flows.

2. Computations of annual populations and net migration at local level: General framework

The Human Mortality Database (HMD) protocol can be used to estimate the national life tables of a large number of countries by employing a common set of methods. These life tables are calculated from age-specific populations at 1 January of each year, which in turn are estimated using census populations and the number of deaths and births. To illustrate this point, I calculate the total annual population in a geographic unit i over an intercensal period running from a first census on 1 January of year T_1 to a second on 1 January of year T_2 .

The first step involves calculating the migration flow between T_1 and T_2 (M_{i,T_2}). M_{i,T_2} is equal to the difference between the actual change in population and its intrinsic growth:

$$M_{i,T_2} = (P_{i,T_1} - P_{i,T_2}) - \sum_{t=T_1}^{T_2} (B_{i,t} - D_{i,t}), \quad (1)$$

with D the total number of deaths, P the average population and t the year.

The populations at 1 January of each year during the intercensal period are computed in a second step, the intercensal migration flow being distributed in proportion to the time elapsed since the first census. On 1 January of year $T_1 + a$, this gives:

$$P_{i,T_1+a} = P_{i,T_1} + \sum_{t=T_1}^{T_1+a} (B_{i,t} - D_{i,t}) + \frac{a}{T_2-T_1} M_{i,t}. \quad (2)$$

Bonnet (2020) and the curators of both the Canadian Human Mortality Database and the Japan Human Mortality Database have used this method to estimate life tables at the local level in France since 1901, in Canada since 1921, and in Japan since 1975. Nevertheless, as revealed by Bonnet (2020), distributing the intercensal migration flow proportionally to the time elapsed since the first census is inappropriate in times of war, when migratory movements are faster and massive. This leads to biased estimates of *départemental* life expectancies during the Second World War. It is therefore crucial to develop another method to compute annual populations per *département* and deduce net migration flows using births and deaths.

Assuming that the yearly national populations are known, the goal is to distribute this population between the local geographical units. I start from the raw mortality rate $q_{i,t}$,

$$q_{i,t} = \frac{D_{i,t}}{P_{i,t}}, \quad (3)$$

with i the geographical unit. In the same way, one can express (3) at the national level:

$$q_{nat,t} = \frac{D_{nat,t}}{P_{nat,t}}. \quad (4)$$

Assuming that the average and recorded populations of the year are equal at the dates of the first and the second census (T_1 and T_2), and since both the local and national mortality rates are available for these dates, the relative mortality rates θ can be calculated using:

$$\theta_{i,t} = \frac{q_{i,t}}{q_{nat,t}} = \frac{\frac{D_{i,t}}{P_{i,t}}}{\frac{D_{nat,t}}{P_{nat,t}}} \quad t = \{T_1, T_2\}. \quad (5)$$

The next step is to estimate the annual relative mortality rates between T_1 and T_2 for each geographical unit. I illustrate this point with a country divided into two regions. Region 1 has relative mortality rates greater than 1 at both T_1 and T_2 . In region 2, the relative mortality rates are lower than 1. To estimate the annual relative mortality rates, the naive approach would be to consider that these rates evolve linearly, with the implicit assumption that the two regions are subject to the same mortality impacts. In times of war, if restrictions are the same in the whole country, mortality should vary in a similar way. However, region 1 only may experience a significant mortality impact, with nonlinear variations in the relative mortality rate. Again, in times of war, local fighting should increase mortality in some places rather than others. The effects of symmetrical and asymmetrical mortality changes therefore need to be disentangled to compute the annual relative mortality rates between T_1 and T_2 .

I use this distinction to rewrite (5) in (6). With q^* representing the mortality rate ignoring asymmetrical changes and assuming that θ^* evolves in a linear manner between T_1 and T_2 , the relative mortality rates for each *département* and each intercensal year, $\hat{\theta}_{i,t}^*$, can be estimated using:

$$\theta_{i,t}^* = \frac{q_{i,t}^*}{q_{nat,t}^*} \quad t = \{T_1, T_2\}. \quad (6)$$

The average populations for each *département* and each year of the intercensal period, $\hat{P}_{i,t}$, can then be calculated using:

$$\hat{P}_{i,t} = \frac{D_{i,t}^*}{q_{nat,t}^* \times \hat{\theta}_{i,t}^*} \quad t = \{T_1, T_1 + 1, \dots, T_2\}. \quad (7)$$

Inserting the number of births and deaths, the estimated migration balance, \hat{M} , is:

$$\hat{M}_{i,t} = (\hat{P}_{i,t} - \hat{P}_{i,t-1}) - (D_{i,t} - B_{i,t}). \quad (8)$$

To conclude, it should be noted that this method cannot be used to disentangle the duration and intensity of specific migration, as the populations used to estimate the migration flows are yearly means. To illustrate this issue, let us consider a geographical unit with a population of 100,000 in year t . In year $t + 1$, 50,000 people leave during the first three months of the year, and then return. The average population in t is equal to 100,000, while the average population in $t + 1$ is 87,500. The estimated migration balance with the above method is 12,500 ‘women-years,’ or 12.5% of the population in year t , the product of the migration time (3 months, 25% of the year) and the migration intensity (50,000, 50% of the population in t).

3. Application to annual populations and net migration in France during the Second World War

In this paper, I use this new method to estimate internal migration in France during the Second World War. I consider only female migration flows for two reasons. First, there is no information on military deaths in the raw data from the *Statistique Générale de la France*. Second, women were less restricted than men. French soldiers were sent to the battlefields of the north and the east in 1940. At the end of the *Campagne de France*, 1,800,000 had been captured, of whom 1,600,000 were sent to Germany, 1,000,000 remaining there for five years (Durand 2015). Among those remaining in France, 650,000

were forced to work in Germany as part of the *Service du Travail Obligatoire* (Spina 2012). Computing female migration flows ensures that the findings are more reliable.

The area considered does not cover the whole of metropolitan France as it is defined today. I excluded Moselle, Bas-Rhin, and Haut-Rhin as the data for these *départements* are unavailable between 1939 and 1945 since they were under direct German administration. I also exclude Corsica, the data for this *département* being unavailable in 1943 and 1944. I keep the 86 other *départements* in my study; contrary to the First World War, during which fighting occurred on French Territory from 1914 to 1918 and prevented the registration of vital statistics in eastern *départements*, this registration continued during the Second World War. It is possible that deaths were less well documented in specific territories home to fighting, such as Ardennes in 1940, but the magnitude and persistence over time of the results justify taking these *départements* into consideration. The whole sample used is presented in Online Appendix 1.

3.1 Data

I use two sources of data at the *département* level. The first is the dataset of Bonnet (2020), who compiled an extensive set of vital statistics and census data by sex for the entire 20th century to focus on mortality per *département* in France. I extract the populations recorded in the 1936 and 1946 censuses – available for each sex and *département* – and vital statistics, namely the number of births and the number of deaths per year (by *département* of residence) recorded in yearbooks between 1936 and 1946.

The other source is the official publication, *Statistique du Mouvement de la Population*, which, in addition to the deaths by age recorded each year, provides the number of deaths by cause for 1936 and 1940–1946. Unfortunately, the data for the period 1937–1939 were destroyed during the war. The number of deaths in each *département* is available for all years, and by sex for the years 1936 and 1942–1946. The International Classification of Diseases used at the time did not change in the studied period. The only exception is deaths resulting from car accidents, which appear as a separate category in the data for 1944–1946. This classification is shown in Online Appendix 2. Note that the total number of deaths per *département* coincide, whether they are classified by age or by cause.

I use Vallin and Meslé's (2001) data to estimate the total population of the 86 *départements* for each year between 1936 and 1946. In their study of age-specific mortality in France in the 20th century, the authors estimated the national population every 1 January using census and vital statistics data. However, the list of *départements* included changes over time: the data for Moselle, Bas-Rhin, Haut-Rhin (Alsace-Lorraine) and Corsica are missing for some years. Table 1 (Column 2) presents the national female

populations in Vallin and Meslé's (2001) database. From 1936 to 1939 and in 1946, these data cover the whole of metropolitan France as defined in 2018. They do not include Alsace-Lorraine from 1939 to 1942 or Corsica from 1943 to 1945. The weight of the missing *départements* can be estimated from the closest year in which the data are available (Table 1, in italics). For example, before 1938, Alsace-Lorraine accounted for 4.60% of the total population, and the population on 1 January for the 86 *départements* with continuous data (Column 5) can be calculated using this information and the corresponding proportion for Corsica. Hereinafter, the term 'national' will be used to refer to the 86 *départements* with a continuous raw dataset. Note that the average populations of each year are calculated by averaging the populations of the preceding and the following year.

Table 1: Estimates of the national population of women at 1 January between 1936 and 1946

Year	Pop. 1 January Vallin and Meslé (2001)	% Corsica	% Alsace-Lorraine	Pop. 1 January 86 <i>départements</i>
1936	21,390,450 ¹	0.60	4.60	20,277,826
1937	21,406,000 ¹	0.60	4.60	20,292,568
1938	21,422,700 ¹	0.60	4.60	20,308,399
1939	20,439,918 ²	0.60		20,317,564
1940	20,520,230 ²	0.60		20,397,395
1941	20,235,330 ²	0.60		20,114,200
1942	20,165,130 ²	0.60		20,044,420
1943	20,009,630 ³			20,009,630
1944	19,981,430 ³			19,981,430
1945	19,936,730 ³			19,936,730
1946	21,006,118 ³	0.60	4.39	19,957,902
1947	21,147,621 ¹	0.60	4.39	20,092,344

¹ Population of women with 90 *départements*; ² Population of women excluding Moselle, Bas-Rhin, and Haut-Rhin; ³ Population of women excluding Moselle, Bas-Rhin, Haut-Rhin, and Corsica.
Sources: Vallin and Meslé (2001).

Notes: Population of women at 1 January calculated by Vallin and Meslé (2001) according to different definitions of the national territory. Italic numbers are the weights of the *départements* in the national population for the last known years. The "86 *départements*" specification excludes Moselle, Bas-Rhin, Haut-Rhin, and Corsica.

3.2 Definition of symmetrical and asymmetrical mortality

The method presented above uses 'symmetrical mortality,' which has to be disentangled from 'asymmetrical mortality' in the total mortality rates. To do so, I isolate the 42nd category (43rd after 1944), "Violent or accidental death (except suicide and homicide)," in the statistics by cause of death, which corresponds to war-related civilian deaths. This category includes deaths from bombing, whether by German or Allied forces.

Table 2 shows the share of accidental and violent deaths in the total by year and the variability by *département*. There was a sharp increase overall during the war (Line 1), from 1.6% in 1936 to 3.5% in 1940 and 9.2% in 1944, with substantial spatial variations. The lowest maximum *départemental* rate was 2.9%, in 1936, and the highest was 41.6%, in 1944 in Calvados (Line 3). Some regions remained unaffected by the war, the minimum violent death rate remaining constant, at around 1% of total deaths (Line 2), in *départements* in the rural southwest, such as Ariège and Lozère. The year with the greatest disparities between *départements* was 1944, with a standard deviation of 6.5 percentage points (Line 4). Some specific historical events appear in the data. For example, in 1943, the *département* with the highest share of violent deaths was Loire-Inférieure (12.2%) as a result of the Allied bombing of Nantes in September, which killed 1,450 people.

Table 2: Share of violent or accidental deaths in the total for women: 1936–1946

	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
National (%)	1.6				3.5	2.3	2.4	3.5	9.2	2.6	2.1
Minimum (%)	0.7				0.8	0.8	0.9	1.2	0.7	0.7	0.6
Maximum (%)	2.9				9.5	4.5	4.0	12.2	41.6	8.0	3.5
Standard deviation	0.4				2.0	0.6	0.6	1.8	6.5	1.0	0.6

Sources: Own calculations from Statistique du Mouvement de la Population.

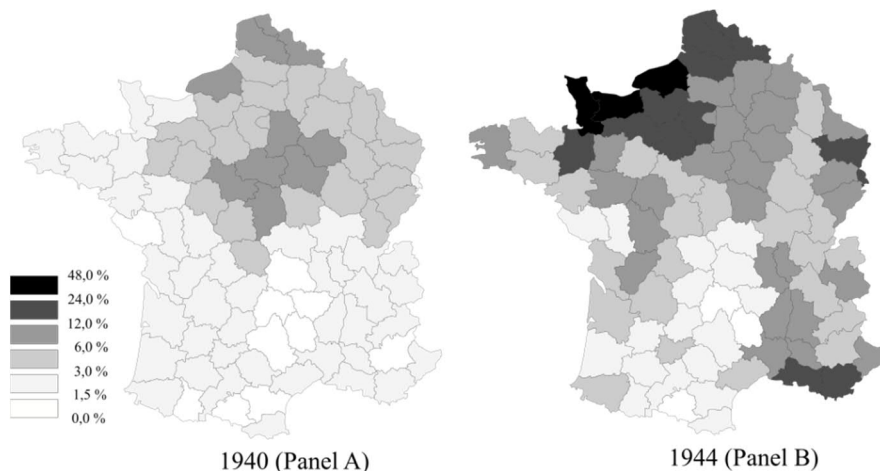
Notes: 'National' refers to the 86 *départements* of the sample (excluding Corsica, Moselle, Bas-Rhin, and Haut-Rhin). Violent or accidental deaths belong to the 42nd (43rd between 1944 and 1946) category of the International Classification of Diseases in force at the time (see Online Appendix 2 for more details according to the nomenclature). Violent or accidental deaths are not available between 1937 and 1939.

Figure 2 shows the proportions of female deaths due to violent or accidental causes for the 86 *départements* in 1940 (Panel A) and 1944 (Panel B), when the national proportions were at their highest.⁴ The maps reveal the asymmetrical nature of this mortality. In 1940, violent mortality was higher in the northern *départements* that saw substantial fighting (Nord, Pas-de-Calais, Seine-Inférieure) and in the region southeast of Paris (between 6% and 11% of all deaths). The increased share of violent deaths in the first area is explained by the route of the German invasion, between 10 May 1940 and 22 June 1940; that of the second area may reflect deaths occurring during the exodus of May–June 1940, when columns of fleeing civilians were attacked repeatedly by the Luftwaffe. The south and the west were not affected, with violent mortality rates remaining similar to those in the prewar period (between 0% and 2%), which is in keeping with the fact that this area was not invaded before the armistice (Figure 1). The

⁴ All the maps in this study were prepared using the Philcarto software <http://philcarto.free.fr/>.

proportions in 1944 are higher in almost all regions, with peaks in the northwest and southeast. The coastal *départements* in Normandy were particularly affected, with the share of violent deaths reaching 40% in Calvados and about 25% in Seine-Inférieure and Manche. In contrast, in the Massif Central and Vendée regions and near the Pyrenean border, the rates remained close to those observed in 1936.

Figure 2: Share of violent or accidental deaths in the total for women: 1940 and 1944



Sources: Own calculations from *Statistique du Mouvement de la Population*.

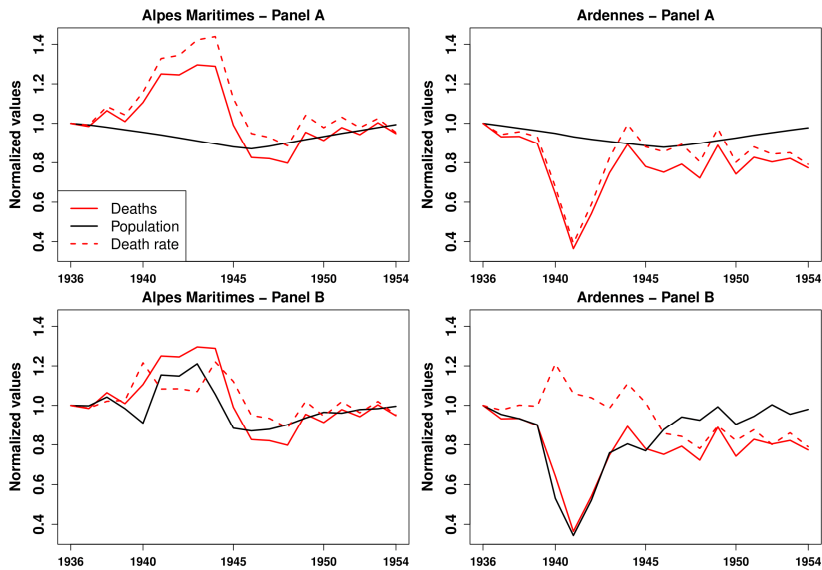
Notes: Violent or accidental deaths belong to the 42nd (43rd after 1944) category of the International Classification of Diseases in force at the time. Sample of 86 *départements* (excluding Corsica, Moselle, Bas-Rhin, and Haut-Rhin).

Subtracting these violent/accidental deaths from the total number gives the ‘symmetrical mortality’ rates for each *département*. The missing death-by-cause statistics for 1937, 1938, and 1939 are not a problem for two reasons: first, this study focuses on the period 1939–1946, and second, the shares of violent or accidental deaths before the start of the Second World War were low (around 1%) and likely ‘symmetrical,’ varying little either across the country (between 0.7% and 2.9%) or between 1936 and 1939. Indeed, the war only really began in Western Europe on 10 May 1940 with the German invasion of Belgium and Luxembourg. The distributions of deaths by sex are not available for 1940 and 1941. However, since these distributions are stable – roughly 70% men and 30% women in the other years in each *département* – I used the values from 1942 for the two preceding years.

Figure 3 compares the populations computed for Ardennes and Alpes-Maritimes, using the HMD protocol (Panel A) and the new methodology (Panel B). These

estimations are available for the period 1936–1954.⁵ The populations are normalized using the 1936 counts to highlight variations since that date. The populations computed using the HMD protocol evolve linearly during the two intercensal periods (1936–1946 and 1946–1954). As a result, the death rates and total number of deaths follow the same trends. For example, in Ardennes, the death rate in the HMD estimations falls by 60% between 1939 and 1941, despite the fighting and subsequent German occupation. Conversely, the mortality rates computed using the new methodology evolve in the same way in both *départements*. In Ardennes the death rate increases by 10% between 1939 and 1941, while the population decreases by nearly 60%. This figure also shows that the annual population changes in Ardennes between 1939 and 1946 differ considerably from those in the subsequent intercensal period, highlighting the impact of fighting on migration choices, as discussed in detail in the following section.

Figure 3: Examples of population and death rates computed using the HMD protocol (Panel A) and own method (Panel B), 1936–1954



Sources: Own calculations from Bonnet (2020), Vallin and Meslé (2001), and Statistique du Mouvement de la Population.

Notes: Deaths, death rates, and populations computed using the HMD protocol and the new methodology based on relative mortality rates. All values are normalized using 1936 values.

⁵ To compute *départementale* populations for 1946–1954, I used the annual *départementale* birth and death numbers between 1946 and 1954, and the populations recorded in the 1954 census. Asymmetrical mortality is defined in the same way as before, namely deaths classified as violent or accidental.

4. The effects of World War II on internal migration in France

I calculated *départemental* population variations resulting from migration for each year of the period 1939–1946. These changes are expressed as a percentage of the population in 1939, at the beginning of World War II. My analysis is based both on the analysis of annual and cumulative migration flows. For example, the calculations for 1943 are based on migration flows between 1942 and 1943 and on those between 1939 and 1943. I have chosen a purely map-based analysis of the results using six specific maps, presented below. These maps illustrate the chronology and extent of internal migration. Other maps are shown in the Online Appendix.

4.1 1940: The flight to the southwest

Germany invaded Poland on 1 September 1939, officially to liberate the German populations in the Danzig Corridor, administrated by Poland since 1919. The United Kingdom and France declared war on Germany on 3 September 1939. Until 10 May 1940, fighting occurred mainly in Eastern Europe; the civilian populations of France, the United Kingdom, Belgium, the Netherlands, and Luxembourg were not affected. Three major offensives occurred in this period. The Polish campaign, from 1 September 1939 to 6 October 1939, resulted in the partition of Poland between Germany and the Soviet Union. The Winter War between the Soviet Union and Finland, from 30 November 1939 to 13 March 1940, resulted in Finland ceding some of its territory. Finally, the Germans launched Operation Weserübung, the invasion of Denmark and Norway, on 9 April 1940. The two countries surrendered a few weeks later.

During this period, the French government prepared for a probable German invasion, notably with plans to evacuate Paris and the *départements* along the eastern and northern borders. In the event of invasion, civilians in each of these border *départements* and each Parisian district were to be sent to a specific southern or western *département* (Diamond 2008: 20). In addition, Parisian schoolchildren were advised to extend their summer holidays in the countryside to protect them from probable bombings. But apart from these specific preparations, the government's strategy was to limit population movements until absolutely necessary, to safeguard troop morale.

On 10 May 1940, the German armies launched the Manstein Plan, invading Belgium, the Netherlands, and Luxembourg, which had declared themselves neutral. The Germans then crossed the Ardennes into France, defeating the French armies in the Battle of Sedan on 12 and 13 May (Figure 1). This invasion resulted in the catastrophic evacuation of British and French armies from Dunkirk on 4 June, the entry of German troops into Paris on 15 June and the signing of the armistice on 22 June. According to the

French Ministry of Defense (*Mémoire des hommes*), about 60,000 French soldiers died during this 40-day campaign.

This rapid military defeat had serious repercussions on civilian population movements. Figure 4 (Panel A) shows the net migration flows between 1939 and 1940, with the *départements* with a negative migration balance in blue and those with a positive migration balance in yellow and red. These balances are expressed as a percentage of the population in 1939.

Four separate regions stand out. First, civilians fled the eastern and northern border regions between 1939 and 1940 ahead of the German and Italian troops. In Ardennes, where the Battle of Sedan took place, the female population decreased by 42%. The decrease was 16% in Meurthe-et-Moselle and 17% in Hautes-Alpes. Second, civilians fled Paris and its suburbs from 14 June as the city was declared open. Third, from Marne to Pyrénées-Atlantiques via Corrèze, all the southwestern *départements* welcomed refugees. The *départements* to the south of Paris saw the greatest influx. The populations of Loiret, Yonne and Aube increased by about 16% as a result of these internal migration. Also of note was the 16% increase in Allier, where the French government was established after the Franco-German armistice.

Lastly, Pyrénées-Orientales in the south stands out from neighboring *départements* with a 17% decrease in the female population between 1939 and 1940. This is explained by the passage of Spanish Republicans (about 500,000 overall (Dreyfus-Armand 2012)) fleeing after Franco's victory, which increased the population momentarily before these refugees relocated to neighbouring *départements* in the southwest.

4.2 1941: No return to the northeast

After the Franco-German armistice was signed on 22 June 1940, France was divided into three main areas, shown in Figures 4, 5, and 6. The demarcation line divided the country between the "free zone" (in the south) and the 'occupied zone' (in the north). The new French government settled in the capital of the free zone, Vichy, near the demarcation line in the *département* of Allier. The third article of the armistice stated that the French government ruled all of France, but in the occupied regions "the German Reich exercises all the rights of the occupying power. The French government undertakes to facilitate by all means the exercise of these rights [...] with the assistance of the French Administration. The French government shall immediately invite all French authorities and administrative services in the occupied territory to comply with the regulations of the German military authorities and to collaborate with them in a correct manner." A third area in the northeast of the country was earmarked for German settlement and refugee returns in the corresponding *départements* were prohibited.

The signing of the armistice and the creation of these three areas had a significant impact on internal migration. Four areas can be distinguished in Figure 4 (Panel B), which shows *départementale* migration balances between 1940 and 1941, and Online Appendix 3a (Panel A), which presents cumulative migration balances since 1939.

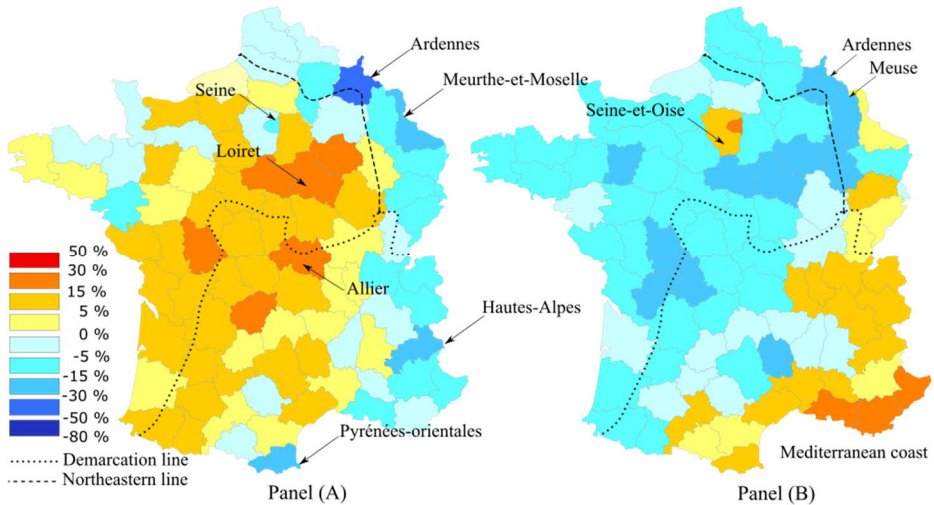
The first area consists of the *départements* near the northeastern borders, especially Ardennes and Meuse, whose populations decreased by 20% between 1940 and 1941 as refugees continued to leave in significant numbers. The creation of the forbidden zone meant that previous refugees did not return to their homes and others decided to leave. Cumulatively since 1939, 60% of the population of Ardennes had left by 1941 (35% in Meuse). More broadly, the populations of the northeastern *départements* decreased by 15% to 30% between 1939 and 1941.

The second area is Paris and its suburbs (the Seine and Seine-et-Oise *départements*). Here, the exodus of May–June 1940 was quickly forgotten and the population increased by 23% and 13% respectively between 1940 and 1941 as former refugees returned home and new refugees came to settle. Between 1939 and 1941, the population of the Seine *département* increased by 16%. Refugees therefore sheltered in the Île-de-France region, even if difficulties in transportation probably meant that it was a forced stopover before moving elsewhere in France.

The third area consists of the *départements* in southwestern France, the population of which increased sharply between 1939 and 1940 because of the 1940 exodus. The refugees gradually left in 1941. Nevertheless, the *départements* south of the demarcation line still recorded migration-related population gains over the period 1939–1941, notably Gers (+14%), Haute-Garonne (+9%), and Lot-et-Garonne (+6%). While some refugees decided to go home, others preferred to settle permanently in the safer environment of the southwest.

The fourth area includes the *départements* close to the Swiss and Italian borders and along the Mediterranean coast. Here, the population increased substantially between 1940 and 1941, by as much as 25% in Alpes-Maritimes, Bouches-du-Rhône, and Var. These population flows were largely refluxes of the many refugees who left ahead of the Italian invasion. Nevertheless, the populations of the Mediterranean *départements* increased more between 1940 and 1941 than they had decreased between 1939 and 1940. Between 1939 and 1941, the population increased by 20% in Var and by 15% in Bouches-du-Rhône as these *départements* became havens for the populations fleeing occupied France.

Figure 4: Population variations due to migratory movement: 1939–1940 and 1940–1941



Sources: Own calculations from Bonnet (2020), Vallin and Meslé (2001), and *Statistique du Mouvement de la Population*. Notes: Computations made for the 86 départements of the sample (excluding Corsica, Moselle, Bas-Rhin, and Haut-Rhin), according to the population of women. Panel (A) is the variation of population between 1939 and 1940 due to migratory movement. Panel (B) is the variation of population between 1940 and 1941 due to migratory movement. Migratory movement is the difference between the whole variation and intrinsic growth, i.e., the difference between births and deaths. Values are in % of the population in 1939.

4.3 1942 and 1943: Refugees return to the northeast and depart to the south

The results for 1942 and 1943 reveal two kinds of major migratory movements.

The first involves the *départements* in the previously forbidden northeastern region, to which refugees were allowed to return from 18 December 1941. Figure 5 (Panel A) shows that the migration balances were positive between 1941 and 1942 in Aisne (+9%), Ardennes (+20%), and Meuse (+6%). This gradual return of refugees continued between 1942 and 1943 (Online Appendix 3b, Panel B), particularly in Ardennes (+26%), Meurthe-et-Moselle (+7%), and Meuse (+14%). Thus, some refugees chose to return rather than stay in or flee to the south to avoid the German occupation. Between 1941 and 1943, the population of Ardennes recovered from 39% to 84% of its 1939 level.

The second kind of migratory flows were movements from occupied France in the north to the free zone in the south. Figure 5 (Panel A) shows that the population of the *départements* north of the demarcation line and west of the northeastern line decreased between 1941 and 1942. The decrease reached 7% in Brittany (Finistère, Morbihan, Côtes d'Armor) and 9% in Normandy (Calvados, Manche), a result of the building of the

Atlantic Wall (from April 1941, Figure 1) and the creation of a 20 to 30 kilometer-wide exclusion zone along the coast from Dunkirk to the Basque Country. In contrast, populations in the *départements* south of the demarcation line increased between 1941 and 1942, particularly in the southeast, rising 9% in Rhône and Isère and 11% in Var. This map therefore highlights a tendency to flee the deprivations and restrictions of occupied France in favour of the south. The cumulative migration flows over the 1939–1942 period (Online Appendix 3a, Panel B) also show this clear distinction between the *départements* north of the demarcation line, with net positive migration, and the *départements* south of the demarcation line, with net migration deficits. Between 1939 and 1942, the greatest increases in population were along the Mediterranean coast, with a maximum increase (+32%) in Var. Paris and the surrounding region (Seine and Seine-et-Oise) were exceptional in that while they were in the occupied zone, the population increased by about 10% between 1939 and 1942.

On 11 November 1942, the Germans occupied the whole of France in response to the Allied landings in North Africa. The French fleet based in Toulon was scuttled. This major change shows up in the migration map for 1942–1943 (Online Appendix 3b, Panel B), which is more complicated than the map for 1941–1942. Refugees continued to move to the southern *départements* but migration flows to the west of the country appeared, especially to the Vendée and Charente regions. Overall, though, the divide between the north and the south was the most pronounced in the cumulative migration map for 1939–1943 (Online Appendix 3b, Panel A). The demarcation line appears clearly in the redistribution of the population since 1939. Only a few *départements* north of this line grew in population: around Paris, although the annual flows reversed after 1941; Côte-d’Or and Haute-Saône, which probably hosted refugees from the forbidden zone who were unwilling to return; and Gironde, where the migration flow in 1942–1943 was nonetheless strongly negative (–13%). In contrast, the *départements* in the southeast saw large inflows of population, with peaks of +19%, +22% and +31% in Rhône, Gard, and Var, respectively.

4.4 1944: Inland flight

From 1942 onwards, the Allies launched a series of landings in Western Europe and North Africa. The Dieppe raid in August 1942 was a failure, but the landings in Morocco and Algeria (November 1942), Sicily (July 1943), and mainland Italy and Corsica (September 1943) were successful. In 1944, two major landings (in Normandy in June and in Provence in August) accelerated the course of the war towards the eventual defeat of the Germans. These landings were preceded by massive bombing raids to reduce German defensive capabilities. The scale of civilian casualties resulting from these raids

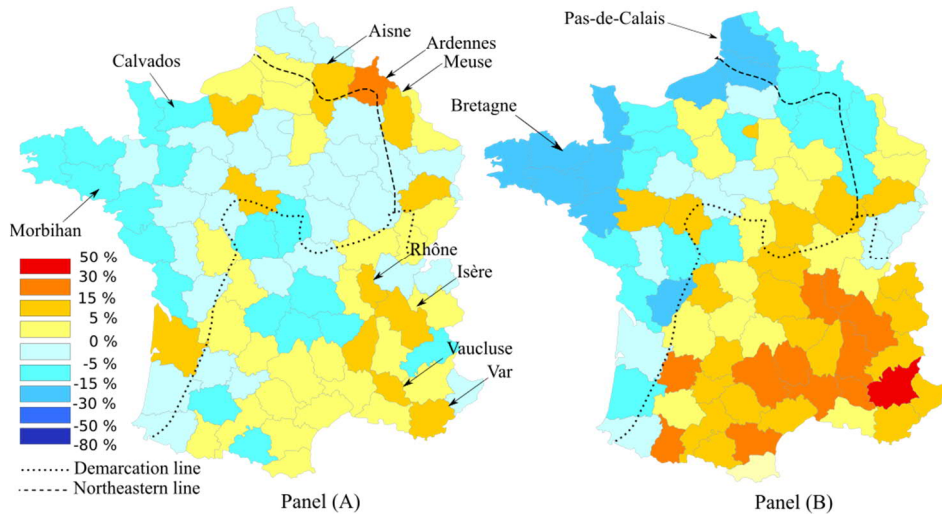
is highlighted in Figure 2 (Panel B). These landings, and the bombings that preceded them, had a profound impact on civilian population movements.

The results of the analysis for 1943–1944 (Online Appendix 3c, Panel A) show that migration flows were negative in the *départements* where landings were expected. In the north of the country, the Germans believed that the landing would take place in the Pas-de-Calais rather than Normandy (Plan Fortitude South). This could explain why the population decreased strongly in Nord and Pas-de-Calais, but increased in Calvados where the landing actually took place. In the south of the country, the population in Var, Alpes-Maritimes and Bouches-du-Rhône decreased between 1943 and 1944 (–24% in Var, –15% in Alpes-Maritimes). The refugees having settled in these *départements* between 1939 and 1943 fled the deadly bombing raids, responsible for 500 deaths in Toulon on 24 November 1943 and 1,750 deaths in Marseille on 27 May 1944. The migration balance was slightly negative on the Atlantic coast. Although there was no landing in this area, it was heavily bombed (the bombing of Nantes in September 1943 killed 1,450 civilians), which may explain these movements.

This analysis of migration flows shows where the refugees who fled the bombings settled. Those who left the Mediterranean coast settled in nearby rural *départements*, the populations of Lozère and Basses-Alpes increasing by 18% and 25%, respectively. The population of Savoie increased by 16% in 1944 after little or no variation from 1939 to 1943. More generally, Normandy and all the eastern rural *départements* welcomed refugees during this period. In addition, 25,000 women fled abroad.

Figure 5 (Panel B) shows that the imprint of the demarcation line is still visible on the cumulative migration balances for this period. There was thus some inertia in the redistribution of the population after this fictitious border disappeared. This map also shows that in 1944 Ardennes ceased to be the *département* with the greatest migration deficit, which has been the case since 1939. In 1944, the population decrease due to migration reached 15% to 30% in Brittany and the coastal *départements* of Normandy and northern France (Manche, Pas-de-Calais, Seine-Inférieure, Somme).

Figure 5: Population variations due to migratory movement: 1941–1942 and 1939–1944



Sources: Own calculations from Bonnet (2020), Vallin and Meslé (2001), and *Statistique du Mouvement de la Population*.
 Notes: Computations made for the 86 départements of the sample (excluding Corsica, Moselle, Bas-Rhin, and Haut-Rhin), according to the population of women. Panel (A) is the variation of population between 1941 and 1942 due to migratory movement. Panel (B) is the variation of population between 1939 and 1943 due to migratory movement. Migratory movement is the difference between the whole variation and intrinsic growth, i.e., the difference between births and deaths. Values are in % of the population in 1939.

4.5 1945: The gradual return of refugees from the south

After the landings in Normandy and Provence in 1944, the Allies gradually liberated the whole of France. The cities closest to the landing beaches in Normandy (Cherbourg, Saint-Lô, and Caen) were the first to be liberated, in July 1944. They were followed in the beginning of August by those in Brittany and Pays de la Loire, with Rennes, Vannes, Le Mans, Quimper, and Angers liberated between 4 and 8 August. After the landings in Provence, the Germans began to retreat from the southwest in mid-August (Tarbes, Perpignan, Toulouse, Pau) while the cities in the southeast were liberated between 22 August (Gap) and 3 September (Lyon). Paris was liberated on 25 August 1944.

Figure 6 (Panel A) shows the departmental migration balances for 1944–1945. The progressive liberation of France had a major impact on population movements. The population in the southeast, where many refugees were still settled in 1944, decreased sharply; the départements used to escape the bombings in Provence, Lozère and Basses-Alpes lost 18% and 26% of their populations through migration, respectively. These refugees returned to départements west and north of the demarcation line, where the

population had fallen sharply between 1939 and 1944 (Figure 6, Panel B). The strongest return flows were into Ile-et-Vilaine and Loire-Inférieure, where the population increased by 18% and 15%, respectively. Two exceptions to this trend are visible on the map. First, refugees did not return to Calvados and Orne, presumably because of the destruction that followed the Allied landing, two thirds of the buildings in Caen having been destroyed. Second, the eastern *départements* had negative migration balances, as low as -18% (Haute-Saône). This probably reflects the local population fleeing the fighting that continued in this area until the beginning of 1945.

The analysis of cumulative migration flows between 1939 and 1945 (Online Appendix 3c, Panel B) shows that the return of refugees was incomplete in 1945. Large areas in the north, west, and east of France still had significant cumulative migration deficits, close to -16% in Ardennes, Calvados, and Morbihan. Other regions accumulated positive migration balances, including two areas around Indre-et-Loire and Isère, where the population increased respectively by 20% and 17% owing to migration. The maps suggest that refugees stopped temporarily in these *départements* on their way back to the northwest, north, and east.

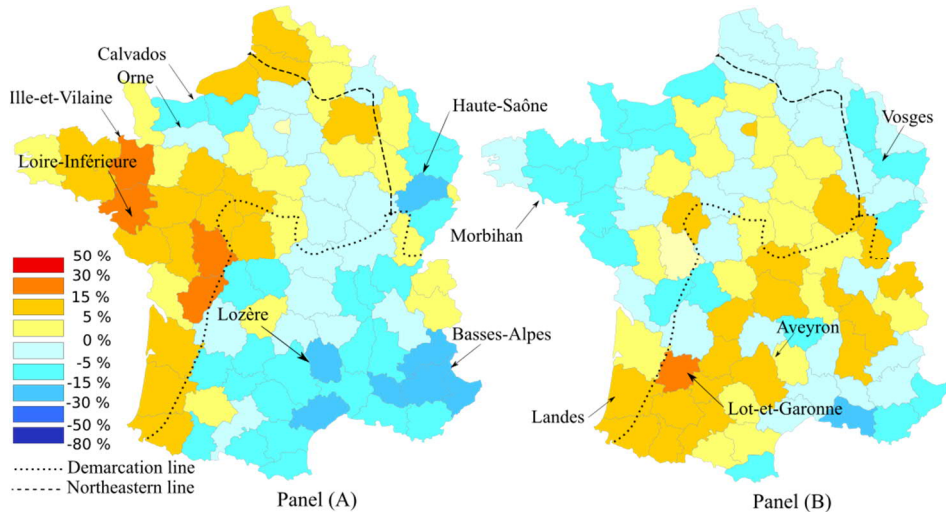
4.6 1946: The scars of World War II

The liberation of France was completed between 1 January and 11 May 1945. The cities near the German border were liberated at the end of the winter: Colmar on 2 February, Forbach on 14 March, Wissembourg on 19 March. The areas in the west and the north of the country left behind during the Allied advance in 1944 because of heavy German resistance, notably La Rochelle, Dunkirk, Lorient, and Saint-Nazaire, were liberated only after the unconditional German surrender on 8 May 1945. The Vichy government was replaced by the *Gouvernement Provisoire de la République Française*, led by Charles de Gaulle. The gradual return to normal in military and political terms was accompanied by the return of internally displaced populations.

The migration balances between 1945 and 1946 (Online Appendix 3d) show that the return of refugees to the former deserted regions continued into this period. Most of the northern and eastern *départements*, whose population decreased between 1939 and 1945, had a positive migration balance for 1945–1946. This is notably the case for Calvados, Pas-de-Calais and Haute-Saône, where the balances are close to $+10\%$. Similarly, the increase observed in Charente-Inférieure for this period is explained by the late liberation of La Rochelle. The map also suggests that the refugees mostly came from the two *départements* identified as temporary hosting areas in 1945, the populations of Maine-et-Loire and Isère decreasing by 18% and 11%, respectively.

Lastly, Figure 6 (Panel B) shows the cumulative migration balances between 1939 and 1946 and the demographic scars of World War II. The cumulative migration balance of many *départements* is close to zero, but some areas accumulated substantial deficits. The northeast lost about 7% of its population between 1939 and 1946, *Vosges* more than 10%. In Normandy and Brittany, about 8% of the population was displaced and did not return. The *départements* with the greatest deficits were Loire-Inférieure (–13%) and Morbihan (–12%). Conversely, the data suggest that some of the refugees who settled in the southwest and some eastern *départements* chose to stay at the end of the war. There is a particularly uniform area of positive net migration between Aveyron, Landes, and Hautes-Pyrénées, with increases over the period of about 8%, and a maximum of +16% in Lot-et-Garonne. This development of increasing population in the southwest and decreasing population in the northwest is at odds with the aggregation process that occurred between 1851 and 1936 (Bonnet 2019), during which the population concentrated in Paris and the north of the country.

Figure 6: Population variations due to migratory movement: 1944–1945 and 1939–1946



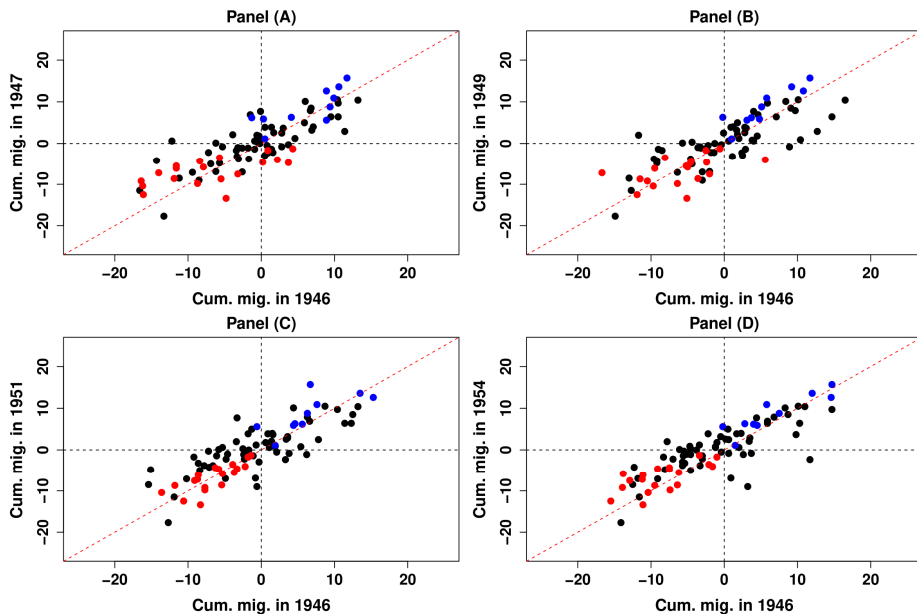
Sources: Own calculations from Bonnet (2020), Vallin and Meslé (2001), and *Statistique du Mouvement de la Population*.

Notes: Computations made for the 86 *départements* of the sample (excluding Corsica, Moselle, Bas-Rhin, and Haut-Rhin), according to the population of women. Panel (A) is the variation of population between 1944 and 1945 due to migratory movement. Panel (B) is the variation of population between 1939 and 1946 due to migratory movement. Migratory movement is the difference between the whole variation and the intrinsic growth, i.e., the difference between births and deaths. Values are in % of the population in 1939.

4.7 1946–1954: The persistence of population losses

To conclude, I sought to understand to what extent refugees continued to return after 1946 or remained settled in their new homes. Using the data collected by Bonnet (2020) and the methodology used for migration between 1939 and 1946, I calculated the female populations for each year of the period 1946–1954 and deduced the *départementale* variations of populations due to migration for each year. Figure 7 compares the cumulated migration balances for 1939–1946 with those for 1939–1947 (Panel A), 1939–1949 (Panel B), 1939–1951 (Panel C), and 1939–1954 (Panel D). Each point represents a *département*. The blue dots represent the *départements* of the northwest which had migration deficits between 1939 and 1946; the red dots represent the *départements* of the southwest where refugees settled. Extending the analysis to later years does not change the overall trends, which indicates that the war affected the spatial distribution of the population well beyond 1946: some refugees did not return.

Figure 7: Spatial persistence of population losses after World War II



Sources: Own calculations from Bonnet (2020), Vallin and Meslé (2001), and *Statistique du Mouvement de la Population*.

Notes: Computations made for the 86 *départements* of the sample (excluding Corsica, Moselle, Bas-Rhin, and Haut-Rhin), according to the population of women. "Cum. mig." is the variation of population between 1939 and the year chosen due to migratory movement. Migratory movement is the difference between the whole variation and the intrinsic growth, i.e., the difference between births and deaths. Values are in % of the population in 1939.

5. Discussion and conclusion

This paper proposes a methodology for estimating local populations between censuses. The approach is based on knowledge of the national population for each intercensal year, local populations for each census year, and local deaths by cause for each intercensal year. Using these vital statistics, I distinguish “symmetrical mortality,” which trends synchronously at the local and national levels, from “asymmetrical mortality.”

I have used this methodology to estimate the female population of each French *département* yearly between 1939 and 1946. Subtracting deaths classified as “violent and accidental” from the total number to obtain “symmetrical mortality” rates, and using estimated *départemental* populations and recorded *départemental* births and deaths, I have calculated the annual internal migration balance of each *département* during World War II. This has never been done before.

These migration balances reveal the extent of the May–June 1940 exodus in France. The population of the eastern and northern border regions fled to the southwest. Ardennes lost 40% of its population between 1939 and 1940, and the *départements* in the Alps bordering Italy lost 10% of their population to internal migration. In the northeastern *départements*, allocated for German colonization, refugees returned only after this project was abandoned in late 1941. From 1941, the largest population flows were from the north and northwest to the south, beyond the demarcation line into the free zone. While the conventional wisdom is that this line tore France apart, it is interesting to note that populations were able to cross it massively. In 1942 and 1943, the *départements* along the Mediterranean coast welcomed a large number of new inhabitants, with refugees accounting for as much as 30% of the 1939 population in Var and Alpes-Maritimes. In 1944, refugees moved inland, fleeing bombings along the coast. Around the Mediterranean, refugees moved to neighboring rural *départements* such as Lozère, Aveyron, and Basses-Alpes. As a semblance of normality returned between 1945 and 1946, there was a “backward exodus” of refugees from southern *départements* returning to the north and the northwest. Nevertheless, the demographic scars of the war were still evident in 1946, with many refugees from *départements* north of an arc connecting Loire-Inférieure and Doubs via Somme not returning. Relative to 1939 populations, the proportion of missing women varied from 5% to 15%, with the greatest deficits in Meuse and Brittany.

This paper focuses on female migration. Although the data for men are noisier because of military deaths, it should be possible to replicate this study for annual male migration. This would reveal the extent of outward migratory flows, and whether male and female migration followed different trends during World War II. Using the same approach as for female migration, I used the data collected by Bonnet (2020) to calculate male migration balances for each year between 1939 and 1946, and a partial answer to

the second question is outlined in Online Appendix 4, which compares female (Panel A) and male (Panel B) migration balances between 1939 and 1940. The two maps are almost identical. In particular, population flows from the north and east to the south and west are visible in both. There are nevertheless differences in the magnitude of the flows: the migration balance in the southwest was higher for men than it was for women.

This study, by using quantitative information from censuses and vital statistics, may open the way for further research. An outstanding question is whether migratory movements during the Second World War were age-specific. The elderly were presumably less likely to migrate because of their weakness, but this phenomenon has yet to be quantified. Other historical events involving intense and short-term migration could also be studied. An emblematic example in France would be the arrival of the *pièdes-noirs* from Algeria in the 1960s. The geography of this population's resettlement in metropolitan France could be refined using the proposed method, and may shed new light on this event, in line with Hunt (1992).

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