Working Paper

Selected Demographic Aspects of a United Germany

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WP-90-33
July 1990

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FOREWORD

Two changes that are putting Europe in center stage of world events are the integration of the economies of the Common Market 12 and the unification of Germany. This paper deals with demographic aspects of the latter, leaving for the moment consideration of how the new Germany will fit into an integrated Europe.

The two matters are connected in various ways; for one thing, the concern of its neighbors that Europe will be dominated by Germany is diminished by its incorporation in a single European economy. The demographics also give some assurance; at least West Germany's birth rate is far short of replacement, and with unification an assimilation of the East to the birth rate of the West is much more likely than the reverse.

Beyond such matters is the expected geographical restructuring. Berlin will probably be the capital, but it is much less a center of population than Bonn; there could well be population shifts in the direction of Berlin, and certainly the development of infrastructure connecting it to the rest of united Germany.

This working paper takes the authors' investigation of the demographics of reunification a considerable step forward.

Nathan Keyfitz
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ABSTRACT

The paper gives a first sketch of demographic patterns in the united Germany. It primarily focuses on regional divergences in population density, age structure, sex ratio, nuptiality, fertility, mortality and natural population growth. The paper then presents data to demonstrate that the (future?) German capital, Berlin, is located far away from the demographic center of the united Germany in a sparsely populated area. To estimate the consequences of the unification for population distribution, the paper calculates the demographic gravity centers of the FRG, the GDR, and the united Germany. Finally, a locational profile of selected German cities (including Frankfurt and Berlin) is calculated to determine their demographic centrality.

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SELECTED DEMOGRAPHIC ASPECTS OF A UNITED GERMANY

Gerhard K. Heilig and Thomas Büttner

INTRODUCTION

Since the unification of the two German States, the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR), can be expected in the near future, it seems appropriate to consider the demographic consequences of this historical event. While the unification of the two German states certainly does not result in a demographic superpower, it well raises Germany out of the group of other populous European nations. Its population will be some 20 million larger than that of Italy (57 million), the UK (57 million), or France (56 million).

On the other hand the GDR is only sparsely populated. While the territory of a united Germany will increase by some 44% as compared to the FRG, its population will grow by only some 16%. The present population of the GDR is smaller than that of Northrhine-Westfalia, which is only one of the 11 federal states ("Bundesländer") of the FRG; the GDR territory, however, is larger than that of Bavaria and Baden-Württemberg (the first and third largest federal states of the FRG) combined.

Since we are primarily interested in studying the demographic patterns of a united Germany from a *demo-geographical perspective,* we have to consider its future regional structure. This structure will heavily depend on a regional reform in the GDR, which is presently being discussed in both German states.

In 1952 the GDR government had dissolved the "old" German system of federal states and introduced a new administrative order. The former federal states of Mecklenburg, Brandenburg, Saxonia/Anhalt, Saxonia and Thuringia were broken up into 14 districts and East Berlin, which was declared the capital of the GDR. This administrative reorganization during the early 1950s was intended to firmly establish the centralized state bureaucracy and the political power of the communist party. The result was a suppression of regional autonomy. Below the district level the GDR was also reorganized into 191 rural and 28 urban administrative areas. In quite a number of these administrative areas the boundary lines were changed with the intention to facilitate centralized planning and administration.

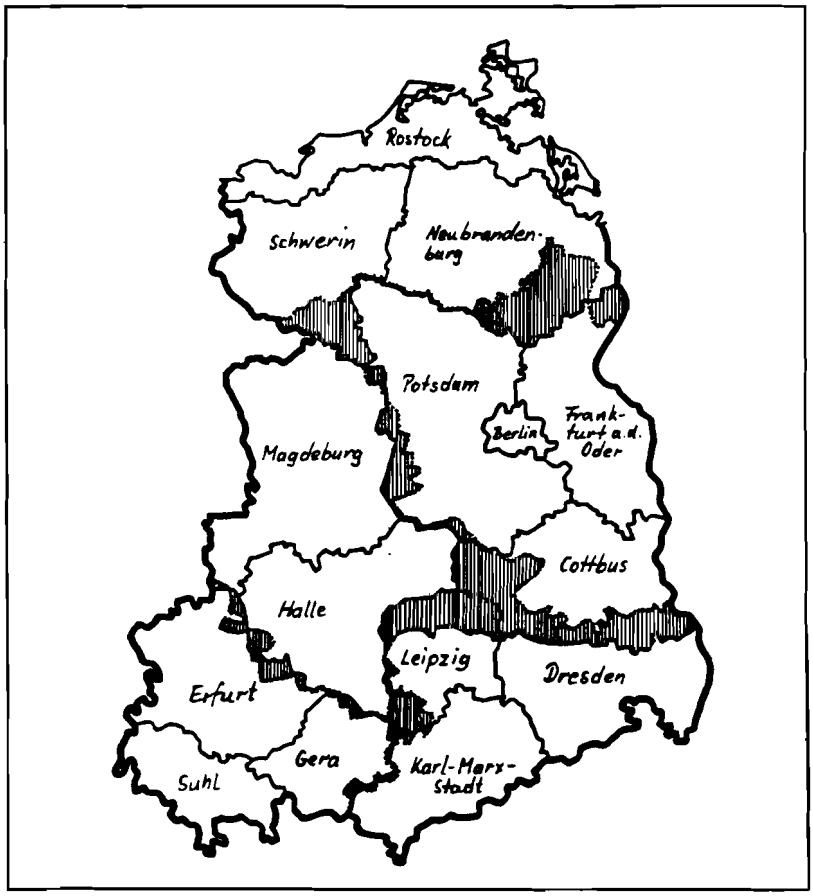
Since the political revolution in the GDR in October 1989 this administrative structure has been heavily debated, both in the GDR and the FRG. The new political parties in the GDR agree that the administrative system has to be reorganized. Especially the revitalization of federal states is of paramount political significance, since this would demonstrate the decentralization of political power. The existence of federal states in the GDR would also be necessary for unification based on the constituency of

the FRG: according to this constituency ("Grundgesetz") a united Germany can only be a *federal* republic where the states ("Länder") have a certain political autonomy from the central government.

Presently three models for this administrative reform in the GDR are being discussed:

(1) A first variant would be the establishment of federal states by *using the boundaries of the presently existing 14 districts.* This would be by far the easiest solution, since the 14 districts would only have to be aggregated into 5 states. From the demographer's point of view this solution would have the advantage that all statistical data collected during the past 40 years could be used immediately. However, this method of establishing the states on the basis of districts would not reproduce the "old" federal system as it existed before 1952. Especially in the south of the GDR (Cottbus, Leipzig, Dresden) and in Neubrandenburg and Schwerin, the borders would have to be drawn rather differently than they were before 1952. Figure 1 presents both the "old" federal states and the present district boundaries.

Figure 1. GDR: "Old" federal states and present district boundaries (shaded areas show the divergences).



(2) A second variant would be the *re-establishment of federal states in the GDR according to the pre-1952 borders.* This solution is favored by conservatives, who want to go back completely to a pre-communist regional structure in the GDR. For demographic analyses, however, this variant of a regional reform in the GDR would mean serious problems: All statistical data with a spacial dimension that were collected during the past 40 years would have to be recalculated on the basis of these "old" administrative units.

(3) A third variant -- which is rather hypothetical -- was recently discussed by several politicians in the FRG. They argued for an *administrative reform in both German states* that would result in a complete new federal structure of the united Germany. This solution would reduce the number of federal states by merging some very small states (such as Saarland, Hamburg or Bremen) with larger, economically more viable states. There are also suggestions that the present GDR territory should be reorganized into only two federal states[1] instead of the former five. While this reform could certainly increase administrative efficiency, it would also require a major change of the political system. For regional demography this reform would pose a severe problem, since all statistical time series would have to be recalculated according to the new administrative structure.

In the following analyses we have used a regional classification based on the first variant for an implementation of federal states in the GDR. According to this variant we have used the following administrative structure:

- the federal State of Mecklenburg was aggregated from the districts of Rostock, Schwerin and Neubrandenburg
- the federal state of Brandenburg was aggregated from the districts of Potsdam, Frankfurt/Oder and Cottbus
- the federal state of Sachsen/Anhalt was aggregated from the districts of Magdeburg and Halle
- the federal state of Saxonia was aggregated from the districts of Leipzig, Dresden and Chemnitz (former Karl-Marx-Stadt)
- the federal state of Thuringia was aggregated from the districts of Erfurt, Gera and Suhl.

East Berlin and West Berlin were aggregated to form the (future?) German capital of Berlin.

Table 1 gives an overview of the (possible) future administrative structure of the united Germany (see also Figures 2, 3 and 4).

[1] A "northern" state consisting of Mecklenburg and the northern parts of Brandenburg and Saxony-Anhalt; and a "southern" state which would include Thuringia, Saxony and the south of Brandenburg and Saxony-Anhalt.

Table 1. Possible future administrative structure of the united Germany: federal states (ranked by size of territory) and districts.

Federal States / Districts	Size (qkm)
Capital Berlin	883
(1) Bavaria (FRG)	70,553
Oberbayern	17,529
Niederbayern	10,331
Oberpfalz	9,691
Oberfranken	7,231
Mittelfranken	7,246
Unterfranken	8,532
Schwaben	9,993
(2) Lower Saxony (FRG)	47,439
Braunschweig	8,096
Hannover	9,044
Lüneburg	15,348
Weser-Ems	14,952
(3) Baden-Württemberg (FRG)	35,751
Stuttgart	10,558
Karlsruhe	6,919
Freiburg	9,357
Tübingen	8,917
(4) North Rhine-Westphalia (FRG)	34,068
Düsseldorf	5,288
Cologne	7,368
Münster	6,898
Detmold	6,515
Arnsberg	7,999
(5) Brandenburg (GDR)	28,016
Potsdam	12,568
Frankfurt/Oder	7,186
Cottbus	8,262
(6) Mecklenburg (GDR)	26,695
Rostock	7,075
Schwerin	8,672
Neubrandenburg	10,948
(7) Hesse (FRG)	21,114
Darmstadt	7,445
Gießen	5,381
Kassel	8,288
(8) Saxony-Anhalt	20,297
Halle	8,771
Magdeburg	11,526
(9) Rhineland-Palatinate (FRG)	19,848
Koblenz	8,093
Trier	4,926
Rheinhessen-Pfalz	6,829
(10) Saxony (GDR)	17,713
Leipzig	4,966
Dresden	6,738
Chemnitz (Karl-Marx-Stadt)	6,009
(11) Schleswig-Holstein (FRG)	15,728
(12) Thuringia (GDR)	15,209
Erfurt	7,349
Gera	4,004
Suhl	3,856
(13) Saarland (FRG)	2,569
(14) Hamburg (FRG)	755
(15) Bremen (FRG)	404

Figure 2. United Germany by federal states.

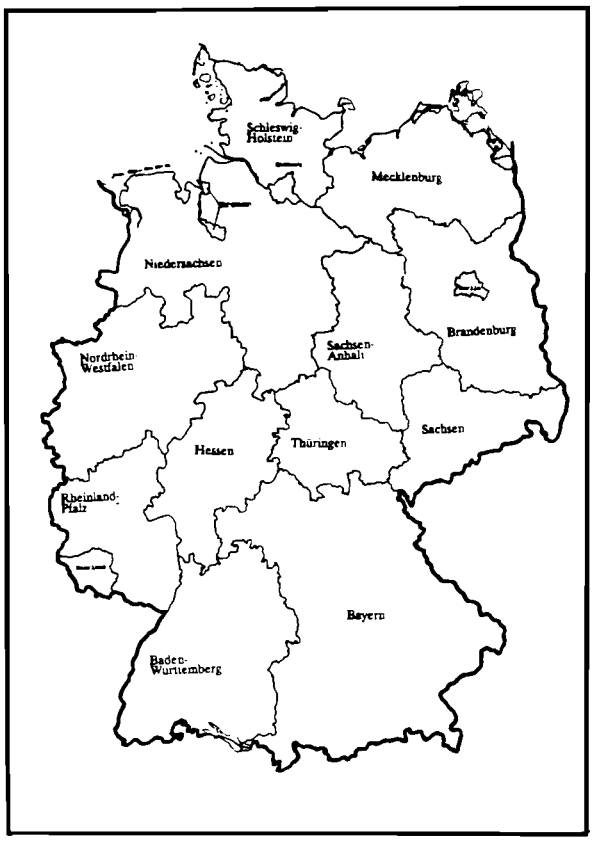
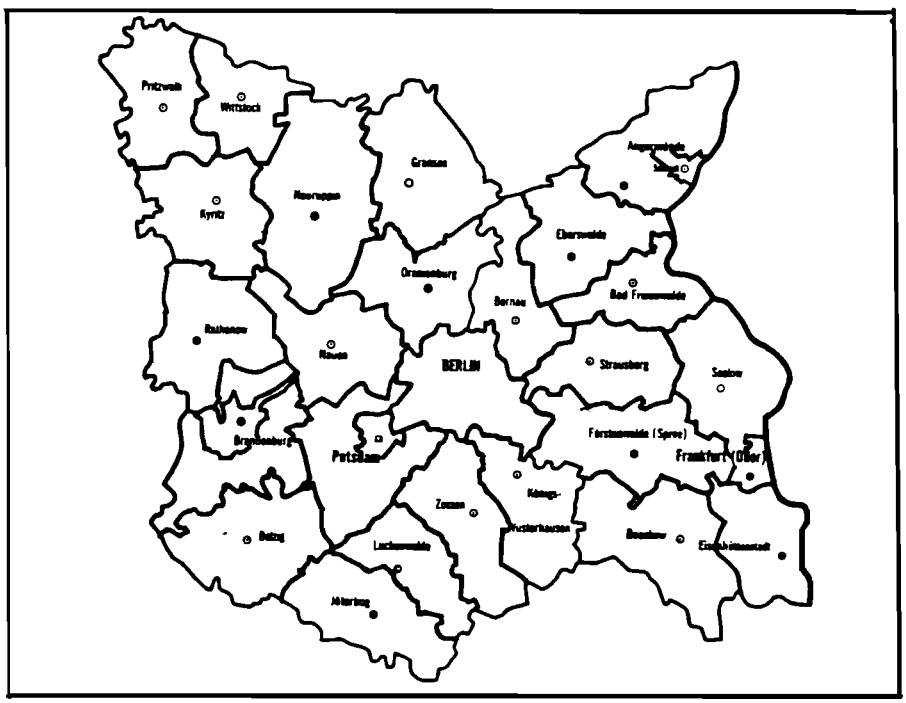


Figure 3. United Germany by districts.

Figure 4. Berlin and its "Hinterland".



Urban and Rural Areas

We have also analyzed demographic indicators for all (future) 428 rural areas ("Landkreise") and 119 urban areas ("Stadtkreise") of the united Germany. This corresponds to the next lower administrative level. Table 2 gives a short overview of some demographic divergences between rural and urban areas in Germany.[2]

Table 2. Selected demographic indicators for rural and urban areas in a united Germany (1987).

Indicator	type of areas / country				unit of measurement
	rural areas		urban areas		
	FRG	GDR	FRG	GDR	
average area	1001	552	121	95	square km per district
population	168,4	58,7	187,1	155,0	1000 people
population density	168	106	1530	1637	people per square km
sex ratio	106,2	109,5	111,9	112,1	females per 100 males
crude birth rate	10,97	13,53	11,98	11,54	live births per 1000 of population
crude death rate	10,63	13,53	11,98	11,54	deaths per 1000 of population
infant mortality rate	7,91	8,84	8,82	8,46	deaths of infants (aged 0 to 1) per 1000 live births
crude marriage rate	6,27	15,95	6,30	18,20	marriages per 1000 of population
growth rate	0,34	-0,00	-2,23	1,85	excess of births or deaths (-) per 1000 of midyear population

[2] A more detailed study of regional demographic patterns in Germany will be published separately.

Data Quality

While the Federal Republic of Germany is certainly a leading industrialized country, it has a rather poor system of *demographic* statistics -- as compared to countries such as Sweden or Finland. Its statistical system is highly fragmented into independent offices for each federal state. Strangely enough these offices do not feed all their primary datasets to a centralized database; much demographic information is passed on only in the form of *aggregated* tables to the Central Statistical Office in Wiesbaden. As a result, the Central Statistical Office is not in a position to provide a customer with certain more detailed demographic statistics. For instance, the Office was not able to provide us with total fertility rates or life expectancies by federal state. One has to ask each of the 11 different offices of the federal states to get access to these most important demographic indicators.

If the decentralization of demographic datasets was the only inconvenience with the statistical system in the FRG, most German demographers would be rather happy. However, there are also inconsistencies in the program of demographic statistics. Parity-specific fertility rates, for instance, are just not available; in the FRG the parity distribution of births is only reported for existing (!) marriages. Another example of this limited access to basic demographic statistics in the FRG is the fact that there is no question in the census concerning the birth history of women. As a consequence it is not possible to calculate a true completed fertility rate. Like in an underdeveloped Third World country, demographers in the FRG have to use special techniques to reconstruct this basic demographic indicator. Finally it must be said that the protection of the individual against infringement of his or her rights through storage of computerized data has become some kind of national hysteria.

At first glance, demographic statistics in the GDR are much better. As a centrally planned communist state, the GDR has given high priority to a most detailed system of demographic indicators. However, while the demographic statistics were collected mainly in accordance with international concepts and practices, their publication was heavily restricted -- as in the case of the suicide statistics, population forecasts, and external migration. Until recently, statistical data in the GDR were considered as some kind of internal knowledge for government use only. Not everyone -- especially not from outside the GDR -- had free access to existing demographic data in East Germany. Some published statistics also have aroused suspicion of having been "polished" to better fit the socialistic ideal, especially through differences in the definition of demographic events, the methods of calculation or underreporting. Since the democratic revolution in the GDR, this somewhat instrumentalistic attitude towards demographic statistics has changed. From a demographic point of view we can only hope that a unification of the two German states will introduce the much better East German concepts to the rather strange system of demographic statistics in the FRG.

The following paper discusses selected demogeographical features of a united Germany. The data used are from official statistical sources in the FRG and GDR.[3] They refer to the years 1987/1988 or are the last available. Consequently, all statements concerning the demographic patterns of a united Germany reflect the situation of 1987/1988.

1. POPULATION DISTRIBUTION AND DENSITY

One of the most obvious demographic distinctions that can be made between the FRG and the GDR concerns the level of population density. West Germany is one of the most densely populated areas in the world (see Figure 5). According to the last census its *average* population density was 246 individuals per km^2; several large districts, however, had densities of more than 450 inhabitants per km^2. On the contrary there is much less population pressure in the GDR. With its average population density of 154 inhabitants per km^2, the GDR could almost be called a remote area, as compared to the FRG. This is certainly true in the northern parts of the GDR, where several large rural districts are inhabited by just 30 to 40 persons per km^2. Even on the level of (the future) federal states, population density in the north of the GDR would be under 100 inhabitants per km^2 (Mecklenburg: 80 Inh./km^2; Brandenburg: 97 Inh./km^2). Actually, the relatively sparse population of the GDR was frequently used by the former communist government to "explain" the slow development of the economy. While this argument was mainly propaganda to cover up the poor performance of the centrally planned economy, it certainly had a serious foundation. One has to consider the fact that the GDR has lost almost one fourth (!) of its total population during the past 40 years by "illegal" flight across the "iron curtain" and legal emigration to West European countries, primarily the FRG. This "population-drain" compensated the relatively high level of fertility in the GDR (as compared to the FRG) resulting in a noticeable shrinking of the population.

Can we expect that in the long run the difference in population densities between the FRG and the GDR will be levelled out by a process of population redistribution from West to East? The answer to this question heavily depends on the future process of economic modernization in the GDR. If the country experiences an economic miracle ("Wirtschaftswunder") like West Germany during the 1950s, there might well be a substantial back-migration of former GDR citizens. The economic opportunities might also attract young active groups of the FRG population. Presently, however, another scenario seems to be more likely: An economic recovery in the highly industrialized southern districts of the GDR will probably attract population from the rural north of the GDR. This will increase the uneven distribution of the population in the GDR even further.

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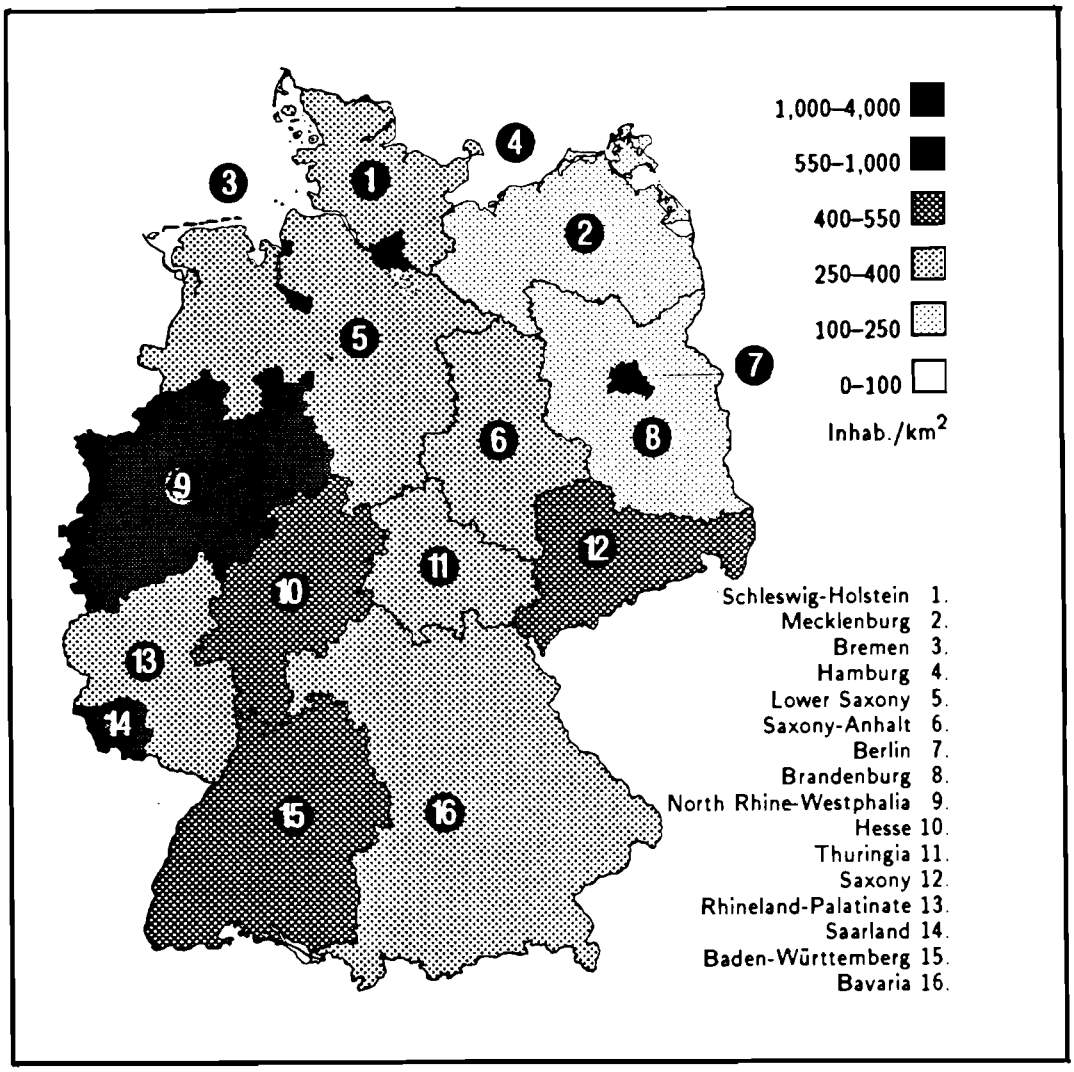
[3] Data for the FRG are from the Central Statistical Office ("Statistisches Bundesamt") in Wiesbaden and from the Statistical Offices of all federal states. GDR data came from the Statistical Office of the GDR ("Statistisches Amt der DDR") in East Berlin and from the Institute for Medical Statistics and Dataprocessing ("Institut für Medizinische Statistik und Datenverarbeitung").

Figure 5. Population density by federal state in Germany.



2. AGE STRUCTURE

A first glance at the regional differences in the age structure of the German population reveals that the proportion of active to non-active age groups is more unbalanced in the GDR than in the FRG. In the GDR 100 individuals of "active" age (15 to 64) have to support some 59 persons of non-active age (0-14 and 65+), as compared to only 51 in the FRG.[4] However, this heavier demographic "burden" in the GDR of today, might well be a great advantage for the future, since a very large proportion of the non-active population are children. For 100 adults of active age there are 37 children in the GDR, but only 28 in the FRG (see Table 3).

[4] The total dependency ratio (TDR) for the GDR was 58.7, while only 51.1 in the FRG. The TDR was calculated by: TDR = p15-64 / (p0-14) + (p65+).

Table 3. Dependency ratios by federal states in Germany (1987) (federal states were ranked by the total dependency ratio).

	Territory (Country/Federal State)		Dependency Ratios		
			Total	Old Age	Young Age
1	Saarland	[FRG]	47.8%	21.9%	25.9%
2	North Rhine-Westphalia	[FRG]	49.7%	22.2%	27.5%
3	Hamburg	[FRG]	50.0%	27.7%	22.3%
4	Hesse	[FRG]	50.3%	23.3%	26.9%
5	Baden-Württemberg	[FRG]	51.0%	21.6%	29.3%
6	Bremen	[FRG]	51.4%	27.1%	24.3%
7	Rhineland-Palatinate	[FRG]	52.0%	23.6%	28.4%
8	Bavaria	[FRG]	52.1%	22.9%	29.2%
9	Schleswig-Holstein	[FRG]	52.7%	24.5%	28.2%
10	Lower Sxony	[FRG]	53.5%	24.1%	29.3%
11	Brandenburg	[GDR]	56.9%	18.9%	38.0%
12	Mecklenburg	[GDR]	57.5%	17.3%	40.2%
13	Saxony-Anhalt	[GDR]	57.6%	21.8%	35.9%
14	Thuringia	[GDR]	58.5%	21.1%	37.4%
15	Saxony	[GDR]	61.0%	25.5%	35.5%
	East Berlin	[GDR]	52.3%	17.7%	34.6%
	West Berlin	[FRG]	52.0%	28.4%	23.6%
	Capital Berlin		52.1%	24.3%	27.8%
	GDR		58.2%	21.4%	36.8%
	FRG		51.1%	23.1%	28.0%

The most unbalanced age structure of the GDR can be found in Saxony with a total dependency ratio of 61. In this (future) federal state, the proportion of children is also relatively low while the proportion of individuals of retirement age is by far the highest in the GDR. Obviously Saxonia suffered most from the communist rust-belt economy. Here, in the old industrial heart of the country, the decay of the system was felt more seriously than in the rural areas of the north or in East Berlin. Many young families fled across the "iron curtain" (via Hungary) or migrated to the central areas of the GDR (especially to East Berlin). The older population remained behind.

The other side of the coin, however, is a very young population in Mecklenburg, Brandenburg and East Berlin. Here old age dependency ratios vary between 17.3 and 18.9, while in the FRG they range from 21.9 (in Baden-Württemberg) to 28.4 (in West Berlin). Most remarkable is the situation in Berlin: While the active population in both parts of the city has to carry approximately the same "burden" of non-active population (the total dependency ratio is 52), it is mostly children in East Berlin and mostly elderly in West Berlin. Hence, the unification of both parts of Berlin would substantially rejuvenate the German capital as compared to the graying West Berlin.

3. SEX RATIO

There are undoubtedly more impressive demographic indicators than the sex ratio of the total population or that of certain age groups. From the perspective of regional demography, however, this measure can uncover some interesting spatial divergences of the social structure.

In general, the proportion of females in the GDR is higher than in the FRG: The GDR sex ratio is 110 females per 100 males, as compared to 108 females in the FRG (see also Table 4). However, this overall pattern is heavily distorted, if we analyze it at a lower regional level. In the administrative districts of Baden-Baden, Bamberg and Würzburg (all FRG), for instance, we can find between 20 and 25 percent more women than men; on the other hand in Greifswald (GDR), Groß-Gerau (FRG), Gifhorn (FRG) or Rotenburg (FRG), which are all sparsely populated rural districts, there is only a slight female excess over males (of some 1 to 3%) or we find even more males than females. These imbalances of the male-female ratio in certain areas is primarily a result of differential migration. Baden-Baden, for instance, is a typical retirement city for wealthy widows and Bamberg has a social-science oriented university which primarily attracts young female students. Both Bamberg and Würzburg have also large teacher colleges that attract more female than male students.

Table 4. Sex ratios (females per 100 males) by federal states in Germany (1987).

	Federal States		Sex ratio of total population
1	Mecklenburg	[GDR]	106.1
2	Baden-Württemberg	[FRG]	106.9
3	Lower Saxony	[FRG]	107.3
4	Hesse	[FRG]	107.3
5	Brandenburg	[GDR]	107.5
6	Rhineland-Palatinate	[FRG]	107.7
7	Schleswig-Holstein	[FRG]	107.9
8	Bavaria	[FRG]	108.1
9	North Rhine-Westphalia	[FRG]	108.6
10	Saarland	[FRG]	108.6
11	Thuringia	[GDR]	109.9
12	Saxony-Anhalt	[GDR]	110.5
13	Bremen	[FRG]	111.4
14	Saxony	[GDR]	113.5
15	Hamburg	[FRG]	113.8
	East Berlin	[GDR]	111.8
	West Berlin	[FRG]	114.9
	Capital Berlin		113.7
	GDR		110.3
	FRG		108.3

A heavily imbalanced sex ratio of *young adults* can be a cause of low nuptiality. In some areas of Germany we find nearly twice as many males, age 20 to 35, than females; in other areas it is just the opposite. If migration is low, this imbalanced sex ratio can result in a so-called "marriage squeeze": It means that there are just not enough potential partners of the opposite sex to satisfy the demand for marriage. Some German demographers think that this marriage squeeze is one of the reasons for the very low marriage rates in the FRG.

As in most of the highly developed countries, the life expectancy of women is much higher than that of men in both German states. Combined with the effect of male losses during World Wars I and II, this results in an extremely imbalanced sex ratio of

the older population. Among Germans age 65+ the proportion of women is nearly twice that of men. In the FRG the proportion of women age 65+ to men of the same age is 19 to 10 (see Table 5); in the GDR there are even 21 women for 10 men age 65 and above.

Table 5: Sex ratios (females per 100 males) at age 65 and older by federal states in Germany (1987).

	Federal States		Sex ratio of population 65 and older
1	Hesse	[FRG]	183
2	Lower Saxony	[FRG]	185
3	Rhineland-Palatinate	[FRG]	186
4	Bavaria	[FRG]	187
5	Schleswig-Holstein	[FRG]	188
6	Baden-Württemberg	[FRG]	189
7	Bremen	[FRG]	190
8	Saarland	[FRG]	194
9	North Rhine-Westphalia	[FRG]	196
10	Hamburg	[FRG]	198
11	Thuringia	[GDR]	198
12	Saxony-Anhalt	[GDR]	201
13	Saxony	[GDR]	210
14	Brandenburg	[GDR]	211
15	Mecklenburg	[GDR]	214
	East Berlin	[GDR]	226
	West Berlin	[FRG]	256
	Capital Berlin		248
	GDR		207
	FRG		192

4. NUPTIALITY

There is probably no other demographic aspect which is more different in both German states than the level of nuptiality. Presently, marriage rates among East Germans are up to two times as high as among citizens of the Federal Republic. In 1987 the crude marriage rate in the GDR was 8.5 (marriages per 1000 of population) as compared to 6.3 in the FRG. On the level of federal states, the lowest rates were found in Hamburg and Bremen (6 marriages per 1000 of the population); the highest in East Berlin (10.2 marriages per 1000) (see also Table 6).

These differences in the crude marriage rate between East and West Germany cannot be attributed only to the younger average age of the GDR population. It was until recently also the result of massive political and administrative influence: In the past, young couples only had a chance to get an apartment of their own if they were married and had a child. Hence, many young men and women in the GDR fled into early marriage to be independent from their parents. The strong desire for an intact private world might have also been some kind of "emigration to the inside" in order to avoid the latent pressure from a communist society. However, it seems rather unlikely on the other side that legislation and political culture by itself had such a tremendous

effect on people's marriage behavior. We rather believe that traditional, family-oriented values are still very widespread in the GDR.

Table 6. Marriages and crude marriage rates by federal states in Germany (1987) (federal states were ranked by level of marriage rate).

	Territory (country/federal state)		Marriages	
			total	per 1000 of population
1	Bremen	[FRG]	3951	5.99
2	Hamburg	[FRG]	9565	6.00
3	Lower Saxony	[FRG]	43731	6.11
4	Baden-Württemberg	[FRG]	56780	6.11
5	Hesse	[FRG]	33705	6.12
6	North Rhine-Westphalia	[FRG]	105446	6.31
7	Bavaria	[FRG]	70035	6.42
8	Schleswig-Holstein	[FRG]	16464	6.45
9	Rhineland-Palatinate	[FRG]	23905	6.58
10	Saarland	[FRG]	7021	6.65
11	Thuringia	[GDR]	19988	7.91
12	Saxony	[GDR]	39552	7.92
13	Saxony-Anhalt	[GDR]	25688	8.48
14	Mecklenburg	[GDR]	18542	8.72
15	Brandenburg	[GDR]	23720	8.73
	East Berlin	[GDR]	12656	10.15
	West Berlin	[FRG]	11961	5.93
	Capital Berlin		24617	7.54
	GDR		141283	8.49
	FRG		382564	6.26

5. FERTILITY

In 1987 some 225,959 babies were born in the GDR which is equivalent to 35% of the number of births in the FRG (642,010). The population in the GDR, however, was only 16% of that in the FRG. While in terms of population the ratio between East and West Germany was 1 to 3.7, it was only 1 to 2.8 in the number of births. Comparisons like these give the impression of a very high fertility differential between East and West Germany.

However, by using crude birth rates, we find that the difference between both German states is actually much smaller: 13.6 children per 1000 of the population in the GDR as compared to 11.0 in the FRG. Measured in terms of the crude birth rate fertility was "only" some 24% higher in the GDR than in the FRG. While the overall birth rate is certainly a better measure to compare reproduction in East and West Germany, it does not take into account the age structure of the (female) population and consequently does not reflect the true level of fertility.

By using the total fertility rate (TFR) we found that average period fertility was some 29% higher in the GDR than in the FRG in 1987/1988. While the GDR had a total fertility rate of 1,739.9 it was 1,344.3 in West Germany. Provisional data for 1989, however, indicate that the TFR has increased in the FRG to 1.5 in 1989. This would reduce the fertility differential to 16%. Hence, we have to reconsider the question if the higher fertility in the GDR was only a short time response to policy measures.[5]

To get a more accurate idea of the regional divergences of fertility in both German states we have compared total fertility rates for all (future) federal states of Germany.[6] We found substantial variation in the level of fertility in Germany: Bremen has the lowest TFR (1,179.7); the highest fertility was found in the (future) federal state of Mecklenburg (1,888.6) (see Table 7).

For the district level (which is the next administrative level below the federal state) we were unable to obtain total fertility rates. By analyzing the crude birth rates we found the lowest rates in Bremen, Hamburg, Kassel, Darmstadt and Saarland (all in West Germany) -- between 8.75 and 9.9. The districts of Schwerin, Neubrandenburg and Rostok, which are all situated in the sparsely populated northern part of the GDR, have the highest birth rates (15.1 to 15.9).

Table 7. Live births, birth rate, and total fertility rate (TFR) in Germany by federal states (federal states were ranked by level of fertility).

Rank	Federal States	Live Births	Birth Rate	TFR
1	Mecklenburg (GDR)	32,923	15.5	1,888.7
2	Brandenburg (GDR)	38,189	14.1	1,742.5
3	Saxony (GDR)	62,548	12.5	1,709.2
4	Thuringia (GDR)	33,772	13.4	1,709.1
5	Saxony-Anhalt	40,128	13.2	1,708.5
6	Hesse (FRG)	57,643 *	10.4 *	1,587.2 *
7	Schleswig-Holstein (FRG)	27,310 *	10.6 *	1,466.4 *
8	Bavaria (FRG)	126,409 *	11.5 *	1,463.4 *
9	North Rhine-Westphalia (FRG)	185,877 *	11.0 *	1,425.2 *
10	Rhineland-Palatinate (FRG)	39,850 *	10,9 *	1,424.7 *
11	Lower Saxony (FRG)	76,036 *	10.6 *	1,409.4 *
12	Baden-Württemberg (FRG)	110,627 *	11.8 *	1,396.0 #
13	Saarland (FRG)	10,748 *	10.2 *	1,257.2
14	Hamburg	15,359 *	9.6 *	1,250.4
15	Bremen (FRG)	6,420 *	9.7 *	1,179.7 #
	East Berlin	18,339	14.8	1,716.1
	West Berlin	20,980 *	10.2 *	1,405.4 #
	Capital Berlin	37,953	11.6	1,537.1
GDR		225,959	13.6	1,739.9
FRG		677,259 *	11.0 *	1,362.0

1986; * 1988; All other data: 1987

[5]Büttner, T. and W. Lutz. 1990. Estimating Fertility Responses to Policy Measures in the German Democratic Republic. Paper presented at the PAA Annual Meeting in Toronto, May 3-5, 1990.

[6]Every demographer would expect that the TFR by federal state is easily available from the Central Statistical Offices. However, as mentioned before, this is not the case in both the FRG and the GDR. In West Germany, we had to ask each of the 11 federal statistical offices; one alone could not provide us with this information. In East Germany, the TFR is not available on the level of federal states since this administrative structure did not exist over the past 40 years. Hence it was necessary to estimate it on the basis of districts for which TFRs were available.

6. MORTALITY

Life expectancy (at birth) is 2.5 years shorter for women in the GDR than in the FRG; for men the difference is 2 years. This is not a small divergence for two industrialized countries which started at approximately the same level of mortality only 40 years ago. The average life expectancy at birth is usually very sensitive to the level of infant mortality. However, it is not a higher infant mortality which is the cause of lower life expectancy in the GDR as compared to the FRG. In fact, infant mortality is even lower in the GDR than in some federal states of the FRG. Consequently, the level of adult mortality must be different.

This can be demonstrated by comparing further life expectancy at various ages: at age 65, further life expectancy is 13.8 years for men in the FRG and 12.7 in the GDR. For women age 60, further life expectancy is 17.6 (FRG) versus 15.6 (GDR). Hence, the differential between West and East Germany in further life expectancy at age 65 is still 1 year for men and 2 years for women (see Table 8). These figures indicate that living conditions were harder in the GDR than in West Germany; especially the health system obviously suffered from major deficiencies.

Table 8. FRG/GDR: Life expectancy at birth; further life expectancy at selected ages (1987).

	Life expectancy (in years)			
	Male		Female	
Age	FRG	GDR	FRG	GDR
0	71.8	69.8	78.4	75.9
15	57.8	55.9	64.2	61.8
60	17.3	16.1	21.7	19.6
65	13.8	12.7	17.6	15.6

As expected, we found mortality varying considerably by federal states and districts. By federal states the lowest life expectancy at birth for women was found in Brandenburg (GDR): 75.1 years; in Hesse (FRG) women could expect to live 3.7 years longer -- their life expectancy was 78.8 years. Among men the discrepancies in life expectancy between East and West Germany were even more dramatic. While men in Mecklenburg had a life expectancy at birth of 68.2 years, it was 72.6 years in the federal state of Hesse (FRG). Hence, men in Hesse gained 4.4 years of life, as compared to those living in the northern GDR state of Mecklenburg.

If regional discrepancies are as large as those on the level of federal states, it can be expected that they are even more visible on the basis of smaller regional areas. However, we could not get the necessary information to calculate life tables by districts. Hence, we have used crude mortality rates to give a first impression of small-scale mortality differences. Any interpretation of this demographic measure, however, has to take into account that it heavily depends on the age composition of the population.

On the administrative level of districts the highest crude mortality rate (deaths per 1000 of population) was found in West Berlin (15.2) and Chemnitz/GDR (15.0) -- formerly the district of Karl-Marx-Stadt. The lowest mortality rate was in Tübingen (9.2) and Stuttgart (9.6) (both FRG). Even further apart are the mortality rates if compared on the level of small urban and rural areas ("Land- und Stadtkreise"). The highest mortality rate (18.1) is in Reichenbach (GDR), a rural area in the western part of Chemnitz. The lowest mortality rate, on the other hand, was found in Halle/Neustadt (GDR): 5.1; very low mortality rates, however, were also found in Schwedt/Oder (GDR) and Neubrandenburg (GDR) which are both urban areas in the federal state of Brandenburg. There is a general tendency of high mortality in the southern industrialized districts of the GDR, while the northern districts and the area around East Berlin have relatively low death rates (see Table 9).

Contrary to adult mortality the level of infant mortality is similar in both German states, namely 8.7 deaths per 1000 live births in the GDR as compared to 8.3 in the FRG.[7]

Table 9. Deaths, death rate, infant deaths, infant death rate, and life expectancy at birth in Germany by federal states (federal states were ranked by level of life expectancy).

Rank	Federal States	Deaths		Infant Deaths		Life Expectancy		
		Total	Rate	Total	Rate	Male	Female	Table
1	Hesse (FRG)	62,128 *	11.2 *	424 *	7.4 *	72.6	78.8	(86/88)
2	North Rhine-Westphalia (FRG)	186,987 *	11.1 *	1558 *	8.4 *	71.8	78.4	(85/87)
3	Baden-Württemberg (FRG)	92,418 *	9.8 *	707 *	6.5 *	71.8	78.1	(80/85)
4	Schleswig-Holstein (FRG)	30,424 *	11.9 *	185 *	6.8 *	71.0	77.4	(80/85)
5	Bavaria (FRG)	118.450 *	10.7 *	859 *	6.9 *	70.9	77.4	(80/85)
6	Lower Saxony (FRG)	82,920 *	11.5 *	551 *	7.3 *	70.7	77.4	(80/85)
7	Hamburg	21,186 *	13.2 *	118 *	7.8 *	70.5	77.3	(81/86)
8	Bremen (FRG)	8.712 *	13.2 *	50 *	7.9 *	69.9	77.3	(80/85)
9	Rhineland-Palatinate (FRG)	41,882 *	11.5 *	329 *	8.3 *	70.4	77.1	(80/85)
10	Saarland (FRG)	12,388 *	11.7 *	107 *	10.0 *	69.2	76.2	(80/85)
11	Saxony (GDR)	71,622	14.3	556	8.9	70.5	75.9	(85/86)
12	Thuringia (GDR)	31,899	12.6	295	8.7	69.7	75.6	(85/86)
13	Saxony-Anhalt(GDR)	40,430	13.3	355	8.8	69.2	75.2	(85/86)
14	Mecklenburg (GDR)	23,541	11.1	248	7.5	68.2	75.2	(85/86)
15	Brandenburg (GDR)	32,486	12.0	360	9.4	69.4	75.1	(85/86)
	East Berlin	13,894	11.1	155	8.4	70.2	75.3	(85/86)
	West Berlin	30,021 *	14.6 *	191 *	9.2 *	68.6	75.8	(80/85)
GDR (with East-Berlin)		223,872	12.9	1969	8.7	69.6	75.5	(85/86)
FRG (with West-Berlin)		687,516 *	11.2 *	5079 *	7.6	71.8	78.4	(80/85)

1986; * 1988; All other data: 1987

[7] It should, however, be noted that the definition of a "live birth" in the GDR and the FRG, respectively, is slightly different. The GDR definition did not count cases with only a pulsation of the umbilical cord as "live" births.

7. NATURAL POPULATION GROWTH

In 1987 the reproductive balance was positive in the GDR while it was negative in West Germany. In the GDR, the excess of births over deaths was some 12,000 (which was equivalent to 0.73 excess births per 1000 of the population). On the contrary, the FRG had a birth deficit of some 45,400, or 0.74 per 1000 of population.

In a united Germany, there will be only four federal states with natural population increase -- three of them in the GDR, namely Mecklenburg, Brandenburg, Thuringia, and only one in the FRG, Baden-Württemberg. All other federal states will experience natural population decline of up to minus 4.6 births per 1000 of the population (as in the case of Hamburg) according to the data of 1987. A high birth deficit can also be found (apart from the city-states of Hamburg, Bremen and Berlin) in Schleswig-Holstein. Strangely enough, the neighbor state of Mecklenburg has the highest natural population growth.

In West Germany there is a clear south-north slope in the rates of natural population growth: While the southern federal states traditionally have natural population growth or only minor rates of decline, the northern states experience a high birth deficit (see Table 10). The situation in the GDR is just the opposite: Here natural growth can be observed in the rural north, while the industrialized south has a relatively high birth deficit.

Table 10. Natural population growth by federal states in Germany (1987) (federal states were ranked by rate of natural population growth).

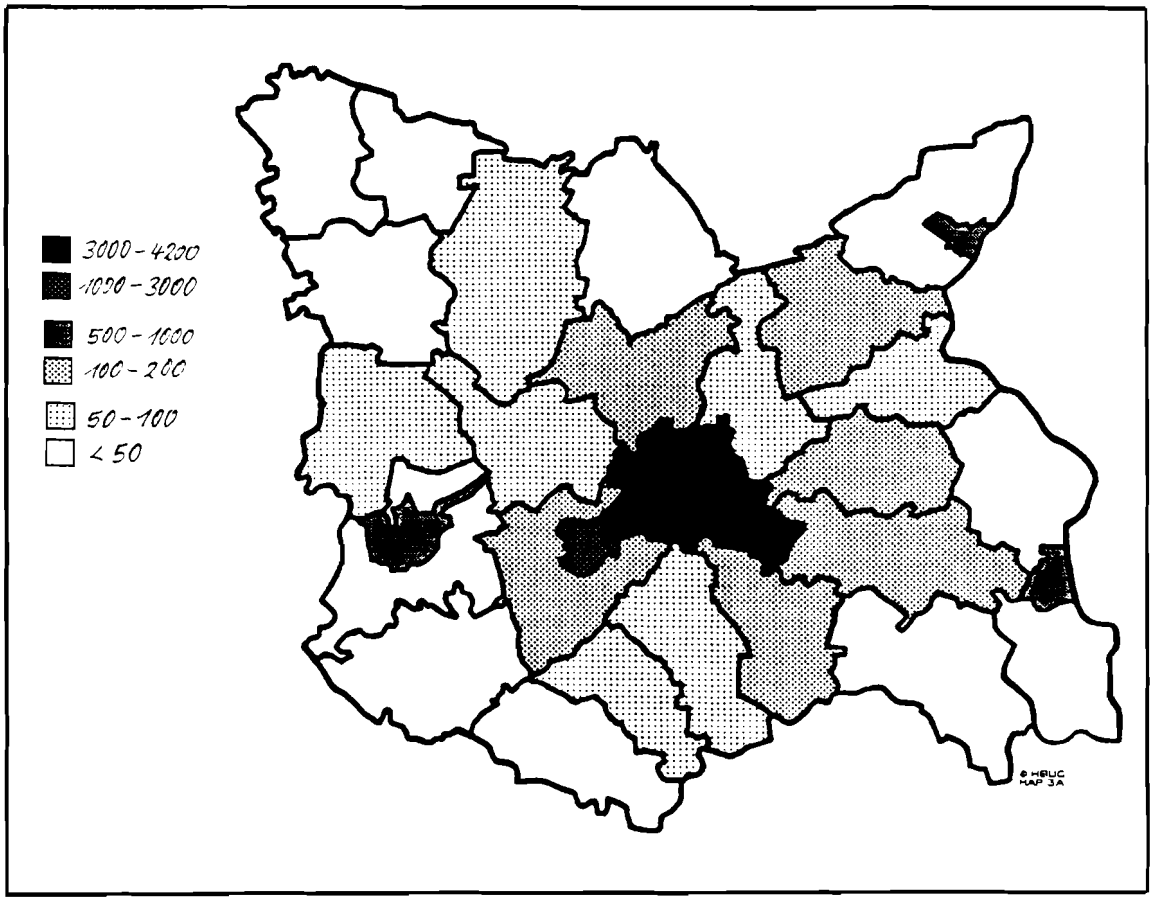
Territory		Excess of births (+) or deaths (-)	
		total	per 1000 of popul.
Hamburg	[FRG]	-7257	-4.55
Bremen	[FRG]	-2716	-4.11
Schleswig-Holstein	[FRG]	-4929	-1.93
Saxony	[GDR]	-9074	-1.82
Saarland	[FRG]	-1801	-1.71
Lower Saxony	[FRG]	-9927	-1.39
Hesse	[FRG]	-6884	-1.25
Rhineland-Palatinate	[FRG]	-4238	-1.17
North Rhine-Westphalia	[FRG]	-8456	-0.51
Saxony-Anhalt	[GDR]	-302	-0.10
Bavaria	[FRG]	-39	-0.00
Thuringia	[GDR]	1873	0.74
Baden-Württemberg	[FRG]	12003	1.29
Brandenburg	[GDR]	5703	2.10
Mecklenburg	[GDR]	9382	4.41
East Berlin	[GDR]	4505	3.61
West Berlin	[FRG]	-11165	-5.54
Capital Berlin		-6660	-2.04
GDR		12087	0.73
FRG		-45409	-0.74

8. THE CAPITAL BERLIN AND ITS "HINTERLAND"

One of the most remarkable aspects of the population distribution in a united Germany will be the extremely low population density around its (future?) capital, Berlin. With a population density of some 3700 inhabitants per km^2, the city is among the most densely populated areas in Germany. Its "hinterland", however, is nearly deserted (see Figure 6). Only 97 persons per km^2 live in the (future) federal state of Brandenburg which surrounds the city of Berlin. This is the second lowest population density of all German federal states. Enclosed by the "wall", the populous "island" of West Berlin developed its shining urban culture in the midst of a stagnating, most traditional rural area. But it was not only West Berlin that was separated from its surrounding area -- also East Berlin was enclosed by some kind of "invisible wall". Administrative regulations, restrictions to migration and the availability of housing prohibited easy migration between the city and its neighboring districts.

Now, since the "wall" is down and the unification on its way, one does not have to be a great prophet to predict a massive outmigration from the city to its "hinterland". Real estate still being cheap, a beautiful, unspoiled landscape, and the short distance to the inner city will make the surrounding areas of Berlin most attractive for suburban development. One can easily foresee a fundamental demographic change for the districts around Berlin.

Figure 6. Population density in the "hinterland" of Berlin.

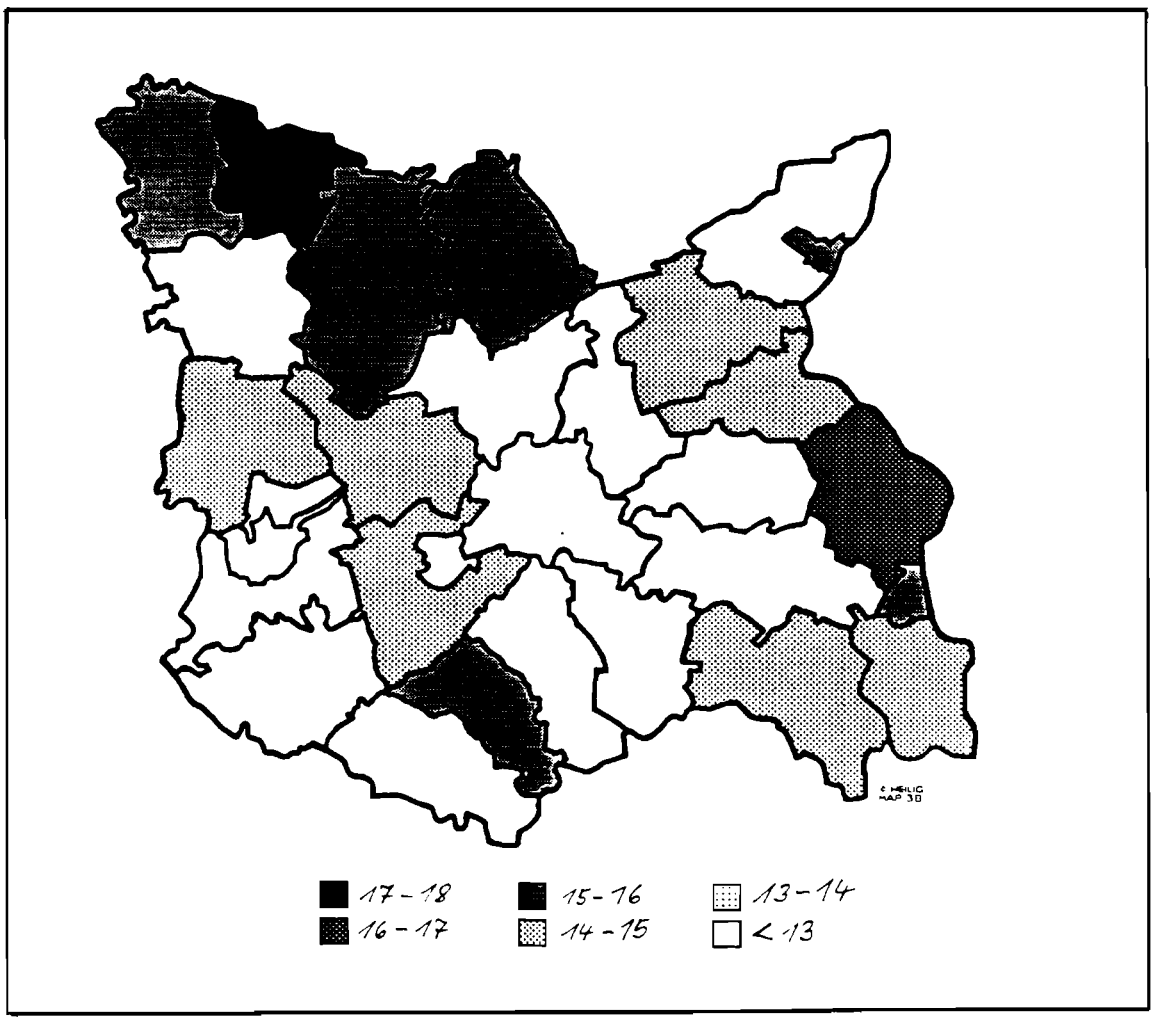


In the immediate neighborhood of Berlin we find a large rural area with a population density of only 88 (Nauen) persons per km^2. Even lower population densities can be found in Pritzwalk, Wittstock and Kyritz (under 45 individuals per km^2), northwest of Berlin. The lowest population density in Brandenburg is in Belzig (37 individuals per km^2), Eisenhüttenstadt (38), and Beeskow (39) which are all located south of Berlin.

As we said, the (future?) capital of Berlin has a very unique relationship to its "hinterland". The city is not only located in the middle of a sparsely populated federal state, but it also seems to be surrounded by a very traditional population. An indicator of this thesis is the relatively high birth rate in many areas around Berlin (see Figure 7).

These high birth rates in the area around Berlin have the result of natural population growth in all but three areas of Brandenburg. Only Berlin, the urban area of Eisenhüttenstadt, and the area of Bad Freienwalde have a birth deficit. All other rural and urban areas in Brandenburg experience natural population growth.

Figure 7. Birth rates in the "hinterland" of Berlin.

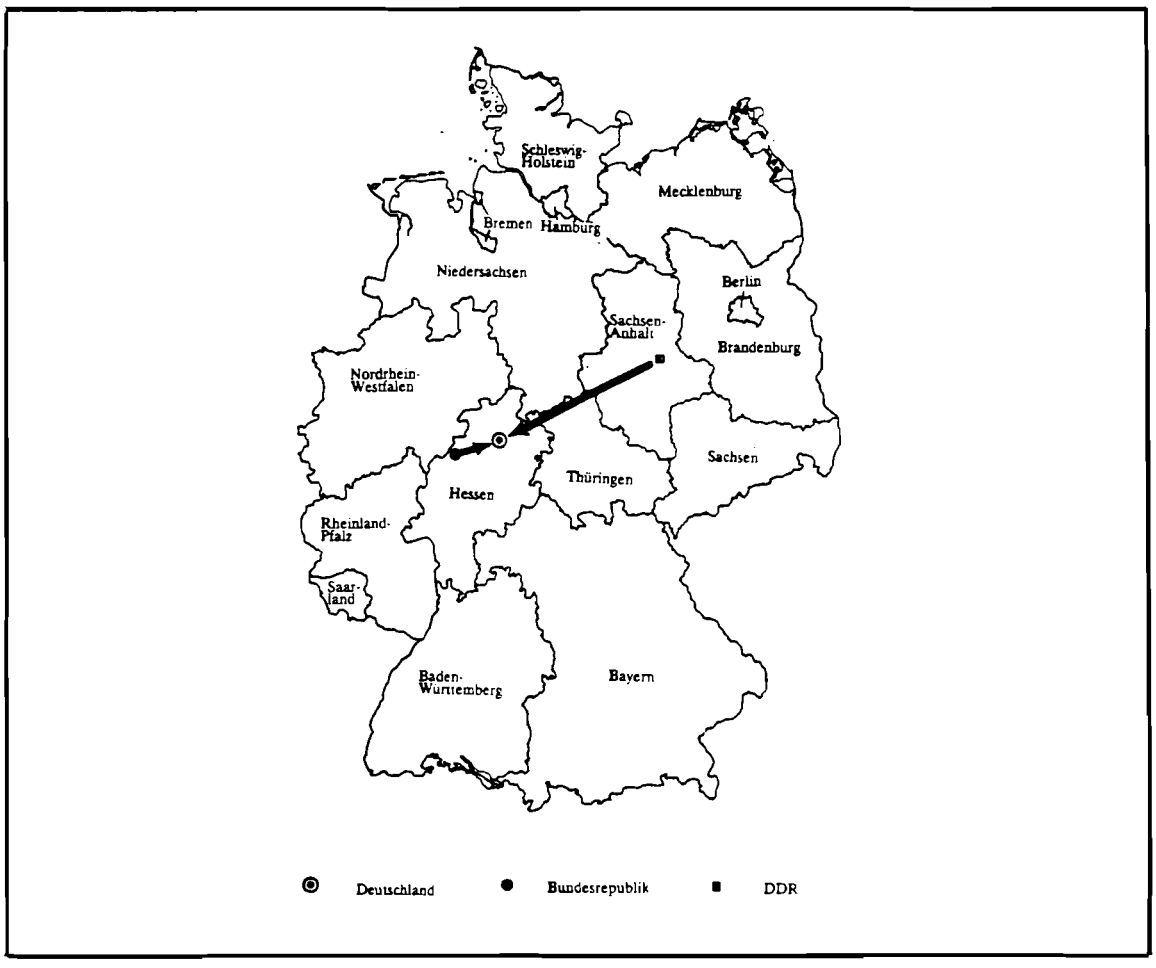


9. THE DEMOGRAPHIC GRAVITY CENTER OF GERMANY

The concept of a demographic gravity center was developed by geographers. It denotes the shortest (euklidean) distance between all individuals (or settlements) of a given area. Usually the demographic gravity center of a country is calculated on the basis of its smallest administrative areas -- weighted by their population. We have used the distances between all 547 urban and rural areas ("Land- und Stadtkreise") of Germany to calculate the gravity center for the FRG, the GDR and the united Germany, respectively.

Figure 8 shows that the demographic gravity center of West Germany was northwest of "Marburg an der Lahn" which is a medium-sized university town in the "Marburg-Biedenkopf" rural area. This is one of the few sparsely populated areas in the federal state of Hesse. In 1987 the gravity center of East Germany was situated far away from East Berlin near the town of Magdeburg in the rural area of Zerbst. This area is located in the western federal state of Saxonia-Anhalt. The unification of the GDR and FRG will -- as expected -- only slightly move the FRG gravity center to the northeast. It will be situated near the town of Homberg in the northeast of Hesse. This is a relatively remote area near the former "iron curtain". From the perspective of the GDR, the future demographic gravity center will move far southwest across their state border into the territory of the FRG.

Figure 8. Demographic gravity center of FRG, GDR and a united Germany.



The "demographic gravity center" is a rather synthetic measure which not necessarily identifies a strategic location. However, from the perspective of logistics it can be quite useful. Just think of the problem of planning a national distribution center for consumer goods! It should be situated in the shortest possible distance to all consumers. Theoretically this would be the demographic gravity center; however, due to uneven distribution of transportation infrastructure (such as streets, railroads, telephone cables) another location might be more appropriate.

10. THE "CENTRALITY" OF SELECTED CITIES

The concept of "centrality" of cities is rather similar to that of a "demographic gravity center". Both measures are based on euklidean distances, weighted by the population of the coordinates used. We have adopted two different approaches to calculate the centrality of selected German cities:

- First the "centrality" of these cities was calculated by summing up all (euklidean) distances from that city to all 547 rural and urban areas of Germany ("Land- und Stadtkreise") weighted by their population. This number was divided by the total sum of distances between all points of measurement. The result was the average distance between the location of that city and the living areas ("Land- und Stadtkreise") of all individuals in Germany.
- Then we drew a set of concentric circles with given radii around each of these cities. For each circle we summed up the population living within that area. This gave us a "locational profile"[8] which represents the population of catchment areas of various distances around these cities.

The average distances of selected German cities to all other administrative units[9] is given in Table 11. Since these distances were not weighted by population, they represent the geographical centrality of each city.

Table 12 gives the average distance (in km) of selected cities to the rest of the German population. Among these cities "Kassel" (situated in the federal state of Hesse) has the highest centrality in a united Germany; this medium-sized town has an average distance of 230 km from all German citizens. Berlin, the future capital of Germany, has a very low demographic centrality; the city is far away both from the densely populated industrial areas in the FRG ("Ruhrgebiet") and the industrialized south of the GDR. Only Munich, the capital of the federal state of Bavaria, has a lower level of demographic centrality. On average German citizens will have to travel 370 km to reach their capital Berlin; this journey is 50% longer than to Frankfurt for instance.

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[8] See Oeberg, S. 1976. Methods of Describing Physical Access to Supply Points. Lund Studies in Geography, The Royal University of Sweden, CWK Gleerup.

[9] This is what we have called "urban and rural areas". In Germany this administrative unit is called "Land- und Stadtkreise".

From a demogeographical point of view, Frankfurt would probably be the ideal location for the German capital.

Table 11. Geographical centrality of selected German cities.

City	Average distance to all (rural and urban) areas in Germany	
	in km	relatively (Kassel=1.0)
Berlin	318	1.3203
Hamburg	343	1.4233
Munich	372	1.5453
Cologne	323	1.3395
Frankfurt	271	1.1239
Düsseldorf	328	1.3610
Stuttgart	325	1.3513
Leipzig	248	1.0307
Dresden	301	1.2478
Magdeburg	255	1.0583
Kassel	241	1.0000

Table 12. Demographic centrality of selected German cities.

City	Inhabitants (in 1000)	Average distance to all inhabitants of Germany	
		in km	relatively (Kassel=1.0)
Berlin	3263.0	370	1.6045
Hamburg	1593.6	360	1.5630
Munich	1188.8	385	1.6736
Cologne	927.5	279	1.2092
Frankfurt	618.5	247	1.0720
Düsseldorf	563.4	281	1.2214
Stuttgart	552.3	310	1.3442
Leipzig	549.2	283	1.2299
Dresden	519.5	345	1.4998
Magdeburg	289.6	280	1.2138
Kassel	187.4	230	1.0000

As Table 13 shows, Berlin's demographic centrality is much lower than its geographical centrality, which already is much lower than that of Kassel, Leipzig, Magdeburg, Frankfurt/Main, and Dresden. Using the average unweighted distance between all rural and urban areas ("Land- und Stadtkreise") in Germany and Berlin (to calculate the geographical centrality), the future capital ranks number 6 among the cities selected. However, when weighting these distances with the population living in these areas, Berlin moves down to the second lowest rank (number 10 among the 11 cities studied).

Table 13. Ranking selected German cities by geographic and demographic centrality.

Centrality (relatively, Kassel = 1.0)			
geographic		demographic	
Kassel	1.0000	Kassel:	1.0000
Leipzig	1.0307	Frankfurt	1.0720
Magdeburg	1.0583	Köln:	1.2092
Frankfurt	1.1239	Magdeburg	1.2138
Dresden	1.2478	Düsseldor	1.2214
Berlin	1.3203	Leipzig:	1.2299
Cologne	1.3395	Stuttgart	1.3442
Stuttgart	1.3513	Dresden:	1.4998
Düsseldor	1.3610	Hamburg:	1.5630
Hamburg	1.4233	Berlin:	1.6045
Munich	1.5453	Munich :	1.6736

To calculate the centrality of a city by using distances to all other areas/inhabitants of the country -- as we have done above -- is probably not the best method for the purpose of planning infrastructure. As was already mentioned, there is a second method to study the centrality of a city: the locational profile. It is based on the idea of catchment areas around the city under study. A city that has a densely populated "hinterland" has high centrality; if it is situated in a remote area, its centrality is low. Table 14 gives the population living within 40, 80, 100 and 120 km around selected German cities. If one draws a circle with a radius of 80 km around Cologne, one will find a population of some 12 million included; in Berlin, only 5 million people would live in an area of the same size around the city.

Table 14. Locational profile (population within catchment areas with a radius of 40, 80, 100, and 120 km) of selected German cities.

City	Population in catchment area (in 1000)			
	(distance from city centre in km)			
	40	80	100	120
Kassel	835.0	2912.1	5412.5	9089.4
Dresden	1355.7	3329.3	5173.4	6227.0
Leipzig	1913.1	5090.8	7597.7	9107.4
Munich	2119.6	4143.9	4874.2	6086.8
Hamburg	2531.4	4327.9	6048.7	6995.6
Stuttgart	2765.7	5967.1	8370.7	10208.9
Frankfurt	3012.4	6738.3	8763.0	11694.6
Berlin	3950.6	5006.1	5651.4	7107.0
Cologne	4458.7	12332.7	14058.5	15924.9

A comparison of the locational profiles of these cities reveals most interesting results. Let us take a look at Berlin. If we include an area of only 40 km around Berlin, the future capital would have a very high rank of centrality (rank 2): some 4 million individuals are living within this distance. However, by expanding the catchment area to 120 km, Berlin scores down to a very low rank of centrality (rank 6): the area is only inhabited by some 7 million individuals. This, again, shows the rather strange location of Berlin in the middle of the sparsely populated federal state of Brandenburg. Currently there is no demographic "hinterland" for the future capital of Germany. This is different in Frankfurt/Main: While the city has only the third highest rank of centrality according to a catchment area of 30 km radius, it gets up to a centrality of rank 2 for the area of 120 km: some 12 million individuals live in this area -- as compared to only 7 million in Berlin (see also Figures 9 and 10).

Figure 9. Locational profiles of Kassel, Munich, Dresden, Hamburg, Leipzig, and Stuttgart.

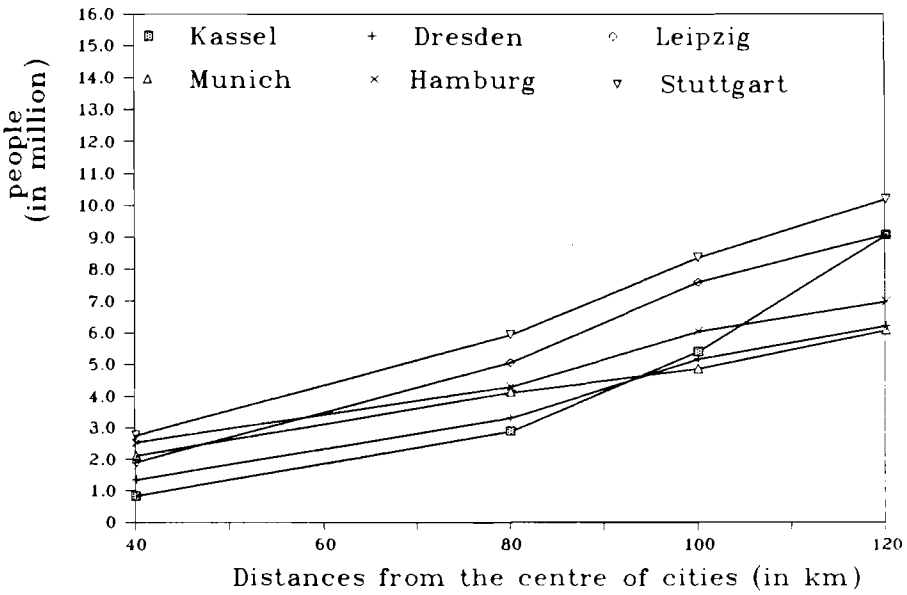
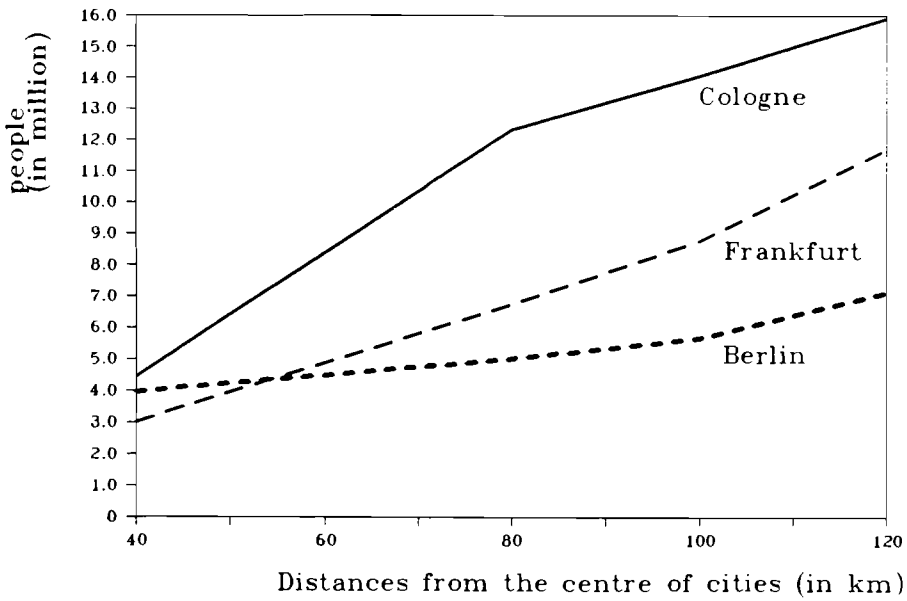


Figure 10. Locational profile of Berlin, Frankfurt, and Cologne.



CONCLUSION

The demographic patterns of a united Germany will differ to a certain extent from the conditions in both the German Democratic Republic and the Federal Republic of Germany.

- Demographic heterogeneity will increase. A united Germany will have a greater variation in the levels of fertility, mortality and population density -- as compared to the present situation in both the GDR and FRG.
- There will be a new "axis" between the densely populated industrial areas in the west and south of the FRG (Ruhrgebiet, Stuttgart, Munich) and the districts of Dresden and Chemnitz in the south of the GDR. Previously remote areas along the inner-German border, such as the districts of Oberfranken, Unterfranken, Kassel (all FRG), Suhl, Erfurt, and Gera (all GDR), will be situated right in the middle between these economic centers.
- Berlin, the (future?) capital is characterized by a rather unique demographic situation: The city is located far away from the geographic and demographic gravity center of a united Germany near the eastern border. It is situated in the middle of the (future) federal state of Brandenburg, which is predominantly a sparsely populated, rural area. Berlin will also be far away from the industrial centers of both the FRG and the GDR. This will have tremendous consequences for the necessary development of infrastructure (such as streets and railroads).
- There will be a new "hinterland" for Hamburg, which was cut off by the "iron curtain" from its traditional economic links to the districts of Schwerin and Rostock. There is already discussion whether this area between Hamburg and Berlin would be suitable for a major airport which would be a new center for European air traffic.

APPENDIX

Basic Demographic Indicators

by Districts in Germany

Table A.1. Area, population and population density for German districts (1987), ranked by density.

Territory		Area (sqkm)	Population	
			total (in 1000)	per sqkm
Neubrandenburg	[GDR]	10948	620.3	57
Schwerin	[GDR]	8672	593.2	68
Potsdam	[GDR]	12568	1121.7	89
Lüneburg	[FRG]	15348	1446.7	94
Trier	[FRG]	4926	472.4	96
Frankfurt/O.	[GDR]	7186	711.4	99
Niederbayern	[FRG]	10331	1027.7	99
Oberpfalz	[FRG]	9691	969.9	100
Cottbus	[GDR]	8262	883.7	107
Magdeburg	[GDR]	11526	1248.9	108
Rostock	[GDR]	7075	911.7	129
Kassel	[FRG]	8288	1161.0	140
Unterfranken	[FRG]	8532	1203.5	141
Weser-Ems	[FRG]	14952	2128.2	142
Suhl	[GDR]	3856	549.2	142
Oberfranken	[FRG]	7231	1036.5	143
Schwaben	[FRG]	9993	1547.4	155
Schleswig-Holstein	[FRG]	15728	2554.5	162
Koblenz	[FRG]	8093	1351.8	167
Erfurt	[GDR]	7349	1236.9	168
Tübingen	[FRG]	8917	1530.7	172
Gießen	[FRG]	5381	952.8	177
Gera	[GDR]	4004	739.8	185
Braunschweig	[FRG]	8096	1585.8	196
Freiburg	[FRG]	9357	1870.0	200
Halle	[GDR]	8771	1780.9	203
Oberbayern	[FRG]	17529	3602.9	206
Mittelfranken	[FRG]	7246	1522.5	210
Hannover	[FRG]	9044	2001.4	221
Dresden	[GDR]	6738	1766.0	262
Rheinhessen-Pfalz	[FRG]	6829	1807.4	265
Detmold	[FRG]	6515	1793.7	275
Leipzig	[GDR]	4966	1368.3	276
Karl-Marx-Stadt	[GDR]	6009	1862.3	310
Stuttgart	[FRG]	10558	3493.7	331
Karlsruhe	[FRG]	6919	2396.2	346
Münster	[FRG]	6898	2390.1	347
Saarland	[FRG]	2569	1055.5	411
Arnsberg	[FRG]	7999	3605.1	451
Darmstadt	[FRG]	7445	3394.6	456
Köln	[FRG]	7368	3856.3	523
Düsseldorf	[FRG]	5288	5067.8	958
Bremen	[FRG]	404	660.1	1633
Hamburg	[FRG]	755	1593.6	2112
Unified Berlin		883	3263.0	3695
East Berlin	[GDR]	403	1246.9	3094
West Berlin	[FRG]	480	2016.1	4199
GDR		108333	16641.3	154
FRG		248709	61095.8	246

Table A.2. Sex ratio for German districts (1987), ranked.

Territory		Sex Ratio (females per 100 males)
Lüneburg	[FRG]	105.1
Neubrandenburg	[GDR]	105.3
Rostock	[GDR]	105.5
Stuttgart	[FRG]	105.6
Weser-Ems	[FRG]	105.8
Gießen	[FRG]	106.0
Unterfranken	[FRG]	106.2
Tübingen	[FRG]	106.2
Frankfurt/O.	[GDR]	106.3
Oberpfalz	[FRG]	106.7
Niederbayern	[FRG]	107.1
Münster	[FRG]	107.1
Trier	[FRG]	107.3
Cottbus	[GDR]	107.5
Darmstadt	[FRG]	107.5
Köln	[FRG]	107.6
Schwerin	[GDR]	107.7
Rheinhessen-Pfalz	[FRG]	107.8
Schwaben	[FRG]	107.8
Koblenz	[FRG]	107.8
Schleswig-Holstein	[FRG]	107.9
Kassel	[FRG]	107.9
Braunschweig	[FRG]	107.9
Karlsruhe	[FRG]	107.9
Potsdam	[GDR]	108.2
Arnsberg	[FRG]	108.3
Freiburg	[FRG]	108.5
Oberbayern	[FRG]	108.6
Saarland	[FRG]	108.6
Suhl	[GDR]	109.3
Detmold	[FRG]	109.3
Mittelfranken	[FRG]	109.3
Erfurt	[GDR]	109.8
Hannover	[FRG]	110.0
Düsseldorf	[FRG]	110.0
Oberfranken	[FRG]	110.1
Magdeburg	[GDR]	110.1
Halle	[GDR]	110.7
Gera	[GDR]	110.7
Bremen	[FRG]	111.4
Dresden	[GDR]	112.7
Leipzig	[GDR]	113.7
Unified Berlin		113.7
Hamburg	[FRG]	113.8
Karl-Marx-Stadt	[GDR]	114.1
East Berlin	[GDR]	111.8
West Berlin	[FRG]	114.9
GDR		110.3
FRG		108.3

Table A.3. Marriages and crude marriage rates for German districts (1987), ranked by marriage rates.

Territory		Marriages	
		total	per 1000 of population
Hannover	[FRG]	11441	5.72
Stuttgart	[FRG]	20301	5.81
Bremen	[FRG]	3951	5.99
Detmold	[FRG]	10766	6.00
Hamburg	[FRG]	9565	6.00
Darmstadt	[FRG]	20413	6.01
Braunschweig	[FRG]	9627	6.07
Arnsberg	[FRG]	22235	6.17
Lüneburg	[FRG]	8964	6.20
Tübingen	[FRG]	9485	6.20
Kassel	[FRG]	7242	6.24
Karlsruhe	[FRG]	14991	6.26
Düsseldorf	[FRG]	31841	6.28
Oberbayern	[FRG]	22799	6.33
Gießen	[FRG]	6050	6.35
Schwaben	[FRG]	9872	6.38
Oberfranken	[FRG]	6619	6.39
Freiburg	[FRG]	12003	6.42
Weser-Ems	[FRG]	13699	6.44
Unterfranken	[FRG]	7748	6.44
Schleswig-Holstein	[FRG]	16464	6.45
Münster	[FRG]	15414	6.45
Mittelfranken	[FRG]	9838	6.46
Niederbayern	[FRG]	6646	6.47
Rheinhessen-Pfalz	[FRG]	11783	6.52
Köln	[FRG]	25190	6.53
Trier	[FRG]	3118	6.60
Saarland	[FRG]	7021	6.65
Koblenz	[FRG]	9004	6.66
Oberpfalz	[FRG]	6513	6.72
Karl-Marx-Stadt	[GDR]	13614	7.31
Unified Berlin		24617	7.54
Suhl	[GDR]	4168	7.59
Gera	[GDR]	5880	7.95
Erfurt	[GDR]	9941	8.04
Leipzig	[GDR]	11295	8.21
Dresden	[GDR]	14645	8.29
Halle	[GDR]	15014	8.43
Magdeburg	[GDR]	10674	8.55
Schwerin	[GDR]	5099	8.59
Cottbus	[GDR]	7609	8.61
Rostock	[GDR]	7968	8.74
Frankfurt/O.	[GDR]	6249	8.78
Potsdam	[GDR]	9861	8.79
Neubrandenburg	[GDR]	5475	8.83
East Berlin	[GDR]	12656	10.15
West Berlin	[FRG]	11961	5.93
GDR		141283	8.49
FRG		382564	6.26

Table A.4. Births and crude birth rates for German districts (1987), ranked by birth rates.

Territory		Live births	
		total	per 1000 of population
Bremen	[FRG]	5773	8.75
Hamburg	[FRG]	14259	8.95
Hannover	[FRG]	18353	9.17
Braunschweig	[FRG]	15130	9.54
Kassel	[FRG]	11360	9.78
Darmstadt	[FRG]	33429	9.85
Saarland	[FRG]	10517	9.96
Düsseldorf	[FRG]	51482	10.16
Schleswig-Holstein	[FRG]	25956	10.16
Koblenz	[FRG]	13757	10.18
Lüneburg	[FRG]	14901	10.30
Arnsberg	[FRG]	37601	10.43
Oberbayern	[FRG]	37703	10.46
Rheinhessen-Pfalz	[FRG]	18943	10.48
Gießen	[FRG]	10025	10.52
Karlsruhe	[FRG]	25270	10.55
Oberfranken	[FRG]	10940	10.55
Detmold	[FRG]	19097	10.65
Mittelfranken	[FRG]	16247	10.67
Köln	[FRG]	41416	10.74
Trier	[FRG]	5078	10.75
Stuttgart	[FRG]	39043	11.18
Freiburg	[FRG]	20947	11.20
Oberpfalz	[FRG]	10989	11.33
Niederbayern	[FRG]	11656	11.34
Münster	[FRG]	27513	11.51
Schwaben	[FRG]	17827	11.52
Weser-Ems	[FRG]	24653	11.58
Unified Berlin		37953	11.63
Unterfranken	[FRG]	14261	11.85
Karl-Marx-Stadt	[GDR]	22277	11.96
Tübingen	[FRG]	18330	11.97
Leipzig	[GDR]	17093	12.49
Halle	[GDR]	23047	12.94
Suhl	[GDR]	7204	13.12
Dresden	[GDR]	23178	13.12
Gera	[GDR]	9753	13.18
Erfurt	[GDR]	16815	13.59
Magdeburg	[GDR]	17081	13.68
Cottbus	[GDR]	12355	13.98
Potsdam	[GDR]	15739	14.03
Frankfurt/O.	[GDR]	10095	14.19
Rostock	[GDR]	13790	15.13
Neubrandenburg	[GDR]	9706	15.65
Schwerin	[GDR]	9427	15.89
East Berlin	[GDR]	18399	14.76
West Berlin	[FRG]	19554	9.70
GDR		225959	13.58
FRG		642010	10.51

Table A.5. Total fertility rates for GDR districts (1987), ranked.

Territory	Total Fertility Rate
Schwerin	1944.8
Neubrandenburg	1915.6
Rostock	1833.5
Dresden	1778.5
Frankfurt/O.	1746.4
Cottbus	1741.2
Potsdam	1741.0
Magdeburg	1720.1
Erfurt	1719.8
Suhl	1703.3
Halle	1700.3
Gera	1695.6
Karl-Marx-Stadt	1691.6
Leipzig	1644.0
East Berlin	1716.1
GDR	1739.9

Table A.6. Deaths and crude death rates for German districts (1987), ranked by death rates.

Territory		Deaths	
		total	per 1000 of population
Tübingen	[FRG]	14011	9.15
Stuttgart	[FRG]	33491	9.59
Freiburg	[FRG]	18327	9.80
Weser-Ems	[FRG]	21719	10.21
Münster	[FRG]	24436	10.22
Oberbayern	[FRG]	37266	10.34
Rostock	[GDR]	9445	10.36
Köln	[FRG]	40899	10.61
Unterfranken	[FRG]	12874	10.70
Karlsruhe	[FRG]	25758	10.75
Darmstadt	[FRG]	36693	10.81
Niederbayern	[FRG]	11164	10.86
Oberpfalz	[FRG]	10714	11.05
Schwaben	[FRG]	17170	11.10
Detmold	[FRG]	20179	11.25
Rheinhessen-Pfalz	[FRG]	20341	11.25
Gießen	[FRG]	10817	11.35
Trier	[FRG]	5372	11.37
Frankfurt/O.	[GDR]	8174	11.49
Düsseldorf	[FRG]	58279	11.50
Schwerin	[GDR]	6864	11.57
Mittelfranken	[FRG]	17636	11.58
Arnsberg	[FRG]	41772	11.59
Neubrandenburg	[GDR]	7232	11.66
Saarland	[FRG]	12318	11.67
Lüneburg	[FRG]	16959	11.72
Cottbus	[GDR]	10656	12.06
Koblenz	[FRG]	16303	12.06
Schleswig-Holstein	[FRG]	30885	12.09
Potsdam	[GDR]	13656	12.17
Braunschweig	[FRG]	19352	12.20
Kassel	[FRG]	14188	12.22
Oberfranken	[FRG]	12838	12.39
Gera	[GDR]	9194	12.43
Hannover	[FRG]	24934	12.46
Erfurt	[GDR]	15534	12.56
Bremen	[FRG]	8489	12.86
Suhl	[GDR]	7171	13.06
Magdeburg	[GDR]	16509	13.22
Halle	[GDR]	23921	13.43
Hamburg	[FRG]	21516	13.50
Unified Berlin		44613	13.67
Dresden	[GDR]	24278	13.75
Leipzig	[GDR]	19348	14.14
Karl-Marx-Stadt	[GDR]	27996	15.03
East Berlin	[GDR]	13894	11.14
West Berlin	[FRG]	30719	15.24
GDR		213872	12.85
FRG		687419	11.25

Table A.7. Infant mortality for German districts (1987), ranked.

Territory		Deaths of infants aged 0 to 1	
		total	per 1000 live births
Schwerin	[GDR]	49	5.20
Freiburg	[FRG]	120	5.73
Hannover	[FRG]	114	6.21
Darmstadt	[FRG]	217	6.49
Gießen	[FRG]	66	6.58
Karlsruhe	[FRG]	179	7.08
Schwaben	[FRG]	128	7.18
Schleswig-Holstein	[FRG]	187	7.20
Mittelfranken	[FRG]	118	7.26
Oberbayern	[FRG]	276	7.32
Stuttgart	[FRG]	291	7.45
Halle	[GDR]	174	7.55
Oberpfalz	[FRG]	85	7.74
Tübingen	[FRG]	142	7.75
Kassel	[FRG]	90	7.92
Oberfranken	[FRG]	87	7.95
Detmold	[FRG]	156	8.17
Neubrandenburg	[GDR]	80	8.24
Lüneburg	[FRG]	124	8.32
Niederbayern	[FRG]	97	8.32
Hamburg	[FRG]	119	8.35
Rheinhessen-Pfalz	[FRG]	161	8.50
Gera	[GDR]	83	8.51
Unterfranken	[FRG]	122	8.55
Karl-Marx-Stadt	[GDR]	192	8.62
Rostock	[GDR]	119	8.63
Braunschweig	[FRG]	131	8.66
Erfurt	[GDR]	146	8.68
Weser-Ems	[FRG]	222	9.00
Leipzig	[GDR]	154	9.01
Köln	[FRG]	374	9.03
Dresden	[GDR]	210	9.06
Koblenz	[FRG]	125	9.09
Suhl	[GDR]	66	9.16
Cottbus	[GDR]	114	9.23
Düsseldorf	[FRG]	488	9.48
Frankfurt/O.	[GDR]	96	9.51
Potsdam	[GDR]	150	9.53
Bremen	[FRG]	56	9.70
Arnsberg	[FRG]	373	9.92
Unified Berlin		378	9.96
Münster	[FRG]	277	10.07
Magdeburg	[GDR]	181	10.60
Saarland	[FRG]	113	10.74
Trier	[FRG]	57	11.22
East Berlin	[GDR]	155	8.42
West Berlin	[FRG]	223	11.40
GDR		1969	8.71
FRG		5318	8.28

Table A.8. Life expectancy by sex and GDR districts (1985/86) (ranked by female life expectancy).

Territory	Life expectancy (in years)	
	males	females
GDR	69.64	75.48
Dresden	70.90	76.22
Gera	69.88	76.12
Karl-Marx-Stadt	70.20	75.78
Leipzig	70.21	75.58
Suhl	69.15	75.49
Rostock	68.43	75.37
Halle	69.34	75.31
East Berlin	70.20	75.31
Neubrandenburg	68.05	75.27
Erfurt	69.84	75.24
Cottbus	69.38	75.21
Potsdam	69.81	75.16
Frankfurt/O.	68.91	75.07
Magdeburg	69.00	75.03
Schwerin	67.93	74.90

Table A.9. Natural population growth for German districts (1987), ranked.

Territory		Excess of births (+) or deaths (-)	
		total	per 1000 of popul.
Hamburg	[FRG]	-7257	-4.55
Bremen	[FRG]	-2716	-4.11
Hannover	[FRG]	-6581	-3.29
Karl-Marx-Stadt	[GDR]	-5719	-3.07
Braunschweig	[FRG]	-4222	-2.66
Kassel	[FRG]	-2828	-2.44
Unified Berlin		-6660	-2.04
Schleswig-Holstein	[FRG]	-4929	-1.93
Koblenz	[FRG]	-2546	-1.88
Oberfranken	[FRG]	-1898	-1.83
Saarland	[FRG]	-1801	-1.71
Leipzig	[GDR]	-2255	-1.65
Lüneburg	[FRG]	-2058	-1.42
Düsseldorf	[FRG]	-6797	-1.34
Arnsberg	[FRG]	-4171	-1.16
Darmstadt	[FRG]	-3264	-0.96
Mittelfranken	[FRG]	-1389	-0.91
Gießen	[FRG]	-792	-0.83
Rheinhessen-Pfalz	[FRG]	-1398	-0.77
Dresden	[GDR]	-1100	-0.62
Trier	[FRG]	-294	-0.62
Detmold	[FRG]	-1082	-0.60
Halle	[GDR]	-874	-0.49
Karlsruhe	[FRG]	-488	-0.20
Suhl	[GDR]	33	0.06
Oberbayern	[FRG]	437	0.12
Köln	[FRG]	517	0.13
Oberpfalz	[FRG]	275	0.28
Schwaben	[FRG]	657	0.42
Magdeburg	[GDR]	572	0.46
Niederbayern	[FRG]	492	0.48
Gera	[GDR]	559	0.76
Erfurt	[GDR]	1281	1.04
Unterfranken	[FRG]	1387	1.15
Münster	[FRG]	3077	1.29
Weser-Ems	[FRG]	2934	1.38
Freiburg	[FRG]	2620	1.40
Stuttgart	[FRG]	5552	1.59
Potsdam	[GDR]	2083	1.86
Cottbus	[GDR]	1699	1.92
Frankfurt/O.	[GDR]	1921	2.70
Tübingen	[FRG]	4319	2.82
Neubrandenburg	[GDR]	2474	3.99
Schwerin	[GDR]	2563	4.32
Rostock	[GDR]	4345	4.77
East Berlin	[GDR]	4505	3.61
West Berlin	[FRG]	-11165	-5.54
GDR		12087	0.73
FRG		-45409	-0.74