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**The Fall of the East German Birth Rate After Unification:  
Crisis or Means of Adaptation?**

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**Abstract**

Since the fall of the Wall, Eastern Germans have drastically changed their demographic behavior. Marriages and births have dropped to an unprecedented low level. Our paper tracks birth rates of the East German population, past, present, and future. We propose a simulation model of future cohort fertility. The hypotheses we develop build on the historical record of reproductive behavior in the German Democratic Republic (GDR) since 1960 and on an analysis of the pattern of change between 1990 and 1994. The particular emphasis lies in the assumption that East German couples will rapidly westernize their family size by trying to reach completed fertility levels of the corresponding West German cohort. This implies that the resulting adaptation process includes the post-unification crisis as a logical first step.

# **The Fall of the East German Birth Rate after Unification: Crisis or Means of Adaptation?**

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**Comments welcome**

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# 1 Introduction

The fall of the Berlin Wall and the unification of the two German states brought unforeseen and dramatic changes. The speed of events after November 1989 hardly allowed a gradual process of assimilation. Almost overnight the East German population<sup>1</sup> had to adapt to new political, economic and social systems. An area in which the dramatic changes clearly have had a great impact has been fertility behavior. Whereas demographic trends in West Germany remained largely unaffected by the unification process, in East Germany the number of births fell from 200,000 in 1989 to only 80,000 in 1994. This is a change of 60% over five years, although most of the change occurred in 1991 and 1992 alone. The number of marriages fell even more sharply with a change of 60% in only three years.

The most dramatic fall in birth rates that has ever occurred in peacetime has led to a fertility level which, if it prevails, would lead to significant depopulation. A question of far-reaching consequences is how trends in fertility behavior will continue and how changes that have already occurred will translate into future developments of birth rates. As a result of the pronounced changes in demographic trends, the study of East German fertility has recently become an active area for research (BfLR 1993; Birg, Flöthmann 1993; Münz, Ulrich 1993-94; Schulz, Wagner, Witte 1993). These studies show interesting differences and similarities with respect to methods, assumptions, and projections results.

Our paper tracks birth rates of the East German population, past, present, and future. We propose a simulation model of future cohort fertility.<sup>2</sup> The hypotheses we develop build on the historical record of reproductive behavior in the German Democratic Republic (GDR) since 1960 and on an analysis of the pattern of change between 1990 and 1994. The particular emphasis of this paper lies on the assumption that East German couples will rapidly westernize their family size by trying to reach completed fertility levels of the corresponding West German cohort. This implies that the resulting adaptation process includes the post-unification *crisis* as a logical first step.

In section two we look at the fertility behavior and the family policy in the socialist state. Section three compares the fall of birth rates after unification with similar historical and international developments, and tries to outline explanations. Projections for the future are developed in chapter four. Section five briefly reviews related studies and concludes. Finally, technical details as well as tables of the projected total fertility rates are contained in the appendix.

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<sup>1</sup> Eastern Germans are defined as the population on the territory of the former GDR or the new Länder (including East Berlin).

<sup>2</sup> Cohort always denotes birth cohort, which will either described by year of birth or by age in a given year.

## 2 Families and birth rates before unification

Birth rates in the former GDR reveal some interesting patterns. From 1960 to 1990, the total fertility rate<sup>3</sup>, which is shown in figure 1, ranged between 1.4 and 2.5 children per woman. After about 1970 this number was well below the average of 2.1 children, which was roughly what is needed for generational replacement.

With respect to the two German states figure 1 shows two different phases: a parallel development of birth rates until about 1974 and a divergent development thereafter. In the first phase both West and East Germany experienced an upward trend followed by a strong decline, a pattern that can be found in many other western European states during this period (Höpflinger 1987; Huinink 1993, pp. 226 sq.). In the second phase West German fertility stabilized on a low level, whereas the GDR experienced a pronounced but short-lived upward trend. In the late 1980s the birth rates in both parts of Germany were closing their gap.

Figure 1: Total fertility rates 1960-1994

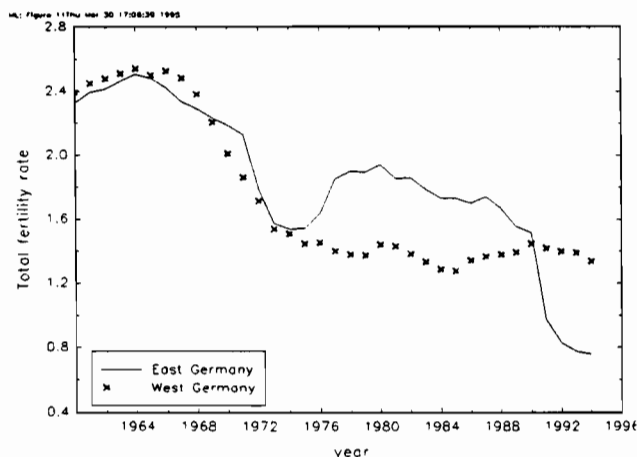
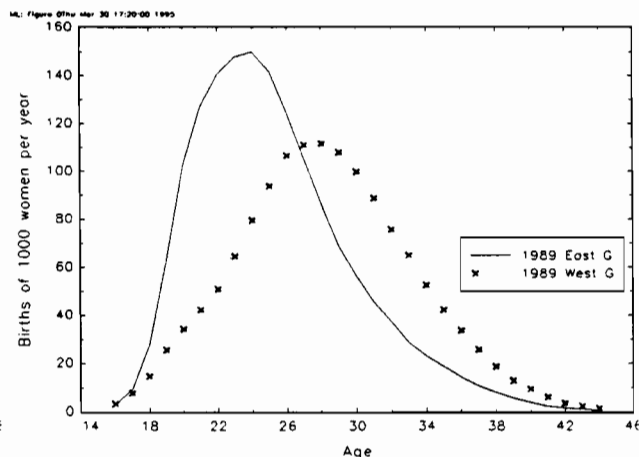


Figure 2: Age-specific fertility rates 1989



The temporary upward trend in the second half of the 1970s follows the introduction of several measures under the family policy initiative of the Honecker regime. The upward trend is often casually referred to as the "Honecker Berg", or the Honecker mountain. The use of this term implies that the policy initiative of the GDR government not only preceded the upward trend, but that it contributed significantly to the change in the fertility behavior of the Eastern Germans. Measures introduced in 1972 combined the liberalization of abortion and a better availability of contraceptives with a number of pronatalistic measures ranging from financial incentives for marriage and birth to the improvement of child day care that provided an overwhelming majority

<sup>3</sup> The total fertility rate (TFR) is defined as the number of children that would be borne by 1,000 women during their lifetime, assuming the fertility rates of different age groups remain constant over time.

of East German parents with cost-free day care for children older than one year. A 1976 package extended these benefits and introduced a "baby year". This is a one-year leave for the mother after the birth with full compensation of earnings and the guarantee of keeping her job (Winkler 1989).

Family policy became an important element in reaching the overall goal of the GDR, namely the unity of economic and social policies. One of the major parts of this policy, as presented by the government, was to give women equal opportunity to improve their status in socialist society. In practice, that meant providing for the compatibility of motherhood and employment. But there are other factors that may have contributed to the formulation of the equal opportunity policy goal. To begin with, there was the dramatic drop in birth rates after the mid-1960s. Also, the chronic labor shortage of an economy with a very low productivity rate made the participation of women more than a desirable goal. Their participation in the labor force was a necessity both for the economy and for the family income. Finally, the prevailing view in the GDR held that government-induced changes of demographic trends were not only desirable but also feasible.

Today the question remains as to whether the government policy of the socialist state could have indeed determined a behavior that is the result of a great number of social as well as individual factors. The impact of the pronatalist measures of the Honecker regime is much debated. It seems clear now that young women have not increased their average number of children but have only changed the timing of births (Büttner, Lutz 1990; Dorbritz 1992, pp. 176-77; Vortmann 1987). Several aspects of fertility behavior indicate distinct differences between East and West Germany. These differences are most visible in the downward trend of fertility since the mid-1960s (1); the average childbearing age (2); and the fertility patterns of women with higher education (3).

(1) The decline in birth rates that occurred in both German states since the mid-1960s could have been a product of two factors: an increase of the number of women who did not give birth and a decrease in the number of children per mother. The decline in birth rates can be attributed in both states to the latter, a drop in the number of children per mother. Only in the West do we also see the increase in the number of childless women as being responsible for the decline in birth rates. In East Germany 10% of the women born in 1960 are expected to remain childless as compared to 23% in West Germany (Dorbritz 1993-94, p. 422).

In West Germany, lifestyles have become increasingly polarized between individualized couples who would be childless all their lives and family-oriented couples, most of which still have two children. Contrary to the polarization in the West, in the GDR society was moving towards homogeneity with respect to its fertility behavior. The combination of a long-term downward trend in fertility rates and a downward trend in childless women meant that an increasing number of women gave birth to a declining number of children. In the GDR the small family became an

institution in which a greater majority of the population lived as compared to the West (Wendt 1991, p. 256 sq.).

(2) Probably the most pronounced difference between East and West Germany existed in the childbearing age of women. Figure 2 shows the age-specific fertility rates in East and West Germany in 1989. Whereas the curve for East German women reaches its peak at the age of 24, the maximum is reached for West German women at 28. In the GDR relatively more children were born to women under age 26, while in the Federal Republic relatively more children were born to those over 26. The curves also show that birth is much more evenly distributed by age in the West, representing a greater variety of biographies. In the East a higher percentage of births occurred in the peak ages. That means again a more homogenous behavior in the GDR (Pohl, Störtzbach, Wendt 1992).

(3) Even more pronounced is the difference in fertility behavior for those with a college education. For western European countries like West Germany, it is typical for the college-educated to postpone marriage and motherhood until later years. A study by Huinink (1995b) suggests that in the GDR this group's behavior with respect to timing of marriage and number of children was similar to the behavior of other groups in the GDR. By the time of graduation, three-fourths of East German women were married, as opposed to a mere one-fourth in the West, and one-third already had one or more children as compared to 10 % of West German women.

What do these differences in fertility behavior between East and West Germany tell us? Fertility behavior is influenced by a great number of individual and social factors. And although social science is far from having reached consensus about the importance of each factor and its respective contributions to overall trends, the differences suggest that the two populations have reacted quite sensitively to two distinct social and institutional systems. In the GDR the trends toward small families, early childbearing, and a high rate of marriage and motherhood among students are compatible with an incentive structure that was geared towards leading young adults step by step into the mainstream of socialist society.

The relatively early childbearing age of East German women finds a rational explanation in a system in which marriage and family formation were the most important steps for young people leading to independent lives away from parental households (Huinink 1993; Dorbritz 1992). In most cases, it was the only way to get an apartment in the state-controlled allocation system. The system that governed access to the whole market suffered in most places and at most times from a severe shortage of apartments. Realistic chances of acquiring an apartment existed only for people with priority status. This status was earned through marriage, motherhood or preferably a combination of both.

Although the GDR never reached a high average standard of living compared to other western European states, as long as the system lasted it did succeed in providing young people with the promise of material security for their entire lives that market economies could not give them. The guarantee of employment at predictable income levels may have helped many people to plan for the future and to make long-term commitments, such as families and children, at an early age. And even in the case that marriage did not last, divorce procedures were easy and single mothers were fully protected by the pronatalistic measures of the 1970s.

The family policy sent out the clear message that government would provide for the coexistence of motherhood and employment. More importantly, it also provided for the co-existence of motherhood and education. Students were faced with the same incentive structure as working women, including financial incentives, access to apartments, the "baby year", and day care for their children. Furthermore, marriage guaranteed couples that they would later get jobs in the same place.

Finally, there were few alternatives to the family oriented lifestyle. Exposure to lifestyles away from the mainstream was limited. Remaining childless did not open up the same possibilities of consumption and traveling for young people in the GDR as it did for individualized couples in the West.

### **3 The events of the years 1989-1993 and possible explanations**

The political events of 1989-90 and their social and economic consequences had an immediate effect on the demographic behavior of Eastern Germans. When we follow the monthly number of births with a 9-months time lag we see that couples immediately responded to the fall of the wall. The decline became even more pronounced after the monetary union in July 1990 and, then, the political unification in October 1990. In the first year following these events, mostly older married women limited their fertility: those who already had one or two children did not want more. In 1992 and 1993, the decline was most pronounced in the youngest age groups.

It is important to note that not only the birth rate but all the events related to family formation witnessed profound variations. First marriages dropped as dramatically as births, so did divorces. For the first time since 1989 the number of marriages has slowly increased in 1994 (by 6.5 %, *Süddeutsche Zeitung* 1995). Rather paradoxical is the development of illegitimate births which reached about a third of all births at the end of the old regime, but increased even further since unification. The proportion amounted to 41.7 % in 1991 and 41.1 % in 1993. It seems probable that this is only a temporary compositional effect: the low incidence of marriage and the more deliberate efforts to control fertility by those already married have left a higher percentage of births by mostly young unwed women. The relative increase in abortions can be understood as an indicator for the abrupt and crisis induced behavioral responses of women in the former GDR:

although the absolute numbers have declined, the ratio of abortions to 10,000 births has grown from on average 3720 (1988-90) to 4622 (1991) and 4963 (1993; this estimate without East Berlin) (Dorbritz 1993-94, p. 425).

*Figure 3: Age-specific fertility rates in East Germany 1988, 1990, 1992, 1994 and in West Germany 1994*

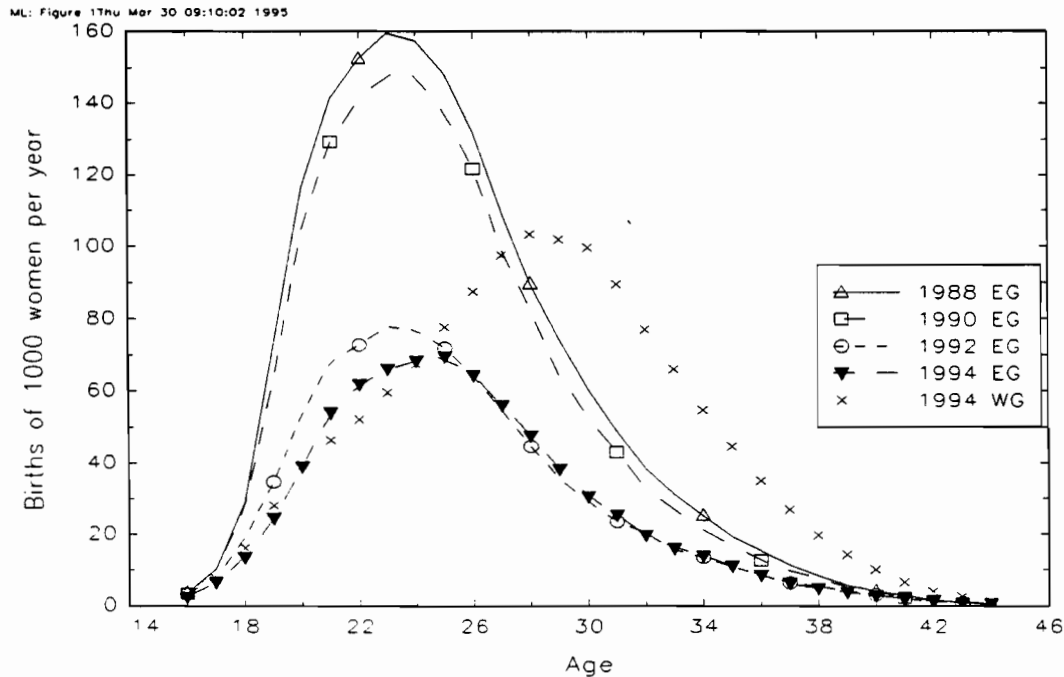


Figure 3 takes a closer look at what happened to East German fertility. This series of curves from 1988 to 1994 shows age-specific fertility rates in the former GDR. The main action took place in 1991 and 1992. By the year 1993 the total rate of fertility had already hit the bottom where it stayed during 1994. The second curve for 1994 serves as a reminder of the different age profile of child births in West Germany.

How can we make sense of the dramatic demographic developments that follow the fall of the wall? On the one hand, the German unification has been called a "natural experiment" (Giesen, Leggewie 1991), a rare opportunity for social scientists to study and understand the impact of a systemic revolution on the attitudes and behaviors of individuals and groups. On the other hand, we observe continuities in behavior and demographic structures which play an important role in affecting the outcomes in the longer run.

A first way to make sense of the demographic behavior in East Germany is to ask if there are some structural causes for the declining numbers of births. Two factors which are not related to the decision to have a baby have influenced the *absolute* number of births on the territory of the



former GDR. The first factor is migration to the West, especially of young adults. The age groups most likely to have babies were also strongly overrepresented in the migration movement (Münz, Ulrich 1994, p. 497). Second, at the beginning of the 1990s, East Germany has witnessed the coming of age of women born in the early 1970s, a period of relatively low fertility. Both trends have led to declining numbers of potential mothers. Together the two factors account for about 20 % to 27 % of the drop in the absolute number of births from 1989 to 1993 (cf. Dorbritz, 1993-94, p. 412).

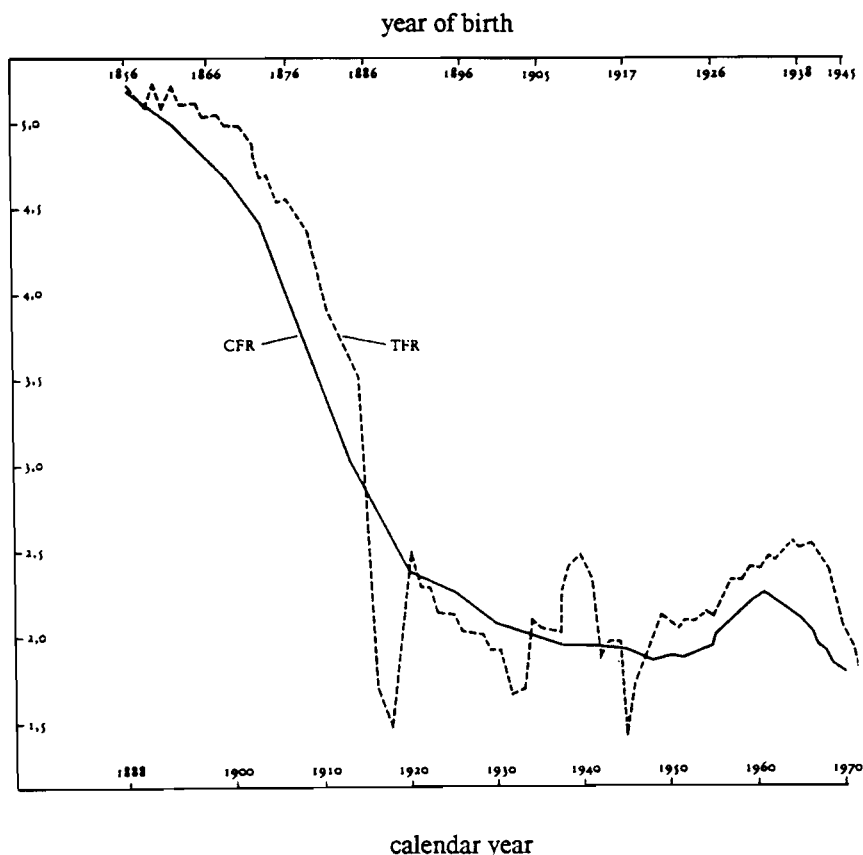
A third factor directly concerns fertility itself but precedes the unification process: since the early 1980s, GDR fertility slowly declined, since 1987 the downward trend accelerated. Already under the old regime, East German couples made tentative adaptations in their fertility behavior that, in due course, could have made their family sizes more similar to those in West Germany (figure 1).

A second way to put the post-unification experience into perspective is to compare it over time and across nations. Historically, the short term declines in birth rates during the First and Second World Wars or during the Great Depression of the early 1930s come into mind. Cross-nationally, the changes in the other Eastern European countries are worth looking at. Even if we make adjustments for the changing population structure, a drop of about 45 % in the birth rate in two years (or of about 50% in 5 years) is unique. Equally, the low level of fertility reached in 1993 and 1994 is unseen in history. The decline during the Great Depression amounted to 20% between 1928 and 1932, the lowest level reached then was still double as high as the East German rate in 1993. As one observer noted: "Such an abrupt and precipitous drop in fertility is unprecedented for an industrialized society during peacetime." (Eberstadt 1994a, p. 138). Only during the two World Wars was the extent of the fertility decline in the German population comparable; from 1914 to 1918 the reduction was around 57 %. However, the years of the Great War were part of the rapid decline of the birth rate which had started after the turn of the century (Marschalck 1984). Still, the lowest levels of fertility reached at the end of both World Wars were still considerably higher than the all time low of Eastern Germans in 1993 and 1994. As Eberstadt remarks: "Eastern Germany's adults appear to have come as close to a temporary suspension of childbearing as any such population in the human experience." (Eberstadt 1994a, p. 139).

The historical analogies give us certain clues concerning how demographic crises are compensated for over time. If we do not look at the total fertility rate per calendar year (TFR) but at the average number of babies that the women of a given birth-cohort (or generation) have over their life time (CFR-completed fertility rate), then we see that people find ways to cope with periods of political or economic crisis. Figure 4 (taken from Marschalck 1984, p. 186) compares these two measures over the long-term from the German Empire to the Federal Republic. The cohorts who were young adults during the World Wars or the Depression decided to postpone child bearing,

not to drop it altogether. What looks on the level of society like a dramatic sequence of crisis and recovery, translates itself on the level of cohorts and life-course in a question of timing. In this perspective, the secular decline of fertility in the 20th century is not less pronounced, but the short term oscillations disappear. This is an important lesson for any consideration of a rapid change in demographic indicators. If we want to know more about the East German behavioral and attitudinal responses to the unification then we have to adopt a cohort perspective (cf. Birg, Koch 1987).

Figure 4: Historical trends of German fertility (1888-1970)



What about Eastern Europe? Most countries in the former Soviet block also experienced a contraction in marriage and birth rates since 1989 or 1990. This comparison equally underlines the uniqueness of the East German experience. A decline of crude marriage rates of between 35 % and 40 % in Bulgaria, Romania and Hungary and close to 30 % in the Czech Republic, Poland and Russia compares to a drop of 60 % in East German marriages (all data for 1989-1992). All Eastern countries already saw their total fertility rates falling during the 1980s and then experi-

enced a more pronounced decline after 1989. Measured by the TFR between 1989 and 1992, Russia lost 23 % and has continued to decline, Bulgaria and Romania lost close to 20 %, and Poland and Hungary only 5 % (UNICEF 1993, pp. 16-18). This contrasts with a 47 % drop in the same period in East Germany. Unlike other Eastern European countries however, East Germany has not experienced any continuous worsening of social and health indicators, like infant and adult mortality.<sup>4</sup>

From the international comparisons some conclusions for the interpretation of the East German case can be drawn. The less pronounced fertility decline in Eastern Europe seems to indicate that young couples are reacting not only to economic crisis, uncertainty about jobs and general pessimism, but also to the pace of social and institutional change around them. The more abrupt and profound the societal transformation, the more pronounced is the fertility decline. What makes the East German experience unique and hardly comparable with other historical or national crises, is that the institutional, economic and psychological environment in which decisions about family formation and fertility are made has totally changed. Since everything has changed it is difficult, if not impossible to track down a single cause. The environment in which family formation and child bearing took place in the former GDR, was part of a social system that was directly linked to the political regime. Among its features were: the generous, pronatalist family policy already mentioned above, the high labor force participation of married women, the housing market, the widely shared norms of what constitutes a normal family, etc. As soon as the political regime crumbled, these features were jeopardized and young couples reacted.

The interpretations of East German fertility decline roughly fall into two categories: the first one stresses crisis, despair over the present and lack of confidence in the future. Scholars like Eberstadt (1994a, b) see the fertility decline as a kind of pathology of the transformation process. The second interpretation highlights the increase of choices and adaptation to consumer society and new norms; analysts like Wolfgang Zapf (1993) and many others see East German demographic behavior as a side-effect of westernization.

The two modes of interpretation are perhaps not completely incompatible. In their own understanding of the transformation process, Eastern Germans combine continuity in certain preferences with a very realistic assessment of the new situation. Several surveys and polls<sup>5</sup> show consistently more people in favor of family life and children than one finds in West Germany. But at the same

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<sup>4</sup> Eberstadt's observations concerning an increase of adult mortality in East Germany after the fall of the wall have not been confirmed by developments in 1992 and 1993 (Dorbritz 1993-94, pp. 431-433); for a comparison with the former Soviet Union see Field (in press).

<sup>5</sup> We are referring to the AIBUS survey of 1991 (Glatzer, Noll 1992, pp. 78-84), a comparison of the Family Surveys for West Germany (1988) and East Germany (1991) (Datenreport 5, pp. 594 sq.; Glatzer, Noll 1992, pp. 179-207), a survey of 10.000 men and women between 20 and 39 by the Bundesinstitut für Bevölkerungsforschung (in the context of the European Family and Fertility Survey) in summer 1992 (Störtzbach 1993-94) and a smaller study in the land Brandenburg in spring 1991 (Roloff 1992, pp. 472 sq.).

time they show broad support for labor force participation of married women and the ideal of a two-earner family. Again these scores are significantly higher than in West Germany. When in summer of 1992 they were directly asked about the reasons for the fertility decline, East German men and women pointed to the unfavorable economic situation (78 %), to the high costs of raising a child (61 %) and to fear of the future (49 %) whereas West German 20 to 39-years-olds stressed hedonism (53 %), and rated difficult housing markets and economic problems (both 51 %) much lower than Eastern Germans (Störtzbach 1993-94, p. 157). Compared to the East/West contrast, gender differences played only a minor role in these attitudes.

Therefore, the compatibility of work and family emerges as the crucial issue for young women on their way into a new social system. And it is particularly the specific East German pattern of early marriage and high fertility in the early twenties which is at odds with all the signals that young women receive from the West German education system and from the labor market. The sudden change in the rules of family benefits and tight housing markets are more elements of a completely reversed incentive structure surrounding family formation (Huinink 1995a). We certainly do not want to suggest that pronatalist policies were the only reason for the different fertility patterns of the GDR, but the sudden change of rules in 1990 and the end of accustomed financial benefits together with the anticipated loss of job security must have had a direct effect on young East German women.<sup>6</sup>

The uncertainty about the personal economic future and the increased opportunity costs for women in a fragile labor market are powerful reasons to interrupt or to postpone the family formation process. In order to evaluate the long term development of fertility it seems fruitful to introduce the theoretical distinction between the quantity and quality of children, put forward by Gary Becker (1991, pp. 145-154). To reach at least the same outcome in human capital as under the conditions of the GDR, more private investment of time, money and care will be involved for a child growing up after unification. In the longer run, the decrease in the average quantity of children can thus be seen as a compensation for the increased investment in the quality of children. If one follows Becker further when he states that increased income leads to a higher preference for quality in children, this allows a fascinating hypothesis about the desire for children in the long run. One can speculate that even a speedy recovery of the East German economy would not lead young couples to choose higher numbers of children, but rather to enhance their quality (e.g. educational status) for improving their chances in a competitive society.

The approach we have chosen tries to understand East German demographic choices as rational behavior. The scenarios presented in the next part of the paper refer to the aggregate behavior of

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<sup>6</sup> On the rather narrow basis of fertility data from the Socio-economic panel East, Witte and Wagner (1994) find a correlation between concerns about the personal economic situation and births (particularly first births) in 1991 and early 1992.

cohorts. We do not want to suggest that individual couples make their decisions merely according to a rational choice model or that they follow a single set of preferences. Instead, the main proposition is that the observed immediate reactions to the fall of the old regime and the predicted reversal of fertility trends together form an adaptation path which can be understood as a rational response of an average couple to the new incentive structure surrounding family formation. We distinguish an immediate reaction that we term *freeze* which basically means the avoidance of long-term commitments in a period of uncertainty. Freezing means temporarily not engaging in marriages and childbearing. It looks like a shock reaction, but it also helps young people gain time to readapt their plans in the new environment.

As a second and medium-term reaction we assume an incremental adaptation to West German patterns of family formation, level and, most particularly, timing of fertility. Since the political and economic transformation has been accompanied with a profound reversal of incentives, expectations and choices for Eastern Germans, one can exclude two extreme arguments: on the one hand it is most implausible that Eastern Germans would go back to their pre-1990 fertility pattern. On the other hand, it is also unlikely and in most cases even impossible that they would change immediately and instantly behave like Westerners. It is safer and sociologically sounder to predict that the different cohorts of Eastern Germans who were, say, 15 or 30 years in 1990 will experience this transition in different ways.

#### **4 Simulations of possible future developments**

This section outlines some possible future developments, and then discusses their plausibility and implications. To accomplish this task we will introduce three different scenarios in the next subsection. They use different assumptions about post-1994 childbearing behavior of the relevant birth cohorts of the East German population. In the end we will compare them with respect to the different consequences for the aggregate number of births. This allows us at least to bound the potential future outcomes and to analyze in some detail what we consider as most likely path. Some technical details of the construction of the scenarios and information about the data sources are relegated to the appendix. As usual, our analysis is limited by the available data: while this paper was written, the only sufficiently up-to-date information consisted in cohort-specific fertility rates and cohort sizes for each year until 1994.<sup>7</sup>

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<sup>7</sup> The age-specific births rates for 1994 are our own estimates (see the appendix for the details).

#### 4.1 Three Scenarios

Before discussing the differences between the three scenarios, let us briefly outline the basic common structure that results from the following assumptions. For East Germany we assume that the age-specific birth-rates, but not necessarily the total number of births, reach their minimum in 1994.<sup>8</sup> This assumption seems very plausible, not only because the 1994 birth-rates represent a record-low for an industrial society, but also because the decrease from 1993 to 1994 was only about 2%. The latter is almost negligible compared to the previous three years. Furthermore, monthly data shows that the number of births - compared to the same month in 1993 - actually rose in the second part of the year. As already noted in the previous sections, explicit or implicit comparisons of the situation in East Germany with the situation in West Germany may be of importance for various reasons. Whenever we invoke such comparisons they are based on the assumption that the age-specific fertility rates of 1994 in the West prevail forever.<sup>9</sup> Considering the oscillation of the total fertility rates (TFR) around its 1994 value (see figure 1) and the recent relative stability of the distribution of the number of births over different cohorts, there is no alternative to this assumption that seems to be more plausible. Finally, it is worth mentioning that although the number of births are predicted endogenously by our model, we do not attempt to predict the size or the composition of the female population. These numbers are taken from a projection of the Federal Statistical Office of the FRG (see appendix for details). Since we use different assumptions than the statistical office for post-1994 childbearing behavior, our predictions of the total number of births may be flawed once they change the composition of the childbearing cohorts. Therefore, strictly speaking we cannot predict those numbers beyond 1995 + 16 = 2011, but since the fertility of 16 and 17 year old girls are almost 0, we will extrapolate these numbers until 2013.<sup>10</sup>

We consider the first scenario a lower benchmark of what could possibly happen. We assume that the age-specific fertility rates of 1994 will prevail forever. This implies that the situation of 1994 is assumed to be a new stable equilibrium after 5 years of adjustment and that all following cohorts will follow the same age-specific pattern of fertility rates. As figure 3 shows this implies that Eastern Germans would have age-specific fertility rates that are very similar to the German ones up to the age of 25, and significantly below those rates thereafter. The average number of children per women of age 45, when childbearing is almost completed, would reach 0.8 in 2012, compared to an already low level of about 1.3 for West Germany.

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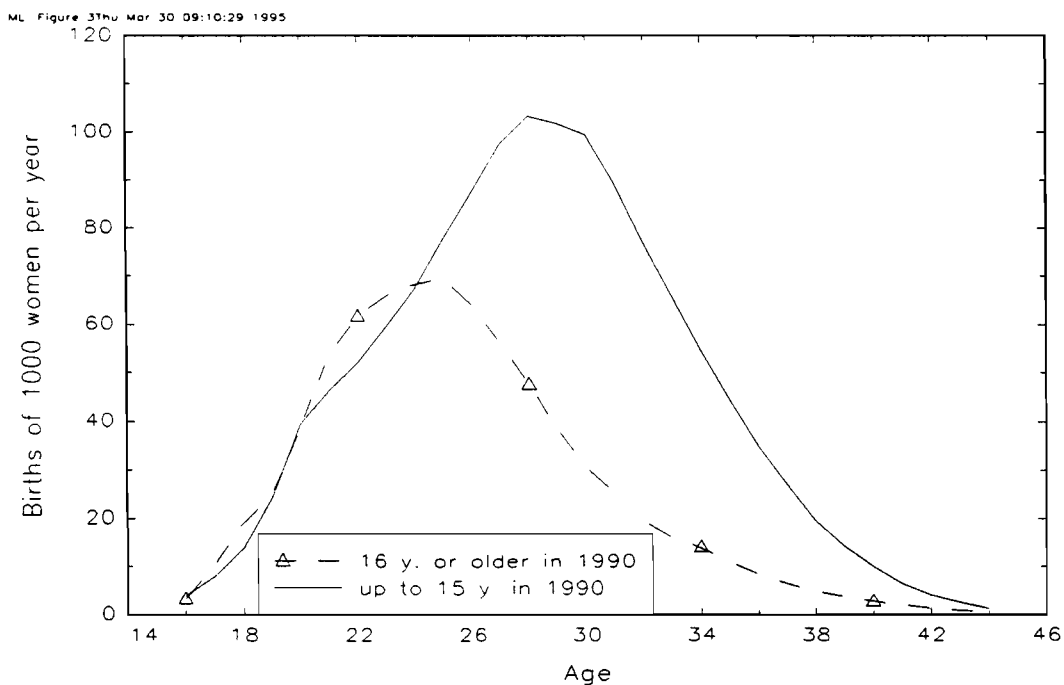
<sup>8</sup> The only exception to the rule occurs when the West German rates are below the East German rates for some cohorts (20-24, see figure 3). In this case the West German rates are assumed to be the lower bound.

<sup>9</sup> We do not differentiate between German and foreign citizens.

<sup>10</sup> The reader is reminded that the longer the distance between the date of prediction and the last data point (1994) the more imprecise is the prediction.

Note that 'end of adjustment' is formulated in terms of birth-rates - first differences of the average number of children per women in a specific cohort - and does not take account of any impact of previous fertility decisions. In our case it is particular striking that this scenario implies that women who begin their fertility after unification in a unified German socioeconomic system should end up with only a little more than 60% of the average number of children of West German women of the same cohort. As already noted in the previous section, there appears no obvious reason for such a different behavior. Therefore, the second scenario approaches this issue by assuming that all women, who begin their fertility after unification (born 1975 or later) will behave on average like a West German women of the same age. This results in a convergence of East German childbearing behavior to Western levels in about 2014. Although this scenario seems to be considerably more plausible than the previous one, the age-specific birth-rates of women born in 1974 and 1975 given in figure 5 shows that there is problem.

Figure 5: Life cycle profile of age-specific fertility rates of women born in 1974 and 1975 in scenario 2



This large difference of the age-specific fertility rates of two successive cohorts seems not to be very plausible. The sharp distinction between pre- and post-unification cohorts would lead in the age of 45 to an average number of children of 0.8 for those born in 1974, and of 1.3 for those born in 1975 and later.

In scenario three we formulate an additional hypothesis of cohort specific childbearing behavior for those born 1974 or earlier. The new feature is the explicit dependence on previous childbearing behavior. It is summarized by the average number of children born in the GDR and in unified Germany until the end of 1994 in every cohort. The by-product of scenario three is that the fertility rates of the cohorts born in 1974 and 1975 are almost indistinguishable, because their respective difference in average number of children born until the end of 1994 is almost the same (zero).

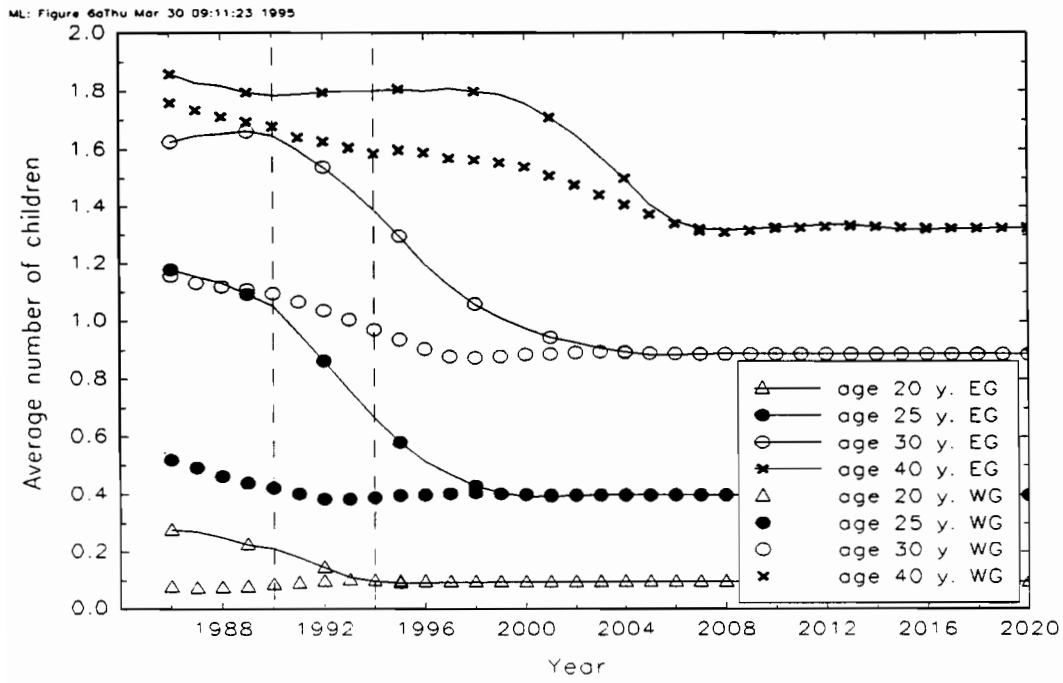
For many reasons given before, it is not the birth-rate, but the actual and desired 'stock' of children at specific ages, which should be used to formalize individual behavior. Fertility rates are derived as a result of these considerations and an additional optimal timing decision that determines the shape of the transitions from actual to desired stocks at the end of fertility. Therefore, it is very obvious that age-specific fertility rates crucially depend on the difference between actual and desired number of children (multiplied by the probability of success) and the remaining time span, i.e. the remaining time of potential fertility. Figure 6 shows that the situation in East and West Germany in 1990 was indeed entirely different with respect to the average number of children (AC) already born. The latter is given on the vertical axes of that figure. The lines and various sorts of dots display the development of AC over time for women in the same age. Note that on any particular line the ages of the women are the same, but not their date of birth. Considering the situation in 1990 (first vertical line), the differences in childbearing ages in the GDR - compared to the FRG - result in huge difference in AC for those aged 20 to 30. After the age of 30 these differences decrease and are very small for those aged 40 or older. This is additional evidence for the point that the major difference between GDR and FRG childbearing is not the total number of children in the fertility cycle of a woman, but the timing of births. Let us now consider the situation in 1994 (second vertical line). From this point of view the 'dramatic' decline of the overall fertility rates does not look dramatic at all: East German women adjusted towards West German levels of AC, but -with the exception of those women who were at the very beginning of their fertility cycle in 1990- the difference is still positive in 1994. For women aged 40 in 1994 the difference increased even a bit, because they had already (almost) completed their fertility cycle in 1990.<sup>11</sup> Therefore, they could not adjust at all. It is exactly this idea that different adjustment speeds should prevail for different cohorts that is the main concept used in scenario 3.

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<sup>11</sup> Note that AC for this group is almost identical to the cohort fertility rate (CFR), which has been introduced in the discussion of figure 4 in the previous section.

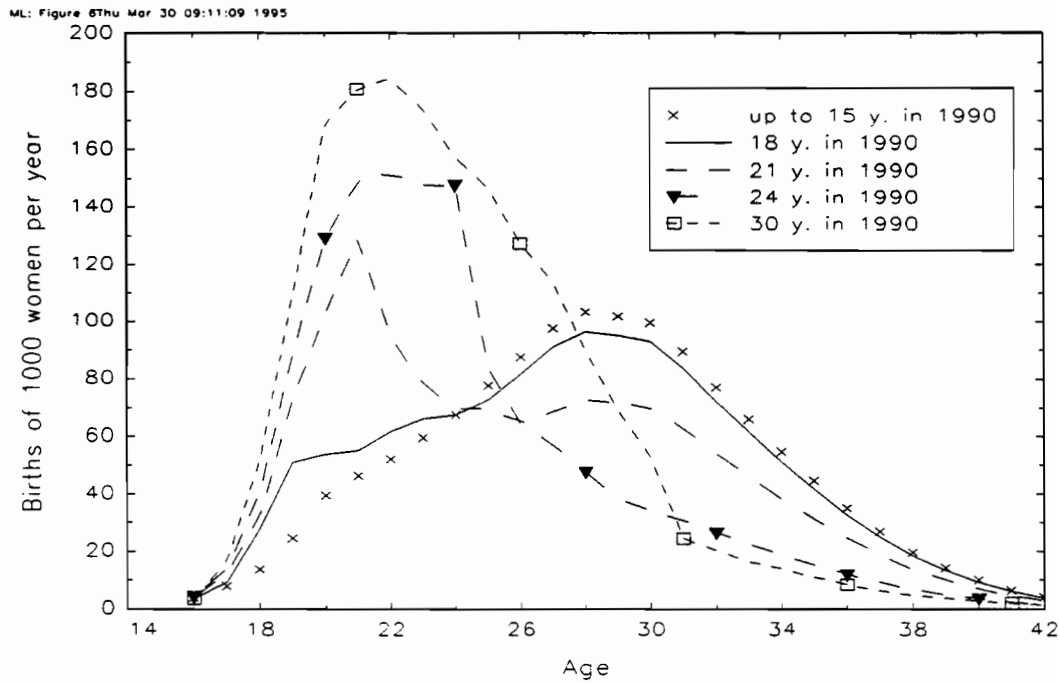


Figure 6: Average number of children of East and West German women aged 20, 25, 30 and 40 years: Observed values and predicted values from scenario 3



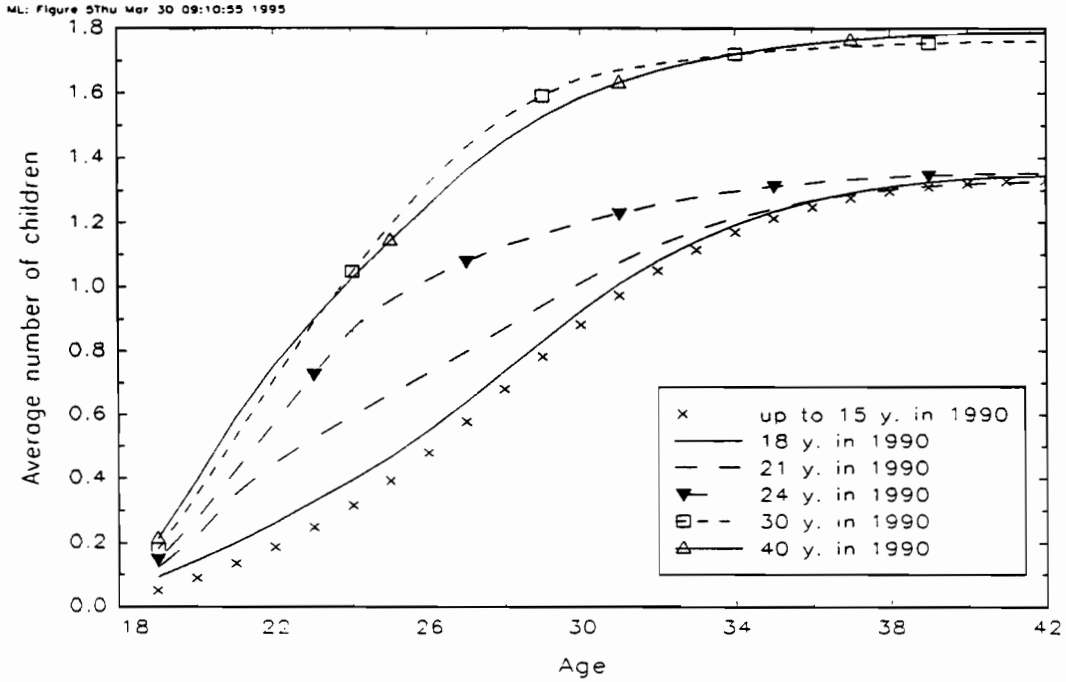
Scenario 3 uses the same assumptions for the cohort born 1975 or later as scenario 2, because they have no stock of children in 1990. Furthermore, their behavior from 1990 to 1994 is almost indistinguishable from that of West German women of the same cohorts. For the older ones we assume that they intend to adjust to West German levels in such a way that they reach them in the age of 44. However, we have to impose some restrictions on the adjustment path that excludes any sort of negative adjustments and sets the minimum of the age-specific fertility rates as the East or West German age-specific fertility rates, whichever are lower. There remains the issue of the time pattern of adjustment, or the timing of births during adjustment. Here we assume more or less arbitrarily that the shape, but not the level of the West German age-specific fertility rates is used (see appendix A.1 for the technical definition). However, using different patterns for the timing of births during adjustment has very little influence on the results. Figure 6 shows that this leads to different end dates for the adjustment process for different groups, and that adjustment is almost finished by the year 2007.

*Figure 7: Age-specific fertility rates for different cohorts over the life-cycle: Observed values and predicted values from scenario 3*



However, it is in several respects more informative to follow particular cohorts over time and compare how the different speeds of adjustment have different impacts on average childbearing behavior over their life cycle. Figure 7 displays the age-specific fertility rates of different cohorts over their life cycles. Depending on the particular cohort we see all sorts of mixtures between various GDR and FRG profiles. It is noteworthy that the sharpest breaks in the profiles appear not to be due to our simulations effective in 1995 and later, but due to the 'adjustments' that have already taken place from 1990 to 1994. Figure 8 provides yet another way to view the adjustment process in the cohort perspective. The vertical axis gives the average number of children per woman in a specific cohort and the horizontal axis denotes the age of that cohort. The lowest curve indicates the West German level for the 1975 cohort. As before, the sharpest kinks in the curves are due to direct post-unification adjustment, whereas our simulation just adds a smooth convergence path towards West German levels. It also obvious from this figure that there are certain cohorts that are not able to adjust to West German levels, because they had already (almost) completed their fertility in 1990.

Figure 8: Average number of children for specific cohorts over the life cycle (scenario 3)



Let us summarize the results of scenario 3: Women of age 15 and younger in 1990 undergo no special convergence, because they are very similar to the West German women with respect to the number of children in a specific cohort. Those who are 18 years and older in 1990 converge, but at different speeds, depending on the stock of children 'inherited' from the GDR and the remaining time of adjustment. Women who are older than 25 in 1990 cannot converge completely to western levels, because of the high and early fertility at least in part due to the "Honecker mountain". Finally, on average no East German woman has fewer children than the respective West German woman over the complete life cycle, despite the dramatic fall of the fertility rates from 1990 to 1994.

#### 4.2 Comparison of the scenarios

We begin the comparison of the different implications of the three scenarios without considering any effects that could be solely due to the change in the composition of the total female population. The different measures shown in figures 9 and 10 include also data from 1960 onward to allow a comparison of past and possible future developments.

Figure 9: The long run 1: Total fertility rates in East and West Germany 1960-2020

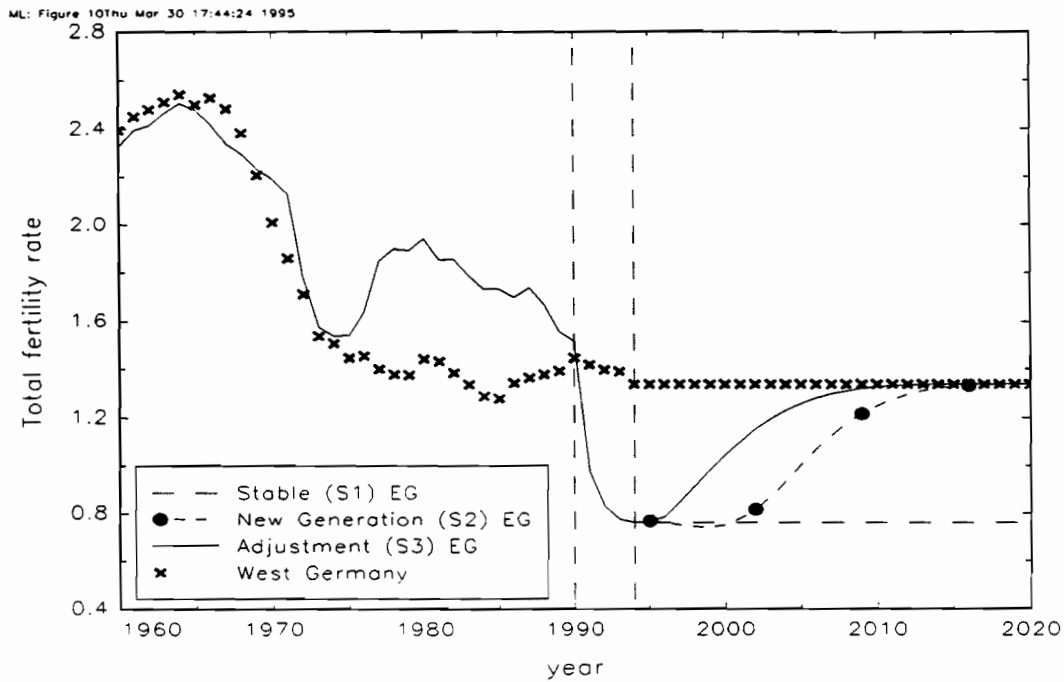
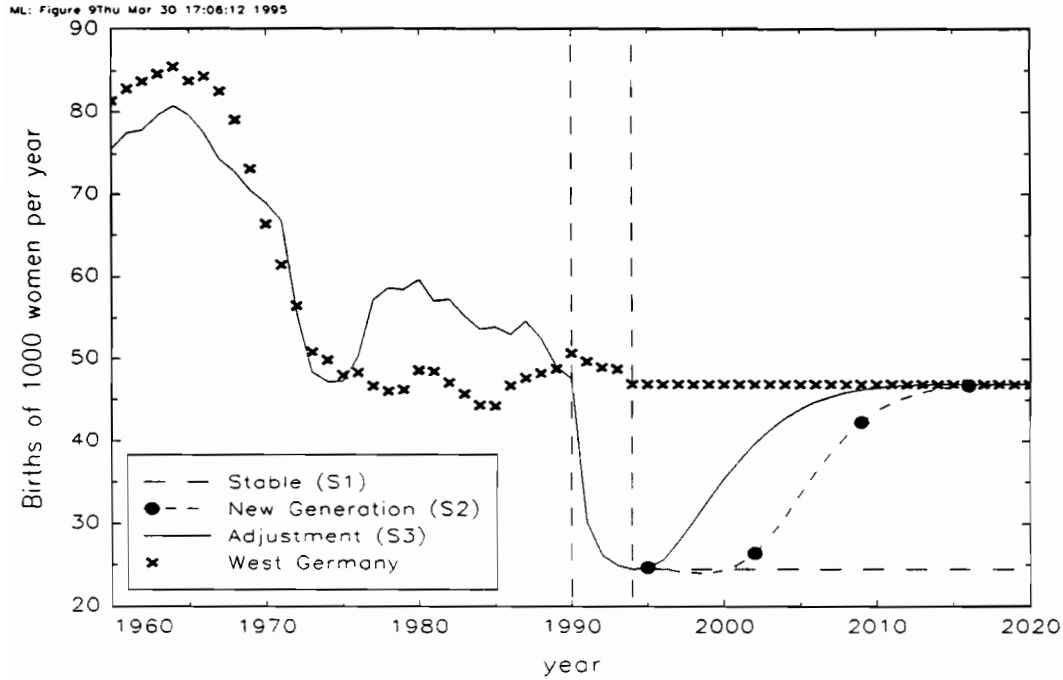


Figure 9 displays the total fertility rate (TFR) from 1960 to 2020 for East and West Germany. We already discussed the definition and problems of interpretation of the TFR in section 2. Figure 10 shows the aggregate fertility rates (AFR) as the number of births relative to the number of women aged 16 to 44. Additionally, the AFR is standardized by using age-specific fertility rates and an age composition of the female population as in East Germany 1994 for all years for East as well as for West Germany.

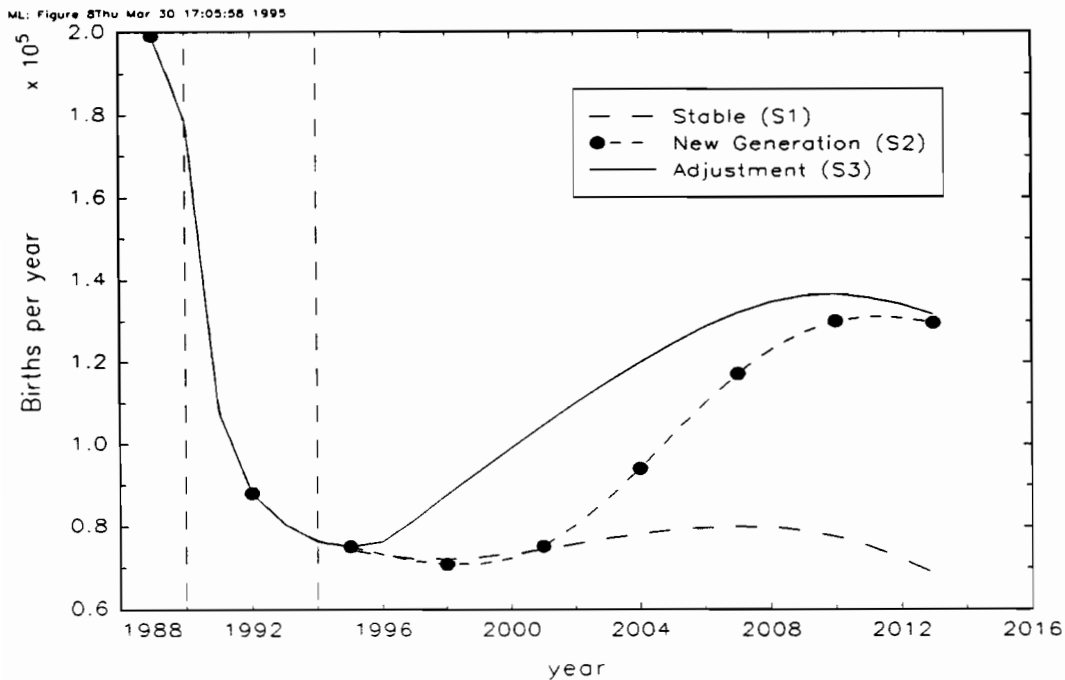
Comparing figure 9 and 10, it appears that they differ in interesting historic details, but almost coincide with respect to the predictions of the scenarios. Clearly scenario 1 (S1) would lead to an inevitable extinction of the East German population, which does not seem plausible at all. Scenario 2 (S2) would achieve convergence to West German levels in about 2013, whereas scenario 3 (S3) would lead to convergence in about 2008. Scenario 3 adjusts fastest, because every cohort tries to adapt to Western levels, resulting in an earlier convergence. However, note that convergence is towards a West German level that is in itself insufficient for the reproduction of the population.

Figure 10: The long run 2: Standardized aggregate fertility rates in East and West Germany (1960-2020) based on the East German age structure of 1994



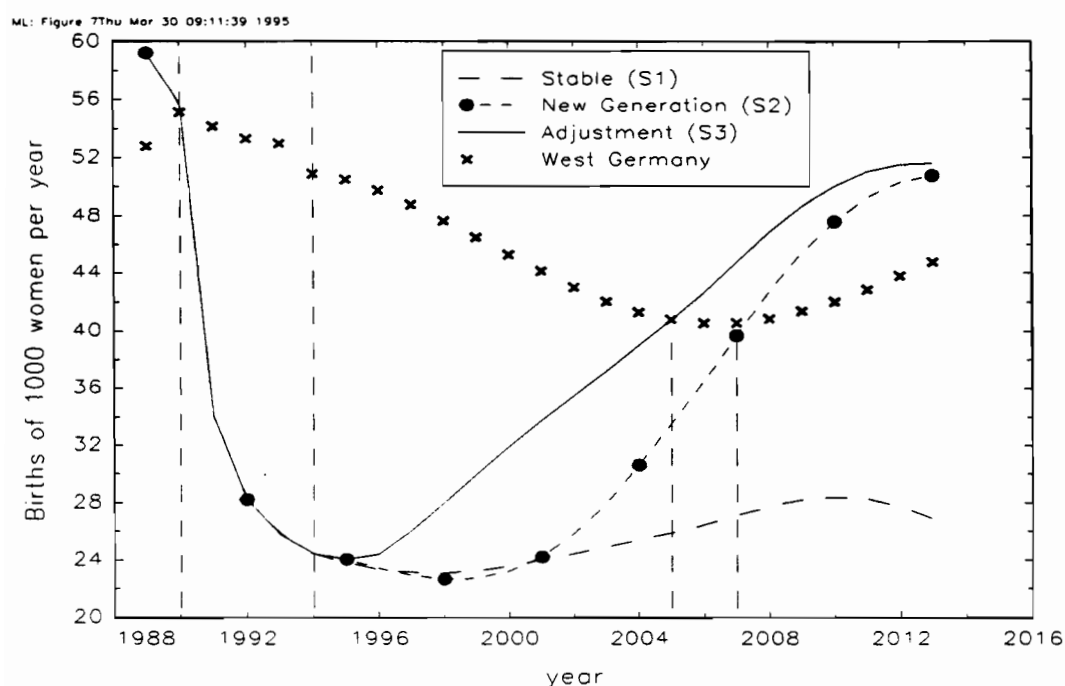
Finally let us consider aggregate fertility behavior based on the actual populations in East and West Germany. Figure 11 gives the total number of births in East Germany after unification. The major difference between scenario 2 and 3 is that the latter predicts a far earlier take-off of the total number of births. The largest difference between these two scenarios in any year is about 30,000 births in 2002. The total difference is about 390,000 additional births in scenario 3. The total difference between scenario 1 and 3 is about 79,000 births between 1995 and 2013. It is also interesting to compare these numbers with the number of births implied by the assumption that the age-specific fertility rates of 1989 prevail. Defined in this way, the loss of births from 1990 to 1994 is about 305,000. The total loss from 1990 to 2010 using the most optimistic and most likely scenario 3 amounts to about 1 million births.

Figure 11: Total number of births per year in East Germany



The comparison of East and West German aggregate fertility rates (AFR ) after unification shows an interesting long term effect. On the one hand the number of West German women in the age categories with the highest fertility rates decreases, so that East German rates could be larger than West German rates after 2005 or 2007 or remain above them for some time. This is augmented by the temporary increase of births due to the Honecker mountain. Twenty to thirty years later these relatively large cohorts will come in their most fertile age and therefore the number of births should increase significantly and one may speak of a little baby-boom in East Germany. But in the same way as the Honecker mountain has a positive long term impact on the total number of births and the AFR , the next such impact can be expected to happen in the years around 2015 and later: The adjustment process of 1990 and later will lead to a sharp decline in the total number of births for quite some time. It is certainly true that demographic structure have a very long memory!

Figure 12: Aggregate fertility rates in East and West Germany



Finally, let us summarize what we can learn from our simulation exercise: A bouncing back of fertility can be expected without any special policy interventions, but it seems unreasonable to assume that East German birth rates (AFRs) will be as high as West German ones before 2005. It seems also plausible that they will reach Western levels before 2007, which - taken together - is however a pretty small corridor. Despite the dramatic fall in fertility rates after 1990, there is no East German cohort with a lower average number of children than the corresponding West German cohort. In our adjustment scenario, the *freeze* behavior we have observed from 1990 to 1994 is entirely compatible with a straightforward adjustment process. Nevertheless, even if it is just adjustment, it has very severe implications, because it leads to a large decrease in the total population and to profound disturbances in the age structure.

## 5 Conclusion

Recent studies of fertility changes in East Germany have reached very similar results. Table 1 summarizes the forecasts of these papers and contrasts them with earlier predictions by international or national institutions (UN 1991; StaBu 1992; BfLR 1993).<sup>12</sup> As Münz and Ulrich (1993, 1994) note the forecasts have grown more pessimistic as the observed data for each consecutive year since unification became known.

<sup>12</sup> The contents of our table 1 is partly taken from table 2 in Münz and Ulrich (1994, p.4).

The four last studies shown in table 1 are all based on the cohort approach. They also share the basic assumption that East German demographic behavior will "westernize", i.e. that the level and timing of fertility will be adjusted to the West German pattern. Three of the four research groups predict nearly identical total fertility rates for the year 2000 or after; only Schulz et al. (1993) project that the TFR will recover more quickly. The overall similarity of results confirms one simple, but nevertheless fundamental conclusion: If one assumes a transition from the East German to the West German cohort fertility in a period of about 10 to 15 years, then the difference between the various scenarios must be extremely narrow.

*Table 1: Comparison of fertility estimates for East Germany*

Author / year of publication	most recent data used	First cohort to achieve WG fertility structure	Estimated TFR
United Nations / 1991 <sup>1</sup>	1988	--	2000-2005: 1.75
Statistisches Bundesamt / 1992	1991	--	Adjustment to WG TFR until 1995
BfLR / 1993	1991	--	2000: 1.0
Birg et al. / 1993	1991	1980	2000: 1.0 2010: 1.3
Schulz et al. / 1993	1992	1985	2000: 1.2 2006: 1.3
Münz ,Ulrich / 1994	1993	1980	2000: 1.0 2010: 1.3
this paper / 1995	1993/1994	1975	2000: 1.0 2010: 1.3

Notes: 1: Medium variant; WG: West Germany; TFR: Total fertility rate.

Under the surface of similarities, there are however important methodological differences. The main areas where the four studies are at variance concern the definition of the adjustment or "assimilation" process, the criterion of "westernization" (CFR, TFR, pattern of age-specific fertility rates), the first Eastern cohort which behaves like its Western counterpart, and the data used.

To illustrate the range of possible outcomes let us consider the important study of the Institute of Demographic Research at the University of Bielefeld. The data Birg and Flöthmann (1993) used for East Germany 1991 and 1992 have not been confirmed by the statistics later released by the Statistische Bundesamt. Their simulation thus starts from a steeper fall in fertility rates particularly of women in their early twenties than actually occurred. For the East German cohorts born between 1970 and 1979, their model leads to lower average number of children than in the West whereas in our model, no East German cohort will have actually less children (CFR - completed fertility rate) than its West German counterpart. Birg and Flöthmann's (1993) model is more



sophisticated as far as it introduces also a cohort-based simulation of future West German fertility. The main implication of the model developed by the research group from Bielefeld is that the unification crisis will have particularly profound repercussions on the completed family size of cohorts.

The main purpose of our study is to integrate the crisis experience of the years 1990 to 1994 into a plausible transition from the East German fertility pattern to the West German one. Our first criterion of westernization is that East German cohorts will rapidly westernize their average family size by trying to reach completed fertility levels of the corresponding West German cohorts. The East German cohort born 1966 is the first one to reach this goal, i.e. CFR, given its cohort fertility prior to 1995. The second criterion of westernization used here is that the shape of the adjustment path is determined by West German age-specific fertility patterns of 1994, given the difference in the number of children already born until 1994 by corresponding East and West German cohorts. The first cohort to completely adjust to this is born in 1975. Under these assumptions, the East German birth rate will slowly recover in the next 10 to 15 years. Although the same level of fertility will then prevail in the West and the East, the large generations of women born in the GDR of the 1980s will produce a small Eastern baby boom around 2010.

The precipitous decline of fertility after the German unification has all the features of a shock: the speed, the extent, the accompanying pessimism. In our analysis, however, the short term *freeze* reaction of Eastern Germans looks like the first step of a medium term adaptation to Western demographic patterns. So one could certainly call this a *crisis*, but a crisis that may very well be caused by a rational adaptation process.

This rough exploration of largely uncharted territory leaves the door wide open for future research and more refined data. In all the forecasting about the transformation process in the East, the safest bet is that we will see rapidly increasing differentiation and heterogeneity of social change. Future research with individual data<sup>13</sup> should allow deeper insights into the motivations of young men and women of consecutive generations, but it will also probably show increasing differences along the lines of socio-economic status, education, region, between winners and losers, pessimists and optimists.

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<sup>13</sup> A first attempt in that direction has been presented by Witte and Wagner (1994) who use the Socio-Economic Panel (East). However, it seems that their analysis suffers from the small number of actual births of the relevant population. Therefore, we conclude that a much larger sample is necessary to get sufficiently precise estimates of the importance of individual heterogeneity.

## Appendix

### A.1 Computation of the adjustment path for scenario 3

This part of the appendix gives the exact formulas used to compute the adjustment paths for scenario 3. As stated before, future East German age-specific birth-rates are assumed to be the same as West German age-specific birth-rates up to a common constant between zero and one which enters multiplicatively. This constant is computed in the first step. The second step makes sure that the adjustment path does not fall below the lower limit defined in section 4.1.

Let us first introduce some necessary notation to describe the problem. The final object of these computations is the East German age-specific fertility rates for various ages and years after 1994, denoted by  $FR^E(\text{age}, \text{year})$ . Their West German counterparts are denoted by  $FR^W(\text{age}, \text{year})$ . Furthermore, denote the average number of children for a given cohort at a particular year as  $AC^E(\text{age}, \text{year})$  and  $AC^W(\text{age}, \text{year})$ , respectively. Finally,  $\text{age}_{94}$  indicates the age in 1994 and  $c(\cdot)$  denotes age constants which are different depending on the value of  $\text{age}_{94}$ .

For  $\text{age}_{94} < 44$  the age specific constants and the resulting fertility rates are given by:

$$c(\text{age}_{94}) = \min_{c \geq 0} [AC^E(\text{age}_{94}, 1994) + c(\text{age}_{94}) \sum_{\tau=\text{age}_{94}+1}^{44} FR^W(\tau, 1994) - AC^W(44, 1994 + 44 - \text{age}_{94})]^2,$$
$$FR^E(\text{age}_{94} + t, 1994 + t) = \max \{ c(\text{age}_{94}) FR^W(\text{age}_{94} + t, 1994), \min [FR^E(\text{age}_{94} + t, 1994)], FR^W(\text{age}_{94} + t, 1994) \}, t > 0, \text{age}_{94} < 44.$$

### A.2 Data sources

The pre-unification data for fertility rates and respective populations have been taken from various issues of the Statistical Yearbooks of the FRG and GDR. Post-unification data has been provided by the Statistische Bundesamt (1994a, b, c). The projected female population in age categories are estimates by the Statistische Bundesamt (1994b), variant 2 (basis 31.12.1992).

When writing this paper we had complete information only up to 1993. For 1994, age-specific fertility rates were not yet available. Therefore, to estimate the 1994 age-specific fertility rates we used the total number of births for East and WestGermany, respectively, the projected populations for 1994 in the particular cohorts, and the assumption that the 1993 age distribution of fertility rates will also prevail in 1994.

All computations are based on our simulation program PCFD (projection of comparative fertility developments) developed in GAUSS V.3.2.<sup>14</sup>

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<sup>14</sup> In principle we are prepared to make this program available on request. All such inquires should be sent directly to the second author.

**A.3 Age-specific fertility rates 1990 to 1994 and projections of scenario 3 up to 2010.**

*Table A.1: Age-specific fertility rates for 1000 women in East Germany 1989-1999*

Age	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
16	3.2	3.3	3.9	3.2	2.4	2.4	2.9	2.9	2.9	2.9	2.9
17	9.5	9.8	10.3	7.9	6.5	6.4	7.5	7.5	7.5	7.5	7.5
18	27.8	27.7	22.3	19.2	13.8	13.5	16.1	16.1	16.1	16.1	16.1
19	63.8	63.0	51.0	34.7	25.0	24.5	28.0	28.0	28.0	28.0	28.0
20	103.9	104.9	75.0	53.8	39.8	39.0	39.5	39.5	39.5	39.5	39.5
21	128.6	129.2	90.1	68.2	55.1	54.0	54.0	46.4	46.4	46.4	46.4
22	142.3	141.1	94.6	72.7	63.0	61.8	61.8	52.2	52.2	52.2	52.2
23	149.7	148.2	93.9	77.9	67.3	66.0	66.0	59.5	59.5	59.5	59.5
24	151.6	147.7	92.1	77.0	69.7	68.3	68.3	67.3	67.3	67.3	67.3
25	143.4	137.3	83.6	71.8	71.0	69.6	69.6	69.6	72.5	75.9	77.2
26	125.5	121.7	72.9	64.0	65.5	64.3	64.3	70.4	76.8	81.7	85.5
27	105.8	99.0	58.4	54.6	57.2	56.1	56.1	68.5	78.5	85.7	91.1
28	87.2	82.1	45.6	44.6	48.6	47.6	47.6	60.6	72.5	83.1	90.7
29	69.4	64.2	36.5	35.5	39.0	38.3	38.3	46.1	59.7	71.5	81.9
30	56.8	52.5	29.3	29.2	31.2	30.6	30.6	34.2	45.1	58.4	69.9
31	45.8	43.0	24.5	23.5	25.8	25.3	25.3	25.3	30.7	40.5	52.4
32	37.6	32.9	19.6	20.3	20.2	19.8	19.8	19.8	19.8	26.4	34.9
33	28.9	27.1	16.2	15.4	16.3	16.0	16.0	16.0	16.0	16.0	22.6
34	23.4	21.2	12.4	13.4	14.3	14.0	14.0	14.0	14.0	14.0	14.0
35	19.1	16.9	10.5	10.7	11.2	11.0	11.0	11.0	11.0	11.0	11.0
36	14.5	12.7	8.8	8.4	8.6	8.4	8.4	8.4	8.4	8.4	8.4
37	10.9	9.6	6.9	6.3	6.4	6.2	6.2	6.2	6.2	6.2	6.2
38	8.1	7.8	5.4	5.3	4.9	4.8	4.8	4.8	4.8	4.8	4.8
39	5.7	4.9	4.1	4.0	3.8	3.7	3.7	3.7	3.7	3.7	3.7
40	3.8	3.9	3.1	3.0	2.8	2.7	2.7	2.7	2.7	2.7	2.7
41	2.3	2.2	2.2	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9
42	1.4	1.5	1.3	1.1	1.3	1.3	1.3	1.3	1.3	1.3	1.3
43	1.1	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
44	0.4	0.7	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
sum <sup>1)</sup>	1572	1517	976	829	774	759	767	785	846	914	981

Note: 1) Sum equals the TFR minus the fertility rate for women of age 15.

Table A.2: Age-specific fertility rates for 1000 women in East Germany 2000-2010

Age	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
16	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
17	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
18	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1	16.1
19	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
20	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5
21	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
22	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2	52.2
23	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
24	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3	67.3
25	77.6	77.6	77.6	77.6	77.6	77.6	77.6	77.6	77.6	77.6	77.6
26	87.0	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
27	95.4	97.1	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5	97.5
28	96.5	101.0	102.8	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3
29	89.4	95.1	99.5	101.3	101.8	101.8	101.8	101.8	101.8	101.8	101.8
30	80.1	87.4	92.9	97.3	99.0	99.5	99.5	99.5	99.5	99.5	99.5
31	62.8	71.9	78.5	83.5	87.4	89.0	89.4	89.4	89.4	89.4	89.4
32	45.2	54.1	61.9	67.6	71.9	75.3	76.6	77.0	77.0	77.0	77.0
33	29.9	38.7	46.3	53.0	57.9	61.6	64.4	65.6	65.9	65.9	65.9
34	18.8	24.8	32.1	38.4	44.0	48.0	51.1	53.4	54.4	54.6	54.6
35	11.0	15.3	20.2	26.1	31.3	35.9	39.1	41.6	43.6	44.4	44.6
36	8.4	8.4	12.0	15.9	20.5	24.6	28.2	30.7	32.7	34.2	34.8
37	6.2	6.2	6.2	9.2	12.2	15.8	18.9	21.6	23.6	25.1	26.3
38	4.8	4.8	4.8	4.8	6.7	8.9	11.5	13.8	15.8	17.2	18.4
39	3.7	3.7	3.7	3.7	3.7	4.9	6.4	8.4	10.0	11.5	12.5
40	2.7	2.7	2.7	2.7	2.7	2.7	3.4	4.5	5.8	7.0	8.0
41	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.9	3.8	4.5
42	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.8	2.3
43	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	1.1
44	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
sum <sup>1)</sup>	1043	1100	1150	1193	1229	1258	1280	1297	1310	1320	1326

Note: 1) Sum equals the TFR minus the fertility rate for women of age 15.

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