Countercyclical U.S. Fertility and its Implications

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The following article is the **verbatim** text of a report based on research funded by the Social Security Administration and the National Institute of Child Health and Human Development to the Rand Corporation. The report looks at changing fertility rates in the United States and their implications for future population size and age distributions. An economic model of fertility rates is used to explain observed differences in fertility rates among couples and to predict future rates. The focus is on trends since 1947 because post-World War II data are the most complete. Several explanations for changing fertility rates are examined, and their usefulness in predicting the future is evaluated.

Predicting fertility rates is an important undertaking because their consequences are far-reaching. Some short-term consequences are evident in the first months or years after a rise or fall in fertility occurs. Other longer-term consequences, as for the social security system, emerge only after 20 to 50 years.

Consider the effects of the large decline in U.S. fertility during the last 20 years. The short-term effects of this decline have ranged from empty hospital maternity wards throughout the country to sparsely used elementary school classrooms and many unemployed elementary school teachers. Along the way, the demand for housing has shifted significantly, both in the private market and in publicly provided housing. As their fertility fell, young couples have reduced their demands for housing space as well as for the other goods and services that children use.

In many important instances, both public and corporate policy were caught unaware by these shifting demands. Part of their problem is that social scientists have not been able to predict fertility movements, even a few years ahead. Hence, we haven't been able to say much about whether a recent change is a temporary aberration or part of a longer-term shift that should be planned for.

These longer-term shifts are of great importance—politically, socially and economically. These effects result largely from the fact changing fertility—along with mortality and past fertility—changes the age structure of the U.S. population.

Figure 1 illustrates this phenomenon. The configuration on the left shows the percent of the U. S. population in each ten-year age group in the year 1910. Our population was very young then. The largest group was children born in the previous ten years, and the smallest group was the elderly.

Thirty years later in 1940, the age structure of the population had shifted. The babies born between 1900 and 1910 were then 30 to 40 years old. Though the structure is still shaped like a pyramid it is more rectangular, indicating that older people were by then a larger share of the U. S. population. In addition, the youngest cohort, born during the decade of the depression, was relatively small.

The picture for 1975 tells of a country that underwent sweeping fertility changes in the previous 35 years. The largest group today are in their twenties. They significantly outnumber the teenagers and young children.

But what of the future? Some of it we know now. Barring enormous wars or other catastrophies, most of the babies born in the last decade will be 40 to 50 years old in the year 2020. And their numbers will be exceeded by people aged 50 to 60 and 60 to 70.

However, much of what that future society will look like depends on what we don't know now—the bottom part of the age structure. If it turns out to be small, making the total

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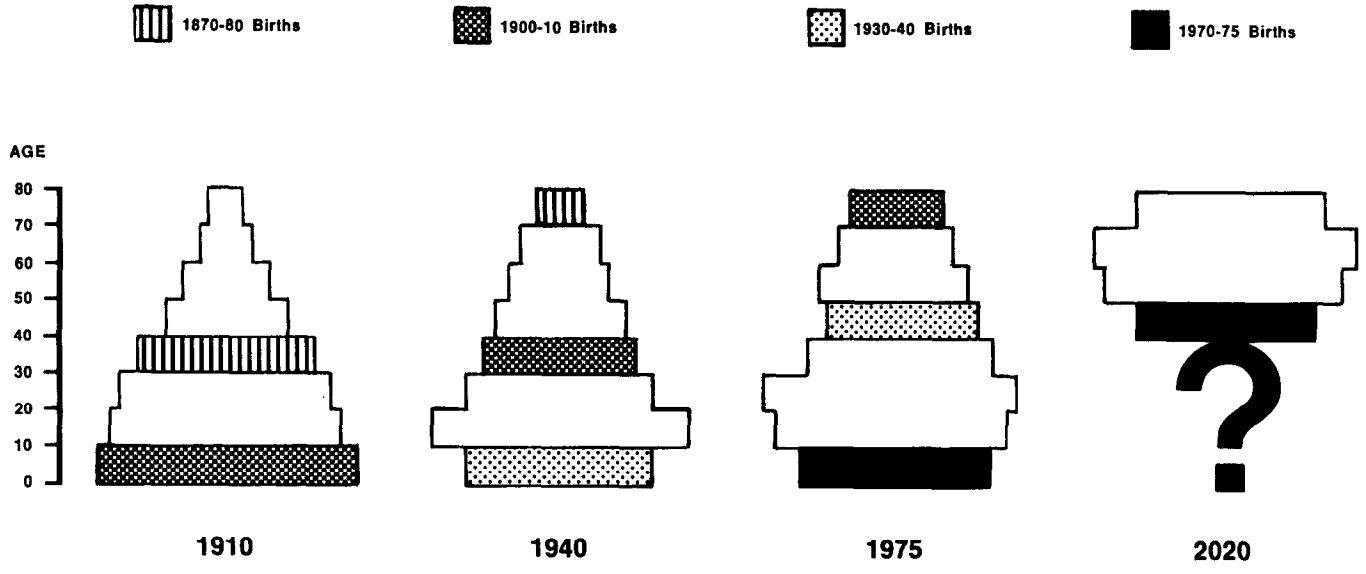
Figure 1.—The population's changing age structure



structure top heavy, the United States will face completely new challenges. The kinds of social services, economic goods, and medical care demanded would change dramatically. One might expect considerable change in the political views and voting patterns of this older population. And the social security system could be in serious difficulty—in fact, long before the year 2020. Very small changes in fertility significantly affect the contribution rate necessary to finance a pay-as-you-go social security system.* As a result, the prospects for continuing low fertility have led Congress to revise the system's financing, so as to accumulate a large reserve for meeting the demands of the 21st century.

On the other hand, this smaller number of births since 1960 may be a temporary phenomenon. If so, the picture for the year 2020 will have a small middle, with a large top and a heavy bottom. Though with this population distribution the social security system can then breathe more easily, the total size of the population would of course be much larger than it is today, with possible attendant strains on social services and natural resources.

The principal cause of these changing age distributions is current and past changes in the fertility rate. The crucial issue for policy makers is what causes these movements in fertility rates. The better we understand the causes, the better we will be able to predict future movements, and the more effectively government and corporate planners will be able to prepare for the resulting economic and political changes. Our research uses an economic model of fertility behavior to explain fluctuations in fertility rates and to predict future rates. We have concentrated primarily on fertility trends since 1947 because post WWII data are more complete; however, as a test of our model, we have extended the analysis back to 1920.

Before we consider our research results in detail, it is instructive to review several of the prominent explanations for fluctuating fertility rates and evaluate their usefulness.

Figure 2 shows the fertility rate from 1800 to 1975. The height of the line in a particular year gives the number of births in that year, divided by the number of women who were between ages 14 and 44 in that year. For example, on January 1, 1800 an average woman had about a 70 percent chance of having a birth by December 31 of that year. By 1975, the average woman's chances had fallen to about 17 percent.

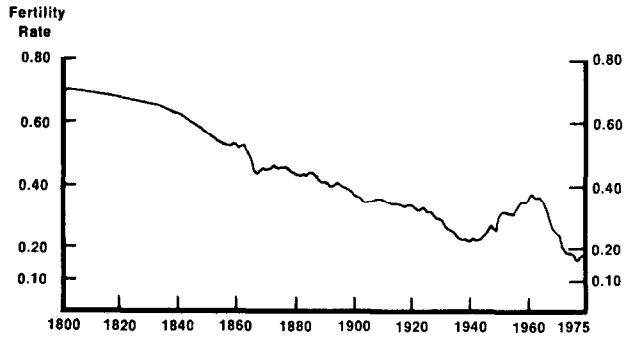
During some periods, fertility rates have fluctuated dramatically. In the late 1930s, the fertility rate began a 20 year bulge, followed by a subsequent prolonged decline. This bulge is often called the baby boom, and the decline—the most rapid sustained decrease in our history—is known as the baby bust.

One explanation for changes in fertility rates focuses on the relationship between fertility rates and business cycles in industrialized societies. In a long series of studies conducted from the 1880s to the 1950s, statisticians, demographers and economists investigated whether cycles in economic activity induced cycles in births. The findings were consistent for all the half dozen countries studied: business cycles and fertility rates tended strongly to move together. Whether the long run trend in fertility was up or down, fertility rates jumped above the long term trend during and just after economic recessions.

Other explanations focus on the dramatic fertility decline since 1957—the baby bust. One suggests that the discovery and marketing of the birth control pill caused this baby bust and that a continual stream of new contraceptive technologies and an ever increasing public and private supply of

* These large effects are estimated by the Social Security Administration, Office of the Actuary, in Francisco R. Bayo, William D. Ritchie and Joseph F. Faber. **Long-Range Cost Estimates for Old-Age, Survivors, and Disability Insurance System, 1978.** (Acturial Study No. 78), June 1978; table 16b, page 48.

Figure 2.—Fluctuations in the U. S. fertility rate



these contraceptives kept the baby bust going. According to this explanation, the recent fertility decline happened when science and modern marketing methods gave couples the power to restrict their fertility effectively, thereby allowing couples to attain the small family sizes they had always wanted.

Another, quite different, explanation of the baby bust focuses on women's changing attitudes toward housework and childbearing versus work in the labor market. The hypothesis here is that women's attitudes toward these alternative roles shifted dramatically, leading many to opt for labor market careers instead of homemaking careers; fertility rates fell as a result.

Finally, a number of social scientists think that this twenty-year baby bust is largely a temporary phenomenon. One school of thought argues that many young couples delayed their births during the 1960s, but will soon make up for lost time. The result would likely be a new baby boom.

Though rigorous tests of these explanations are not a simple matter, we can judge their usefulness in a general way by examining movements of the fertility rate since WWII (fig. 3).

One of the explanations of fertility rate movements is that they tend to be positively correlated with business cycles. This figure shows that the economic recessions of 1954 and 1958 were indeed accompanied by a pause and a downturn in the fertility rate. However, the prolonged economic expansion of the 1960s occurred during a steep fertility decline. Further, the resessions of 1970 and 1974 occurred as the fertility rate was temporarily rising, or at least pausing in the midst of its decline. Hence, this explanation appears to have been useful until around 1960. After that, one would do better by expecting just the opposite of what this hypothesis predicts.

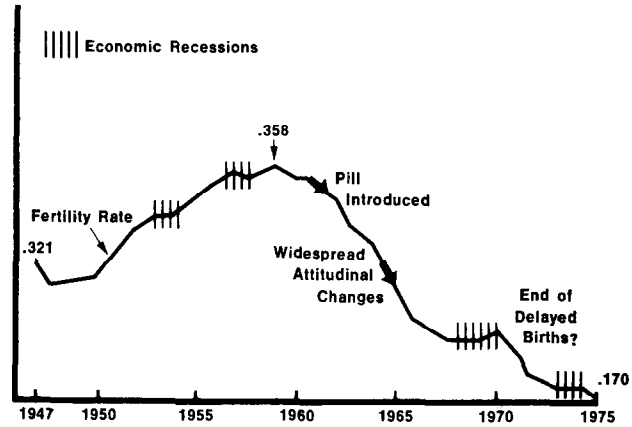
Another explanation focuses on the discovery and marketing of more effective contraceptives. The first of these, the birth control pill, was first authorized for public use in June 1960. By 1964, the baby boom had been over for seven years and fertility rates were falling faster than ever before in our peacetime experience. Yet by 1964, only ten percent of married women of childbearing age were using the new birth control pill and subsequent contraceptive innovations fueled the ongoing fertility decline in the last 15 years, but they did not start it.

An alternative explanation proposes that widespread changes in women's attitudes and preferences caused the baby bust. Attitudinal changes cannot, of course, be exactly pinpointed in time, but research by sociologists and social psychologists suggests that these attitudinal shifts were hardly noticeable until the middle 1960s and were not widespread until several years later. One suspects that these shifts were more a result of women's increasing freedom from young children and involvement in the job market, rather than a cause.

Finally, there is the hypothesis that the baby bust is a temporary phenomenon that will end when couples make up for their delayed births. This explanation was prominent during the fertility levelings of 1970 and 1974. But in both cases, the fertility rate then resumed its steep decline. Of course, there is always the possibility that next year will see the long awaited sustained rise, but such a theory is useless for predicting.

The research we have conducted attempts to improve on the record of these hypotheses in explaining and predicting fertility changes over time. We draw on an economic model of fertility behavior to explain observed fertility differences among couples. The model directs attention to two variables. One is family income. The simple form of this model predicts that, other things being equal, couples with higher income will have more children, just as they will have more cars and more European vacations. The other key variable is the opportunity cost of women's time. In a society where mothers usually take major responsibility for raising their children, this opportunity cost is a significant part of the cost of children. This economic model predicts that women who can earn higher wages in the labor market will have fewer children, other things equal, because the opportunity cost of their time with children is higher. Simply put, the more children cost in terms of the employment value of the mother's time, the fewer children should be demanded.

Figure 3.—Some explanations of fertility rate change



The implications of this model for time series fertility rates are straightforward. First, consider what happens when few wives are employed. Business cycles generate cycles in men's income. On the upswing, men's income, and hence family income, is rising, and the model predicts that fertility rates should rise accordingly. During recessions, however, fertility rates should fall, as couples decide against the costly activity of childbirth when their income is low.

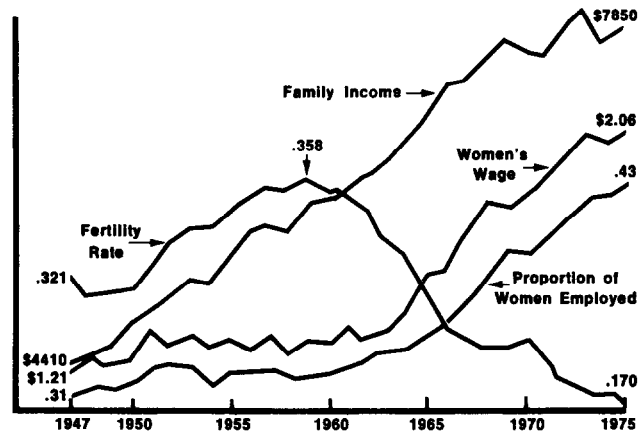
Now assume that women's wages and job opportunities improve steadily. Basic economics as well as common sense predicts that the proportion of wives who are employed should increase. As this occurs, our model points to an interesting possibility. With many women employed, business cycles generate cycles not only in men's income but also in women's wages and job opportunities, that is, in the opportunity cost of women's time at home with children. In this situation, good times economically are still times of high income, but now they are times when childbirth and childrearing are most costly in terms of the mother's time. As more and more women are employed, the former positive relationship between business cycles and fertility should break down. If enough women are employed, and if the cost of children is a sufficiently important factor in couples' decisions fertility rates may even move countercyclically.

Let's see if this story makes sense in terms of U. S. fertility trends and economic variables. One variable emphasized in the model is family income. Charted in figure 4 in constant 1962 dollars, it rose steadily during the period, except during the four recessions. The second variable of interest is the average hourly wage of women, shown rising quickly in the 1960s and 1970s following a very slight upward trend in the decade in the 50s. Finally, we see that the proportion of women employed also rose dramatically in the last twenty years. Note that both series referring to women declined or leveled during the 1970 and 1974 recessions, while the fertility rate was temporarily rising.

Our model suggests the following interpretation of this experience. During the 1950s and previously, few enough women were employed so that fertility rates tended to follow business cycles. However, the prolonged economic expansion of the 1960s, with rising wages and job opportunities, induced increasing numbers of women to work outside their homes, and correspondingly, to forgo, or at least delay, having children. The proportion of women employed became high enough that the economic recession of 1970, with its falling women's wages and diminishing job opportunities, induced a fertility increase. Many couples apparently decided to have a child then, when it cost relatively little in terms of the wife's forgone income. After the 1970 recession, real wages resumed their steep rise and women went to work in record numbers instead of having children. This experience was repeated, though less drastically, during and after the recession of 1974.

A quick examination of the series lends general support to an explanation of time series fertility rates that emphasizes the importance of family income and the opportunity

Figure 4.—How the key variables have changed since World War II



cost of women's time. To test the model more rigorously and construct a framework useful for prediction, we turned to statistical regression analysis. We used the data shown in figure 4, though disaggregated by single years of age, and supplemented with data on several other variables thought to influence fertility and the actual fertility rates.

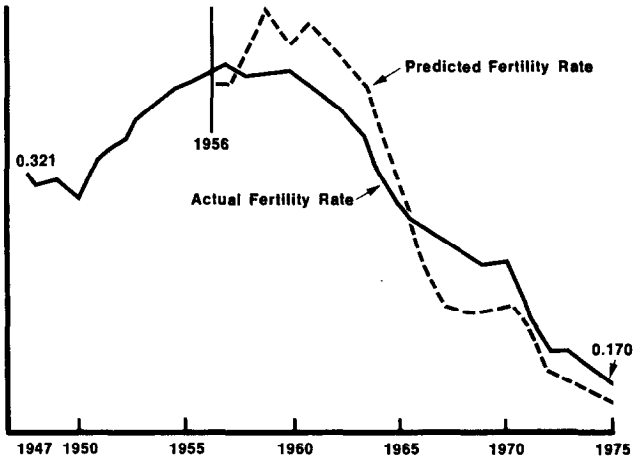
The results of these regression analyses are consistent with the predictions of our model. Family income is positively associated with fertility rates. Women's wages are negatively associated with fertility rates. And the latter correlation is stronger, the higher the proportion of women employed. These results are also consistent with the findings of other studies that have analyzed fertility differences among couples in a given year.

The key question remaining is whether this model can accurately predict fertility rates outside the range of data used to estimate the model. To answer this question, we estimated the model for parts of the post-War period and tried to predict fertility rates for the years that were left out.

As one would expect, the more years of experience that the model, in a sense, knows about, the better it is able to predict fertility rates in the few remaining years. Hence, we pushed the procedure to the other extreme. We asked how well this simple model could predict fertility during the baby bust, on the basis only of the years before the bust began, namely 1947 to 1956.

The performance, graphed in Figure 5, is certainly not perfect. The model predicts a higher and later fertility peak and an even more rapid decline than what actually occurred. Yet the model is able to predict important features of this experience: the end of the 20-year baby boom, the rapid fertility decline during the economic expansion of the 1960s, and the fertility increases or levelings during the recessions of 1970 and 1974. No other model of fertility behavior that we are aware of can match this performance. If the model can do as well for the future, it should provide better guesses about the shape of the population size and age structure in the year 2020, hence better guidelines for

Figure 5.—Predicting with the model



corporate and government planners to prepare for the resulting economic and political changes.

We conducted this exercise with demographically disaggregated data to investigate the different responsiveness of couples, by age, to changing economic conditions. We also estimated the influence on fertility of several other factors. However, the most important extension of this analysis focuses on the extent to which recent fertility changes are permanent or temporary, hence whether their implications will be long-reaching, or short-lived. If young women have indeed been delaying their births—by now for quite a while—the U. S. may soon experience a new baby boom, with concomitant burgeoning demands for maternity facilities, elementary classrooms and teachers. The longer run consequences would be immense. In particular, it would be completely unnecessary for the social security system to accumulate revenue surpluses in preparation for increasing disbursements to an aging population.

If one had a measure of couples' fertility expectations for the future, one could measure their current fertility against those expectations, and determine whether their fertility this year seems temporarily high or temporarily low relative to their plans, hence whether rates are likely to go down or up. We have developed a procedure for making this comparison on the basis of data on couples' fertility expectations. We use a more complex form of our model to generate estimates of couples' expected completed fertility, which is the number of children an average couple in a particular year is expected to have. If expected completed fertility is below the fertility rate, fertility in that year is temporarily high. Births are being temporarily compressed.

In figure 6, we have compared expected completed fertility to the fertility rate. The comparison suggests first, that the baby boom did partially reflect increasing expected completed fertility. To this extent, its consequences would not be temporary. However, expected completed fertility lay below the fertility rate throughout the boom, indicating that part of the boom also reflected fertility timing considerations.

Next, the comparison suggests that couples viewed the baby bust in its first years as temporary. Their expectations adjusted, however, and the adjustment was dramatic and complete. After 1962, our estimate of couples' fertility expectations plummeted along with their fertility. It does not look like a case of delayed births, likely to be made up later.

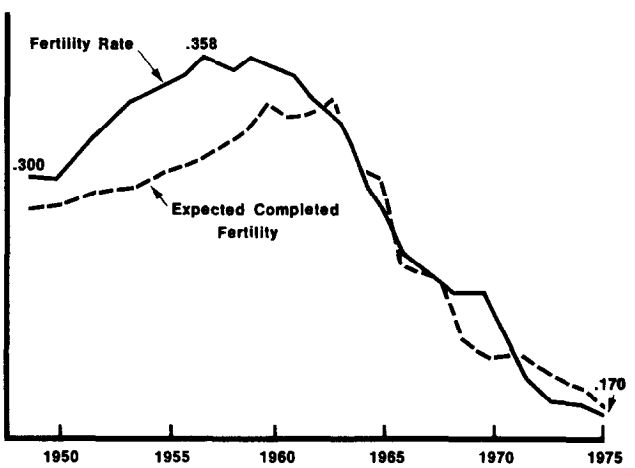
Finally, the 1970, and to a lesser extent the 1974, fertility blips appear to have been largely temporary increases. Our model suggested earlier that these blips happened because couples compressed their births into low cost periods. This evidence corroborates that suggestion by indicating that the fertility increases were indeed viewed as largely temporary, to be made up in the immediately preceding or following years.

What conclusions can we draw from these analyses? First, although fertility rates in the U.S. tended to move along with business cycles before the late 1950s, since then they have moved against business cycles. This apparent reversal of a pattern that one prominent demographer had called "one of the most firmly based empirical findings in any of the social sciences," had not been pointed out, prior to our work.

Second, our economic model is able to explain both kinds of fertility movements—pro-cyclical and countercyclical—within a unified theoretical and statistical framework. To be sure, human behavior is more complex than any model of it—certainly more complex than our very simple model. Yet, in spite of ignoring many complexities, the model can explain—and predict—important features of recent U. S. fertility experience.

Finally, these findings have clear implications for the future. Certainly fertility rates will not reach zero, and of course they cannot go negative. However, as long as women's real wages continue to rise and a large proportion of women are employed, we look for continuing fertility declines until a bottom is reached. We also predict that these declines will be punctuated by countercyclical annual movements, as couples compress their births into periods of

Figure 6.—The fertility rate and expected completed fertility



economic slowdown when the births are less expensive.

Some other prominent models yield quite the opposite, prediction: that fertility rates are on the verge of a long secular increase. If this occurs, the population in 2020 will be much larger than it is now, and much younger. Economic goods and social services associated with children and young people will have been in increasing demand. And the economy will be called upon to provide first jobs for increasingly large numbers of teen-agers.

However, all the evidence we've considered points to a very different future. The declining fertility rates we expect would create a top heavy age structure in the year 2020—something like the 1910 pyramid in fig. 1 turned on its head. This situation would be without precedent in American history, and nearly without precedent in world history. The burden of supporting an increasing proportion of elderly—in terms of economic goods, social and medical services, and social security transfers—might fall on a declining proportion of earners, leading to economic, social, and political strains with which we have no experience. Further, fertility rates would then be so low that our population would not be reproducing itself and the size of the population would be falling. The few societies that have actually faced this prospect have engaged in difficult debates about its consequences and remedies, followed by important policy changes designed to reverse the trend.

Our statistical tests of this model—the model that predicts continuing low fertility except temporarily during economic slowdowns—are certainly not conclusive. We think these tests are quite thorough, given the data on which they have been performed. But the data are highly aggregated, and they treat only one country. Other researchers are by now testing the model in other ways. The strongest test of the predictive power of this model, versus its competitors, will occur naturally as we watch the path of fertility rates and economic conditions during the next five years or so.

SSI/OASDI Beneficiaries

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Benefits Based on Minimum PIA

Because, as stated earlier, the social security benefit level directly influences SSI eligibility, it is useful to look separately at beneficiaries with low benefit amounts. A low benefit amount is defined here as one derived from the minimum PIA (then $121.80). All benefits under this definition are low enough to permit individuals and couples living in their own or another's household to be eligible for an SSI payment.

The 2.2 million persons in the low-benefit group (table 3) represented 6.4 percent of the 34.2 million beneficiaries. These proportions were 7.1, 2.7, and 6.6 percent, respectively, for the retired-worker, disabled-worker, and survivor groups. Fewer of the disability benefits were based on a minimum PIA. On the other hand, the proportion in the low-benefit group who were receiving SSI payments was larger for disabled workers and their dependents (35.2 percent) than for the other two groups (24.3 and 25.1 percent, respectively).

Among beneficiaries aged 65 and older, the proportion with SSI payments increased from 7.1 percent to 28.6 percent when only benefits based on the minimum PIA level were considered. The analogous increases were from 14.3 percent to 49.6 percent among beneficiaries with entitlement based on disability and from 1.0 percent to 3.8 percent among other beneficiaries.