1). Similar to inferences gained from our analysis of regional trends, these data suggest that the majority of countries showing no progress are concentrated in Sub-Saharan Africa; however, country-specific trends within this region are heterogeneous.

The growing disparities in MMR between Sub-Saharan Africa and other developing world regions raise the question of whether the countries with the highest initial MMRs are being left behind. To answer this question, we examine country-specific trends in MMR over the period 1990–2008. Countries with a higher initial MMR needed to have achieved higher absolute declines in MMR over the period 1990 to 2008 in order to be considered on track for achieving the MDG 5 target.

In Figure 3a, the distance between the solid “no change” line and the dotted “on track” line indicates the reduction in MMR between 1990 and 2008 that was necessary to be considered on track for meeting the MDG 5 target. Figure 3b shows the same information plotted on a logarithmic scale, and thus, the “no change” and “on track” lines are parallel. In both panels, we have shaded observations for which we estimated that there was a measurable positive decline in the MMR between 1990 and 2008 as indicated by a 95% uncertainty interval around the estimated rate of change over the period 1990 to 2008.

Countries with higher initial MMRs generally experienced greater absolute declines in MMR over the period 1990–2008 than did countries with lower initial levels. In addition, the data plotted on the logarithmic scale suggest that neither the estimated relative rate of change in the MMR observed over the period 1990–2008, nor our certainty that a positive decline in the MMR has actually occurred, appears to be tied to the initial MMR observed in 1990.

These results stand in contrast to the findings of Hill et al. (arrived at using a different method of analysis), which suggested that the decline in MMR over the period 1990–2005 for the group of countries with an initial level of MMR greater than 200 was not statistically significant.22 Using country-specific uncertainty intervals around rates of change, our results suggest that statistically significant progress in reducing maternal mortality can be observed at varying initial levels of MMR.

Decomposing Changes in the Numbers of Maternal Deaths

The annual rate of decline in maternal deaths can be approximated by the sum of the annual rate of decline in births and the annual rate of decline in MMR. As the global trend in births was almost flat from 1990 to 2008, the decline in the total number of maternal deaths at the global level over this time period is attributable entirely to a decline in the MMR (Table 1).

Declines in the MMR were not rapid enough to counterbalance the effect of increasing numbers of births in Sub-Saharan Africa and Oceania, and consequently the total number of maternal deaths increased over the period 1990–2008 in these two regions. In all other developing regions, annual declines in the MMR were more rapid and were generally coupled with declines in the total number of births. Thus, most developing regions experienced declining numbers of total maternal deaths (in Eastern Asia, especially, the decline in total births contributed substantially to the decline in maternal deaths). Similarly, in developed regions, as well as in the Commonwealth of Independent States, declines in both the MMR and the number of live births contributed to the decline in maternal deaths.

Decomposing Changes in Lifetime Risk of Maternal Death

Reductions in the MMR decrease the lifetime risk of maternal death directly, while reductions in the general fertility rate decrease the lifetime risk of maternal death by reducing the number of times women are exposed to pregnancy-related health threats. An increase in the average woman’s reproductive lifetime (due to reductions in mortality generally) will increase the amount of time a woman is exposed to the risk of pregnancy and subsequently to the risk of maternal death, and thus will increase the lifetime risk of maternal death.

In all developing regions, both the MMR and the GFR declined between 1990 and 2008, and the sum of the annual percentage change in these two measures approximates the annual percentage change in the lifetime risk of maternal death.