<u>Background</u>

Throughout the world, demographers have noted significant fertility declines, oftentimes coming hand in hand with decreases in mortality and improvements in health services and living conditions (including education, increases in income, etc.). While significant reductions in fertility have occurred in most of the Arab world, Palestinian fertility remains among the highest in the world (Fargues 2000; Khawaja 2003; Khawaja, Assaf, and Jarallah 2009).

Palestinian fertility has come to be termed as a 'demographic puzzle' due to the persistence of high fertility despite higher levels of women's education, high rates of urbanization, low infant mortality, and improved access to contraception compared to other countries in the region with lower fertility levels (Fargues 2000; Khawaja 2000, 2003; Khawaja, Assaf, and Jarallah 2009).

There has been some analysis of fertility trends by region (West Bank and Gaza Strip), age, and women's education (Khawaja 2000, 2003; Khawaja, Assaf, and Jarallah 2009). Some studies have also examined age at marriage patterns and contraceptive use over time in relation to fertility. However only basic descriptive analyses of fertility *per se* by time period have been conducted without the inclusion of these factors in a model assessing their overall impact on fertility. None of the studies have actually accounted for the contribution of each of these determinants to fertility change at the macro level. This paper utilizes the Bongaarts framework for analyzing the proximate determinants of fertility (Bongaarts 1978) in order to examine fertility trends, and their proximate determinants, in the occupied Palestinian territory between 1996 and 2010.

Methods:
<u>Data:</u>
Data from four household surveys were utilized in this paper. The household surveys were undertaken by the Palestinian Central Bureau of Statistics (PCBS). They are all representative at the national level, including both the West Bank and Gaza Strip. Data from the 1996 and 2000 Demographic and Health Surveys, and the equivalent information from the 2006 Palestinian Family Health Survey and the 2010 MICS survey were utilized. These surveys are Demographic Health Survey (DHS)-type household surveys and are based on a similar survey design. All of these surveys include complete birth histories for the five years leading up to the survey for married women between the ages of 15-49.

<u>Analysis:</u>

This paper utilizes an analysis of the proximate determinants of fertility based on the Bongaarts framework of the proximate determinants of fertility (Davis and Blake 1956; Bongaarts 1978; Sibanda et al 2003) . This framework focuses on the four proximate determinants of fertility that were found to account for the majority of variation in

fertility levels: marriage, contraception, induced abortion, and postpartum infecundability (Bongaarts 1978; Sibanda et al 2003). Bongaarts (1978) developed indexes that can be calculated using data from conventional demographic surveys to measure the contribution of each of these proximate determinants to total fertility in a population.

All index scores range from 0 to 1. The index of proportion married C_m is calculated based on the weighted average age of the age-specific proportions married, with the weights given by the age-specific marital fertility rates. A score of 1 indicates that all reproductive age women are married. This index assumes that no childbearing happens outside of wedlock, which is a valid assumption in the occupied Palestinian territory. The index of contraception C_c is equal to 1 if no form of contraception is used and zero if all fecund women use modern methods of contraception that are 100 percent effective.

Given the extremely low prevalence of induced abortion in the occupied Palestinian territory, none of these surveys even collected information on induced abortion. Therefore, the index of abortion (C_a) was assumed to be 1, where no births were averted by abortion. The index of postpartum infecundability, C_i, is equal to 1 in the absence of postpartum abstinence and breastfeeding and zero when infecundability is permanent. Bongaarts recommends using 15.3 as the maximum number of births or the total natural fertility rate (TN). The equation for the total fertility of a population is:

$$TFR = TN \times C_m \times C_c \times C_a \times C_i.$$

The analysis was conducted initially at the aggregate oPt level and then further disaggregated into West Bank and Gaza Strip for 1996 through 2010. Since mobility between the two regions is highly restricted, it is safe to treat them as separate physical entities for the purposes of this analysis. The contribution of each of the proximate determinants is compared across region and survey year. In addition, the sources of fertility change will be examined for women with varying levels of education and women living in rural, urban, and refugee camp settings.

Results:
Table 1 provides an overview of the results of preliminary analysis of the 2000 and 2006 data. During this period, marriage patterns as measured in the index of proportions married (C_m) have not changed much over time, although there seems to be a slight increase in the proportions married. The trend is likely greater over the period from 1996 to 2010. A difference in the index scores between the West Bank and Gaza Strip exists, where marriage in the Gaza Strip seems to be slightly more universal. The indexes of contraception and infecundability indicate the most change over time, respectively. The indexes of contraception and infecundability have declined between the two survey periods, indicating that contraceptive use and infecundability have increased. Marked differences in the index of contraception can be seen primarily due to the increase in contraceptive use among married women in both regions. It should be noted, however,

that marked differences in contraceptive prevalence exist across regions and are evident in the variations in index scores. The variations in the index of infecundability (C_i) are primarily due to an increase in the mean duration of breastfeeding between the two periods.

Figure 1 provides an illustration of the number of births averted by each of the proximate determinants. Based on the number of births averted, it is evident that contraception has played the biggest role in reducing fertility, followed by postpartum infecundability, and then marriage. The roles of contraception and postpartum infecundability have increased over time in reducing fertility rates. The predicted total fertility rate (TFR) differs slightly from the actual TFR estimated by the Palestinian Central Bureau of Statistics. This may be partially due to assumption that induced abortion in the population is negligible, but may also be an artifact of data or sampling issues.

Table 1-Summary of Results:

	oPt		West Bank		Gaza Strip	
Indexes	**2000**	**2006**	**2000**	**2006**	**2000**	**2006**
Cm	0.80	0.82	0.78	0.79	0.84	0.86
Cc	0.61	0.49	0.59	0.42	0.65	0.56
Ci	0.81	0.77	0.83	0.78	0.79	0.77
Predicted TFR	6.08	4.80	5.84	3.92	6.62	5.62
Actual TFR	5.9	4.6	5.5	4.2	6.8	5.4
Fertility Reduction	**2000**	**2006**	**2000**	**2006**	**2000**	**2006**
Marriage	1.50	1.02	1.62	1.06	1.27	0.91
Contraception	4.89	6.03	5.22	6.97	4.20	5.21
Infecundability	2.83	3.44	2.62	3.35	3.21	3.57
Fertility Reduction	9.22	10.50	9.46	11.38	8.68	9.68

Figure 1: Contributions of Proximate Determinants to Predicted TFR
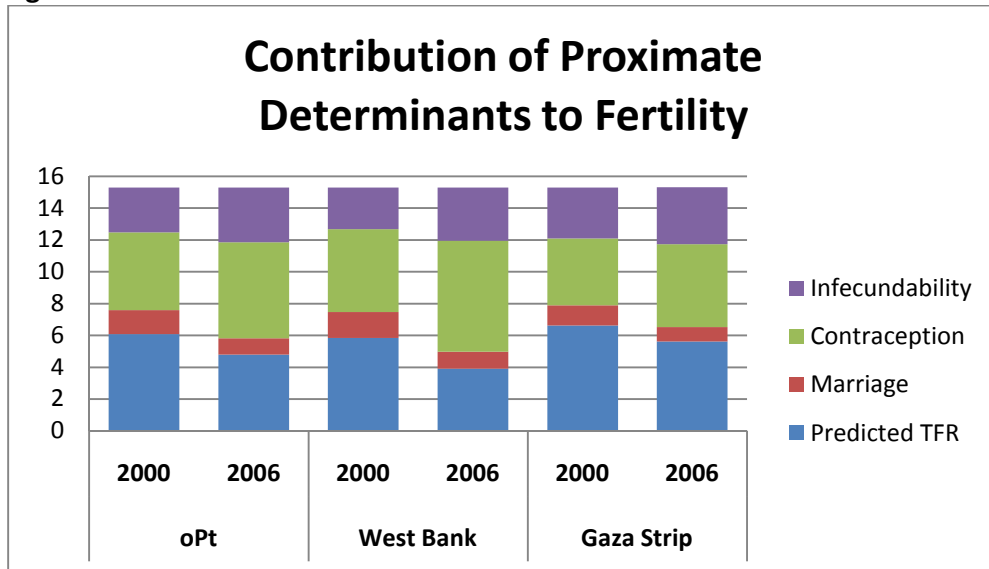
Overview of planned analysis:

This abstract present preliminary data to illustrate the value of the Bongaarts approach to understanding fertility change from 2000 to 2006. Our paper will broaden this analysis to include additional survey years, 1996 and 2010. In addition to examining the differences between the West Bank and Gaza, we also plan to examine differences in trends by women's education and residence in urban, rural, and refugee camp settings for the entire Palestinian population.

To our knowledge, this is the first time the Bongaarts framework has been used to examine Palestinian fertility trends over time. Understanding changes in Palestinian fertility are especially important to address the 'demographic puzzle' of high fertility in the context of relatively high education, access to contraception, urbanization, and development. This research will also inform political debates around high fertility as a 'demographic weapon' in the situation where under occupation, the majority Palestinian population is treated as an ethnic minority.

References:

Bongaarts, J. A framework for analyzing the proximate determinants of fertility. *Population and Development Review* (1978). 4(1):105-132.

Davis, K, Blake J. Social Structure and Fertility: an Analytic Framework. *Economic Development and Cultural Change* (1956). 4(3):211-235.

Khawaja, M. The recent rise in Palestinian fertility: permanent or transient? *Population Studies* (2000). 54(3):331-346.

_____. The fertility of Palestinian women in Gaza, the West Bank, Jordan and Lebanon. *Population* (2003). 58(3):273-302.

Khawaja, M, Assaf S, Jarallah Y. The transition to lower fertility in the West Bank and Gaza Strip: evidence from recent surveys. *Journal of Population Research* (2009). 26:153-174.