Why is fertility still so high in Guatemala?

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Introduction

Fertility levels in Guatemala have, at least until the turn of the 21st century, remained high in contrast to the rapidly declining trend in fertility rates in the rest of Latin America. The total fertility rate (TFR) of 5.8 recorded by the 1998-99 Demographic and Health Survey (DHS) in the rural areas is among the highest in the region and Guatemala was, in 1999, apparently the only country where the urban TFR exceeded 4.0 (Instituto Nacional de Estadistíca et al. 1999). Despite very recent estimates for Guatemala indicating lower fertility - an overall TFR of 4.4 is reported for 2002 (MSPAS (Ministerio de Salud Pública y Asistencia Social) et al. 2003) – the country's fertility remains higher than that in the neighbouring Central American countries of El Salvador, Nicaragua, Honduras and higher than most other South American countries, especially in urban areas (Table 1 and Figure 1). Low use of family planning (FP) is partly responsible for high fertility in Guatemala (Guzman 1996). However, questions remain regarding why FP use in Guatemala is so low. Few studies have been undertaken recently to establish fertility trends over time and the reasons for the observed fertility levels.

Previous research has shown the importance of the socio-economic or structural factors affecting the progress of the fertility transition. Economic development; urbanisation; the increased availability of health care services; decreasing infant and child mortality; the effect of FP programmes in expanding access to FP services and reduce unmet need; and increased female literacy, education and labour force

participation have all contributed to the decline of fertility in Latin America (Caldwell 1980; Weinberger 1987; Tuiran et al. 2003). On all these factors Guatemala is lagging behind almost all other Latin American countries – a partial exception being Bolivia, where fertility is also high (Table 2). Cultural factors have increasingly been considered to play a crucial role in the further progress of the fertility transition (Le Bras and Todd 1981; Boserup 1985b; Cleland and Wilson 1987; Zavala de Cosio 1996; Oppenheim Mason 1997). It has been argued that the diffusion of ideational change is an important determinant of the progress of fertility decline within the same region (Cleland and Wilson 1987; Bongaarts and Watkins 1996), and previous work in historical Europe (Lesthaeghe 1977) has demonstrated the impact of linguistic divides on fertility levels during the transition. Socio-cultural heterogeneity and barriers raised by different ethnicity, cultural values, and religions (which are often associated with discrimination and the unequal distribution of health and education facilities) prevent knowledge and attitudes favouring modern reproductive behaviour from diffusing through all sectors of the society (Cleland and Wilson 1987; Bongaarts and Watkins 1996; Reed et al. 1999; Madhavan et al. 2003).

Guatemala has been described as the most segregated country in Latin America (Glei 2000; Wearne 1994). This observation stems from the fact that a very large proportion of the population is indigenous and ethnic divides are strongly correlated with socio-economic divides (Wearne 1994; Lovell and Lutz 1994). Not only is the indigenous population large (50 per cent of the total population), but it consists of

22 different Maya tribes, each with its own language, traditional dress and customs. Previous studies have highlighted the importance of ethnic segregation in health and reproductive behaviour. Generally, the indigenous population is characterised by higher infant and child mortality rates and lower life expectancy than the *ladino* population (that is, the population which is of Spanish descent). It is also one of the most underserved populations in Latin America in terms of primary health care (de Ferranti et al. 2003). Similarly, indigenous women have always used FP and modern pregnancy related care less often than ladino women (Bertrand et al. 1982; Bertrand et al. 2001; Goldman and Glei 2003). Our own research in an area in the east of Guatemala has shown that diversity in contraceptive behaviour and pregnancy related care remains very high between and within ethnic groups and in rural and urban areas, even when factors such as access to services are controlled for (De Broe et al. forthcoming). However, few studies exist on the ethnic diversity in fertility patterns (Anderson and Morris 1977; Anderson et al. 1980) and no studies have described the situation in recent years.

This paper addresses the question of why fertility has remained so high in Guatemala for so long. We argue that the great cultural diversity and ethnic heterogeneity in the country is one factor preventing the smooth progress of the fertility transition. We argue that this happens in two ways. Firstly, the lack of investment by the national government of health and education provisions in rural indigenous areas has meant that the Guatemalan rural indigenous population has remained particularly illiterate and poor compared to the rest of Latin America (de

Ferranti et al. 2003). This is reflected in high levels of malnutrition and infant mortality, which contribute to the high fertility in rural areas. Secondly, continuing cultural heterogeneity creates barriers that prevent the diffusion of knowledge and attitudes favouring modern reproductive behaviour. We suggest that this effect might be responsible for retarding fertility decline among all ethnic groups.

We begin by charting the history of Guatemalan fertility over the past 25 years using data from the 1987, 1995 and 1998-99 (DHSs) and the 2002 National Maternal and Child Health Survey and methods similar to those employed for Nepal by Collumbien et al. (1997) and for Tanzania by Hinde and Mturi (2000). This analysis is aimed at describing fertility trends at the national level, and identifying the trend in fertility in rural and urban areas.

If cultural heterogeneity is important, then we might expect substantial local-level variation in fertility levels associated with ethnic and cultural divides. Moreover, if these are characteristic of urban areas as well as rural areas, then this might help to explain why urban fertility (on average) remains so high. DHS data are unsuited to identifying this kind of geographical patterning, so in the last part of the paper we turn to the 2002 population census and use *municipio*-level census data to analyse geographical variations in fertility in Guatemala (the *municipio* is the smallest unit for which fertility data are published in the census reports). The census data will be used to demonstrate the diversity in fertility patterns among the different *municipios* within Guatemala. Finally, we argue that we expect less segregation and so less

diversity and as a consequence observe a more advanced stage of the demographic transition in countries who had to deal with lower barriers such as fewer ethnic groups with their own language (Bolivia, Ecuador, Peru, Honduras), fewer poor illiterate indigenous people (El Salvador, Nicaragua, Dominican Republic) or a more equal distribution of resources (Colombia).

Background

The theory of diffusion and the evolution of fertility in Latin America. The start of the demographic transition in Latin America at the end of the 19th century was marked by sharp declines in infant and adult mortality thanks to the availability of modern public health care (Arriaga 1970). Initially, fertility levels rose as a consequence of the reduction in sterility among women of reproductive age and decline in widowhood (Zavala de Cosio 1996). Fertility levels rose much more rapidly in Latin America compared to Europe because modern public health care was introduced much more suddenly. Additionally, Latin America was characterised by higher and more universal nuptiality whereas in Europe substantial proportions of the population remained unmarried for life. Even though in most Latin American countries fertility levels only started to decline around 1965, cities like Buenos Aires and Montevideo had lower fertility levels from the 1930s onwards because communities of European immigrants had preserved the reproductive behaviour from their country of origin (Cosio-Zavala 1997).

Before 1960, agriculture was the main economic activity in most Latin American countries. The majority of the population lived in rural areas, had no or little education and mainly depended on manual labour. In countries where the indigenous people constituted the majority, they were excluded from the main economic and political activities in the society (Rama 1984). In the 1960s profound social and economic changes took place. People emigrated from the rural areas into the cities; women participated increasingly in the non-manual labour force and the development of mass media, communication and transport facilities improved social interactions between the different sectors and social layers of the societies.

There has been considerable variation in the timing and the pace of the fertility transition both between and within countries (Chackiel and Schkolnik 1996; Guzman 1996). At the beginning of the transition all Latin American countries contained social groups that practiced birth control; however, the size of these groups differed between countries and depended on the national level of socio-economic development. Because of the elitist character of Latin American society, the reproductive behaviour in these socially distinct groups took place in relative isolation prior to 1960 (Juárez 1993), but after that date social changes allowed the more widespread adoption of fertility control. Bongaarts and Watkins (1996) observed that large regions experienced fertility decline at approximately the same time independently of the degree of development at the local level: the transition occurred first in the most literate, industrialized, urban provinces and then spread

out to other regions even if these had far lower levels of development. According to the diffusion theory, fertility declines were not an adjustment to changing socio-economic circumstances as suggested by the classic demographic transition theory but a consequence of the horizontal and vertical diffusion of ideas, attitudes, and information about birth control within and between different social groups, regions and individuals of the same society. As such, diffusion can determine the timing and pace of the fertility transition. Diffusion channels such as mass media communications and social networks created the opportunities for the transfer of contacts and information.

Several authors have 'blended' this diffusion theory of the fertility transition with the 'classical' account which sees socio-economic changes as the engine of demographic change in order to explain the diversity in the Latin American fertility transition (Reed et al. 1999). For example, Zavala de Cosio distinguished two models to explain the demographic transition in Latin America (Zavala de Cosio 1988). In the first, the more 'modern' reproductive behaviour among the rich, characterized by the adoption of traditional or modern contraceptives, was spread through a diffusion process. The process of the decline itself was 'determined by the speed at which the various social groups are integrated into the process' and the overall adoption of modern reproductive behaviour depended on whether the higher educated sectors were taken as a model for the rest of the society (Guzman, 1996 p. xxvii). The second model concerns the poorest sectors of the society where the decline of fertility took place not so much because of improved standards of living

but because modern contraceptives were supplied in abundance through FP programmes. The adoption of FP among the poor is what Zavala de Cosio refers to as 'the Malthusianism of the Poor' whereby poor women learn through experience that having many children under poor conditions poses serious economic restrictions (Boserup 1985a; Cosio-Zavala 1997).

Ethnic diversity in Guatemala. The focus of this analysis is Guatemala, a Latin American country where social groups are particularly segregated and where governments, until very recently, have shown no signs of commitment towards population policies. The two main ethnic groups in Guatemala are, in very simple terms, the *ladinos*, who speak Spanish, wear Western clothes and dominate the political and economic sectors, and the indigenous people (Mayas) who speak an indigenous language, wear traditional dress and usually belong to the lowest social classes in the Guatemalan society. The indigenous people are divided into more than 20 different Maya tribes speaking more than 20 different languages (Wearne 1994).

Estimates of the proportion of the population which is indigenous vary between 30 per cent (Instituto Nacional de Estadistíca et al. 1999) and 70 per cent (Lovell 2000). The reason for the wide variation lies in the difficulty of distinguishing indigenous and *ladino* people. Most researchers use cultural characteristics, such as place of residence, language and dress, but this is problematic because these

characteristics are changeable and make the boundary between 'indigenous' and *ladino* vague and crossable (van den Berghe 1974; Harris 1995).

Gillin (1951) and Tumin (1952) argued that Indians and *ladinos* had relations of 'caste' and there existed strong social barriers between them . In some areas of Guatemala the division is fairly rigid, and wealthier and more educated indigenous persons will not automatically be accepted (or might even be considered a threat) in the sectors of the society dominated by *ladinos*. Relations between *ladinos* and Indians have been described as discriminative and paternalistic resulting in a cultural segregation with interactions between the two ethnic groups being always on unequal terms (van de Berghe 1967). An indigenous person moving up the social ladder to become part of the lower (more 'Indian-looking') *ladino* class (Colby and van de Berghe 1961), could still retain some of his or her indigenous traits and the ethnic boundary could still persist (Wade 1997). Finally, development and modernization do not necessarily mean the disappearance of ethnic divides and a smooth move to an integrated *mestizo* society. The border between the two groups transcends socio-economic divisions and is difficult to pin down. The diffusion of new and modern ideas can be adapted to the traditional indigenous belief system but can also provoke resistance to adoption and reinforce cultural distinctiveness (Colby and van de Berghe 1961; Wade 1997).

Fertility trends in Guatemala

Table 3 presents the TFRs in Guatemala between 1987 and 2002 estimated by the three DHSs of 1987, 1995, and 1998-99, the Guatemalan National Maternal and Child Health Survey (MCHS) of 2002 and the national Census of 2002, using in each case births in the past year. The evolution of the overall TFR and the age specific fertility rates (ASFRs) between 1987 and 2002 indicates that a decline in fertility has taken place (Table 3 and Figure 2). The TFR estimates suggest a relatively slow fertility decline between 1987 and 1998 followed by a sharp decline in fertility between 1998-99 and 2002. The raw census estimates differ substantially from the 2002 survey estimates, apparently because of under-reporting of births. This is revealed by the P/F ratios (Table 4) for the age-groups 20-24 and 25-29 years. The P/F ratio is the ratio between the reported average parity of women of a particular age (P) and the average parity women of that age would have attained if they had been subject to current ASFRs (F). Assuming unchanging fertility and perfectly accurate reporting, the P/F ratio at all ages should be equal to 1.0. P/F ratios in excess of 1.0 might be the result of a recent fertility decline (which would inflate P relative to F, since P is based largely on births in the past when fertility was higher) or under-reporting of current fertility relative to past fertility, or a combination of the two. However, the impact of recent fertility declines should be small among younger women (aged 20-24 and 25-29 years), suggesting that the P/F

ratios among these women may be used to estimate the reporting of current fertility relative to past fertility (National Academy of Sciences et al. 1983). In the case of Guatemala's 2002 census, the P/F ratios for women aged 20-24 and 25-29 years are 1.26 and 1.28 respectively (Table 4), suggesting that current fertility is under-reported by about 25 per cent. Inflating the current fertility in the 2002 census by this amount produces the TFRs in the right-hand column of Table 3, which are close to those reported in the MCHS in the same year. This does not entirely resolve the difference between these two sets of data, however. If we plot the ASFRs for the census data (inflated at each age by a factor of 1.25) and the MCHS survey data of 2002, different age-patterns emerge (Figure 4). The very sharp dent in the urban fertility trend at ages 30-34 in the MCHS data is puzzling and is not supported by the census data. It may be a real effect, or it may be due to some deficiency in the MCHS data. If the latter, the likely effect would be that the MCHS data somewhat underestimate urban (and thereby overall) fertility in the country in 2002. (We have not been able to examine this issue further because the individual-level MCHS data were not available until a few weeks ago, although we propose to address this in the future.)

The urban fertility rates measured by the DHSs (Table 3 and Figure 3) seem to indicate that urban fertility was lower in 1995 than in 1998-99. The irregularity in the trend suggests either that urban fertility may have been underestimated by the 1995 DHS, or that the urban TFR of 4.1 in the 1998-99 DHS is an overestimate. To try to shed light on this issue, we calculated P/F ratios for the 1987, 1995 and 1998-

99 DHS data (Table 4). If fertility has been declining the F values for any age group will be lower than the P values, and if fertility decline has been occurring continually over the life of the women represented, the divergence between F and P will increase with age. Therefore P/F ratios which increase steadily with age can be interpreted fairly reliably as an indication of recent fertility decline. Indeed, they may underestimate the extent of fertility decline because of the tendency for average parities among older women to be under-estimated because of the omission of births which occurred long ago, especially when the children died in infancy.

The P/F ratios for the whole population from the 1998-99 DHS show a very 'typical' and consistent trend, being close to 1.0 in the younger age groups (their current fertility corresponding with their fairly recent past fertility) and increasing steadily for the older age groups, indicating a decline in fertility. The 2002 census data also indicate a decline in fertility - older women have higher P/F ratios than younger women. However the P/F ratios for the 1987 and 1995 surveys do not indicate a decline in fertility. Similar conclusions can be drawn from the results when looking at the P/F ratios for urban and rural areas (Table 4). However, the data for urban areas have to be considered with caution because of the effect of rural-urban migration. Recent high levels of rural-urban migration might inflate values of P if moving from the countryside to an urban area involves a simultaneous (or even slightly delayed) change in fertility behaviour. This might account for the relatively high P/F ratios in urban areas in the 1987 DHS. There is nothing in the P/F ratios to indicate that current urban fertility in 1995 was under-reported.

In order further to examine trends in fertility, the ASFRs over four-year periods between 1968-71 and 1996-99 for the three surveys (1987, 1995 and 1998-99) were calculated to detect whether estimates for the same periods correspond. The ASFRs are calculated using the exact exposure within each age group in each period, and are rendered as comparable across the surveys as possible by the exclusion of data from the northern region of Petén from the 1998-99 DHS (since this region was not included in the 1995 or 1987 DHSs). Table 5 presents the estimates for the whole country. We focus mainly on the periods 1980-83, 1984-87, 1988-91 and 1992-95 as the ASFRs for most age groups are available for at least two of the surveys so that 'TFRs' can be estimated by summing the ASFRs for women aged 15-39 years. The results suggest a clear decline in fertility from a TFR (for women aged 15-39 years) of about 6.0 in 1980-83 to just under 5.0 by 1992-95 and 4.7 in the late-1990s. The consistency across the three surveys is impressive, which increases our confidence in the results.

Table 6 presents similar estimates for urban areas. The figures for urban areas are not easy to compare across DHSs, as whether or not a woman is defined as an 'urban' dweller is based on her place of residence at the date of the survey. Rural-urban migration means that it is likely that some women who were classified as urban in, say, 1995, were living in rural areas in earlier periods. If fertility behaviour adjusts quickly to changed social and economic circumstances, so that moving from a rural area to an urban area soon results in a reduction of fertility at

the individual level, then we should expect to see a steady rise in 'urban' fertility measured by a particular DHS as we move backwards through time, since the further back in time we go, the greater the proportion of women described as 'urban' at the time of the survey who were then living in rural areas. This effect could be attenuated, however, if women who would subsequently migrate to urban areas had lower fertility than the rural average even before their migration (possibly because they belonged to more ambitious, materialistic, or less traditional households). Probably because of this, there is less consistency across DHSs in the estimated 'TFRs' for women aged 15-39 for a given period. The figures which most accurately reflect urban fertility rates are those for periods closest to each survey data (i.e. 1984-87 for the 1987 DHS, 1992-95 for the 1995 DHS and 1996-99 for the 1998-99 DHS). Comparing these figures suggests that fertility in urban Guatemala has not declined appreciably since the mid-1980s, maintaining a TFR for women aged 15-39 of 3.8 or 3.9.

The figures for rural areas (Table 7) are less influenced b y rural-urban migration than those for urban areas. Consequently there is more consistency across surveys, and a rather simpler pattern. There has been a gradual decline in rural fertility since the early 1980s, with 'TFRs' for women aged 15-39 years falling from something above 6.5 to about 5.3 in 1996-99.

Recent fertility trends in Guatemala can, therefore, be summarised as follows. Fertility has been declining in Guatemala since the early 1980s even in rural areas.

The decline in fertility, however, has been very slow, and the TFR is still well over 5.0 in rural areas. Urban fertility is lower than that in rural areas, but the rural-urban differential is not as large as that in other parts of Latin America, and the decline of urban fertility appears to have been arrested between the late 1980s and the early 1990s at a point when the urban TFR still exceeded 4.0. Recent survey data for 2002 suggest that the decline in urban fertility may have resumed, but there are reasons to suppose that this survey may have underestimated urban fertility.

Factors associated with current fertility in Guatemala: analysis of the 2002 census data

Our analysis of recent fertility trends suggest that the question posed in the title of this paper be amended to read: why has Guatemala's fertility decline been so slow and hesitant?

In order to answer this question we return to the initial hypothesis suggesting that cultural heterogeneity and ethnic diversity in Guatemala have delayed the start and prevented the smooth progress of the fertility transition. In this section we use the 2002 census data at the level of the *municipio* to examine the social, economic and cultural factors which are associated with current fertility (Guatemala is divided into 331 *municipios*). Figure 5 (see also Table 8 for a key) shows the geography of Guatemalan fertility in 2002. There is a belt of high fertility stretching from the

north-east of the country to the western Highlands. To the south of this, fertility levels are generally lower, though there is considerable local diversity, particularly in the south-west. (The map is based on data unadjusted for under-reporting, and so some of the differentials may be due to variations in the degree of under-reporting. We hope to calculate TFRs for each *municipio* adjusted using the P/F ratios in future work.)

We examined the factors associated with the *municipio*-level TFRs using an ordinary least square regression analysis. The dependent variable in this analysis was the TFR in each *municipio*, and the independent variables included variables measuring socio-economic conditions at the *municipio* level, such as the proportion of women above 19 years of age who were economically inactive; the proportion of the population residing in rural areas; the proportion of women who were indigenous; and whether each *municipio* was the 'capital' of one of Guatemala's 23 provinces. These variables were derived from the 2002 census. In addition, data on the proportion of mothers giving birth at home and on infant mortality were obtained from the Office of National Statistics in Guatemala based on 2001 vital registration data. Whether the *municipio* was the 'capital' of the province was selected as a variable because the main hospital and administrative facilities are often located in those 'capital' *municipios*, and we were interested to see if their presence was associated with fertility levels.

The correlation matrix (Table 9) confirms that most independent variables (proportion indigenous; proportion rural; proportion giving birth at home and proportion illiterate) have a strong correlation with the TFR. Some of the independent variables are equally strongly correlated with one another. The infant mortality rate was not correlated with any of the other variables, except for a weak correlation with the proportion of indigenous people. The regression analysis revealed that the 'best fit' model included only three independent variables: the proportions illiterate, the proportions living in rural areas, and the proportions indigenous (Table 10). The strongest effect was of the proportion of the population illiterate. Diagnostic checks showed that the standardised residuals from the model reported in Table 10 were approximately normally distributed, and that there were no obvious geographical patterns in the residuals.

Figures 6 and 7 show the geographical distribution of two of the independent variables which were significant in the regression analysis, the proportions illiterate and the proportions indigenous. The indigenous population is mainly concentrated in the northern and western highlands of the country in the provinces of Huehuetenango, Quiche, Alta and Baja Verapaz, Izabal and Totonicapan (see Table 8). In the provinces of Sacatepequez, Chimaltenango, Quetzaltenango and Suchitepequez there are several dark patches indicating *municipios* with a high concentration of indigenous people. Around Lake Atitlan (in province of Solola) the majority of the population is indigenous. In the east there are smaller dark patches representing the Maya tribes, the Ch'orti and Poqomam. The majority of the

municipios are predominantly indigenous (between 80% and 100%) or predominantly non-indigenous (between 0 and 20% of indigenous people); there are few *municipios* where the population is relatively mixed. This illustrates the high degree of ethnic segregation in Guatemala.

The map of the proportion illiterate (Figure 7) shows a higher degree of local-level variation between the *municipios* than the ethnicity map. High illiteracy is observed mainly in the Petén and northern regions (Quiche, Alta Verapaz and Izabal) of the country. The western and eastern regions show a patchy pattern with lower illiteracy in the capital *municipios* of the provinces. High levels of illiteracy are observed around Lake Atitlan and in the east of the country among the Ch'orti and Poqomam. There are common features in all three maps, with many of the *municipios* having high concentrations of indigenous people also showing high levels of fertility and illiteracy.

Why has Guatemala's fertility decline been so slow and hesitant?

Our analysis has shown that fertility levels in Guatemala have only declined slowly since the 1980s. An explanation for this could be couched in 'classical' fertility transition terms, by pointing out that Guatemala lags behind other Latin American countries on a whole range of social and economic indicators, and therefore that it is unsurprising that it also lags behind in its fertility transition.

However, Guatemala is neither the poorest nor the only country in Latin America that is characterised by socio-economic barriers that prevent the progress of the fertility transition. Moreover, our analysis of the 2002 census data shows that not all the social and economic variables are strongly associated with current fertility rates, but that illiteracy and ethnicity are particularly important. Using the theory of diffusion as a framework for explaining fertility trends, we note that Guatemala is faced with the additional challenge that its population is heterogeneous and socially and economically segregated so that modern reproductive ideas and behaviour find it hard to spread.

The multivariate analysis however suggests that the independent variable with the greatest impact on fertility is the proportion of people illiterate. This corresponds with overwhelming evidence in the literature that education, and mainly as a proxy of other socio-economic indicators, is an important determinant of fertility (Weinberger 1987). After accounting for illiteracy, the proportion of indigenous people is, together with the proportion of people living in rural areas, the only independent variable that significantly determines fertility levels at the *municipio*-level. However, its B-value is limited and the results suggest that, after accounting for illiteracy and residence in a rural area, an entirely indigenous *municipio* would have a TFR only 0.57 births higher than an entirely non-indigenous one. There are, however, reasons to suppose that the influence of ethnicity on fertility may be greater than indicated by the regression.

An historical perspective might help to elucidate this. The Spanish *conquista* of Guatemala in 1520 was particularly difficult because the country was very fragmented and inhabited by competing and fighting Maya tribes (Lovell 1988). In order to control the population politically and administratively, the Spanish organized it into *congregaciones:* families were forced to live in settlements usually around a church. According to Lovell (2000), displaced indigenous people who continued to live within the borders of the *congregacion* often reunited following the borders of their previous indigenous community (*parcialidad)* and established a separate social and economical system according to their old traditions. Under the colonial system immigrant Spaniards received tribute and services from the indigenous communities from whom they had appropriated land (Lovell 1983). The north and west of the country, the cold land or *tierra fria*, were considered less attractive because of the high altitude and less fertile land (MacLeod 1973). The indigenous population, by settling in the highlands managed to preserve a large part of their land, traditions and Maya culture (Lovell 1988). The eastern part and southern coast were considered of high agricultural value and had a more pleasant climate (MacLeod 1973). In those areas, cultural and biological mixing took place much more intensely and created a 'mestizo' or *ladino* population generating a mixed Hispanic and pre-Columbian culture (La Farge 1940). The extent of the diversity and the strong cultural identity of the different Maya communities were also underestimated by the religious missionaries who arrived shortly after 1520. The original indigenous communities remained and preserved their original identity within the *pueblos de Indios* (towns of the Indians) the missionaries had formed to

create controllable and easily governable Indian communities. The indigenous people from a certain *parcialidad* would not necessarily communicate or co-operate with the *parcialidades* within the same town (Lovell 2000).

The historical evidence suggests that ethnic segregation has been an inherent part of the Guatemalan history and is linked to geographical location. The map on the proportion of indigenous people (Figure 6) shows that their concentration is still highest in the inaccessible and cold northern highlands. A recent World Bank report also shows that Guatemala is the country with the most unequal distribution of health care services with its indigenous people one of the most underserved populations in Latin America in terms of education and health (de Ferranti et al. 2003). As such, being poor and illiterate in Guatemala can almost be considered a consequence of being indigenous. Thus the independent variable 'proportion of illiterate people' in our model could be interpreted as absorbing part of the effect of being indigenous.

We now turn to the apparent halt in the decline of urban fertility after the late 1980s. One reason for the lack of progress is that urban populations are continually being augmented by migrants from rural areas, who bring with them their higher fertility behaviour. Moreover, these migrants are ethnically diverse, which leads to high levels of ethnic heterogeneity and cultural segregation within urban areas rendering less likely the diffusion and acceptance of modern urban reproductive behaviour. Findings from a study in the Ch'orti area located in the eastern part of Guatemala

show that ethnic diversity in reproductive behaviour persists at a very small urban scale (De Broe et al. forthcoming). To avoid the problems mentioned earlier of assigning people to ethnic groups, this study asked people to identify themselves with an ethnic group. A large proportion of the population (60 per cent) reported they considered themselves indigenous. These self-proclaimed indigenous women were much less likely to take up family planning methods compared to the women living in the same town who considered themselves 'mixed' or *ladino* (Table 11), despite access to FP services being similar for all groups. A multivariate analysis showed that ethnicity remained significant in determining levels of family planning uptake after controlling for socio-cultural and socio-economic indicators. In addition, indigenous women were disadvantaged, compared with *ladino* women, in access to information on FP. Interviews with service providers indicated that the latter had low expectations of their indigenous clients.

The uptake of FP has been vital for the decline in fertility in Latin America. The lack of commitment from the part of the Guatemalan government towards family planning policies is probably a major cause of general low use of family planning in Guatemala. However, more and more evidence suggests that uptake of FP, modern pregnancy related or primary health care services is not only a problem of supply but also of demand (Gragnolati and Marini 2003). The indigenous population, whether they live in the rural remote areas or in the urban town centres seems to be less informed, in less demand of and more reluctant to make use of available services.

Conclusion

Fertility levels in Guatemala, one of the most ethnically diverse countries in Latin America, have only declined slowly since the late 1980's whereas its urban fertility has barely declined since then. Guatemala is lagging behind compared to other Latin American countries on the socio-economic characteristics that have traditionally caused fertility to decline. However, the classic transition theory seems to provide only a partial explanation for the evolution of Guatemalan fertility. Since the creation of Guatemala, its indigenous population, currently representing roughly half of the total population, has shown signs of socio-economic underdevelopment compared to its non-indigenous population. Overall, levels of illiteracy remain very high in Guatemala, particularly among its indigenous population. Consequently, being poor and illiterate, as one of the most important determinants of fertility can almost be considered a consequence of being indigenous. In addition, ethnic segregation and cultural diversity cause barriers that prevent the spread of modern reproductive behaviour among rural and urban populations, as suggested by the theory of diffusion. Evidence shows that ethnic differences in uptake of FP and fertility persist even where access to FP services is similar and after controlling for socio-economic and cultural indicators. The fact that Guatemala has an ethnically segregated and culturally very diverse population added to the lack of governmental commitment towards FP policies provide an explanation for the late start and the slow progress of the Guatemalan fertility transition.

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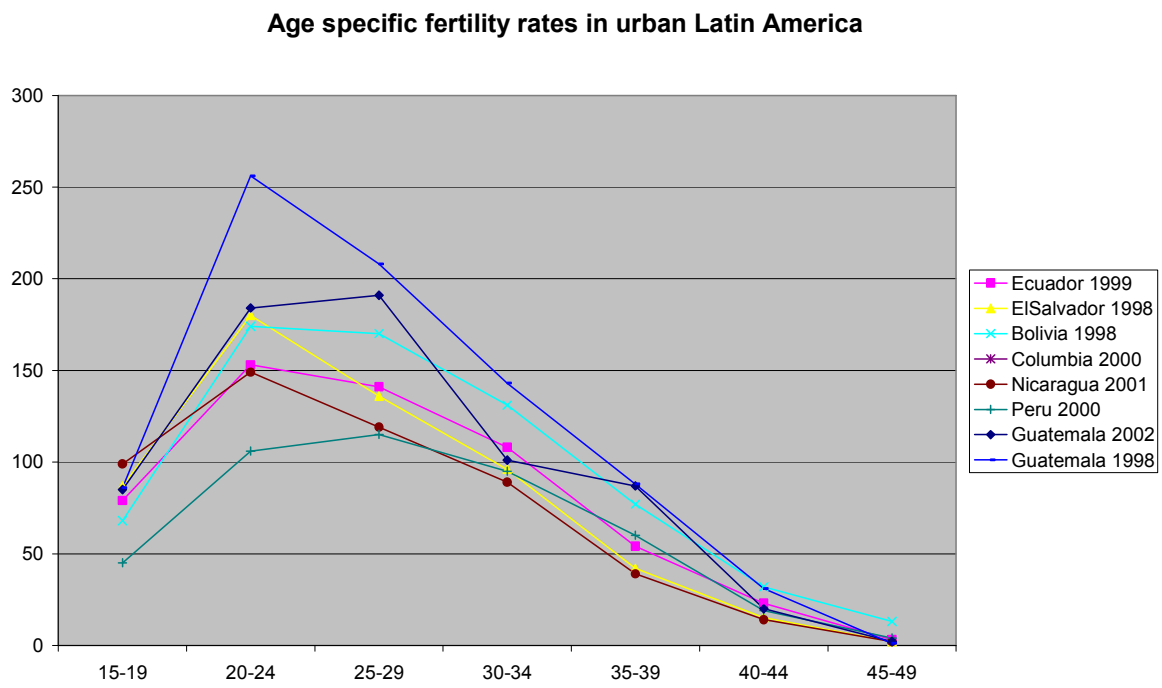
Table 1

Total fertility rates in different Latin American countries

Country	TFR	TFR RURAL	TFR URBAN
Guatemala 2002	4.4	5.2	3.4
Guatemala 1998/99	5.0	5.8	4.1
El Salvador 1998	3.6	4.6	2.8
Ecuador 1999	3.3	4.4	2.8
Bolivia 1998	4.2	6.4	3.3
Peru 2000	2.9	4.3	2.2
Columbia 2000	2.6	3.8	2.3
Nicaragua 2001	3.2	4.4	2.6
Honduras 2001	4.4	5.6	3.3

Sources: Guatemalan National Maternal and Child Health Survey 2002; Guatemalan Demographic and Health Survey 1998-99; Republic of El Salvador National Survey on Family Health 1998; Republic of Ecuador Demographic and Maternal and Child Health Survey 1999; Bolivian Demographic and Health Survey 1998; Peruvian Demographic and Family Health Survey 2000; Columbian Demographic and Health Survey 2000; Nicaraguan National Demographic and Health Survey 2001; Honduran National Survey of Epidemiology and Family Health 2001.

Figure 1



Sources: see Table 1.

Table 2

Percentage distribution of women of reproductive age according to demographic characteristics for 8 Latin American countries

Demographic Characteristic	Guatemala 1998/99	Guatemala 2002*	El Salvador 1998*	Ecuador 1999*	Bolivia 1998	Peru 2000	Columbia 2000	Nicaragua 2001	Honduras 2001*
Residence									
Urban	45.0	42.5	55.0	63.0	71.5	69.9	77.4	63.1	53.6
Rural	55.0	57.5	45.0	37.0	28.5	30.1	22.6	36.9	46.4
Educational level									
None	25.3	25.5	14.2	4.0	8.1	5.1	3.3	14.4	10.0
Primary	49.3	44.4	39.3	39.6	29.2	28.6	31.8	39.5	59.0
Secondary-higher	22.4-3.0	25.9-4.2	20.9-25.5	41.4-15.0	14.1-48.6	44.6-21.7	50.1-14.8	36.1-9.9	31.1
Age group	No education	No education	No education	No education	No education	No education	No education	No education	No education
15-19	12.8	12.3	5.8	NA	1.2	1.0	0.6	6.3	NA
20-24	20.2	18.4	11.1	NA	3.2	2.0	1.2	10.5	NA
25-29	21.0	24.2	13.9	NA	4.3	3.0	1.7	15.5	NA
30-34	25.8	29.2	18.2	NA	6.8	5.3	2.0	13.2	NA
35-39	35.2	32.6	22.1	NA	12.8	7.0	5.3	19.1	NA
40-44	44.4	43.1	26.2	NA	18.9	10.4	6.9	24.3	NA
45-49	42.1	43.2	NA	NA	26.0	14.4	10.2	28.5	NA
% Housewife	65.0	63.7	NA	49.1	46.6	43.4	51.5	59.4	63.2
Infant mortality	45.0	44.0	35.0	30.0	67.0	43.0	24.0	35.0	34.0
% Children chronically malnourished	42.0	49.3	23.3	NA	26.0	26.0	13.5	20.2	29.2
Unmet Need	23.1	NA	8.2	10.0	26.1	10.2	6.2	14.6	7.0

Sources: Demographic and Health Surveys 1987; 1995; 1998/99; *Maternal and Child Health Survey 2002; NA=Not Available

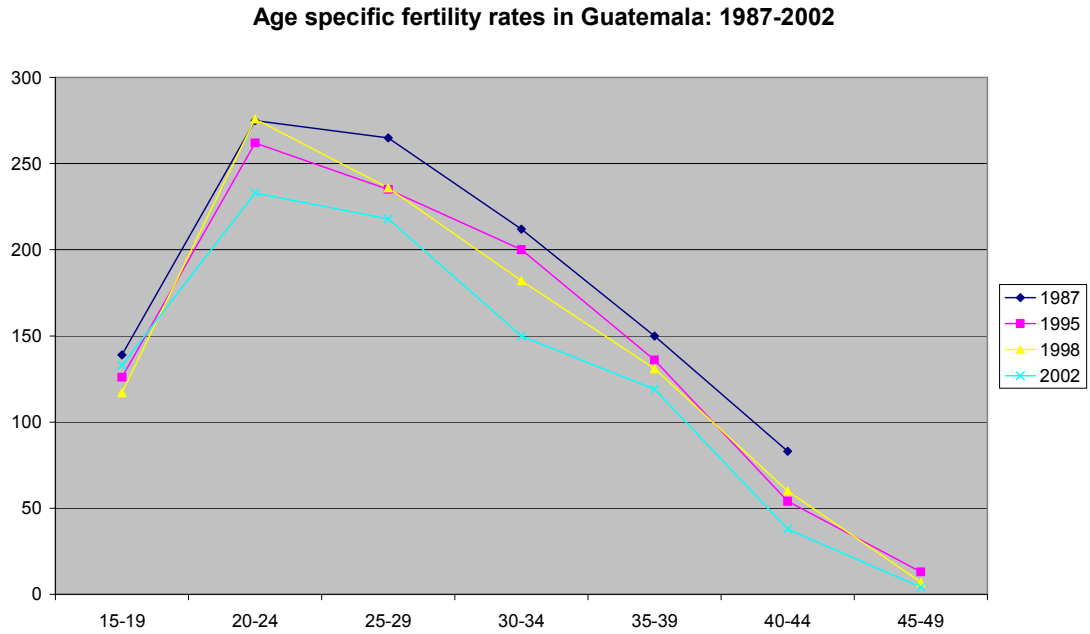
Table 3

Total fertility rates between 1987 and 2002 in Guatemala according to type of place of residence

	1987	1995	1998-99	2002 survey	2002 census	2002 census, corrected using P/F ratio
TOTAL	**5.6**	**5.1**	**5.0**	**4.4**	**3.7**	**4.6**
URBAN	4.1	3.8	4.1	3.4	2.8	3.5
RURAL	6.5	6.2	5.8	5.2	4.7	5.8

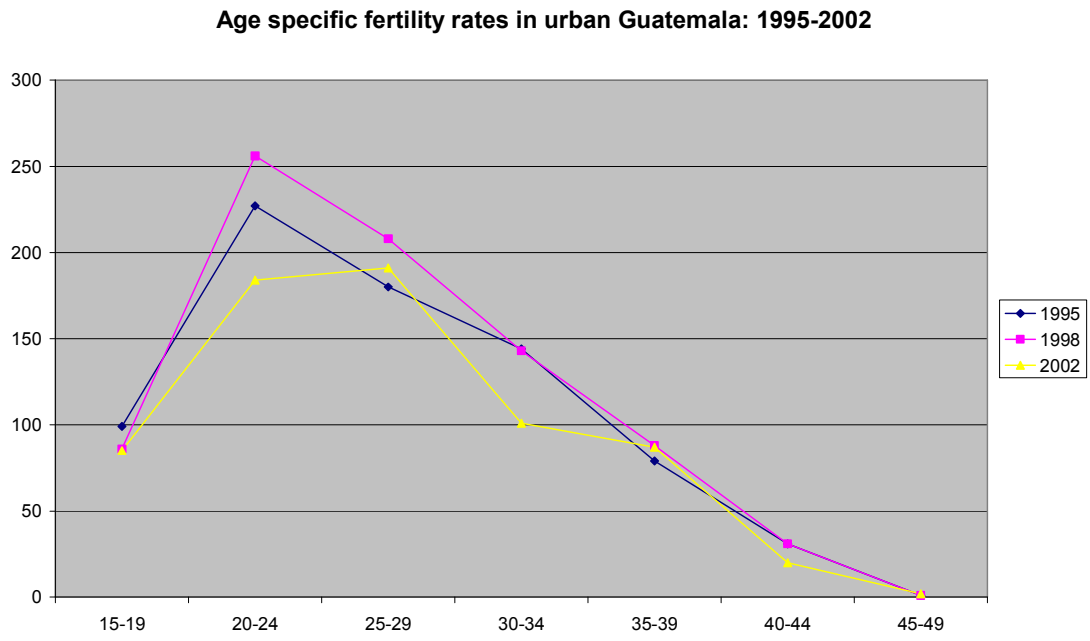
Sources: Guatemalan Demographic and Health Surveys, 1987; 1995 and 1998-99; Guatemalan National Maternal and Child Health Survey 2002; census of Guatemala 2002.

Figure 2



Sources: Guatemalan Demographic and Health Surveys, 1987; 1995 and 1998-99; Guatemalan National Maternal and Child Health Survey 2002.

Figure 3



Sources: Guatemalan Demographic and Health Surveys, 1995 and 1998-99; Guatemalan National Maternal and Child Health Survey 2002.

Table 4

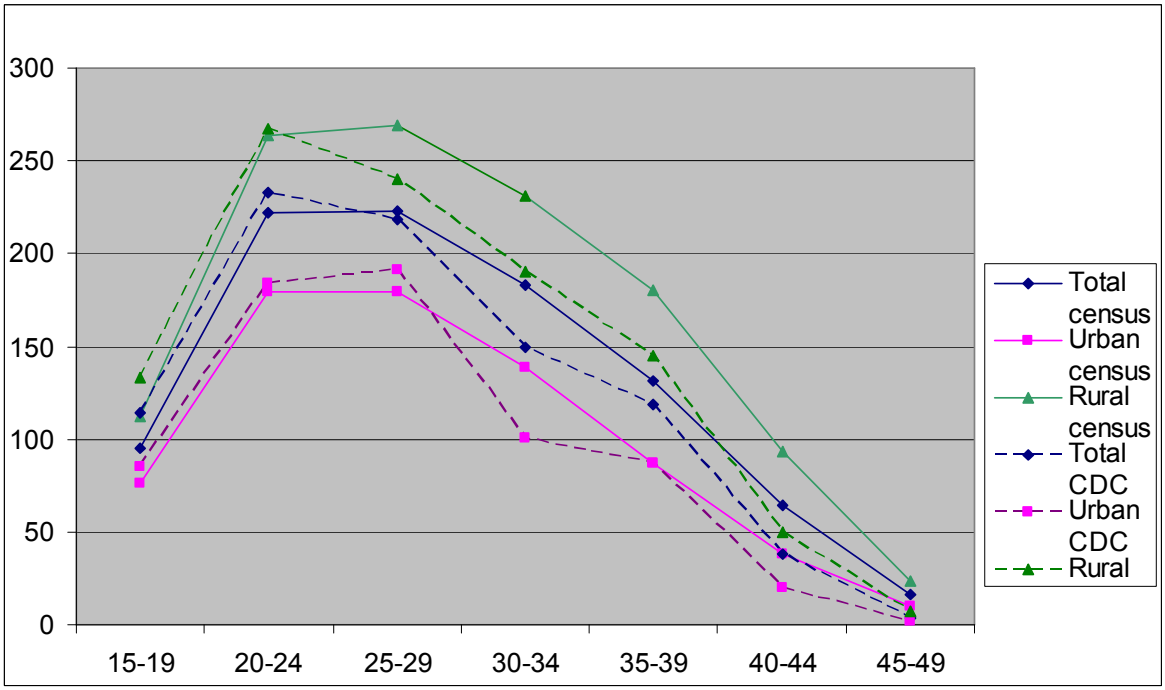
P/F Ratios for the different DHS Surveys and the 2002 Census in Guatemala

Age groups	1987 DHS	1995 DHS	1998/99 DHS	2002 census
20-24	1.05	1.03	0.99	1.26
25-29	1.07	0.98	0.99	1.28
30-34	1.05	1.01	0.99	1.31
35-39	1.03	1.00	1.09	1.33
40-44	1.03	1.00	1.13	1.36
45-49		1.04	1.12	1.40
URBAN				
20-24	1.11	1.02	1.01	1.22
25-29	1.15	0.94	1.00	1.26
30-34	1.16	0.94	0.99	1.31
35-39	1.08	1.02	1.00	1.36
40-44	1.23	1.05	1.16	1.42
45-49		1.03	1.13	1.49
RURAL				
20-24	1.04	1.03	1.00	1.31
25-29	1.05	0.99	0.97	1.32
30-34	1.01	1.04	1.00	1.32
35-39	1.01	0.99	1.10	1.32
40-44	0.97	0.97	1.09	1.34
45-49		1.06	1.08	1.36

Sources: See Figure 2.

Figure 4

Age specific fertility rates: estimates from the census 2002 and the Maternal and Child Health Survey 2002



Sources: Guatemalan National Maternal and Child Health Survey 2002; census of Guatemala 2002.

Table 5

Age specific fertility rates for four-year periods from the DHSs of 1987, 1995 and 1998-99: whole of Guatemala

Age group	Period							
	1968-71	1972-75	1976-79	1980-83	1984-87	1988-91	1992-95	1996-99
15-19								
1998-99	0.113	0.144	0.151	0.141	0.120	0.139	0.133	0.115
1995	0.128	0.145	0.158	0.157	0.146	0.142	0.127	
1987	0.154	0.168	0.161	0.167	0.137			
20-24								
1998-99	0.249	0.332	0.283	0.266	0.283	0.276	0.274	0.276
1995	0.276	0.286	0.285	0.293	0.279	0.270	0.268	
1987	0.279	0.284	0.304	0.302	0.271			
25-29								
1998-99		0.289	0.292	0.318	0.281	0.276	0.233	0.235
1995	0.329	0.286	0.284	0.286	0.252	0.253	0.244	
1987	0.312	0.303	0.283	0.296	0.262			
30-34								
1998-99			0.162	0.218	0.205	0.213	0.187	0.180
1995		0.235	0.255	0.240	0.209	0.196	0.196	
1987		0.270	0.258	0.252	0.206			
35-39								
1998-99					0.173	0.130	0.147	0.130
1995				0.205	0.153	0.146	0.135	
1987				0.185	0.152			
40-44								
1998-99						0.079	0.060	0.063
1995					0.111	0.073	0.055	
1987					0.081			
45-49								
1998-99							0.000	0.006
1995						0.013	0.012	
1987								
TFR15-39								
1998-99					**5.31**	**5.17**	**4.87**	**4.68**
1995				**5.91**	**5.20**	**5.04**	**4.85**	
1987				**6.01**	**5.14**			

Note: The TFR15-39 is obtained by summing up the ASFRs for the age groups 15-19 to 35-39 inclusive, and multiplying by 5. In this table, the Petén region was excluded from the 1998-99 DHS, as this region was not included in the 1995 and 1987 DHSs.

Sources: Guatemalan Demographic and Health Surveys, 1987; 1995 and 1998-99.

Table 6

Age specific fertility rates for four-year periods from the DHSs of 1987, 1995 and 1998-99: urban areas

Age group	Period							
	1968-71	1972-75	1976-79	1980-83	1984-87	1988-91	1992-95	1996-99
15-19								
1998	0.078	0.123	0.121	0.118	0.091	0.117	0.102	0.086
1995	0.100	0.117	0.141	0.100	0.110	0.103	0.098	
1987	0.119	0.131	0.126	0.119	0.093			
20-24								
1998		0.316	0.274	0.219	0.225	0.250	0.232	0.258
1995	0.210	0.236	0.251	0.247	0.226	0.225	0.232	
1987	0.247	0.235	0.263	0.247	0.212			
25-29								
1998			0.256	0.304	0.235	0.241	0.203	0.206
1995		0.204	0.238	0.236	0.197	0.194	0.196	
1987	0.263	0.243	0.225	0.238	0.210			
30-34								
1998				0.179	0.150	0.170	0.123	0.145
1995			0.177	0.173	0.157	0.134	0.142	
1987			0.208	0.194	0.149			
35-39								
1998					0.170	0.086	0.101	0.088
1995				0.145	0.091	0.099	0.083	
1987				0.143	0.086			
40-44								
1998							0.048	0.038
1995						0.036	0.029	
1987					0.053			
45-49								
1998								0.001
1995							0.001	
1987								
TFR15-39								
1998-99					**4.36**	**4.32**	**3.81**	**3.92**
1995				**4.51**	**3.91**	**3.78**	**3.90**	
1987				**4.71**	**3.75**			

Notes: See Table 5.

Sources: See Table 5.

Table 7

Age specific fertility rates for four-year periods from the DHSs of 1987, 1995 and 1998-99: rural areas

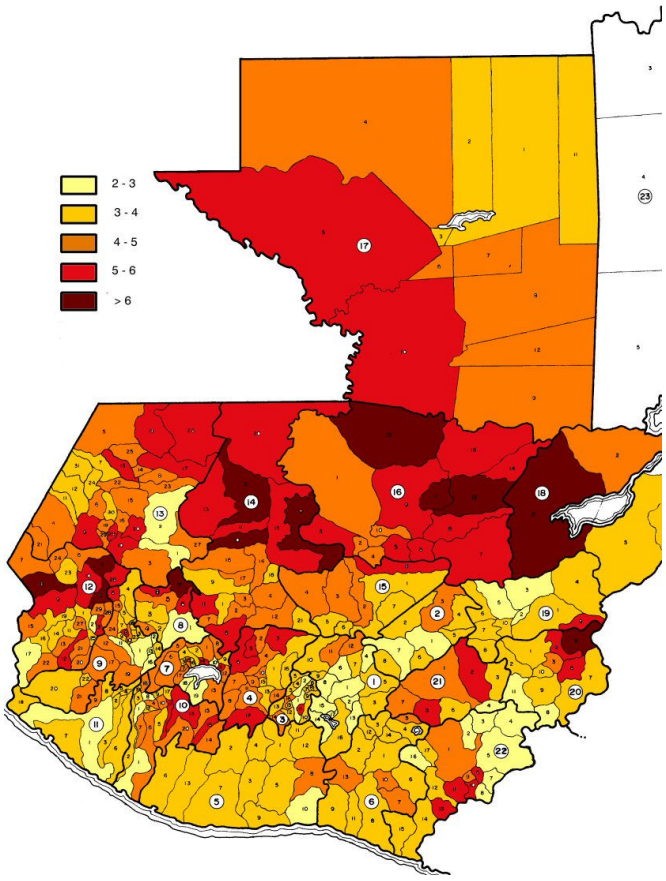
Age group	Period							
	1968-71	1972-75	1976-79	1980-83	1984-87	1988-91	1992-95	1996-99
15-19								
1998	0.142	0.162	0.175	0.161	0.148	0.157	0.162	0.136
1995	0.150	0.166	0.173	0.199	0.170	0.170	0.149	
1987	0.174	0.189	0.182	0.195	0.162			
20-24								
1998	0.167	0.346	0.291	0.305	0.328	0.303	0.308	0.293
1995	0.334	0.327	0.310	0.332	0.319	0.302	0.292	
1987	0.298	0.312	0.327	0.334	0.306			
25-29								
1998			0.320	0.329	0.318	0.302	0.261	0.260
1995		0.362	0.322	0.323	0.298	0.299	0.278	
1987	0.351	0.339	0.316	0.328	0.292			
30-34								
1998				0.249	0.251	0.248	0.236	0.210
1995			0.328	0.299	0.248	0.246	0.238	
1987			0.289	0.286	0.238			
35-39								
1998					0.176	0.167	0.184	0.163
1995				0.261	0.207	0.184	0.172	
1987				0.211	0.189			
40-44								
1998						0.062	0.070	0.083
1995						0.106	0.075	
1987					0.102			
45-49								
1998								0.010
1995							0.022	
1987								
TFR15-39								
1998-99					**6.11**	**5.89**	**5.76**	**5.31**
1995					**6.21**	**6.01**	**5.65**	
1987				**6.77**	**5.94**			

Notes: See Table 5.

Sources: See Table 5.

Figure 5

Total fertility rate in each of the *municipios*, 2002

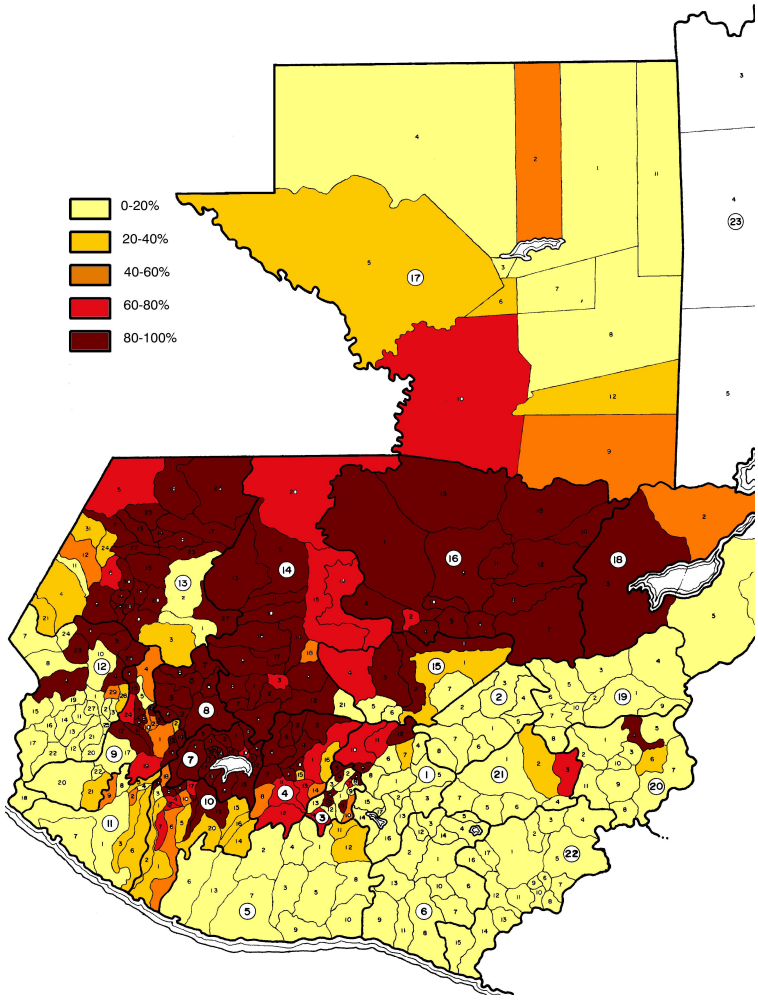


Source: Census of Guatemala, 2002.

Note: The TFRs plotted here are those obtained from the raw census data uncorrected for under-reporting. They, therefore, embody the assumption that under-reporting does not vary regionally throughout the country. In future work, we plan to adjust these TFRs using P/F ratios calculated for each *municipio*.

Figure 6

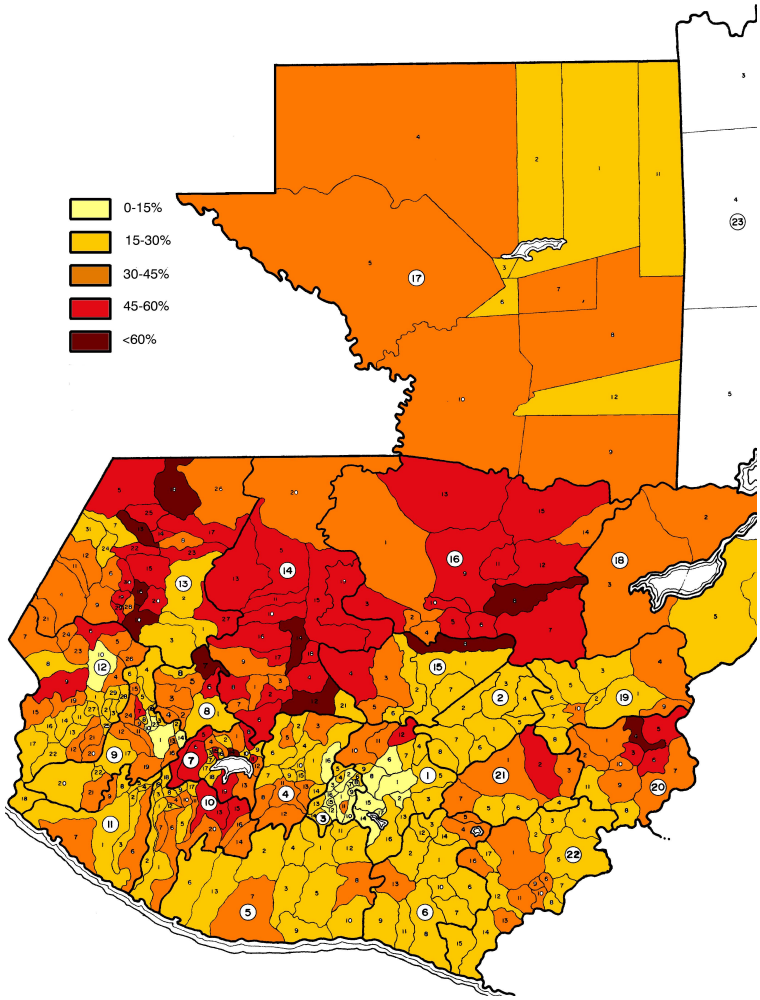
Proportion indigenous people in each of the *municipio*, 2002



Source: Census of Guatemala, 2002.

Figure 7

Proportion illiterate people in each of the *municipio*, 2002



Source: Census of Guatemala, 2002.

Table 8

Names of the provinces referred to by numbers in the maps ('*departamentos*')

1. Guatemala
2. El Progresso
3. Sacatepequez
4. Chimaltenango
5. Escuintla
6. Santa Rosa
7. Solola
8. Totonicapan
9. Quetzaltenango
10. Suchitepequez
11. Retalhuleu
12. San Marcos
13. Huehuetenango
14. Quiche
15. Baja Verapaz
16. Alta Verapaz
17. Peten
18. Izabal
19. Zacapa
20. Chiquimula
21. Jalapa
22. Jutiapa
23. Belice

Table 9

Correlation matrix for the exploratory regression analysis

	Total fertility rate	% indigenous	% illiterate	% inactive	% rural	% giving birth at home	infant mortality rate
Total fertility rate	1.00	0.46	0.68	0.42	0.51	0.45	0.052
% indigenous		1.00	0.55	0.15	0.03	0.40	0.31
% illiterate			1.00	0.48	0.55	0.50	0.01
% inactive				1.00	0.57	0.43	-0.02
% rural					1.00	0.47	-0.17
% giving birth at home						1.00	0
infant mortality rate							1.00

Note: These correlations are based on 331 *municipios* in each case.

Table 10

Results of an exploratory linear regression analysis of the total fertility rates among *municipios* in Guatemala in 2002

Covariate	B	95% CI	p
Proportion ethnic population	0.57	0.34-0.81	0.001
Proportion illiterate	2.96	2.07-3.85	0.001
Proportion living in rural areas	1.07	0.70-1.45	0.001
Constant	2.20	1.98-2.42	
Sum of Squares	*314.78*		

Note: Other variables included in the model but insignificant were: proportion of mothers giving birth at home; infant mortality rates; proportion of women above 19 years of age inactive; residence in the capital *municipio*.

Sources: Census of Guatemala 2002; vital registration data for 2001obtained from the National Institute for Statistics.

Table 11

Family planning indicators among ever-married or ever-in-union women (all figures are percentages), Jocotán 2001

Family planning indicator	Ethnic group			
	Indigenous (N=108)	'Mixed' (N=25)	*Ladino* (N=40)	**Total**
Knowledge and intentions				
Heard of family planning	91	100	100	94
Knows at least one modern method	90	96	100	77
Knows ovulation time	23	50	58	35
Current non-users planning to use family planning in the future	36	46	61	41
Discusses family planning with partner	66	84	78	71
Unwanted last pregnancy	32	52	20	32
Current and past use				
Currently using:				
▪ Any method	31	48	67	41
▪ Modern method	23	40	55	33
Ever used:				
▪ Any method	50	60	85	60
▪ Modern method	36	48	77	47

Source: own data