From Demographic Transition to Fertility Boom and Bust: Iran in the 1980s and 1990s

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ABSTRACT

Although it is widely recognized that demographic transition is not an uninterrupted process, demographers and population economists have treated short-term swings in fertility with a measure of curiosity. Iran's experience of population growth after the Revolution in 1979 points to a double paradox of a steep and unprecedented surge in population growth in the 1980s followed by a swift restoration of fertility decline in the 1990s. Both periods have been characterized by extensive socio-economic and institutional changes combined with radical and far-reaching sways in Iran's post-revolutionary population policy. This article applies standardized decomposition analysis to separate out and quantify the proximate components of change in the crude birth rate during these two fertility 'boom' and 'bust' phases. The aim is to ascertain to what extent structural/demographic or behavioural factors can explain the dynamics of change in fertility and population growth in Iran since the late 1970s. Our findings point to a hitherto neglected role of population momentum in *initiating* the 'Islamic baby boom' as well as a more limited role for population policy in explaining the *genesis* (rather than the momentum) of both boom and bust phases.

INTRODUCTION

Evidence on population growth in Iran after the Revolution points to a double paradox: the two decades since 1979 have witnessed, first, a steep and unprecedented surge in population growth lasting into the 1980s, followed by an even more vigorous and drastic fall in fertility in the 1990s.

In the first period, Iran's demographic transition stalled, and to some extent even reversed its course (Aghajanian, 1991).[1] During this period, the country's population behaviour steered close to the experience of smaller Arab states with fast growing populations and high fertility levels

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1. It is generally believed that Iran's demographic transition (a combined process of declining death and birth rates) had started in the 1970s (i.e. before the Revolution; see Aghajanian, 1991).

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incommensurate with their income standards and economic development (the so-called Middle Eastern 'population puzzle'; see Omran and Roudi, 1993). By the early 1990s, however, this trend had sharply reversed, establishing Iran at the forefront of demographic transition in the region.

Although it is generally recognized that demographic transition is not an uninterrupted process (Courbage, 1999: 2–3), population swings have provoked some curiosity among demographers and population economists, most notably the post-war baby boom in the West (see below for more on this, and also some examples from the Middle East). Interest in the Iranian case has been further heightened by two considerations: first, the rapid *pace* of both baby boom and bust phases, which has by all accounts been significant (the bust being possibly even more drastic than the boom); second, over the past two decades, Iran has undergone extensive socio-economic and institutional changes encompassing revolutionary turmoil, internal strife and external war. These changes have both enriched and complicated the task of finding satisfactory explanations for Iran's population swings in these periods. Two broad perspectives have emerged: those stressing the role of population policy in general and family planning in particular (see Aghajanian and Mehryar, 1999a) and those giving primacy to socio-economic factors and developments (see Sadeghi, 2000; Salehi-Isfahani and Tandon, 1999).

A marked feature of this period was sharp swings in the Islamic government's population policy, which almost mirrored the population growth cycles. The Islamic baby boom of the 1980s was characterized by strong pronatalist policies. These included shutting down family planning clinics, promoting early marriage, lowering the legal age of marriage (to nine for girls and fourteen for boys), and discouraging birth control.[2] These were further reinforced by strong undercurrents of 'Islamization' that operated at the regulatory and socio-economic levels seeking to redefine the role of women in the economy and to encourage their retreat into the family and domestic arenas.[3]

A swift and decisive reversal of these policies was, however, under way by the late 1980s as concerns over population growth began to spread among policy makers. An active population control programme was introduced

2. Commending the results of the first post-Revolution census (in 1986), the then Prime Minister, Hossein Moussavi, writing in the Iranian newspaper *Keyhan* (7 Aban 1365) in 1986, hailed the addition of 'some eleven million people since the Revolution' as a major boost to Iran's Islamic population. In his view, this was a source of 'major developments' in the region and in the Islamic world more generally (quoted in Pakdaman, 1987: 41). See also Aghajanian (1991) and Hakimian (2000) for a general discussion of the government's pro-natalist policies in these years.
3. Broadly, women's contribution was now seen in 'raising generations of good Muslims' (Aghajanian, 1991: 705). There is a copious literature dealing with changes in the position of women in Iran after the Revolution; see, *inter alia*, Moghissi (1995) for a discussion of employment, social and education policies affecting women in these years.

after 1988 marking a significant U-turn in official thinking and policy. An essential component of this new approach was the setting up of a Primary Health Network (PHC) by the Ministry of Health and Medical Education (MOHME). The Health Houses set up under this initiative have played an active role in distributing and promoting contraceptives, particularly in rural areas (Shadpour, 1994). Moreover, official child benefits have been limited to only three children per household since the early 1990s (UNFPA, 1995: 14 and 20–23; see Aghajanian and Mehryar, 1999b for more details of the family planning programme).

Given the near 'perfect' match between these policy changes and the perceived fertility cycles, it is tempting to correlate radical changes in Iran's population growth with the Islamic government's population policy.[4] If correct, and given the speed and extent of fertility decline in the 1990s, Iran's experience would appear to be one of the most successful cases of social engineering through changes in population policy in recent times. The implications will be of special interest for supply-side mechanisms (namely, the PHC network) in achieving fertility reduction in Iran. In turn, this could have pertinent implications for the role of population policy in achieving fertility change in developing countries more broadly.

This article critically examines changes and developments in the fertility and population spheres in the 1980s and 1990s, focusing on the dynamics and possible causes of the rise and fall of fertility in Iran. As our focus is mainly on short-term swings in fertility, broad determinants of demographic transition are not the principal focus of the article.[5] The methodology used here is based on decomposition analysis of the determinants of the crude birth rate (CBR) — the so-called 'standardization analysis' — to ascertain to what extent changes in four proximate components can account for changes in CBR. These are: age distribution of women of reproductive age; share of women in the total population; age distribution of married women; and finally, age-specific marital fertility rates. This framework allows us to distinguish between the so-called 'structural/demographic' components (age and sex structures) and 'behavioural' factors (marriage status and marital fertility). The latter are arguably of a socio-economic character and are hence prone to policy inducements. This distinction enables us to shed light on factors that have influenced fertility swings in Iran.

The following section reviews the evidence on Iran's population dynamics since the late 1970s, focusing on the dimensions of the boom and bust, including a brief comparison with the recent experiences of other countries in the Middle East and North Africa (MENA) region. This is followed by a

4. Aghajanian and Mehryar come close to suggesting this when observing: 'Recent fertility trends in the Islamic Republic of Iran demonstrate the value of family planning programmes' (1999a: 21).
5. These have been covered more comprehensively elsewhere (see for instance, Aghajanian, 1991).

review of the main theories and approaches to the study of population swing (as distinct from demographic transition), putting Iran's experience of boom and bust into a broader, international perspective. The results of the standardization analysis are then reported and discussed, and an attempt is made to break down changes in fertility measured by crude birth rate over the period 1976–96 into the proximate elements mentioned above. The penultimate section re-examines the evidence on boom and bust to further tease out the possible role of population policy in inducing fertility swings, before the final section summarizes the findings and offers some conclusions.

POPULATION BOOM AND BUST: THE EVIDENCE

A clear indication of Iran's population boom and bust appears from an examination of the population growth rates before and after the Revolution. Table 1 shows that in the last three decades, the population growth rate first rose sharply and then fell back (suggesting a 'hump' shape). Average annual population growth rate climbed to nearly 4 per cent in the intercensal period 1976–86, followed by a steep fall in the 1990s. The fall was especially pronounced in the second half of the 1986–96 period, with annualized growth rate dropping to just 1.47 per cent in 1991–96.[6]

Abrupt changes of this nature observed over a relatively short period have inevitably raised doubts about the accuracy and reliability of the data (see Hakimian, 2000). Nevertheless, there is a consensus that significant changes in the fertility behaviour of Iranian women did indeed propel the unusual and untypical demographic changes observed in the period under consideration. Table 1 sheds further light on the situation by giving a summary of Iran's main demographic indicators before and after the Revolution. In almost every respect, the 1980s appear to stand out for the rapid rise in population dynamics, and the 1990s for the noticeable reversal of this trend.

Iran's population expanded by nearly 50 per cent in the ten years to 1986 (when it reached almost 50 million people) — this implied a (net) total

6. Average growth rate for 1986–96 was 1.96 per cent. These data are based on the National Censuses of Population and Housing conducted by the Statistical Centre of Iran (SCI). National censuses have been conducted at regular ten-yearly intervals since 1956. The exception was in 1991 when — partly as a reaction to the 1986 census results, and partly to assess the effects of the war with Iraq — an interim census-survey was introduced. Thus, the 'intercensal' periods around this date (1986–91 and 1991–96) are for five-yearly periods. For a discussion of other sources of population data in Iran, see Hakimian (2000: 178–79) and UNFPA (1995). The 1980s growth rate (3.9 per cent) includes a sharp rise in Iran's refugee population from Afghanistan. Allowing for this, the growth rate is nearer to 3.5 per cent (see Aghajanian, 1991). Another complication in this period is international out-migration from Iran following the Revolution in 1979 and the outbreak of war with Iraq in 1980 (see Hakimian, 2000, for a discussion of these factors and their possible influence over population growth estimates).

Table 1. Summary Demographic Data: Iran, 1976–96

	1976	1986	1991	1996
Total population ('000)	33,709	49,445	55,837	60,055
Average annual growth rate (%)[(a)]	2.71	3.91	2.46	1.47
Net average annual increment ('000)[(b)]	790	1,570	1,280	840
Sex ratio[(b)]	106	105	106	103
% Urban	47	54.3	57	61.3
0–4 Age group as % of total	16.1	18.3	14.6	10.3
Child–woman ratio (CWR)[(c)]	732.5	857.9	667.9	420.4
Average annual change in CWR (%)[(a)]	–	+1.6	−4.9	−8.8
Infant mortality rate (per 1,000)	112	109	63	36

Notes:
(a) Intercensal periods defined as follows: ten-yearly for 1976 and 1986 (i.e. 1966–76 and 1976–86), and five-yearly for 1991 and 1996 (i.e. 1986–91 and 1991–96).
(b) Males per 100 females.
(c) Children aged 0–4 per thousand women of reproductive ages (15–49).
Sources: SCI census publications (various issues).

addition of about 16 million to the population of just under 34 million in 1976, three years before the Revolution. Measured by child–woman ratio (CWR), fertility rose 17 per cent during the intercensal period 1976–86 (an average annual growth of 1.6 per cent, reaching almost 860 children per thousand women of reproductive age). Similarly, (net) average annual incremental growth almost doubled, reaching about 1.6 million per annum.

As already mentioned, the scale and speed of the downswing that followed seems to have been even more unusual. Table 1 shows that a significant slowdown was under way by the early 1990s and accelerated thereafter. The annual population growth rate fell to an all-time low of 1.5 per cent over the 1991–96 period; net annual population increments fell back to below 1 million by 1996; and CWR contracted on average by nearly 5 per cent annually during 1986–91 and by close to 9 per cent during 1991–96. Thus, only a few years after population dynamics had escalated in Iran, the trend was sharply reversed and a substantial slowdown was well established by the mid-1990s. In sharp contrast to the rise and fall in fertility, infant mortality in Iran has followed a consistently downward trend: it fell from 112 deaths per 1,000 births in 1976 to just 36 deaths per 1,000 births by 1996 (the decline was more pronounced after 1986, see Table 1).[7]

7. The one-way nature of change in infant mortality rules it out as a main explanatory factor behind fertility swing in the period under review. As we shall see below, this is more relevant in explaining fertility decline during the demographic transition than its rise during the baby boom. This point also applies to other socio-economic factors that underlie long-term demographic transition. For instance, female school enrolment rates (for those in the 10–14 year age bracket) rose consistently in Iran over the period 1976–96 (increasing from 54 per cent before the Revolution to 83.2 per cent in 1996; see PDS, 1998), while fertility first rose and then fell.

Table 2 places Iran's demographic experience in a broader, comparative context in the MENA region. It shows recent changes in the population growth tempo and the underlying fertility indicators — crude birth rate (CBR) and total fertility rate (TFR) — for Iran and other MENA countries in the 1980s and 1990s. This confirms two trends: first, the much-delayed process of demographic transition in MENA appears to have got under way across more or less the whole region by the 1990s and, second, Iran's experience of the 1990s appears to be well in line with these regional trends.

After several decades of rapid population growth, the 1990s finally witnessed a deceleration of the growth momentum in almost all MENA countries. This is true even of those countries that experienced some of the highest growth rates in the world in the 1980s — mainly the Gulf

Table 2. Population Growth, Birth Rate and Total Fertility in the Middle East & North Africa (mid-1980s and 1998)

	Population Growth Rate			Birth Rate[(a)]			Total Fertility Rate[(b)]		
	Mid-1980s[(c)]	1998	Ave. Change (% p.a.)	1987	1998	Ave. Change (% p.a.)	1987	1998	Ave. Change (% p.a.)
Algeria	3.1	2.1	−2.9	35.5	25.9	−2.8	5.3	3.5	−3.8
Bahrain	4.2	3.6	−1.0	32.8	20.3	−4.3	4.3	3.4	−2.2
Egypt	2.6	1.7	−3.0	35.1	24.2	−3.3	4.3	3.2	−2.8
Iran	**3.8**	**1.7**	**–6.1**	**38.0**	**22.0**	**–4.8**	**5.7**	**2.7**	**–6.5**
Iraq	3.3	2.2	−3.2	40.3	32.5	−1.9	6.2	4.6	−2.7
Israel	1.5	2.2	2.6	22.7	21.9	−0.3	3.0	2.7	−1.2
Jordan	3.7	2.8	−2.1	38.5	31.0	−2.0	5.8	4.1	−3.1
Kuwait	3.9	3.1	−1.8	28.1	23.0	−1.8	3.9	2.8	−3.0
Lebanon	2.0	1.6	−1.9	27.9	21.2	−2.4	3.4	2.4	−3.0
Libya	4.1	2.2	−4.7	39.9	28.8	−2.9	6.2	3.7	−4.6
Morocco	2.2	1.7	−1.9	35.6	25.1	−3.1	4.4	3.0	−3.4
Oman	3.8	2.0	−4.8	43.0	28.8	−3.6	8.4	4.6	−5.3
Qatar	7.3	3.0	−6.8	26.7	14.2	−5.6	4.7	2.7	−4.8
Saudi Arabia	5.4	3.3	−3.7	37.3	34.1	−0.8	6.8	5.7	−1.6
Syria	3.2	2.5	−1.8	42.7	29.1	−3.4	6.6	3.9	−4.7
Tunisia	2.7	1.3	−5.5	29.2	17.9	−4.4	3.9	2.2	−5.0
UAE	3.6	5.4	3.2	27.9	17.5	−4.2	4.6	3.4	−2.7
Yemen	3.1	2.8	−0.7	52.0	39.9	−2.4	7.7	6.3	−1.8
Turkey	2.4	1.5	−3.6	30.0	21.1	−3.1	3.5	2.4	−3.3
MENA	**3.2**	**2.1**	**–3.4**	**37.5**	**26.7**	**–3.0**	**5.3**	**3.5**	**–3.6**

Notes:
(a) Crude birth rate (CBR) per 1,000 people.
(b) TFR: the total number of children a woman is likely to have during the span of her reproductive age (15–49) assuming she experiences age-specific fertility rates observed in a particular period.
(c) Average for the period 1984–86.
Source: World Bank (2000).

Co-operation Council (GCC) States,[8] Syria, Jordan and Libya.[9] Only Israel and the UAE were exceptions to this rule, although their population growth rates were boosted by international immigration in the 1990s. Judged by CBR and TFR trends, however, it is clear that the fall in fertility indicators was pervasive across the entire region.

Iran has been at the forefront of the slowdown process in the MENA countries (by 1998, only Qatar had experienced a sharper drop in her population growth rate). Again, judged by recent trends in birth and fertility rates, Iran's experience stands out as the sharpest and most drastic in the region: CBR and TFR have contracted by an average of 4.8 per cent and 6.5 per cent per annum, respectively, in the past decade (see Table 2).

In brief, the evidence examined in this section makes it clear that Iran's demographic development followed two contrasting phases in the 1980s and 1990s. In the initial phase, Iran's population behaviour verged towards the rapidly expanding — and pronatalist — experience of much of the Arab world. Subsequently, however, Iran regained her (pre-revolutionary) course of demographic transition and her experience was closer to countries such as Egypt and Turkey, with comparable population sizes and a more established process of demographic transition. The road 'back' to transition, however, was marked by a significant, and largely unpredicted, upward population swing in the 1980s. The next section puts Iran's experience of population boom and bust in a broader demographic and historical perspective.

POPULATION BOOM AND BUST IN WIDER PERSPECTIVE

Much of the post-war literature on population in developing countries has been influenced by discussions of the prospects for, or impediments to, demographic transition. In this context, considerations of short-term fertility swings or fluctuations in population growth have been generally muted by the broader interest in the long-term downward secular trend in fertility. There is, for instance, a copious literature dealing with explanations of 'optimum family size' in terms of socio-economic factors (notably declining infant

8. The Gulf Co-operation Council (GCC) was established in an agreement concluded on 25 May 1981 in Riyadh, Saudi Arabia between Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE.
9. According to World Bank data, Iran, Bahrain, Jordan, Kuwait, Libya, Qatar, Saudi Arabia and UAE were amongst the seventeen developing countries with the highest population growth rates in the 1980s.

mortality and rising female education in developing countries),[10] yet the possibility of a break in the transition process has received much less attention.

One notable exception to the prevailing neglect of short-term population swings has been the work of Dyson and Murphy (1985), which is based on, and draws from, a close study of historical demography. They have observed a pattern of 'pre-decline' fertility rises as a precursor to the onset of long-term demographic transition in many societies. They draw from the fertility history of Europe over the last century and a half, as well as their own detailed compilation of more recent birth rate data for several developing countries, to suggest that in many parts of the world the evolution of birth rates follows a 'hump' shape. Thus, in many cases, a rise in fertility is observed to precede an eventual fall and the start of demographic transition. In their study, this pattern is prominent in nineteenth century Europe and contemporary Latin America and, to a more varied extent, in Asia.

Although Dyson and Murphy do not offer a theoretical explanation for their observation, they nevertheless highlight a surge in marriages (especially among the young) as a prominent feature of the 'hump' in their perceived pre-decline rises in fertility (1985: 427). From a different perspective, Lee (1980) has observed similar 'ski jump' effects during demographic transition and ascribed them to a possible differential behaviour between period fertility rate and reproductive goals.[11]

Perhaps the best known case of baby boom and bust in modern times is that of the western countries after the Second World War. Curiosity over this phenomenon is indeed associated with the rise of the so-called family economics as a new strand within economics in the post-war era. It was driven by a motivation to explain an apparent, and significant, aberration from the well-established path of demographic transition in industrial economies in general and in the USA in particular (see Kirk, 1996, for a useful review of developments in this period). Since the baby boom coincided with the post-war era of growth and prosperity, much attention focused on the influence of the economic growth cycle and, to a lesser extent, on the effect of war itself on population growth (see Olsen, 1994; Willis, 1987).

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10. Becker (1960) discusses the experience of demographic transition in south Asia and also the historical context of northwest Europe. Bloom and Williamson (1998) give an account of the relationship between infant mortality and the demographic transition during the East Asian 'miracle'. For a typical contrast of fertility choices earlier and later in a country's development, highlighting the effect of female work and education opportunities, see Das Gupta (1994). On the increased relative costs of childbearing in Iran in the 1990s, see Karshenas and Pesaran (1995).

11. Lee's explanation is based on a distinction between period fertility rate (F_t) and reproductive goals as defined by desired completed family size (D). During the transition from high to low values of D, he argues, F_t will fall more rapidly than D until D stops falling, then F_t will rise to the new stable level of D leading to a 'ski jump effect as the transition is completed' (Lee, 1980: 214).

Winter (1992), for instance, attributed changes in the population tempo in this period to the historical effects of war on women's social and economic roles. Through mass mobilization of men, he alleged, war expanded the role of women. However, in the post-war period, men's demobilization brought women back to their family roles and responsibilities, thus unleashing the post-war baby boom.[12]

The most prominent explanations of baby boom and bust, however, have focused on economic factors as causes of fertility swings. In his influential work, Easterlin (1969) sought to explain the boom and bust cycles in terms of shifts in preferences for children caused by changes in intergenerational relative incomes across different age cohorts. Accordingly, the rise in post-war fertility reflected the fact that the standard of living of the young exceeded those of their parents in the inter-war period and during the Great Depression years, in particular. Since the standard of living of the young is supposedly formed when they grow up, the intergenerational improvement brought about by post-war prosperity was translated directly into a desire for more offspring.[13] This theory was primarily used to explain the observed swing in American fertility in the period 1946–57 although its application proved wider (see Easterlin and Condran, 1976, for an application of the theory to other western countries).

Over time, however, Easterlin's pro-cyclical theory of population swings led to a battery of critical literature questioning its application to earlier periods of the US fertility history as well as other countries' experiences of boom and bust. Querying the postulated relationship between economic and fertility cycles, for instance, Sweezy (1971: 259) cast doubt on the validity of the Easterlin model in the USA in the *pre-war* era and especially during the fertility slump of the 1920s. In a similar vein, Ermisch (1979) criticized the relevance of Easterlin's hypothesis to the UK's fertility surge during the period 1955–64 (see Lesthaeghe and Surkyn, 1988: 31–34, for a similarly critical view in the context of other European countries).

Given that a central tenet of the Easterlin hypothesis is that fertility is an endogenous variable within a broadly equilibrating *economic* system (rising at times of prosperity and falling during slumps), it is not surprising that his proposition was less than warmly received by other disciplines concerned with population. For instance, some sociologists have scorned the idea that material conditions alone can explain the demographic cycle of baby boom

12. Winter, however, maintains that since war also increases women's awareness of different choices and roles, fertility is likely to resume its pre-war declining trend in the long term.
13. In Easterlin's words: 'The basic idea is that if young men — the potential breadwinners of households — find it easy to make enough money to establish homes in the style desired by them and their actual or prospective brides then marriage and childbearing will be encouraged. On the other hand, if it is hard to earn enough to support the desired style of life, then the resulting economic stress will lead to a deferment of marriage and, for those already married, to the use of contraceptive techniques to avoid childbearing, and perhaps also to the entry of wives into the labour market' (Easterlin, 1973: 181).

and bust. Instead, 'historical specificity and socialization' processes are required to reinforce the logic of economic rationality and to avoid 'reductionism to the simple sociobiological core of competition for material resources' (Lesthaeghe and Surkyn, 1988: 39). It was such a search for 'ideational' forces that led Simons (1980) to the striking rival explanation for boom and bust: the participation figures for Easter communion 'predict' the English baby boom 'better than Easterlin's intergenerational standard of living' (see also Ermisch, 1979; Lesthaeghe and Surkyn, 1988: 36).

Demographers too have been critical of the endogeneity of population growth as expounded by economists from Malthus to Easterlin. Influenced instead by the tradition that demographic conditions at a particular moment in time affect population growth not only during the same period, but also 'in later years', they have tended to view population dynamics from a 'generational' or *structural* point of view. This has led Lee, for instance, to distinguish between two types of population cycles: 'control' cycles, on the one hand, and 'generational' or 'echo' cycles, on the other. The former, emphasized by economists, reflect the 'lagged operation of an endogenous equilibrating mechanism'. The latter, by contrast, are principally demographic phenomena and have to do with the intrinsic 'dynamics of population renewal as an age-structured process' (Lee, 1974: 582). While questioning the empirical evidence in support of control cycles, Lee calls for a synthesis of the two approaches to provide a fuller explanation for population swings in industrial societies (ibid.: 583–4).

The 'income models' of population swing have also influenced explanations of continued high fertility in some of the MENA countries in the 1970s and 1980s. Fargues, for instance, has suggested a positive association between the birth rate and households' standard of living in Egypt (1997: 124), while Courbage has highlighted oil revenues as the key mechanism for consolidating social preferences for large families in the Middle East (1999: 7).[14]

Iran's experience of baby boom and bust, however, stands out from the more familiar patterns of population swing discussed above in a number of interesting ways. First, it has been characterized as a largely *counter*-cyclical fertility surge. The 'Islamic' baby boom in fact occurred mostly during the 1980s when the economy experienced a severe contraction brought about by the combined effects of post-revolutionary upheaval and war with Iraq (see Behdad, 2000, and Hakimian and Karshenas, 2000, for a discussion of the economy in this period). This casts doubt over a positive and direct correlation between population and income growth in Iran.

Iran's experience is also unique in another respect. The western experience of boom and bust was a *post*-war phenomenon. In Egypt, too, a surge in

14. Similarly, he attributes the Moroccan baby boom and bust of the early to mid-1970s to the pervasive effect of the boom and bust in international phosphate prices in that period (Courbage, 1999: 8–9).

fertility during 1973–79 (the so-called Sadat's 'middle' years) appears to have taken place *after* the October war with Israel was over. As we saw above, this has led some economists to attribute population swings of this nature to the effects of war.[15] Yet, Iran's recent experience of baby boom largely coincided with the war years with Iraq (1980–88) rather than following it and is distinct from the more familiar pattern discussed above.

Finally, it is also worth noting that both boom and bust phases in Iran occurred without reversals in the type of socio-economic factors that are highlighted as the main drivers of fertility change in the 'classic' demographic transition model. For instance, as we saw in Table 1, infant mortality rates have been consistently declining throughout this period, although the pace of the decline became more pronounced after 1986. Similarly, female education in Iran (measured by female literacy rates or school enrolment rates) has been consistently improving in the period under consideration (see Abbasi-Shavasi et al., 2003; Aghajanian et al., 1996). It is for these reasons that in order to understand the dynamics of the boom and bust, we will have to look beyond factors that are merely of interest in the context of long-term demographic transition.

The discussion here suggests that Iran's experience of baby boom can be differentiated from other known international experiences because it was largely counter-cyclical and occurred during (not after) war years. It also happened at a time when socio-economic factors (such as improvements in infant mortality rates and female education) might have been expected to play a role in limiting (not increasing) the desired family size. We now turn to an examination of the pertinent components of birth rate in order to shed light on the determinants and dynamics of the baby boom and bust cycles in Iran.

ACCOUNTING FOR POPULATION CHANGE

Accounting for the multiple and composite forces that lead to population booms and busts is a challenge for any careful study of population change. This is because population swings are brought about typically by a rich and composite array of factors operating at different levels — direct, indirect, current, or reflecting population conditions in the past. Moreover, some of these factors are socio-economic, and hence prone to policy stimuli and changes, while others are of a more structural or demographic nature.

Horiuchi (1995) has devised a quantitative framework for 'retrospective decomposition' of population growth, which draws from the cohort

15. Fargues, however, discounts the impact of war on fertility surge in Egypt as limited to demobilization and family reunions after the war, hence viewing it as transitory and of limited magnitude (1997: 122–3).

approach (as distinct from the period approach) in demographic method. He focuses on the past history of a population (rather than using current vital statistics) to account for its changes over time. Specifically, he decomposes total population growth rate in terms of the weighted sum of past changes in the following five factors: population size, age distribution, fertility, mortality and migration. He applies this method to Sweden, with 'its long history of detailed and accurate demographic data', to reconstruct the country's demographic history (ibid.: 162). His findings point to changes in fertility and migration as the largest variations behind population changes in Sweden over the past century and a half (ibid.: 153).

Although this approach is useful in breaking down population change over time into its constituent elements, its extensive data requirements limit, in practice, the extent to which it can be applied in the context of developing countries.[16] Here, therefore, we utilize a modified version of the so-called 'Standardization Approach' to account for changes in fertility. This approach recognizes the composite nature of factors that influence fertility and has modest data requirements as it uses the general fertility rate (GFR) or the crude birth rate (CBR) as a measure of fertility over time.[17] In this context, the approach purports to offer a framework for standardizing or 'decomposing' the influence of the following four components:

1. proportion of women of reproductive ages in the total population;
2. age structure of women of reproductive ages;
3. proportion of married women of reproductive ages;
4. marital age-specific fertility rates (see UN, 1989 for a full description of this methodology).

The approach has been most commonly used in studies concerned with evaluating the impact of family planning programmes in less developed countries (LDCs) since it allows researchers to decompose birth rates into their components and to isolate the influence of marital fertility rate from other factors (see Nortman, 1993 for a comparison of such methods).[18] As we shall see, however, the standardization technique can also be useful at a more general level of analysis. In particular, we regroup the four components above into two broad categories: 'structural' and 'behavioural'

16. In the case of Iran, in particular, data on international migration are generally unavailable and mortality data are considered unreliable (see Hakimian, 2000).
17. Despite the well-known shortcomings of the crude birth data and vital statistics in the developing countries, their relative availability make them useful for analysis of fertility trends (see Dyson and Murphy, 1985: 403–5).
18. However, this is only a preliminary step as it would require further corroborative evidence (such as use of contraceptives) to be able to attribute changes in marital fertility (if any) to programme impact (see Bogue et al., 1993: Section 25 p. 271).

factors. The age and sex compositions of the population (items 1 and 2 above) fall into the former (demographic or structural) category, while marriage status and marital fertility patterns (factors 3 and 4 above) are of a behavioural nature by virtue of the fact that they are prone to socio-economic changes and policy influences.

More specifically, in this framework, CBR is expressed as follows:

$$(1) \quad CBR = \left(\sum\nolimits_i A_i.M_{pi}.F_{mi}\right)(W/P)$$

where:
i = five-year age groups within the reproductive ages band (15–49)
A_i = age distribution of women of reproductive ages (the proportion of women in each age group 'i' among all women of reproductive ages)
M_{pi} = proportion of married women among all women in age group 'i'
F_{mi} = age-specific marital fertility rate in age group 'i'; and
(W/P) = the proportion of women of reproductive ages in the total population.[19]

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19. This is based on the following specifications:

(1) CBR = B/P or

(1)′ CBR = B/W.W/F.F/P

where B = number of births
P = total population
W = number of women of reproductive ages
F = number of females in the total population

(2) Hence CBR = B/W.W/P

(3) But B/W = GFR (general fertility rate)

(4) Thus CBR = GFR.W/P

Moreover, assuming that all births are legitimate and occur only to women in the specified age groups i, total births can be expressed as:

$$(5) \quad B = \sum\nolimits_i W_i.M_{pi}.F_{mi}$$

and

$$(6) \quad CBR = \frac{\sum_i W_i.M_{pi}.F_{mi}}{P}$$

GFR can be expressed as follows:

$$(7) \quad GFR = \frac{\sum_i W_i.M_{pi}.F_{mi}}{W}$$

and likewise

$$(8) \quad CBR = \frac{\sum_i W_i.M_{pi}.F_{mi}}{W}.\frac{W}{P} = \left(\sum\nolimits_i A_i.M_{pi}.F_{mi}\right).\frac{W}{P}$$

where $A_i = W_i/W$ (or the age structure component). As we shall see below, the latter expression (equation 8) is used for the decomposition analysis. For a full discussion, see Bogue et al. (1993: Section 25, pp. 273–74).

In what follows, we look first at the behaviour of each of these four 'proximate' factors to gain an insight into their evolution over time during the two decades covering the boom and bust cycles in Iran (1976–96). We then offer the results of the standardization exercise carried out in order to ascertain the relative importance of each of these during the period under study.

The Proximate Determinants of the Birth Rate

Tables 3–5 provide summary data on the age distribution of women, distribution of women's marital status, and their age-specific marital fertility rates, respectively. As mentioned above, the discussion relates to women in the reproductive age bracket (15–49 years) and is disaggregated at 5-year age cohort levels. The data are based on the full census reports of 1976, 1986 and 1996 and the survey-census report of 1991, which was carried out for the first time on a five-yearly basis reflecting concerns with rapid population growth of the 1980s. Although we will refer to the intercensal periods of 1976–86 and 1986–96 as the 'boom' and the 'bust' years, respectively, this is likely to be a simplification as the data points do not conveniently fit into the beginning and end of either cycle. Moreover, the inclusion of the 1991 data allows us to disaggregate the bust period (1986–96) into two shorter periods (1986–91 and 1991–96), hopefully allowing us to gain more insight into the bust period.

Table 3 shows the age distribution of Iranian women of reproductive ages (A_i's in the CBR identity 1 above). Two issues emerge from this table. First,

Table 3. Age Distribution of Iranian Women of Reproductive Ages (15–49) by Cohorts, 1976–96

	(% of total in each year of enumeration)			
	1976	**1986**	**1991**	**1996**
15–19	24.04	24.02	23.39	24.12
20–24	19.58	19.83	19.91	18.11
25–29	14.86	**17.19**	16.35	15.98
30–34	11.66	**13.72**	14.15	13.42
35–39	10.81	10.18	11.52	11.97
40–44	10.44	7.79	8.29	9.42
45–49	8.61	7.27	6.40	6.98
Total (females aged 15–49)	100.00	100.00	100.00	100.00
Total number of women aged 15–49	7,412,219	10,546,568	12,199,349	14,666,631
Intercensal change (%)	–	42.3	15.7	20.2
Share of women aged 15–49 in:				
Total population	0.220	0.213	0.218	0.244
Total female population	0.453	0.436	0.451	0.496

Sources: Calculated from SCI census publications (various issues).

Table 4. Distribution of Married Women in Iran by Age Cohorts, 1976–96

	(% of total in each cohort)			
	1976	**1986**	**1991**	**1996**
15–19	33.88	33.20	**25.03**	**17.63**
20–24	77.54	**72.60**	**66.84**	**59.79**
25–29	91.53	90.00	86.62	83.85
30–34	94.62	92.10	92.45	91.25
35–39	94.43	92.20	93.45	93.00
40–44	91.05	90.10	91.93	92.07
45–49	86.22	83.70	89.40	89.38
Share of married women in total female population (%)	75.1	73.0	70.5	66.8

Notes:
For 1991 and 1996 figures are adjusted to incorporate women of unknown age on the basis of the assumption that they had the same age distribution as that of the general population.
Also adjusted for women of unknown marital status on the assumption that they had the same marital status distribution of their age group.
Sources: 1986 data from Aghajanian (1991: 708); this does not adjust for women of unknown marital status. For marriage data 1991, SCI (1993a: 49); otherwise calculated from SCI census publications (various issues).

there was a big rise in the absolute number of women of reproductive age in 1986 (up by over 42 per cent, although their relative share in both the total population and total female population declined somewhat). Second, within this category (women of reproductive age), there was a redistribution in

Table 5. Changes in Marital Age-Specific Fertility Rates in Intercensal Periods in Iran, 1976–96

	Marital ASFR (per 1000 women)				**Intercensal Change (%)**			
	1976	**1986**	**1991**	**1996**	**1976–1986**	**1986–1991**	**1991–1996**	**1986–1996**
15–19	384.6	418.7	308.8	334.7	8.8	−26.2	8.4	−20.0
20–24	392.9	422.9	347.8	272.6	7.6	−17.7	−21.6	−35.5
25–29	319.7	358.9	304.2	188.4	12.2	−15.2	−38.1	−47.5
30–34	248.4	311.3	232.6	125.5	25.3	−25.3	−46.0	−59.7
35–39	180.0	278.0	165.9	87.1	54.4	−40.3	−47.5	−68.7
40–44	90.1	137.2	82.7	47.2	52.4	−39.8	−42.8	−65.6
45–49	32.9	58.1	23.5	21.8	76.9	−59.6	−7.1	−62.5
General marital fertility rate	254.7	313.0	231.7	149.1	22.9	−26.0	−35.7	−52.4

Notes:
Age-specific fertility rates from a wide variety of sources have been used to estimate the required *marital* age-specific fertility rates in this table. Numbers of married females have been adjusted for those of unknown age and marital status and unknown age.
Sources: Calculated from various sources cited in SCI (1993b: 73, 75); Aghajanian (1991: 709); and Aghajanian and Mehryar (1999a: Table 5).

favour of those in the prime reproductive age cohorts (that is, towards those in the 25–29 and 30–34 groups and away from those above 40 years). The combined effect of both these changes would be, *ceteris paribus*, to boost general fertility rate. This rise is especially true of the boom years (see the figures in bold for 1986 in Table 3).

This evidence appears to suggest that at least part of the post-revolutionary boom was due to demographic/structural factors, which reflected the population momentum from earlier on. Moreover, even though these ratios moderated after 1986, they remained higher than before the Revolution (in 1976). This too suggests that the subsequent bust has been *in spite* of historically high shares of women in the age groups 25–34.

The same table also shows that the proportion of women of reproductive age in the total population (W/P) decreased in the boom period and rose sharply during the bust phase (it fell to 21.3 per cent in 1986 but then rose, reaching 24.4 per cent in 1996). This movement has a downward effect on birth rate (as opposed to GFR since the denominator shows a bigger population). In turn, this seems to suggest that in fact the baby bust has been even more significant than apparent given the rise in (W/P). This factor, of course, can act as a possible ignition to future baby booms.

Table 4 provides information on the age distribution of married women (M_{pi}). Two trends can be seen clearly here. First, there has been a general and sustained decline in the proportion of married women among the total female population in the country. Interestingly, this is true even of the boom period, when the decline was representative of all age cohorts (the general average fell to 73 per cent in 1986 from 75.1 per cent a decade earlier). This peculiar phenomenon appears to fly in the face of much ideological emphasis and official incentives at the time, which favoured marriages in general, and early marriages in particular. In fact, the younger cohorts appear to have been largely immune to official encouragements in favour of family in this period (the share was stable for the 15–19 age cohort, and declined substantially for those in the 20–24 cohort).

Second, and in the bust period (after 1986), this trend reflects a clear movement towards later marriages as seen in the rising shares of married women within the higher age cohorts. This is true of both 1991 and 1996 data, which show a decline in the share of married women among those below 29 years, a somewhat stable pattern among those in the middle cohorts (30–39) and a rise among those above 40. This evidence in turn appears to suggest three things. First, unlike the case of 'pre-decline rises in fertility' (see discussion of Dyson and Murphy above), there is no evidence of a 'marriage surge' invigorating fertility increases in Iran in the boom period. Second, and related to this, the boom would in fact have been even more significant had there not occurred a downward and moderating movement in the relative importance of marriage preferences and/or opportunities among women during the late 1970s and early 1980s. As we saw this fact goes against expectations, given the type of conservative social changes

that affected women in Iran at the time. Third and last, the young have been at the forefront of the reduction in fertility during the bust period, as suggested by a clear shift towards delayed marriages among young women in particular.

This brings us to a consideration of marital fertility rate as the residual component in determination of fertility (GFR or CBR). Table 5 gives age-specific marital fertility rates by age cohorts and also indicates the extent of changes that occurred over both periods under consideration. A number of interesting observations arise from an examination of these data.

First, as suggested earlier, the bust appears to have been even more robust than the boom judged by the extent of changes in general marital fertility rates. Whereas fertility rose by 23 per cent between 1976 and 1986, it fell back by almost 53 per cent in the next intercensal period of 1986–96 (the fall was even more drastic in the five-year period 1991–96 compared to 1986–91). Second, the rise of fertility in the boom period was visibly concentrated among higher age cohorts (above 25 but even more significantly among those above 35 years of age). Again it appears as if the general fertility rise in this period was not driven by increased marital fertility among the young — a factor that reinforces the earlier observation about the relative unimportance of the marital patterns of the young as a possible contributory factor to baby boom. Third, the bust period is associated with a pervasive and near universal fall in marital fertility rates across all age cohorts. But even here, it appears that the extent of the fall was more significant among older women. By 1996, in fact, marital fertility for all age groups had declined to well below their pre-boom levels, particularly in the case of older women.

In summary, both periods demonstrate a number of interesting patterns. Regarding the boom, we can say that it was caused at least in part by population momentum from an earlier period (namely, changing age structure). Furthermore, the swing could have been even more drastic had the favourable official ideology and policy of encouraging marriages been translated into actual practice of increased and/or early marriages among the young. Last, but not least, it was increasing fertility among older women (rather than the young), which fuelled this process.

With respect to the bust, the above analysis suggests that delayed marriages and decreasing marital fertility among all age groups were the primary movers of changes in birth rate, but also interestingly that there is now a significant population momentum (reflecting the 1980s baby boom), which can potentially exert an upward pressure on fertility in the coming years.

Decomposition Analysis

We will now adapt the framework introduced above in order to standardize for changes in CBR caused by each of the four components discussed earlier. In this way, we can more systematically isolate, and account for, the effects of each of these factors on fertility changes in the periods under discussion.

The standardization technique uses CBR or GFR as a proxy for total fertility rate (TFR), for which consistent time-series data are not always available. It is based on an expression of CBR as given in equation (1) above. However, since it is concerned with accounting for *changes* in the birth rate (or GFR), it operates in terms of, and focuses on, partial changes in each one of the proximate components (keeping others constant). It can, therefore, allow us to assess the role of each of these factors in bringing about changes in CBR over a given period. Since socio-economic and policy factors operate through marriage behaviour and marital fertility, any attribution of change to these two can be of particular interest in explaining possible causes of population boom and bust.

The procedure for decomposition is spelt out in Table 6. These formulae are derived on the basis of a number of simplifying assumptions,[20] and in general relate changes in each specified component to changes in CBR in a *ceteris paribus* fashion.

Table 7 reports the results of the standardization exercise. This includes an indication of both absolute and relative contributions of the specified components to changes in CBR. The results are obtained through detailed calculations involving the computation of age-specific marital fertility rates, which are imputed from age-specific fertility rates in general, for which data are more readily available. However, since there are diverse and sometimes varied estimates of these, we have in most cases taken a mean of the most credible estimates including for various estimates of birth rates (see explanations to Tables 1–5). To control for errors, the results are subjected to a 'consistency test', which checks to see if the CBR equation (1) above holds. In practice, this can yield a different or 'accounted for' CBR compared to the 'observed' CBR. The discrepancy can arise from errors and imprecision in estimations used for each of the four components and/or reflect the influence of the 'joint effects', which are excluded by the nature of the additivity assumption mentioned in Table 6.

Moreover, since the choice of the base period for measuring change can make a difference (see UN, 1989), results are shown for both periods 1 and 2 used alternatively as base periods.[21] In general, however, there appears to be broad conformity between the two sets of estimates reported in Table 7 for

20. The first assumption is that of *additivity* (i.e., the four components can be added and subtracted in order to assess the individual effect of each component). This is despite the fact that these appear as products in the equation. The second concerns functional independence (that the four components are not inter-related) so that the summation of the role of individual components can take place without 'too much risk of adding overlapping effects'. These assumptions are spelt out and fully discussed in Bogue et al. (1993: Section 25, p. 277).
21. For instance, over the 1976–86 period, change is first measured with respect to the 1976 data as benchmark data and then again with the 1986 data. The same method has been applied to other intercensal periods reported in the table.

Table 6. Procedure for Decomposition of Changes in Birth Rate

Change in CBR attributed to changes in each one of the four components	***Procedure***
Demographic/structural factors:	
– Proportion of women of reproductive age in total population	$\text{GFR} \cdot \left(\frac{W_2}{P_2} - \frac{W_1}{P_1}\right)$
– Age structure of women of reproductive age	$\left(\frac{W_1}{P_1}\right)[\Sigma_i (A_{2i} - A_{1i}).M_{1i}.F_{1i}]$
Behavioural factors:	
– Marital status distribution	$\left(\frac{W_1}{P_1}\right)[\Sigma_i A_{1i}.(M_{2i} - M_{1i}).F_{1i}]$
– Marital fertility	$\left(\frac{W_1}{P_1}\right)[\Sigma_i A_{1i}.M_{1i}.(F_{2i} - F_{1i})]$

Notes:
Subscript i refers to age-cohorts within the reproductive ages band of 15–49; subscripts 1 and 2 refer to intercensal periods 1 and 2 over which change is being measured. For a description of the other notations, see the text.
Source: For derivation of these formulae, see Bogue et al. (1993: Section 25, Table 1, p. 276).

comparison purposes; the discrepancy between CBR accounted for by the four components and those observed (from published data) appear to be well within an acceptable band of ± 10 per cent indicating generally robust results.

In general, the results here appear to confirm the observations made in the previous section. Changes in marital fertility are by the far the most important single factor oiling changes in general fertility during both the boom and bust periods. During the first ten-year intercensal period (1976–86), this element accounted for more than 118 per cent of the recorded fertility rise (its effect was, however, moderated by the downward influences of marital status and the proportion of women of reproductive age in the total population with a combined effect of almost 40 per cent). During the bust phase, too, changes in marital fertility were prominent, accounting for about 90 per cent of the fall in CBR in each of the two five-year periods after 1986. By contrast, the marital status factor had a moderating influence on CBR, since it acted as a brake on fertility during both the boom and the bust (accounting for about a fifth or 21–23 per cent of the overall change).

One implication of this last point is that the boom would have been even more pronounced had it not been for a moderating effect of changes in marital status. Similarly, the bust would not have been as drastic were it not for the strong downward contribution of this factor. Taken together, therefore, both 'behavioural' factors (marital status and marital fertility) appear to be significant movers of the rise and fall of fertility in both periods.

For structural/demographic factors, the results appear to confirm our earlier discussion. We can see that changes in age structure contributed positively to the population surge in the boom period. About 30 per cent

Table 7. Attribution of Changes in Crude Birth Rate in Iran to Specified Components, 1976–96

Change in CBR accounted for by:	First year given as the base period						Second year given as the base period					
	Absolute change			Share in total change (%)			Absolute change			Share in total change (%)		
	1976–86	1986–91	1991–96	1976–86	1986–91	1991–96	1976–86	1986–91	1991–96	1976–86	1986–91	1991–96
Age structure	1.93	0.32	−0.97	+29.0	+2.5	−8.6	1.84	0.15	−0.72	+27.6	+1.1	−6.3
Marital status	−1.43	−3.03	−2.64	−21.4	−23.2	−23.2	−1.64	−2.40	−2.57	−24.6	−18.5	−22.6
Marital fertility	7.90	−11.61	−10.96	+118.7	−89.1	−96.3	7.48	−11.51	−11.63	112.3	−88.3	−102.1
Proportion of women of reproductive age in total population	−1.26	1.18	4.20	−18.9	+9.1	+36.9	−1.51	0.85	2.56	−22.6	+6.5	+22.5
Total change accounted for	**7.15**	**–13.13**	**–10.37**	+107.3	−100.8	−91.1	**6.18**	**–12.92**	**–12.36**	+92.8	−99.2	−108.5
Observed change in CBR	6.66	−13.02	−11.39				6.66	−13.02	−11.39			
(% explained)	(107.3)	(100.8)	(91.1)				(92.8)	(99.2)	(108.5)			

Source: Author's calculations from various sources cited in Tables 1–5 above, based on methodology explained in UN (1989).

of the rise in CBR in this period can in fact be attributed to the population momentum from earlier on. Thus, it would be wrong to attribute the entirety of the baby boom to a surge in fertility alone. At least some of the dynamics of the population swing in this period are related to past population factors and could have been better anticipated.

On the other hand, the proportion of women of reproductive age initially acted as a moderating factor during the boom but has since changed signs and is now a contributory factor to (potential) fertility rise. Significantly, this phenomenon could be a potential threat to fertility transition in future.

A CRITICAL APPRAISAL

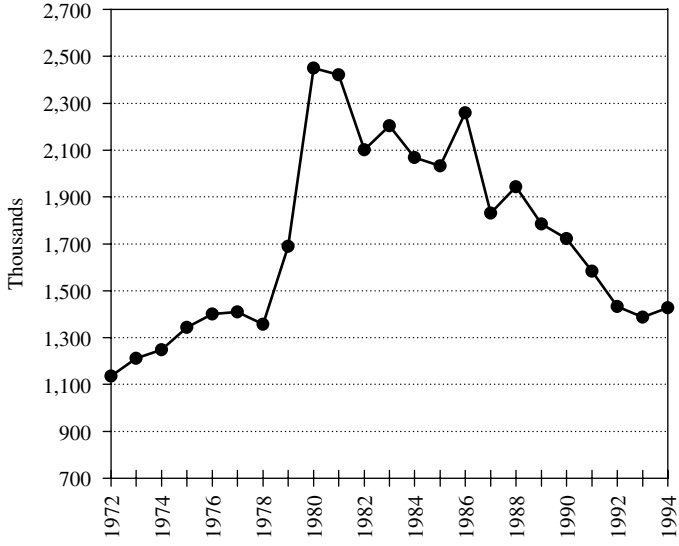
The picture thus far, supported by the standardization analysis, seems to suggest that the so-called 'behavioural components' of CBR were important factors behind the Iranian experience of fertility rise and fall. Although less prominent, the so-called demographic/structural factors also indicate interesting issues and patterns.

We will now take the discussion one step further by revisiting the earlier evidence on the boom and bust and interrogating them in the light of some of the perspectives that have emerged so far. Given the paucity of data, we have to rely on a number of direct and indirect indicators to shed light on the dynamics and characteristics of the rise and fall in fertility. The following therefore focuses on available quantitative evidence on new births and population of the young in an attempt to locate the beginning and end of the boom and bust phases and to relate them to economic and institutional changes that took place in Iran. In studying these, we need to bear in mind the important landmarks and developments of the post-revolutionary period. These are mainly: the Revolution in 1979; the war with Iraq 1980–88; and the beginning of a population policy U-turn from 1988 onwards.

Figure 1 is based on annual registered births collected by Iran's Civil Registration Organization (CRO). Despite the well-known weaknesses of the vital statistics, this is the most direct evidence of population increase in Iran and can provide a useful indication of the trend line and variations in officially-registered births over time (see Hakimian, 2000 for a discussion of the shortcomings of these data). The data here depict a unique and rapid jump in birth registrations in the late 1970s.

Annual population increments climbed to a peak of almost 2.5 million in 1980 and 1981, but the momentum behind population growth can be traced back even further. In the first two years of the Revolution, registrations shot up significantly, by 24 per cent in 1979 and 45 per cent in 1980. Considering the normal conception period, this trend appears to suggest that the initial momentum for the baby boom may have in fact shaped up as early as in 1978, that is, during the tumultuous period *leading* to the Revolution. After that, absolute population increments remained high until 1986 after which

Figure 1. Annual Registered Births, Iran:1972–94



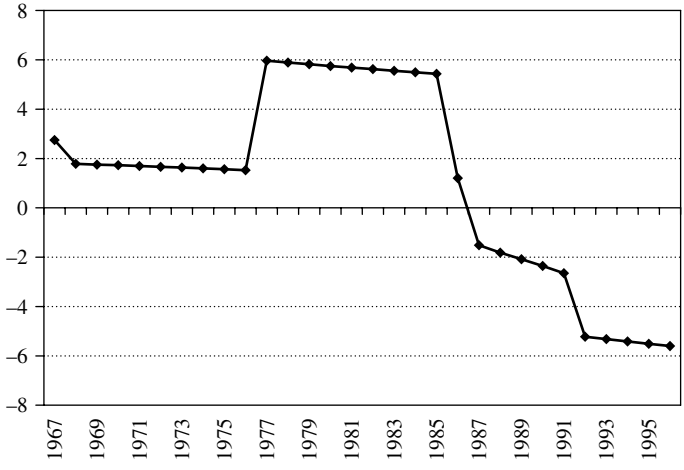
Source: Based on data from the Civil Registration Organization in Hakimian (2000: 196)

they began to fall sharply. By the mid-1990s, they had almost regained their levels of the mid-1970s.

This evidence appears to suggest that neither war nor changes in *official* population and family planning policies provide full and adequate explanations of the *genesis* of (rather than the momentum behind) the baby boom and bust in Iran (the war with Iraq ended in 1988 and the reversal of population policy went into effect after 1988). This preliminary conclusion has of course to be qualified by the fact that errors, overlaps and spurious fluctuations make individual or single data points in this respect less reliable than the indicated trend line and we should therefore exercise caution in deriving any conclusions from the evidence based on vital statistics. However, further evidence compiled from census data appears to convey a similar message.

Figures 2 and 3 use census data to depict Iran's population dynamics from different perspectives. Figure 2 shows annual percentage changes in Iranian children aged 0–4 between 1967 and 1996. This too confirms a clear and sharp jump in the population growth tempo in the late 1970s. It can be seen that a moderately declining trend of the early 1970s was suddenly reversed in 1978, when the annual growth rate of the number of young Iranians jumped to 6 per cent (it had been under 2 per cent in much of the previous decade). Thereafter, the population growth tempo stayed high

Figure 2. Annual % Change in Iran's Population of Children Aged 0–4, 1967–96



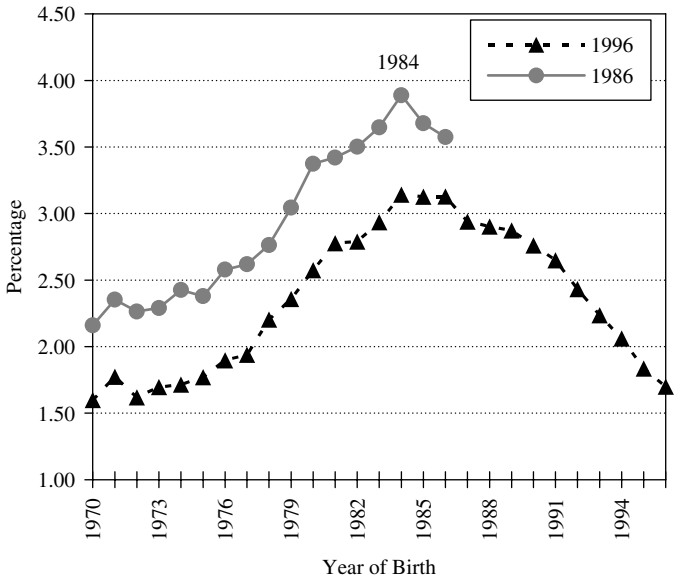
Source: Calculated from PDS (1998).

until 1986 when a sudden and sharp fall put an end to the booming number of the young. Evidence of baby bust is particularly manifest in the sharp falls in the growth rates recorded in 1986 and 1987 but also sustained thereafter. As we have seen, dramatically reversing the baby boom of less than a decade earlier, the growth rate of this cohort of the population continued to fall sharply, edging close to −6 per cent per annum after 1992.

Last, but not least, a similar perspective emerges in Figure 3, which is based on an analysis of age profiles from census data (see Hakimian, 2000). This method is based on the conversion of the single file age data from the 1986 and 1996 censuses into the corresponding years of births and then tracking each year's share in the total population enumerated in these two census years. Here too, we can see a similar picture with an indication of a clear proportionate rise in the number of those born between 1978 and 1984.

We can conclude this discussion by stating that according to a variety of indicators, the surge in population growth started sometime *before* the Revolution (possibly in 1978 or even earlier, in 1977) and came to an end around 1984–86. If correct, the timing of the boom and bust suggested here seems to cast doubt over the primacy of either war or changes in official population policy in initiating the boom and bust cycles in Iran. This does not of course, preclude the possibility that either factor played a prominent and contributory role in maintaining the boom and bust *momentum* after they had got under way.

Figure 3. Population by Year of Birth as % of Total Enumerations in 1986 and 1996



Source: Calculated from census data as in Hakimian (2000: 197).

SUMMARY AND CONCLUSIONS

Common explanations of demographic change in Iran in the post-revolutionary period have been split down the line, stressing socio-economic developments or supply-side policies. Given a near perfect match between population policy and fertility cycles (a succession of pro- and anti-natalist policies coinciding with the rise and fall of fertility), it has been tempting to attribute the boom and bust cycles to the pervasive influence of policy changes in Iran after the Revolution.

However, this article has found a number of surprising results that challenge common thinking on the behaviour and determinants of change in population in Iran. First, the standardization analysis conducted here suggests that the role of structural factors may have been hitherto neglected in explanations of the dynamics of the boom. While policy-induced factors mattered more than the structural factors overall, a significant part (about 40 per cent) of the drive behind the boom was nevertheless accounted for by population momentum. This appears to suggest that even in the absence of social, institutional and ideological changes associated with the Revolution,

Iran would have experienced a population 'boom' of some sort due to its demographic structure. This is also corroborated by further analysis indicating that the initial stages of the population swing may in fact be traced to before the Revolution.

Second, our analysis has also made it clear that, while important, policy changes did not always have the intended or expected outcomes. Despite much ideological emphasis and official encouragement, marriage trends have followed a downward secular trend (especially among young Iranian women), consistently acting as a moderating element on fertility both in the boom and bust phases. Third, a re-examination of the evidence on boom and bust seems to throw doubt on any suggestions of a one-to-one relationship between changes in population policy and fertility behaviour. Neither war nor changes in official population and family planning policies appear to be significant explanatory factors in this regard. The initial stages of population surge seem to have preceded the Revolution — or war — and the slowdown 'kicked in' before pro-natalist population policies gave way to the vigorous family planning programmes in the late 1980s and early 1990s.

What this suggests is not that changes in policy environment do not matter — they clearly do. Moreover, there is no denying their importance in reinforcing the dynamics of change once it had been set into motion. What this article does show, however, is that changes in the policy environment cannot explain the genesis of the two processes of fertility change examined here.

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