

Demographic Swings and Early Childhood Education in Iran

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Abstract

In recent years Iran has greatly expanded its early childhood education program, taking first place in the Middle East in preschool enrolment rates. In this paper we examine the reasons for this unusual expansion and argue that it is in large part an institutional response to demographic changes in Iran, notably the sharp fertility decline of the 1990s. Fertility declined from more than 6 births per woman in the 1980s to about 2 in 2004, while during the same period kindergarten enrollments increased from less than 10 percent to nearly one half of all 5 year old children. Economists usually think of the effect of the reduction in fertility on demand for child schooling in terms of a trade-off between quantity and quality. In their models fertility decline and rising investment in child education are attributed to choices made by families who substitute quality for quantity of children. In the case of Iran, we offer an institutional explanation of the rise of pre-school education which complements the demand explanation. In the early 1990s, the decline in primary school enrolments, itself caused by fertility decline a few years earlier, gave rise to a surplus of primary school teachers. In an attempt to preserve primary school teachers' jobs, the Ministry of Education worked together with parents to set up kindergarten classes in public schools, even though pre-primary education was not part of their official mandate.

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1. Introduction

Family life has gone through fundamental change in post-Revolution Iran, especially in fertility and child education. Fertility has declined from more than 6 births per woman in the 1980s to about 2 in 2004, while at the same time education, especially for girls, expanded to the extent that young men and women born in 1985 now have about 10 years of schooling and women outnumber men in universities. This transformation has brought with it not just more investment in formal schooling, but in early childhood education (ECE) particularly. There has been an explosion of interest in books and educational toys for children, which can now be found in most homes, but is not easily documented.

This combination of changes has been described in the economics literature on family economics as the substitution of quality for quantity of children (Becker 1991), which the modern growth theory considers a precondition for long run economic growth (Becker, Murphy and Tamura, 1990, Lucas 2002). In this paper we explore the relationship between fertility decline and the increase in education in general and its ECE component in particular. We do not directly address the central question that underlies such a relationship, namely whether Iranian families have changed their behavior from the traditional high fertility and low investment in child education to low fertility and high investment in education. If the answer to this question is in the affirmative, the demographic transition in Iran can be viewed in the context of the new economic-demographic theory of growth, which bodes well for the prospect of Iran's long run growth (Salehi-Isfahani, 2006a and 2006b).

Our aim in this paper is to examine one specific instance of the increase in education in Iran--the expansion of kindergarten education—as a case study of this larger question. Preschool education is suitable for this purpose in part because it is not part of the compulsory education so it reflects parental wishes more closely than other types of formal schooling, and in part because of its rapid expansion in recent years. In 2004-05

about 48 percent of 5 year old children were in a pre-school programs compared to 7 percent in 1993-94. Other types of day care services for children below age 5 account for about 10 percent of the total pre-primary enrollment, so by focusing on kindergarten we capture the most important trend in early childhood education in Iran. Our findings lead us to a mixed conclusion on the extent to which the simultaneous increase in ECE and lower fertility are the result of household decisions. There is a clear sign of a demand effect, that is, parental willingness to spend more resources on their children' education. On the other hand, the specific circumstances that led to the expansion of ECE have more to do with an institutional response of the government to the changing age structure than a straightforward quality-quantity substitution. We show that, once the effect of fertility decline had shown up in reduced primary enrollments, in its attempt to preserve the jobs of the surplus primary teachers, rather unwittingly the government undertook the expansion of ECE.

In terms of long term economic growth, ECE investment is of particular interest because it is a signal for deepening of human capital. A significant part of the benefits of smaller families for economic growth is realized not by greater formal schooling, which can also result from expansion of subsidized public schooling and without any decline in fertility, but by greater investment of parental time in child education. In Iran, as in other Middle Eastern countries, the expansion of formal schooling has been more about diplomas than accumulation of productive skills. This is in part because in these countries employers—often the public sector—reward formal schooling better than productive skills (Salehi-Isfahani 2006a). Pre-school education is not required as part of formal schooling in Iran, so its rise may be a signal that parents in Iran have not just substituted for child quantity by more formal schooling, but are actually willing to invest in productive human capital. Even if parents' interest in pre-school is because it enhances their child's chances of success in formal schooling later, it could still help economic growth because it frees women and young girls to participate in formal education and the labor force, and promotes the early development of such skills as creativity and teamwork which are not taught in grade school (Heckman et al 2004).

The evidence we provide is circumstantial. We show how the new emphasis in kindergarten education is temporally related to changes in age structure resulting from a sharp demographic swing in the 1980s. We also show that the increased supply of pre-primary education, which at first came in makeshift kindergarten classrooms, was a response to a surplus of primary school teachers as primary enrollments tumbled. The program's popularity since then, however, reflects genuine demand on the part of parents for early childhood education and can therefore be construed as quality-quantity substitution.

The plan of this paper is as follows. The next section reviews the literature on the effect of ECE on human capital development. Section 3 discusses the effect of fertility transition on age structure, school enrollments, and the potential for increase in quality of human capital in Iran. Section 4 offers a brief overview of formal schooling in Iran, and Section 5 reviews the history of preschool education in Iran and shows how its recent rise is related to the changing age structure. Section 6 is the conclusion.

2. Early childhood development

Recent research has identified Early Childhood Development (ECD) as an important factor in economic and social development (Van Der Gaag & Tan, 1997; Van Der Gaag, 2002). Studies have demonstrated that by providing basic health care, adequate nutrition, and nurturing and stimulation in a caring environment, ECD interventions ensure children's progress in primary school, continuation through secondary school, successful entry into the work force, and increased future earning capacity (Young, 2002). Children who have participated in ECD programs show higher intelligence quotients and improvements in practical reasoning, hand and eye coordination, hearing and speech, and reading readiness (Myers 1995).¹ By intervening early, ECD programs

¹ The 2001 PIRL study examined the effects of preschool education on literacy achievement (Mullis 2002). Iran ranked third from the bottom in literacy competency compared to 24 countries, faring better than only Argentina and Belize. With only one year of preschool, average achievement on the PIRL literacy score increased by 11%, raising Iran's ranking and placing it on par with Macedonia, Cyprus and Turkey.

allow a leveling of the playing field by enabling all children to fully benefit from school and to succeed in the market place, helping to reconcile countries' goals for equity and efficiency (Birdsall, 1999). Grade repetition and dropout rates are lower, performance at school is higher, and the probability that a child will progress to higher levels of education increases (Barnett 1995; Grantham- McGregor and others 1997; Karoly et al., 1998). Its contribution to social capital has also been documented (Heckman, 2000), as well as its effects on reducing delinquent and criminal behavior (Schweinhart et al. 1993; Yoshikawa, 1995; Zigler, Taussig, and Black 1992).

Preschool care and education of children aged 3-5 (ECE), which is the focus of this study, is an important component of ECD. Evidence on how preschool can improve access to schooling for disadvantaged groups is found in numerous international examples. An evaluation (Barros and Mendoca, 1999) of Brazil conducted by the World Bank and the Institute of Applied Economics Research (IPEA) found that one additional year of preschool increases the schooling ultimately attained by about half a year, and reduces grade repetition by 3-5 percent for each additional year of preschool. The study also found a 2-6 percent increase in future earnings with indications of a higher increase for poorer families. The rate of return on investment costs of preschool education was found to be between 12.5 and 15.0 percent. For children whose parents have 4 years of schooling, 1 year of preschool is associated with 0.45 additional years of education. Because it is estimated that 1 additional year of education increases potential earnings by 11 percent, 0.4 years more of education produce an indirect gain of 5 percent in earning power. Children who attend preschool have a direct gain of 2 percent in earning power. The combined indirect and direct gains amount to a 7 percent increase in potential lifetime income. Pre-schooling also increases the participation of females in the labor force. Studies in Brazil, Mexico, and Guatemala found that access to childcare frees older siblings, usually girls, to return to school to complete their own education or to go to work.²

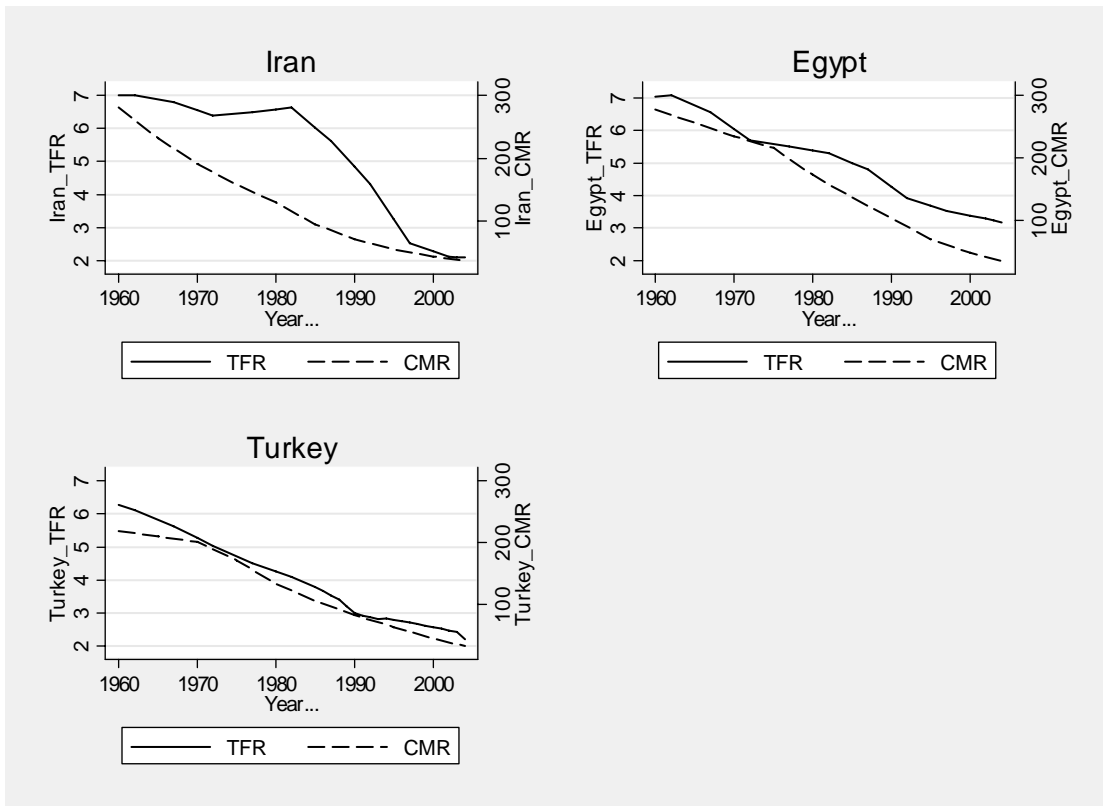
² Brazil Early Child Development, 2001. World Bank, Human Development Department, Report No. 22841-BR.

3. Demographic swings and Early Childhood Education in Iran

In this section we consider the role of a large demographic shift in the last two decades on the rise of ECE in Iran. We show that the rise of ECE is part of the demographic dividend which is also responsible for the overall increase in education. In our view neither would have been possible without the significant reduction in fertility that started in the mid 1980s (Figure 3). The decline of fertility by one-third in a period of about 15 years, if not itself motivated by the desire to invest more in children, has certainly made it possible for parents to spend more resources on each child's education. These resources were made available primarily because of changes in age structure, which have significantly increased the number of adults per child in Iran.

The swing in age structure in Iran has been more exaggerated because fertility rose before falling precipitously. In the early years of the revolution, total fertility (average number of births per woman) rose from about 6 to 7, before falling to about 2 in 2004 (Figure 3). The peculiarity of Iran's fertility transition is demonstrated in Figure 3 which compares the pattern of decline in total fertility (TFR) and child (under 5) mortality rates (CMR) for the three largest countries of the Middle East. Whereas in Egypt and Turkey we observe a relatively smooth transition, and where decline TFR closely follows decline in CMR, in Iran fertility rises before falling and with a substantial delay. This rise and fall in fertility helps explain the drastic changes in age structure in Iran that we believe help explain the sharp rise in ECE (see Figure 6 and Section 5 below).

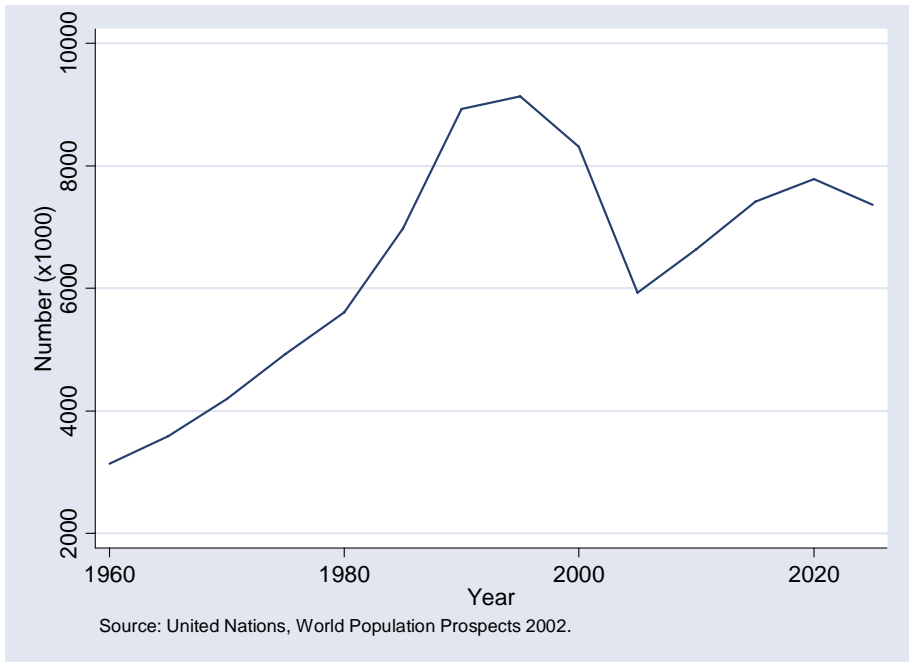
Figure 3. Decline of fertility and child mortality in Egypt, Iran and Turkey, 1960- 2004



Source: World Bank Development Indicators, 2005.

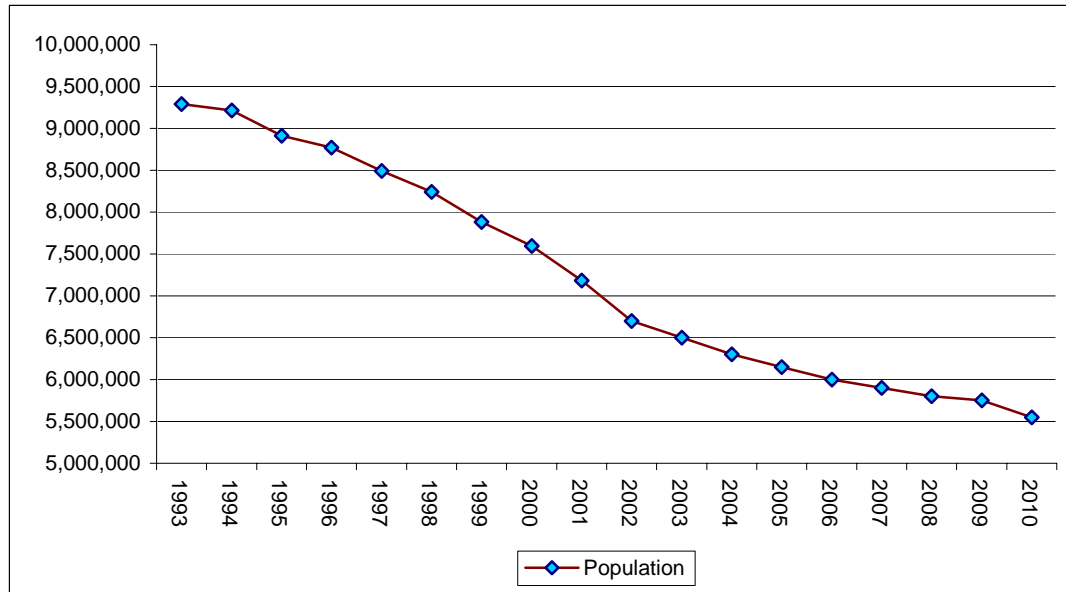
The post revolution baby boom quickly resulted in a sharp increase in the number of primary age children. The number of primary school age children accelerated after 1980 (indicated in Figure 4 by the number of 5-9 year olds, assuming 100% enrollment), rising by 60 percent between 1980-90, forcing public schools to use their buildings in two and sometimes even three shifts per day. This was indeed the initial reason why the government reversed its position on family planning and launched its integrated health and family planning program in 1989. The programs success soon alleviated the intense pressure on the education system. Since 1990 the number of 5-9 year olds (and by implication primary enrollment) has fallen by one-third. As we show below, the savings from this decline in the primary age population is the key to the increase in preschool enrollment.

Figure 4. The number of 5-9 year olds, 1960-2020.



It took only a few years after the government initiated the family planning program in 1989 for its benefits to show up in enrollment data. The number of children enrolled in primary school dropped by nearly 4 million, from 9.9 million in 1993-94 to 6.2 million in 2004-05. By the year 2010, the population of primary school students is expected to decrease by another 1 million, freeing up additional teachers and educational resources (Figure 5).

Figure 5: Population Projection: 6-10 Year Old Population



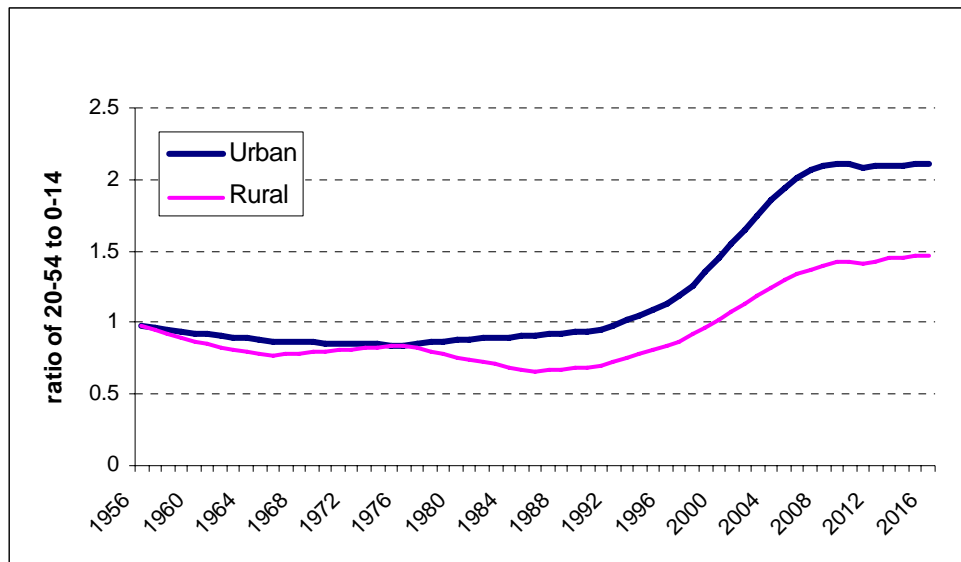
Source: Ministry of Education, Tehran.

The effect of the sharp decline in fertility on age structure is depicted in Figure 6, which shows the historic values of the adult-child ratio since 1956 and its projected values until 2016 using the United Nations population forecasts. The number of adults (20-54 year olds) per child (0-14) has been on the rise since mid 1990s, doubling the ratio in the last ten years in both rural and urban areas. If fertility declines according to the optimistic UN scenario, it may reach as high as 3 by the year 2030 (Salehi-Isfahani 2005).

The rising adult child ratio is a once-and-for-all opportunity for investment in human capital, known in the development literature as the demographic window of opportunity (Barlow 1994, Salehi-Isfahani 2002). The adults in the numerator are parents who, since the late 1990s, have no longer been outnumbered by their children, and therefore can provide them with better health and nutrition and prepare them better for school. They are also teachers who would teach fewer students per class. The fact that the number of adults per child in urban Iran in 2005 was twice what it was in the mid 1990s (see Figure 6) show how dramatically the ability of Iranian families has improved in educating their children in the last ten years. This increase in the societal “teacher-pupil” ratio bodes

well for education of the next generation, especially since new mothers—women aged 20-29—have on average about ten years of schooling (see Table 1 below). The increase in years of schooling and the narrowing of the education gap between boys and girls discussed in the next section is how Iran is taking advantage of its demographic window of opportunity. In this context the rise of early childhood education is interesting because it reveals a new dimension of the response of families to the changing demographic situation, the substitution of child quality for quantity.

Figure 6: Rising adult-child ratio, 1956-2016



Note: The ratio of adults 20-54 years old to children 0-14.

Source: United Nations, World Population Prospects 2002 and author's calculations.

4. Expansion of formal schooling

The rise of formal schooling in Iran is probably the most important socio-economic change in Iran in the last three decades, especially because it entailed a narrowing of the education gap between men and women (Table 1).³ The cohorts born right after the Revolution, in 1980-84, have achieved as adults on average about 8 year of education in rural areas and 11 in urban areas, compared to the 1940s cohorts with less than one year in rural and 4 years in urban areas. The narrowing of the gender gap has been also

³ For education of women in Iran, see Mehran (1997 and 1999).

impressive. Women born during 1940-49 had only a fraction of schooling of men in rural areas and about half in urban areas. For the 1980-84 cohorts the gap has narrowed to about 10% in rural areas and zero in urban areas. The younger cohorts of Iranians born since 1970 have on average at least a basic education (in urban areas about 11 years which since 1996 is a high school diploma). The socio-economic effects of this education increase will last into the future as these are the parents in charge of educating the next generation of Iranians.

Table 1: Educational attainment by gender and cohort (average years of schooling)

Cohort	Rural			Urban		
	Male	Female	Total	Male	Female	Total
1940-49	1.40	0.10	0.70	5.80	2.80	4.40
1950-59	3.20	0.70	1.90	7.70	5.10	6.40
1960-64	4.90	1.70	3.30	8.80	6.50	7.70
1965-69	5.50	2.80	4.10	9.10	7.50	8.30
1970-74	6.80	4.20	5.40	9.50	8.40	8.90
1975-79	8.00	5.90	6.90	10.10	10.10	10.10
1980-84	8.60	7.50	8.00	10.70	11.00	10.90

Source: Authors' calculations based on unit record data from Household Expenditure and Income Survey, 2002.

The expansion of education is also reflected in enrollment rates in Table 2. Enrolment ratios in basic primary education are now comparable to countries at similar levels of economic development. The intake for primary education has increased from 78.5 percent in 1988 to 103.4 percent in 2002. The rapid rise in enrollment has come at a cost. As class sizes increased in the 1980s and many schools went to two--and some even three--shifts, education quality suffered.

Table 2: Enrollment rates by gender and level of education, 1995-2002

Year	Primary			Lower secondary			Upper secondary		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
1995	108.6	101.4	105.1	100.1	81.6	93.1	72.7	66.7	69.8
1998	108.9	102.9	106.0	102.2	85.1	95.9	79.9	81.2	80.5
1999	107.7	102.4	105.1	102.6	85.0	96.0	78.0	81.5	79.7
2000	107.2	102.2	104.8	102.6	85.0	96.1	77.1	81.7	79.3
2001	103.7	99.5	101.6	102.8	85.9	96.6	77.9	83.8	80.8
2002	101.8	98.1	100.0	103.6	87.5	97.8	76.6	82.6	79.5

Note: Enrollment rates for later years are sensitive to population estimates for the relevant age groups.

Source: Ministry of Education, Tehran, Iran.

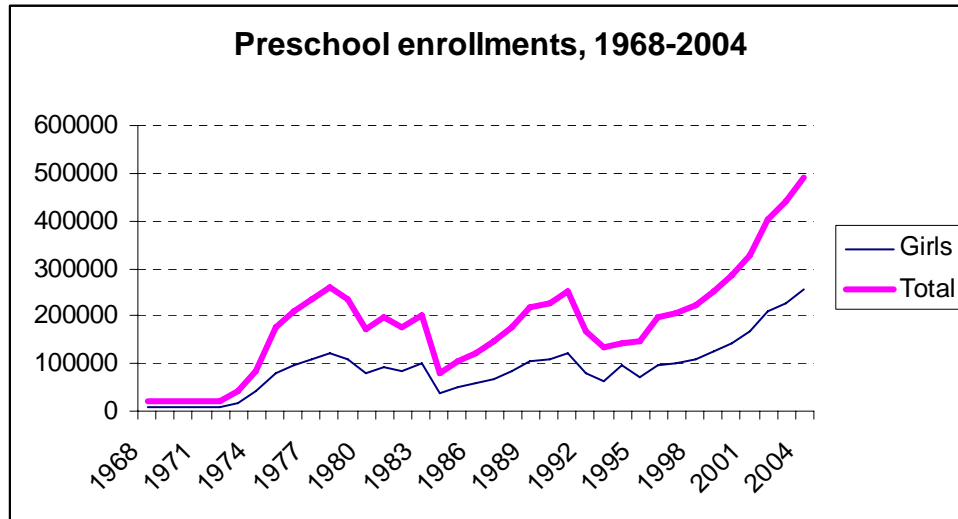
5. The history of pre-schooling in Iran

Preschool education in Iran dates back to the early years of the twentieth century,⁴ but it accelerated only recently. The first preschools were set up by Christian missionaries in Iran in 1919, which were mostly attended by children from the rich families. In 1924, recognizing the growing importance of pre-school education, the government prepared and ratified the bill to regulate their operations and conferred the first permit to operate a kindergarten in Tehran in 1931. During 1943-53 the government set up centers for training of preschool teachers and enrollments increased from 1,874 to 5,346. In 1961 the government started to operate its own kindergartens to allow children from middle and lower income classes to attend preschool, but these were mostly set up within its own ministries to help women employees. By 1972, there were 431 such centers. In 1974 the age for attending preschool was raised from 3 to 5. There was a surge of demand in day care and pre-school education during the oil boom years of 1973-78 before the Revolution (Figure 7), which was met mostly by day care centers attached to places of employment of women. As a consequence, as some women left the labor force or were encouraged to retire early after the Revolution, many of these centers were closed down and enrollments fell by one quarter. A further decline in primary school enrollments occurred in the mid 1980s following the huge increase in primary school age population, which created a shortage of primary teachers and reduced the supply of preschool education. In 1984 enrollments reached their lowest level of about 78,000, less than one-

⁴ For the early history of preschool education in Iran see *Encyclopedia Iranica*, "Nursery and pre-school education," <http://www.iranica.com/newsite/>, under Education.

third its previous high of about 260,000 (see Table A.1 in Appendix). With the end of the war in 1988, enrollments picked up, only to fall again in 1992.⁵

Figure 7. Enrollment in preschools



Notes: 1968 refers to school year 1968-69, and preschool refers to children age 5.
 Source: Ministry of Education 2005 (see also Table A.1).

⁵ The time series of preschool enrollments depicted in Figure 7 is problematic because for earlier years, before 1966, the age range is 3-6, some of whom are in day care but in later years it is only the 5 year old children in kindergarten (see “Nursery and kindergarten education,” *Encyclopedia Iranica*). To get a sense of the proportions involved, consider the numbers for 2003-04 (which do separate day care and kindergarten): 492,422 kindergarten (5 year-old) children, compared to 51,385 in the 0-4 category who were in nursery and day care, the latter comprising only about 10 percent of all pre-primary care of any type. Unfortunately, data on growth of the number of children in day care is not available for all years.

Table 3: Preschool Enrollments, 1993-2004

Year	Enrolment Ratio	Boys	Girls	Total
1993-94	7.6	69,119	63,534	132,653
1994-95	8.2	73,946	67,782	141,728
1995-96	11.0	94,643	86,948	181,591
1996-97	14.3	99,842	95,339	195,181
1997-98	15.5	104,014	100,308	204,322
1998-99	16.3	110,711	109,723	220,434
1999-00	22.0	125,700	125,856	251,556
2000-01	25.3	142,538	144,365	286,903
2001-02	29.2	160,822	168,240	329,062
2002-03	35.6	195,536	208,176	403,712
2003-04	39.8	212,276	226,503	438,779
2004-05	47.8	238,387	254,035	492,422

Source: Enrolment is Ministry of Education (MOE), population estimates are based on birth registration data from Civil Registration Office (CRO), and under 5 mortality rate of 3.5 percent estimated the Statistical Center of Iran (SCI).

Since 1993, expansion of kindergarten education has increased uninterrupted and at a rapid pace (Figure 7 and Table 3). In 2004-05, 47.8 percent of 5 year olds attended kindergarten, compared to only 7.6 percent in 1993-94.⁶ The number of kindergartens increased from a few hundred in 1970s to 17,291 in 2004-05. Nearly 4000 of these were added in that year, while the number of primary schools decreased by about 1500.

Will this latest expansion of preschool education continue or stall, as it has in the past? To answer this question we must first understand how the latest phase of expansion came about. Was it part of the general government-led expansion of formal schooling, or was it an indication of increasing demand on the part of parents for deepening of formal education by extending it to ECE? The answer appears not to be the first because in Iran ECE is not part of the government's mandate as yet. Because of this fact, as we show below, the Ministry of Education took the responsibility for expansion of ECE rather unwillingly. The evidence we present suggests rather that ECE growth was related to

⁶ Preschool enrollment rates are sensitive to population estimates, which are not available from the same official source in Iran. MOE estimates for enrolment rates are lower than ours after 1996, because estimates of the 5 year old population by MOE are unrealistically high, even though both sets of estimates are derived from the same CRO birth registration data using published SCI under 5 mortality rates. For example, the MOE estimate for the number of 5 year olds in 2004 *exceeds* the number of births five years earlier (in 1999) by more than 8 percent, which only makes sense if one assumes undercounting of births by about 13 percent. There is no evidence that CRO data underestimate the number of births at this rate.

increased demand by parents but specific institutional reasons were instrumental in making it happen. We argue that pre-school education is directly related to the decline in fertility and the changing number of primary age children (Figure 4). As noted earlier, in the 1990s the population of primary-age children, and with it primary enrollments, declined rapidly. Unlike in the case of a family that might invest more in each child at the same time as when it decides to have fewer children, there is no reason to believe that such quantity-quality substitution takes place for the government. In fact, the government, as a passive actor, had to wait until all the baby boom children had moved through the entire system of formal schooling before it could think of cashing in on the demographic gift. In the 1990s, even as primary enrollments were declining, as far as the government was concerned relief from a fast growing population was years away, until the fertility bulge had passed through lower and upper secondary schools as well.

Since Becker's (1960) seminal work, economists have viewed increases in education that follow closely fertility reduction as quality-quantity substitution. However, in developing countries where most education is publicly provided, such substitution involves governments who must decide whether to respond to a decline in fertility (and hence enrollments) by raising quality or spend the savings elsewhere. There are competing demands for government revenues outside of the education sector, so reduction in enrollment can as easily result in a smaller education budget as in reduced class size and higher quality. The institutional responses to fertility decline in Iran was fairly unique in that it brought about higher quality in the form of ECE but it was an unintended consequence of an unwillingness or inability to either layoff unwanted primary school teachers or retrain them for middle school teaching. This was itself very much a consequence of the revolutionary spirit that still prevailed in the 1990s Iran, where firing of employees was considered a heartless capitalist act.

The response of Iran's Ministry of Education to primary enrollment decline was thus shaped by institutional constraints and political expediency. The institutional constraint was a government directive, attached to the Second Five Year Development Plan (1989-

93), which prohibited the government from shifting its more important resource—manpower—up to higher grades (presumably because the planners considered retraining impractical). This tied the Ministry's hand in reassigning the surplus primary school teachers who could have, albeit with less competence, filled in the needed slots in the expanding lower secondary level schools. Political expediency for a revolutionary government with a strong anti-capitalist rhetoric, equally ruled out the alternative of laying off the surplus primary school teachers. As a result, the only real choices for the government were to lower primary class sizes and to employ the surplus teachers to expand pre-school education. Both would raise education quality, though in different ways. In the event, the government did some of both; it lowered class size at primary level and expanded kindergarten education. Pupil-teacher ratios at primary level fell from a peak of 31 in 1991 to 20 in 2004, and education expenditures per primary student nearly doubled during 1991-2004, from 6 to 11 percent of per capita GDP (World Bank 2001 and 2005). Increased resources at the primary level also resulted in improved efficiency as transition rates from primary to lower secondary level increased from 83 percent in 1993 to 96 percent in 2002 (MOE 2005).

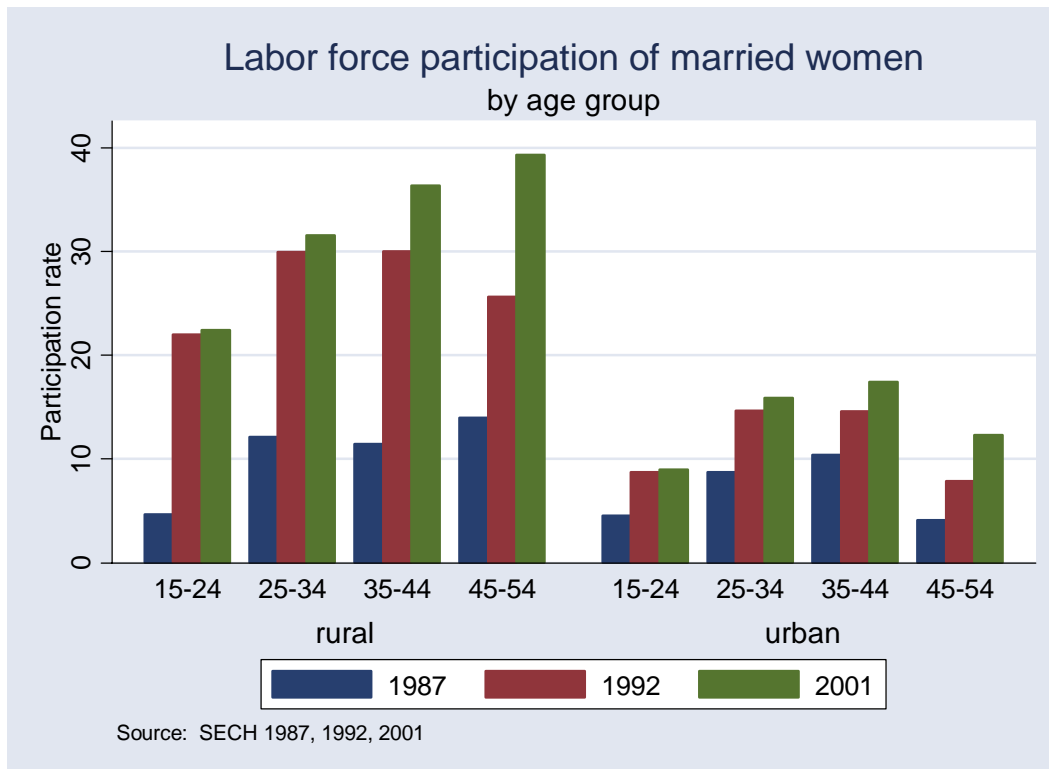
Shifting excess resources down to pre-primary education was not straightforward because yet another institutional constraint prevented the Ministry of Education from engaging in delivery of kindergarten education. As noted earlier, preschool education was (and still is) not part of the Ministry's mandate, so the government could not pay for teacher salaries and other expenses out of the Ministry's annual budget. So, funds to pay for preschool teachers and school supplies had to be raised from parents. The government's role went beyond a middleman between parents and teachers, as it provided the most important ingredient for their joint enterprise—classroom space—free of charge. In every school with surplus faculty, school officials set up classroom space and collected tuition from parents, thus creating semi-public kindergartens that would flourish in the following years. The government had achieved its main objective to help primary school teachers keep their jobs, and in the process has promoted ECE.

This innovative approach of the Ministry to balancing supply and demand for primary teachers led to a sharp increase in preschool enrollments as noted earlier, from 7.6% in 1993-94 to 47.8% in 2004-05, rising at an annual rate of 12.6 percent (Table 3). The rise of pre-primary education has not only improved primary education in terms of higher efficiency as noted above, it has put Iran in a favourable position internationally. The latest UNESCO (2006) report which provides comparative cross country data for 2002/03 shows Iran's gross preschool enrolments at 30.7 percent, much higher than the average of Arab countries (17.7 percent), but below Countries in Transition (34.6 percent), Developing Countries (34.3 percent), and Developed Countries (81.1 percent). The government plans to enroll 70 percent of preschool children by 2010, which is a realistic goal because the number of preschool children is expected to remain relatively constant in the near future.

The positive institutional response to falling fertility is obviously only half of the story of rising child quality in Iran. The other half is the demand side, or more precisely the parents' willingness to pay the fees to enroll their children in government sponsored pre-school program. Increased parental demand for preschool education may be directly their lower demand for children. In other words, parents, for reasons we can discuss, has shifted their behavior from the traditional high fertility-low education to low fertility-high education sometime in the 1980s, and thus they were interested in enrolling their children in pre-school. They were posed for greater investment in them when the government found a way for them to do so. As a related development, at about the same time awareness of the importance of early childhood development was increasing. Discussion of child psychology in the public media, notably in widely circulated *Hamshahri* daily and in state television, grew in the 1990s and helped parents become more aware of the benefits of early childhood education. This was critical in channeling the new energy for child education released by lower fertility away from pressure for better grades and test scores at high school and the university entrance examinations (which are still big obsessions of Iranian parents) to less tangible aspects of education such as ECE.

Second, more women entered the labor force in the 1990s, increasing the demand for daycare and kindergarten services. Figure 8 shows the rise in the participation in market work by married women in both rural and urban areas.⁷ The participation rates for both rural and urban increased for all ages. Rural women's participate rate is greater but because of the nature of their work are in a better position to combine work and child care. The group most affected by lack of day care is probably urban women aged 25-34 and married, the group most likely to have children under 6. Participation rates for these women were still under 20 percent in 2001 but had been increasing in the previous decade and a half. The low activity rate of Iranian women compared with high demand for pr-school education is interesting in itself and an indication of the importance of the demand factor in the case of Iran. Compared to women in North Africa, Iranian women work less in the market (see World Bank 2004), but, as noted above, have higher demand for pre-school education.

Figure 8: Participation rates of women in the labor force, 1987-2001



⁷ The data are from three rounds of the survey Social and Economic Household Characteristics (SECH), conducted by the Statistical Center of Iran. See also Salehi-Isfahani (2005).

Public vs. private supply of preschool education

If demand for preschool education were high, why did the private sector not step in to satisfy it? Although nearly all schools in Iran are public, since preschool education was not part of the government's mandate it would have made sense for the private sector to fill in the gap between supply and demand. In 2004-05, of 218,149 schools at all levels of schooling only 12,778, or 6 percent, were private. Nearly all educational institutions in rural areas are public. Overall, private sector has played a slightly stronger role at the kindergarten level than grade school (see Table 4), but its share in the provision of kindergarten education has fluctuated. In the 1990s the private sector increased its share in kindergarten education from 12.0 percent in 1993 to 19.5 percent in 1997, but its share fell below 10 percent in 2001 as the number of public schools offering preschool expanded. During 1993-2002 enrollments in public kindergartens increased by a factor of 4 compared to 2.5 for private institutions. However, since 2003 enrollments in private kindergartens has been increasing faster; in 2004 private enrollment increased by 21 percent compared to 11 for public. Evidently, for most of this period, the pressure from demand was not sufficient to induce private sector investment in kindergartens, but perhaps that is about to change.

Table 4. The distribution of kindergarten schools and students by ownership

Year	Schools				Students			
	Public	Private	Total	% private	Public	Private	Total	% private
1993	5,292	285	5,577	5.11	116,336	16,317	132,653	12.30
1994	5,592	499	5,877	8.49	117,871	23,857	141,728	16.83
1995	2,201	808	3,009	26.85	147,064	34,527	181,591	19.01
1996	2,400	922	3,322	27.75	157,711	37,470	195,181	19.20
1997	2,462	988	3,450	28.64	164,498	39,824	204,322	19.49
1998	3,285	958	4,243	22.58	185,891	34,543	220,434	15.67
1999	4,812	996	5,808	17.15	219,700	31,856	251,556	12.66
2000	6,331	1,051	7,382	14.24	257,354	29,549	286,903	10.30
2001	8,477	1,104	9,581	11.52	302,074	26,988	329,062	8.20
2002	11,174	1,286	12,460	10.32	372,852	30,860	403,712	7.64
2003	12,099	1,398	13,497	10.36	404,064	34,715	438,779	7.91
2004	15,719	1,572	17,291	9.09	450,351	42,071	492,422	8.54

Source: Ministry of Education (2005).

6. Conclusion

This paper has examined the rapid expansion of pre-primary education in the last ten years in Iran in the context of Iran's demographic transition. We argued that the rise in ECE, indicated by increase in preschool enrollment from 8 percent in 1993 to about 50 percent of the 5 year old population in 2005, is related to the rise and fall of fertility in post-Revolution Iran. We examined the extent to which the fall in fertility and rise in education in the 1990s can be viewed as the substitution of quality for quantity of children, an idea which forms the cornerstone of the new theories of economic growth proposed by Becker, Murphy and Tamura (1990) and Lucas (2002). We showed that in the case of ECE in Iran, the basic elements of the quality-quantity substitution are present, but that the story was more complicated, and perhaps even more interesting, than the theory based entirely on individual choice would have us believe.

The mechanics of how resources freed as a result of lower fertility found their way into greater investment in ECE goes well beyond what a simple model of household decision making would suggest, namely parental decisions to substitute quality for quantity of children. As the size of the primary school age children dropped and a surplus of primary school teachers developed, political expediency of the revolutionary government constrained it from laying off thousands of primary school teachers, while a government directive ruled out re-assigning them to teach at higher levels. The government was then left with the options to reduce class size at the primary level or reassign surplus teachers to teach kindergarten. Since preschool was not part of its mandate, the government was not able to directly pay these teachers, so it in an innovative fashion it acted as intermediaries between teachers and parents in order to provide preschool education. The switch in family behavior cannot be properly understood without reference to the institutional context in which families operated. In particular, the decision of the Ministry of Education to act as the intermediary between primary school teachers in search of a job and the parents who have the resources and the will to invest in their

children's preschool education was crucial in the expansion of preschool education in Iran.

The analysis of this paper draws attention to a simple fact that social outcomes depend on the institutional context in which individuals operate, which is often overlooked when we try to explain such outcomes by relying on models of individual behavior alone. Whether or not demographic transitions go hand in hand with greater investment in human capital depend to a large extent on the institutional or policy context of the country. The lesson for other countries of how Iran's demographic dividend gave rise to higher preschool enrollments is that the benefits of fertility decline do not automatically lead to greater investment in child education. After all, governments in developing countries have other urgent uses for the freed resources and may decide to spend them in other areas than education.

There is also a lesson for Iran's own future benefits from fertility decline. The potential for greater investment in education exists for another decade or two as the fruits of lower fertility are realized in terms of a rising ratio of adults to children. The number students at primary level will stabilize at about 6 million, but it will fall for lower secondary from 4.4 to 3.7 million and for upper secondary from 4.2 to 4.1 million. The demographic gift will continue to present the families and the government of Iran with the opportunity for further improvements in the quality of education. But, the country also faces a great challenge to provide jobs for nearly a million young adults who enter the labor market every year. In the end, Iran's decision to use its demographic dividend to increase enrollments at preschool level, whether the result of household calculations or institutional happenstance, was fortuitous. But the institutional constraints that may prevent further gains in human capital deepening are quite formidable. As Salehi-Isfahani (2002, 2005) has argued, the existing institutions of education and the labor market in Iran do not provide the right incentives for effective utilization of the demographic gift. Iran's educational system is too competitive and its labor market too rigid to induce individuals to invest in the variety of skills that modern economic growth requires. As a result, Iran's formal schooling will probably

continue to expand, while the stock of its effective human capital stagnates. The prevailing incentives push parents and students into greater focus on test taking and rote memorization at the expense of valuable skills that test results fail to reveal. To end on an optimistic note, no matter what happens with future investments in human capital, the rise of early childhood education will prove a lasting improvement because, by its nature, it promotes a variety of types of skills.

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Appendix

Table A.1 Pre-primary enrollments

Year	Girls	Total	Percent Girls	Population	No. schools
1943	966	1874	51.55		30
1953	1730	5344	32.37		115
1963	5924	13296	44.55		262
1968	8782	19462	45.12		337
1969	9248	20214	45.75		376
1970	8706	19308	45.09		349
1971	9509	21237	44.78		431
1972	10025	21773	46.04		419
1973	18587	40987	45.35		607
1974	40574	82854	48.97		980
1975	79978	175424	45.59		1804
1976	97434	211869	45.99		2342
1977	108298	235136	46.06		2918
1978	119662	259497	46.11		3492
1979	109123	236486	46.14		3696
1980	81163	172003	47.19		2791
1981	92554	195989	47.22		2737
1982	85329	177525	48.07		2410
1983	100960	202899	49.76		2735
1984	36135	77774	46.46		1276
1985	50376	106986	47.09		1732
1986	58451	123437	47.35		1911
1987	69064	146409	47.17		2162
1988	85223	177979	47.88		2547
1989	103345	217496	47.52		3210
1990	108151	227492	47.54		3586
1991	119959	252513	47.51		4114
1992	81307	168864	48.15		3003
1993	63534	132653	47.89		2483
1994	97782	141728	68.99		2715
1995	71299	147064	48.48		2201
1996	95339	195181	48.85	1361581	3322
1997	100308	204322	49.09	1318616	3450
1998	109723	220434	49.78	1355445	4243
1999	125856	251556	50.03	1145103	5808
2000	144365	286903	50.32	1134447	7382
2001	168240	329062	51.13	1126193	9581
2002	208167	403654	51.57	1133259	12456
2003	226503	438779	51.62	1103822	13497
2004	254035	492422	51.59	1029455	

Notes: 1943 refers to school year 1943-44.

Source: Ministry of Education (2005)