1990

Wait-for-change Strategy: A Dynamic Analysis Of Chinese Maternity Histories

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WAIT-FOR-CHANGE STRATEGY: A DYNAMIC ANALYSIS OF CHINESE MATERNITY HISTORIES

by

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Submitted in partial fulfilment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
London, Ontario
October 1990

ISBN 0-315-64275-0

ABSTRACT

This study is an attempt to understand how Chinese women carried out China's fertility decline with an unprecedented speed since the mid-1970s. For such an understanding, it is necessary to examine how the fertility revolution carriers acted in response to the most important socio-economic, institutional, and cultural effects. Based on China's large-scale In-Depth Fertility Surveys in Shaanxi (1985) and Guangdong (1987), this study tries to explain the fertility revolution in a new perspective.

It attempts to develop a dynamic theoretical framework which concerns not only the socio-political institutional impact on Chinese women's compliance with the birth control policy from the top down but also the effect of a supposedly all-embracing individual environment which includes socio-economic foundation and cultural "mentality" from the bottom up. Considering such a two-way interactive dynamic, a *wait-for-change* strategy analysis is developed to focus upon how long Chinese couples continued such compliance.

Further, a workable model is conceptualized to examine the spacing pattern of contraceptive use in the birth interval which is perhaps one of the most remarkable features of controlled fertility in the modern world. The model mainly refers to a two stage decomposed birth interval analysis: the first move is from a birth to onset of contraceptive use; then, the next move is from the start of contraceptive use to a subsequent birth. This aim is achieved by creating a critical variable -- the timing of contraceptive use in each birth interval -- from the contraceptive use information of each pregnancy interval from China's In-Depth Fertility Surveys.

Next, by integrating the findings of the component paths, the present study

provides new answer to the puzzle that many recent birth interval studies have posed, which refers to an unexpected direct pathway from individual background variables to birth interval dynamics after the principal "proximate determinants" are controlled. Its answer is found to be likely in a commonly neglected spacing pattern of contraceptive use in birth interval dynamics.

Lastly, the present study has characterized patterns of *wait-for-change* strategy fertility behaviour among Chinese couples in Shaanxi and Guangdong who were exposed to the risk of having out-of-quota births during the *wan xi shao* (later [marriage], longer [intervals between births], fewer [children]) and one-child-family national birth control campaigns, respectively. The findings reveal that Chinese couples were largely willing to comply with the birth control policy by using contraception to space birth at lower parity regardless of differences in educational level, age at marriage, and gender composition of children. However, as they arrived at the contraceptive stage, the situation changed. Generally, the socio-economic factors, gender composition of children, and age at marriage do have significant effect on women's waiting time for parity change. These findings indicate that socio-economic and son preference cultural effects from the bottom up on Chinese women's fertility behaviour were indeed profound and enduring, despite a powerful constraint of political institutional settings from the top down.

Acknowledgements

I am grateful to my advisor, Professor T.R. Balakrishnan for his unfailing help, excellent guidance, and great encouragement during this dissertation writing and throughout my many years of graduate study and research.

My thanks also go to the members of my examining board, Dr. R. Beaujot, Dr. E. Pryor, Dr. F. Rajulton, and Dr. T. Wonnacott for giving their invaluable comment and criticism.

I would like to thank Dr. R. Beaujot, Dr. T.K. Burch, Dr. E. Ebanks, Dr. K. McQuillan, Dr. P. Maxim, Dr. J. Rinehart, and Dr. F. Rajulton. Their insights throughout my many years of graduate study were helpful for my dissertation.

I am also grateful to Shen Yimin of the China's Department of Population Statistics for permitting me to use the In-Depth Fertility Survey data. My thanks also go to Dr. T.K. Burch and S. Shiel of the Population Study Centre for helping me to obtain the Guangdong data directly from the International Statistical Institute and financial support.

I would like to thank many professors, secretaries, and graduate students of the department, especially A. Russell, S. Cote, and L. Schoel, for their warm help all way through my graduate study.

Sincere thanks also go to Dr. Xizhe Peng, Dr. Jichuan Wang, Ying Hu, Chanwen Meng, Weiming Zhang, and Gang Xu for proving invaluable information on China's population issue though they are not responsible for any inadequacy of my dissertation.

I am indebted to the United Nations Development Program which provided

financial support for my master program study and all sources of funds in Canada for my Ph.D. program study.

I am grateful to my parents, brothers, daughter Ru, and my friends for their emotional support. Last but not least, my wife, Kangmei, deserves my deepest thanks: without her constant encouragement and loving companionship, this dissertation would not have been possible.

Dedicated to

my motherland

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CHAPTER I

INTRODUCTION

China, as one of the oldest civilized societies in human history, has experienced her rise and decline for thousands of years until modern time. Since the Opium War of 1840-42, her millions of sons and daughters have dedicated their lives to the cause of modernization from the *national revolution* called by Dr. Sun Yat-sen (1866-1925), father of the Chinese Republic, to the *socialist revolution* led by Chairman Mao Zedong (1893-1976). Although these ordinary people have been nourished by the family-centred culture, modernization is a "national consensus" (Hsu, 1990:803) and the most lofty undertaking. It is under this appealing goal of achieving a rich, strong and prosperous nation that her millions of younger generations have dedicated their personal interests to a fertility revolution since the mid-1970s.

China used to be proud of her largest population size in the world, but recently has come to blame this old pride for population problems. No matter who is responsible for the initiation of this great fertility revolution, whether inside or outside of China, the fertility revolution seems to be successful in the sense that China's total fertility rate has dropped from 5.8 in 1970 to 2.3 in 1980 (Coale and Chen, 1989; Chen, 1982:32-58) though it rose slightly to around 2.59 in 1987 (Department of Population Statistics, 1989:131; also see various estimations by Feeney et al., 1989; Weinstein, 1990).

How this achievement was carried out and how far it could go are the questions which have caused many demographers, both inside and outside of China, to focus much

attention on this achievement. The present study starts by introducing the various existing explanatory approaches and their contributions to the study of China's fertility decline, especially the leading questions produced by their studies, explicit or implicit, which would serve as a basis for further study. In the debates on the determinants of China's fertility decline, we are to meet the institutional approach (McNicoll, 1978, 1980, 1989; McNicoll and Cain, 1990; Greenhalgh, 1988, 1989c) time and time again. It is this rather new approach which sheds light on the understanding of the major cause of China's fertility decline. It is especially from Greenhalgh's (1985, 1986, 1988, 1989a, 1989b, 1989c) sharp observations that the present study gains insight for further advancement. In Chapter Two, we are to sort out the valuable ideas of different authors from the same or different approaches, no matter whether they are the kernel or the spark of the thought. Along with the theoretical reasoning, the present study develops the conceptualization of *wait-for-change* strategy analysis which is directly derived from Greenhalgh's (1988) "fertility-as-mobility" explanatory framework. For Greenhalgh, Chinese couples *wait-for-change* strategy behaviour is from the top down; to the present author, it is a two-way dynamic, namely, not only from the top down but more importantly, from the bottom up. This chapter also provides some discussion to elaborate on this thought.

Thanks to China's In-Depth Fertility Surveys conducted in 1985 and 1987, respectively, which provided the world with the detailed information on how ordinary Chinese couples carried out this fertility revolution in human history. Although China has experienced numerous revolutions and great movements, there has never been any historical record of ordinary people's individual lives, except for these excellent surveys. It is this invaluable historical record which drives the present study to develop a testable

model for revealing how Chinese women carried out the fertility revolution and how far they might go. In Chapter Three, we will review the existing important findings of some empirical maternity history, especially the puzzle of a discrepancy between what the classic socio-demographic model (originated by Davis and Blake [1956] and further developed by Bongaarts [1978]) expects theoretically and the empirical micro-level results (Bumpass et al., 1986; Rindfuss et al., 1987). To tackle the puzzle, the present study provides some first thoughts and a conceptual model to be followed by a test. In this chapter, the background settings for the two selected provinces (Shaanxi and Guangdong), sample data, hypotheses, variable constructions and methodology explanations are provided in order. Among them, we explain in detail the cohort selection criteria and variable construction. For the former, we need to know who we are talking about; for the latter, we should know that those reconstructed variables are retrievable from the data set but largely omitted by existing research.

We start the data analysis in Chapter Four. First, we start from simple percentage analysis. We are to obtain the simple and direct information as baseline reference for further statistical processes. Then a series of conventional birth interval analyses are provided for tackling the puzzle that many recent birth interval analyses have posed (Bumpass et al., 1986; Rindfuss et al., 1987). Furthermore, the analysis is divided into two major paths: "controlled" marital fertility path and "natural" marital fertility path for non-contraceptive users. For the former path, we further decompose the birth interval into two stages: moving from a birth to onset of contraception and then from the start of contraception (refer to reversible method use only) to a subsequent birth. For the latter path, breastfeeding behaviour is substituted for contraception as the "proximate variable"

in the model test. Finally, we try to answer the puzzle of the conventional birth interval analysis by integrating all the component paths. A new explanation for the second birth interval analysis is provided as an example. In general, we find that our *wait-for-change* strategy analysis is fruitful.

Chapter Five goes over what we have seen from the beginning to the end, especially the theoretical reasoning, since the results are quite straightforward. We provide a few conclusions on China's fertility decline.

CHAPTER II

THEORETICAL PROBLEMS OF CHINA'S FERTILITY STUDIES

2.1 Debates of Fertility Transition in China

The recent history of fertility in China has struck the world with its extraordinary extent and rapidity of decline. Up to 1970 China's overall fertility had been high and relatively stable in the vicinity of five to six births per woman, except during crisis periods (1958-1961). During the 1970s, China's total fertility rate fell from 5.8 in 1970 to 2.3 in 1980 -- a span of only eleven years (Coale and Chen, 1989; Chen, 1982:32-58). In studying this decline, there has been a heated debate about whether or not modernization played a role independent of government policy.

Many demographers and social scientists, both inside and outside of China, had stressed the independent role of modernization and socio-economic factors in determining China's contemporary fertility decline (Tien, 1984; Birdsall and Jamison, 1983; Whyte and Parish, 1984; Poston and Gu, 1987; Beijing Review, 1985; Wu, 1985). They devoted their attention to the fertility trends and variations within the context of the country's sub-regional variability in socio-economic development and family planning programs. Through their findings of high negative direct effects of structural development, income, female status, and quality of life on fertility, they tend to assess that the fertility decline in China went through the same evolutionary process as in other Western societies. The key argument made by the development approach is that the "government programs,

although important, have not operated in a vacuum" (Birdsall and Jamison, 1983:651).

In contrast, a number of demographers argued that China's recent successes in reducing its fertility are mainly the result of direct government intervention (Wolf, 1986; Bongaarts and Greenhalgh, 1985; Mauldin, 1982; Lavely, 1984; Tsuya and Choe, 1988). Lavely (1984) observed that vast and varied as rural China is, the trend of fertility fluctuation in the recent three decades has been toward *homogeneity* across broad geographic areas. It is the *standard package* of socio-economic and political reforms that either strongly affect or directly manage China's major events, such as natural catastrophes, new social policies, political upheavals, as well as recent demographic history. "Thus, although the details may differ, the major forces which affect widely scattered locals all belong to the same family of events, and the demographic histories of local areas thus have their broad outlines in common" (p.367).

Continuing this line of argument, a comparative study of fertility trends of Taiwan and mainland China by Wolf (1986), shows that the path taken by Taiwan "is gradual and almost always tends in the same direction, the course taken by the mainland is as erratic as a barometric chart tracing the changes preceding and following a series of violent storms" (p.103). The former is seen as the result of a "slow, unidirectional movement such as characterizes modernization", while the latter seems to be the "product of dramatic shifts of kind that are most likely the result of policy decisions" given a close correlation between well-documented reversals in policy and abrupt shifts in fertility rates (p.104).

It is interesting to note that while some analysts of development approach emphasized the solid socio-economic basis of development for fertility decline, they were

also aware of the limitation of existing level of development for further fertility decline. For example, Birdsall and Jamison (1983) point out that China's "additional fertility decline, or even maintenance of current fertility levels, will likely be possible only through increased direct efforts on the part of government" (p.651). It is at this point that both the policy and development approaches agree that the governmental socio-political power could control population growth beyond the socio-economic limitation. However, one should ask further: how could it become possible for couples in China to bring the fertility decline to an extraordinary extent and rapidity far beyond the societal level of economic development and policy diffusion process? At this point, the debate between above two groups stops.

2.2 Institutional Determinist Approach

In the recent debate of demographic transition, especially on China's successful experience of dramatic nationwide fertility decline, an institutional approach emerges with a new perspective challenging the conventional wisdom on demographic transition, especially in China (see McNicoll, 1978, 1980, 1989; McNicoll and Cain, 1990; Greenhalgh, 1988, 1989c). As Greenhalgh (1989c) explicitly argues,

> the sustained fertility decline that began in the 1970s cannot be understood without taking the broadest possible measures of the profound changes wrought in Chinese society by the transition socialism in the 1950s. In other words, an approach of the third, or institutional sort is necessary. Briefly, I will argue that the explicit fertility policies of the 1970s and 1980s -- the later-longer-fewer (*wan xi shao*) followed by the one-child policy -- were necessary but not sufficient conditions for the fertility decline that occurred. The sufficient conditions include a range of implicit

> fertility policies -- economic and political policies that restructured family and community institutions and state-society relations in ways that fundamentally altered both the economics of childbearing and the politics of fertility decision-making. (pp.3-5)

This proposition succinctly points out a major thrust of the recent innovation of the institutional approach to the existing debate of fertility transition, especially in China. That is, the institutional approach is seeking to place currently known fertility determinants on a more broad ground.

It is known that in the past decades the classical debate between the adjustment (including modernization) approach and the diffusion approach centred their arguments on one major issue: the nature of rationality (or called motivation) of fertility control. The adjustment/modernization approach emphasises an economic rationality which is tightly associated with material conditions, while the diffusion approach stresses an ideational adoption of a small family ideal which is culturally oriented rather than economically conditioned (See Chen, 1986). Now, the institutional determinists look beyond the old question of "what rationality is more important in decision-making" to a new question of "how rationality functions in a structured society as a whole".

To introduce McNicoll's (1980) remarkable institutional approach of fertility, we should begin from its starting point, which is H. A. Simon's (1957) concept of "*administrative man*" as a contrast to "*economic man*". Why is this distinction so important? The key point is that an individual cannot be a "global optimizer" but only an adaptor. Since an individual's "limited computational capacity" for evaluating the medley of confusion which constitutes the real world requires a simplification within fairly narrow limits, "administrative man 'satisfies' rather than 'maximizes'" (McNicoll,

1980:450). It is from this starting point, "[an] individual's (subjective) rationality is thus bounded or *segmented*: at any particular decision juncture, only a few of the many available choices come to mind and are evaluated against each other" (McNicoll, 1980:450). That is to say, in any society, the degree of freedom for an individual is very limited and individual behaviour is only adaptive rather than autonomous. An individual's rationality is conditioned on very narrowed alternatives set by the rule, norms of institutions, and culture.

So how does an individual act with his bounded rationality in such structured environment? What is an individual's position in a society? The limits to human rationality, as Simon (1957) says,

> are not static, but depend upon the organizational environment in which the individual's decision take place. The task of administration is so to design this environment that the individual will approach as close as practicable to rationality (judged in terms of the organization's goals) in his decisions. (pp.240-241)

That is to say, an individual can only conform or adapt to the existing organizational setting. That is the only freedom an individual can have. So, the position for administrative man in the world is only standing as a governable man under the governance of special organizational settings. To sum up, people's behaviour is determined by how the people are controlled by their organizational environment.

It is from this starting point, a reified organizational role played by the institutional setting to govern society as a whole -- a kernel of institutional approach -- is developed. As McNicoll (1978) clearly recognized, the account of "social interest" which sees fertility as "too important a matter to be left to parents" and thus develops its routine responses by institutionalising some form of control over individual behaviour

"may appear to be *anthropomorphizing society*, endowing it with explicit foresight and decision-making powers" (p.86)[italics mine].

Knowing this extreme, McNicoll (1978) said: "A societal demographic outcome roughly in line with an imputed societal interest can be conceptually dis-aggregated into the behaviour of these constituent and often overlapping groups, constrained both by external pressures and by the interests of the more dominant groups themselves" (p.86). This insightful proposition expresses a sober mind of an institutionalist in developing a new theory. However, this is not always the case. When the institutional approach tries to distinguish itself from existing approaches, especially when it bases its starting point on the concept of "administrative man" under the structured environment, the original insightful view of a dynamic social environment constituted by different interacting groups is no longer its main concern. This tendency can be seen from the way of how institutions are defined.

Although institutions are formally defined as "more or less stable social or economic arrangements" (McNicoll, 1980:458-459), in our reading of the institutional determinist's literature, institutions, social and administrative organizations are often synonyms distinguished from economic institutions. This can be best seen from McNicoll and Cain's (1990) updated study of different forms of institutions in rural societies. As they say:

> Any adequate treatment of population and rural development, especially one that aspires to account for intersocietal differences in outcomes, must of course pay due attention to agrarian economic institutions. However, agrarian outcomes are conditioned also by other institutional factors -- indeed we would maintain that characteristics of family and supra-family social structures may contribute as much to the operation and achievement of the rural economy as do more narrowly "economic" institutions, and

perhaps more to the course of demographic change. (p.23)

This account depicts the social and administrative organizations as the kernel of an institutional approach. Such a definition of institutions is to specify something not only "external" to human action but also competing with the well accepted economic institutions, in constraining people's "free will".

In seeking something different from economic factors but still "tangible" for explaining how a demographic transition can happen independently of economic development, the institutional approach tends to go to its extreme by setting aside culture. As McNicoll (1980) says: "While this adaptation of Simonian concepts does allow institutional and cultural factors to be brought into apposition as fertility determinants, our present interest is focused on the former. Here, the value of the construct of a segmented decision environment is not in giving potential decision-affecting force to cultural intangibles but in detailing the impact of quite palpable economic and institutional factors" (p.451). It is the seeking of a tangible determinant that leads the institutional approach to centre on the "palpable" impact of institutions and to touch lightly on the "intangible" effect of culture.

Following the institutional approach, in contrast to modernization and policy approaches, one can easily get a rather satisfactory answer for the question of how it could become possible for a society, like China, to bring fertility decline to a level beyond its level of economic development. It has revealed that the success of China's dramatic fertility decline is largely the result of people's compliance to an opportunity structure governed by sophisticated political and administrative organization settings accumulated by Party and government (see McNicoll, 1980; Greenhalgh, 1988, 1989). The

major thrust of the institutional approach to conventional demographic wisdom is that it successfully singles out a non-material structural but still palpable force, which competes with the tangible economic factors in governing fertility trends.

It is important to note that while proclaiming institution as a superpower-like source of constraint over people's fertility behaviour, institutionalists nowhere deny the existence of limits of political power. Through a review of key changes in Chinese population policy and practice during 1984-1986, especially an examination of the conditions under which second children were permitted, Greenhalgh (1986) found that China's fertility policy shifts toward a more lenient direction during 1984-1986. What has happened? As she says:

> While apparently *initially hoping* that the great majority of couples might be persuaded to have only one child, *within a few years policy-makers had discovered* that this was impossible in the present cultural context. Some people illegally removed IUDs, killed infant girls, beat family planning workers, and stole off to cities to have children, producing a situation that was as politically intolerable as it was unanticipated. ... *Forced to come to terms with socio-cultural reality*, policy-makers bent the rules to accommodate patrilineal families and underprivileged groups, two social elements whose political weight apparently should not be underestimated. (p.508) [italics mine]

Here, a very important issue is brought about: institutional power also has its limitation for controlling population and people. The social and political institution settings are also changing in response to, in Greenhalgh's (1986) words, "socio-cultural reality".

It is surprising to know that China's leaders have allowed rural only-daughter-households to have a second birth in limited areas since 1984 and "officially extended to all rural areas of the country since the first half of 1988" (Zeng, 1989). It means that China's leaders actually made a concession to peasants' strong desire for more than one

child, especially their son preference. This concession confirms the speculation about the limitation of institutional settings in controlling individual fertility behaviour.

How to explain such phenomena from an institutional perspective? Constrained by the logic of explaining behaviour *within* a given structural setting, which actually is developing or changing corresponding to a social dynamics as a whole,[1] institutionalists seem to have a hard time in reconciling this problem.

In an updated discussion of China's fertility trends in 1990s, Greenhalgh (1989) suggests that it is the collectivisation of rural life since the mid-1950s that lowered the value of children to parents and their fertility in the 1970s. It is the decollectivization, a reversion to more traditional forms of rural life, that "bolstered the values of children while partially freeing society from state control. These institutional reversals help explain why fertility in the 1980s returned to the level of the late 1970s, despite the existence of a more stringent fertility policy" (p.19-20). And furthermore, she predicts that since rural economic reform has partially freed peasants from state control "it is clear that it is changes in economic, rather than population policy that will shape the fertility trends of the 1990s" (p.21). This proposition depicts a theoretical inconsistency as she tries to shift her explanation of policy changes from cultural reality dimension back to institution itself.

It is noteworthy that the "institutional reversals" here actually refers to an

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[1] Notice that actually McNicoll (1980) is aware of the issue of institutional dynamics from a transaction course instead of economic course. However, as McNicoll says: "Institutions have been depicted in this paper as more or less stable social or economic arrangements, the form of which depends in part on an underlying logic of transactional attributes. While a theory of institutional structure and change of certified validity is not available off the shelf, the collection of insights in this area developed over recent years -- drawing on new developments in contract and property rights theory and analogies with theories of induced technological change -- make an impressive start". (1980:458-459)

economic reform rather than political reform, an approach which was adopted to deal with the socio-economic institutional settings instead of political organization settings. As Blecher (1988) observes, although China's rural economic reform has separated economic administration from political administration, peasant's land and market of its products and non-agricultural enterprises "are still under considerable central or local government control" (p.98). It seems that Greenhalgh's explanation actually slips into economic institutional determinism which is what the institutional determinist tries hard to avoid.

No matter how institutional determinists try to reconcile this problem with some theoretical improvement in the future, the concern of how institutional settings change or interact with people turns our understanding of China's fertility history to a broader perspective. Such a perspective is to look through, not beyond, institutions to socio-cultural reality and individual fertility behaviour in response to the political control. That is, to look at a more dynamic interactive social reality in understanding the fertility transition.

2.3 Approach to Socio-cultural Reality

It has become a fashion in demography nowadays to say that socio-cultural factors play a crucial role in demographic behaviour since recent work in European countries calls into question the conventional economic-decision model by proclaiming a cultural diffusion approach (Coale and Watkins, 1986; Knodel and van de Walle, 1979; van de Walle and Knodel, 1980). Actually this trend conforms to the intrinsic nature of social reality. As Little (1989) says:

> An important strand of thought in the philosophy of social science holds that social science unavoidably depends on the interpretation of meaningful human behaviour and social practices and that those meanings and practices are *highly culture-specific.* As a result, a *cross-cultural concept of rationality* that might provide a basis for explanation of social phenomena *cannot be constructed.* (p.230) [italics mine]

Little's proposition expresses a fundamental scepticism about the economic rational choice theory which places narrowly defined material interests at the centre of the theory of individual motivation. Because of its intangibility as a mental phenomenon, however, what culture is and how it affects demographic behaviour are still not clear in the demographic literature (see Burch, 1988).

2.3.1 Definition of Culture

Culture, in the recent criticism of demographic practice by Greenhalgh (1988,1989a), "often tends to be reified" (1989a:441) as something concrete and fixed as education or occupation being able to play a determinant role in explaining demographic behaviour (1988). Instead, as she defines,

> culture does not belong on the list of determinants, because it is qualitatively different from the other factors on that list. Culture is like a spice rack of ideas and practices from which people choose depending on the menu of opportunities and constraints posed by their environments. Culture is thus highly variable, capable of taking different forms through different recombinations of its constituting elements; it is historically contingent, not easily caught because it is always in process. At the same time, however, it plays a crucial role in demographic behaviour, and for this reason deserves more sustained attention than it now receives (1988:668).

For her, fertility transition is seen as the product of changes in class-specific opportunity structures, instead of as simply a result of cultural diffusion of small family ideals (1989a:445). No matter how important culture is said to be, Greenhalgh's argument simply states that "one must look beyond culture to the political and economic institutions that shape the cultural patterns and demographic behaviour simultaneously" (1988:636).

Notice that Greenhalgh's view of culture is clearly in agreement with that of the social structure group in anthropology, which is one of two parallel traditions of American cultural anthropology and British social anthropology on theory of culture.[2] As Singer (1976) points out:

> It is now clear why the theory of social structure can dispense with the word "culture": it has incorporated the culture concept into the core of the theory, for the theory of social structure deals with social relations not simply as concrete actually existing objects of observations but as institutionalized and standardized modes of behaviour and thought whose normal forms are socially recognized in the explicit or implicit rules to which the members of a given society tend to conform. (p.532)

It is interesting to know that Greenhalgh reads culture almost exactly the same as what social structure group did. While calling for moving beyond culture to institution, actually Greenhalgh explicitly and implicitly incorporates the culture concept into the context of institutional structure in her more concrete study: fertility as a mobility. We will come back to this later.

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[2] According to Singer (1976), there are two major rival anthropological theories of culture: one is the theory of "culture pattern" which assumes that culture is created by individuals and groups and functions as an intervening variable interacting between human "organism" (individuals and groups) and "environment"; Another one is the theory of "social structure", which tends to avoid using the term "culture" by claiming that social anthropology studies social structure, not culture. In fact it implicitly and explicitly incorporates culture concept.

While such an institutional determinist's view throws light on theorizing the demographic behaviour by looking beyond a conventional socio-economic decision-making variable (a tangible cost and benefit of value) to a constant (a quite palpable institutional setting), it sets aside the culture factor because it is seen as not only intangible but also variable. Its problem has been excellently pointed out, right up to the present, by the initial institutional approach advocator McNicoll and his colleague (1990):

> Perhaps because in one of its meanings the word "institution" can refer to a public building, it is common to exaggerate the tangibility of institutions in the more general, abstract sense of the term that is used here. This tendency in turn breeds too sharp a conceptual division between institutions and culture. Culture comes to been seen as something ethereal, pervading but only marginally constraining the individual-level transactions and interests that give rise to institutional pattern -- and largely irrelevant to the hard-edged social engineering that supposedly is the real stuff of policy (see McNicoll, 1978). (p.55)

They also warn that the institutional determinist's extreme is to "understate the potential sources of resistance to efforts at institutional reform" (1990:55). However (even for themselves), how to reconcile this problem is still an unanswered question.

Here, we must say again that constrained by the logic of explaining behaviour *within* the institutional settings, it is difficult to reconcile this dynamic movement of social change. Before moving to a detailed discussion of dynamic approach, we need to emphasise that it is culture, which is only touched lightly by institutional approach, that can play an independent role in affecting social change. The present author stresses that the assertion of actual incorporation of culture into institution implies that he fully accepts the importance of institutional environment.

But, while recognizing that institutional settings often set constraints on individual

behaviour and shape the cultural pattern, one also should be aware that culture itself has its own drive. As Blau (1967) writes: "The very cultural values that legitimize existing institutions contain *the seeds of their potential destruction*, because the idealized expectations these values raise in the minds of men in order to justify the existing social order cannot be fully met by it, and thus may serve as justification, if need be, for opposition to it" (p.280) [italics mine]. This important proposition suggests that culture itself has its own mental momentum which drives people to justify all the existing social order and even challenge it.

Led by Blau's above very dialectic thought, Lesthaeghe and Surkyn (1989) advance an idea of cultural dynamics as a dialectic process. As they suggest, people's cultural values are their essential non-material need which can sometimes play recursive and reverse causal role in social change with "a counter-institutional content" (p.5). This leads us to consider that both social and political institutions and culture belong to the higher layer of society in comparison with the economic foundation, no matter whether they belong to the superstructure of society. They both are involved in a dialectic process of interactions with the economic foundation of society while keeping their own accumulated momentum. As cultural values root in a deep economic foundation, like Chinese rural family economy, people's non-material need can be reinforced and has its drive to justify the rationale of existing institutional constraints. To make it more specific, let's turn to Chinese socio-cultural reality.

2.3.2 Chinese Socio-cultural Reality

Concerning Chinese culture, one often traces back more than two thousand years to one of the oldest riverine agriculture civilizations in the world and to Confucius (551-479 B.C).[3] It was among those "bucolic, down-to-earth country folk that Confucian scholars first acquired their knowledge about human society and further nourished their political ambition to serve." (Huang, 1989:1) The central theme of Confucianism was that "both the world and its people were essentially moral and that it was the duty of superior minds to train themselves in benevolence or humanity (*ren*) and then extend this out to all people" (Ogden, 1989:16-17). In general, Confucianism is a "complex system": (1) it is a philosophy, which is not metaphysical or concerned with the origins, but is practically oriented toward the here and now of everyday life; (2) It is a secular, though "not irreligious", world-view which saw the universe as one organic whole, that is, the world of the sacred as continuous with that of the secular; (3) It is a ethics which proclaimed that a fundamental loyalty of an individual was first to one's family and close kin, then to a family-based hierarchically organized society (see Ogden, 1989:17).

To understand Chinese culture, particularly in the form of Confucianism, in contrast with Western culture, especially represented by Puritanism, one may gain insight from Weber's ([1920]1984) masterpiece on Confucianism and Taoism. From Weber's analysis we know that a doctrine taken just as much for granted by Taoists as it was by

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[3] Chinese archaeologists recently discover that Chinese civilization did not grow out of a single source, the Yellow River valley, but from a multi-ethnic and multi-cultural traditions located in different regions of the vast East Asian subcontinent since the Neolithic period (about 5500 B.C. to 2000 B.C.) (see Ogden, 1989).

Confucians for over thousand years was the teaching that an individual's "correct life" was crucial to his conduct, and that the "correct life" of the sovereign was crucial to the destiny of his kingdom and to the cosmic order (p.65). These two major Chinese "religious forms", as Weber says, "lacked any vestige of a satanic power of evil with which a pious man (in the Chinese sense) ... might have had to contend to achieve salvation". Correspondingly, "a concept of providence would appear to have been completely absent from popular beliefs" (p.66).

As a consequence, Weber says, "China has lacked any feeling of obligation towards communities concerned with 'things' rather than 'people', whether of a political, ideological or any other character. The whole social ethic in China has merely consisted of transferring the organic relationships of piety to others regarded as analogous to them" (p.68). Although there were five duties of piety -- those toward one's lord, father, husband, older brother and friends -- "the strongest force influencing attitudes to life was feeling of piety within the family based on the belief in spirits" (p.75). This is in contrast to the ethical and ascetic sects of Protestantism which "was to break down kinship bonds and confirm the superiority of community based on faith and an ethical way of life over community based on blood ties, to a considerable degree over the family itself" (p.76).

All these ideas from Weber point to one conclusion: it is the solidarity of family and kinship corresponding to the state, but not the individual himself/herself responsible to God that distinguishes Chinese culture from Western culture. If someone wants a simple answer about what the most distinctive feature of traditional Chinese culture vis-a-vis Western culture is, Weber's conclusion is an insightful answer. In China, family is the social, ideological and ritual entity and converging point for peasants to have continuity

in time and place between the past and afterlife. It is thus understandable why up to the present the concern of family continuity still motivates most Chinese peasant families to act as a collective entity (see Huang, 1989; Harrell, 1985; Nee, 1985; Bongaarts and Greenhalgh, 1985).

Does Chinese culture play an independent role in people's behaviour beside socio-economic and political environment? Weber ([1920]1984) provides his insight again:

> However true it may be to say that the *political* and *economic fortunes* of China have been a determining factor in the development of the Chinese "*mentality*", We can hardly reject the fact that the fundamental characteristics of this "mentality" -- in this case of practical attitude of the Chinese vis-a-vis the world -- have nevertheless also played a *major role* in obstructing [the development of modern capitalism in China]. (p.82) [italics mine]

Weber's analysis concludes that the practical Confucianism did play an independent role in individual behaviour but the role is an obstacle to modernization and development.

Following this conclusion, mainly the later part of the conclusion, as this author suspects, the majority of existing social investigators of cultural influence on fertility, both inside and outside of China, simply read the traditional values as evidence of "cultural lag" (labelled as "feudal mentality"), slated for eventual demise along the alleged modernization path. Viewing cultural effect on people's fertility behaviour from such a perspective, one would ultimately emphasize either modernization or population policy to the exclusion of socio-cultural factors in the study of Chinese fertility decline.[4]

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[4] Recently some demographers tried to explain the fertility decline in respect of culture impact, perhaps stimulated by the insight of "diffusion theory", by comparing the Confucian groups (Taiwanese, Koreans, the Malaysian Chinese, and Singapore Chinese) with other ethnic groups. It is found that across different countries the Confucian groups are identical with respect to the timing of family formation but other groups are very

One exception is Stacey (1983) who brings the family-based Confucianism back into the central issue. Rather than following the modernization thesis to view China's socialist revolution as one more case of worldwide evolutionary process of modernization, Stacey reads the revolution as "a process in which peasants reached backward toward revolution". That is, Chinese peasants, the prime carriers of Chinese socialist revolution who were the impoverished victims of crisis in the peasant family economy in the early twentieth century, fought to *restore* their traditional moral economy, which had been a family economy. Since the nature of the revolution is peasants' revolution, "the socialist revolution in China was a patriarchal revolution as well a radical transformation in the rural patriarchal family mode of production" (1983:254-258).

Stacey's analysis expresses an idea that patriarchy is the cultural lens through which Chinese revolutionaries view their course. In other words, the traditional goals of peasant economy are definitely not the "cultural lag", but people's rational consciousness which *actively helped to shape* Communist-induced revolution and *defended* for the protection and enhancement of peasant family economy. One example given by Stacey is the peasants' strategy of enlisting their sons in the People's Liberation Army (PLA) "in exchange for Communist protection for their subsistence activities" (1983:259). Since both the patriarchal family economy and culture act hand in hand by playing an active role in the process of Chinese socialist revolution, their impact on fertility must be particularly strong and evident even under the domain of state's control over population.

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dissimilar; Singapore Chinese are found having higher proportion of contraceptive use but higher fertility rate, too. All the results are tempting to point to culture effect but still seem premature to reach any explicit conclusion (see Rindfuss and Hirschman, 1984; Hirschman and Rindfuss, 1980; Rindfuss and Morgan, 1983; Fawcett and Khoo, 1980).

It is important to note that right up to the present it is still the family economy that forms the basis for Chinese peasants' spiritual and material sustenance. This is vindicated by recent economic reforms started from rural areas since 1978. The fact is that now the collective lands have been parcelled out to individual households, to which the management of the actual processes of production and labour has been returned. As a result, "the household has returned to the centre of the stage in the agrarian economy" (Ghose, 1987:66). Nearly two decades after collectivisation in the Chinese countryside, the economic reform leads to a decollectivization by introducing a so-called production responsibility system. This has been the single most dramatic social economic development in rural China since the Revolution. It is this economic reform which is voluntarily pushed by rural people with its great development that provides an explicit fact that peasant family economy continuously plays a foundational role in China's social change.

In addition, the nation-wide extent and rapid pace of change since rural economic reform confirm how fundamental the peasant family economy is and how strong the peasant "mentality" is in China's rural environmental sectors. As Croll (1987) observes:

> The original aim of the rural responsibility systems was to introduce a new form of management in the collective sector, reduce the size of labour group and to provide incentives to promote production and link reward more directly to performance. Initially it was not intended either to increase the *autonomy* of the peasant household as a unit of production and so radically alter its relationship with the collective or to extend responsibility for production to all households throughout the country. Rather, a responsibility system was conceived primarily as a means by which the production team was to enter into a contract with a small labour group, individual labourer or household which imposed a new set of rights, obligations and responsibilities for production on both parties.

(p.106)[italics mine]

It is clear here that the initial economic reform was only a slight concession of the institution to the peasants. But what happened after the institutions opened a small hole to peasants?

We have seen that no matter how reluctant China's leaders were to concede peasants authority over the lands and production, the responsibility system became prevalent over almost all of China with an unexpected speed. It is reported that 70 percent of China's production teams had adopted the new system by the end of 1982, and one year later at the end of 1983, production teams had been contracted out to peasant households for 98 percent (See Renmin Ribao, 1983; Beijing review,1983; Hongqi, 1984, quoted from Croll, 1987:107).

It is clear that the reason why opening a small hole immediately results in a big break of collectivisation lies in the momentum of the "avalanche" itself. The intensity toward protection of peasant family economy in the rural sectors is so strong that the rural economic reforms have gone totally beyond the constraints of institutions and the forbidden area of the state's central planning.

The enhancement of such traditional economy by peasants has led to a corresponding revival of traditional social values, alleged as "peasant-feudal mentality", in the countryside. It has become increasingly apparent that the reemergence of peasant economy and a strong correlation between family size and income level of peasant households have increased the labour value of children and heightened the desire for offspring, especially sons (Croll, 1987:122-123; Saith, 1987:234-247). Ironically, the rural economic reform started at the same time as the inception of one-child-family program. These twin policies

seem to create conflicting demands on the peasant household as a unit of production and reproduction.

It may be naive to assert that the government's "production strategy" is held to run counter to the "reproduction policies" since China's leaders knew the tension between their desired high speed of modernization and its lagged effects on high population growth pressures unleashed by their concession in economic reform (see Saith, 1987:229). Now that population growth has been seen as a side-effect of economic reform, it is increasingly clear that the forceful birth control effort is really held to run counter to the increasing demand for labour within the peasant household. Therefore, a study of socio-culture effect distinguishing from the preeminent institutional effect is theoretically important.

2.3.3 Son Preference: A Salient Feature of Chinese Culture

The preference for male children has been found to be very common around the world (Williamson, 1976,1978,1983; Cleland et al., 1983; Kent and Larson, 1982; etc.). In Western societies, the son preference is only moderate in comparison to a relatively balanced gender preference: a desire for one child of each sex with a secondary preference for boys if the family wants an odd number of children (Williamson, 1983; Westoff and Rindfuss, 1974; Ben-Porath and Welch, 1976; Coombs, 1977; Pebley and Westoff, 1982; Slone and Lee, 1983; Teachman and Schollaert, 1989; Krishnan, 1987; Chen and Balakrishnan, 1990). On the other hand, the son preferences are found pervasive in many developing societies, especially in North Africa, India, Paskistan, Korea, China:

mainland and Taiwan (Williamson, 1976, 1983; Eliot, 1968; Knodel and Prachuabmoh, 1975; Arnold and Liu, 1986; Arnold, 1985,1988; Feeney and Yu, 1986; Vaughan, et. al. 1988; Greenhalgh, 1985; Amin and Mariam, 1987; Das, 1987; Vlassoff, 1990).

Among existing documentation of gender preference and its impact on fertility, several studies on developing countries have shown that traditional religious beliefs, social customs (dowry systems, lineage, family and kinship ties, etc.), and economic benefits, especially support of aging parents are largely responsible for the son preference (May and Heer, 1968; Williamson, 1983; Cain, 1984; Das, 1987; Vlassoff, 1990; Arnold, 1985; Arnold and Liu, 1986; Freedman, 1987; Karki, 1988). In a review of Williamson's (1976) book on gender preference, Beaujot (1988) suggests the general explanation:

> As long as there is inequality of sexes, this inequality will be reflected in parental preferences for sons or daughters. While a series of factors influences sex preferences, the most pervasive factor is probably the differential economic value of males and females in societies.
>
> ...
>
> The preference for a predominance of sons is essentially a characteristic of patriarchal societies. In such societies, sons generally provide more economic advantages since they are more productive in the family, more useful as a form of security and as a source of dowries. They provide more social advantages by providing heirs and continuing to be associated with the family, and more psychological advantages - as a source of status, security or influence. (pp.129-130)

This proposition suggests that son preference is a product of patriarchal society and is affected by a set of social, economic, psychological, cultural, and institutional factors. Basically, the stronger the patriarchal characteristic of a society, the stronger people's preferences for sons would be.

Gender inequality seems to exist everywhere in the world. However, the traditional

family system of Confucian China (and even its cultural offshoots, Japan and Korea), says Greenhalgh (1985), was one of the most brutally patriarchal in the world. We are often told that the system of patrilocal marriage combined with patrilineal descent, patriarchy, and the pronatalist Confucianism, such as "more sons, more happiness", were the main reasons in the past for China's strong son preference (Parish and Whyte, 1978; Chan et al., 1984; Croll, 1984; Whyte and Parish, 1984; Arnold, 1986). Even in Taiwan, a capitalist Chinese society with much successful modernization achievement, son preference among Chinese wives is still found to be "overwhelming" (Coombs and Sun, 1978:63). One striking finding is that "the forces producing son preference are so pervasive in the Taiwanese culture that varied background, modernization, or family building experience have little effect on the underlying son preference" (Coombs and Sun, 1978:59; Freedman, 1987). The Confucian gender system and son preference seem to persist across time and space and different institutional settings.

How could traditional son preference be persistent in a free-market society like Taiwan? How could a Confucian gender system be perpetuated under these two different systems of China: a socialist mainland China and a capitalist Taiwan? It is suggested that such gender inequality systems "do not merely persist; rather, they are actively perpetuated by individuals whose interests lie in their continuation and who have the resources and mechanisms necessary to perpetuate them" (Greenhalgh, 1985:304; Hartmann, 1976). It is noteworthy that this interpretation not only sheds light on the investigation of the agents, forces and mechanism of son preference, but also brings our attention to the individual behaviour approach, which is largely avoided by the institutionalist approach and will be discussed later in full detail.

With regard to the agents of son preference, it is found that not only men but also women are the agents who perpetuated the Confucian gender inequality system and son preference culture. As Greenhalgh (1985) observes, although men "stood to benefit most" from this system, married women "stood to benefit in the later phases of their life cycle" (p.304). This is because historically the position of married women in a family is dependent on their children, especially sons. Marriage of a son raises a mother's position in a "joint-family" (as defined by Hajnal, 1982). A mother-in-law is the most respected female in a Chinese family because it denotes that she has served the family ancestors well and deserves their consideration. Therefore, she is also generally eager to have sons and have her son married early (see Yang, 1945:105-106). Thus, it is understandable why Chinese women themselves also have strong son preference.

To discern the forces which produce such a pervasive son preference among Chinese women, one should know how Chinese see their family, *chia*. As Hsiao-tung Fei (1938), a well-known Chinese first generation sociologist says, the main purpose of marriage in the village is to secure the continuity of descent. The importance of posterity is conceived in *religious* and ethical terms which means a continuity of *ancestor worship*. The desire to have children is backed up by the motivation of ensuring this continuity of the line of the descent, as a concrete expression of filial piety. The perpetuation of the family name is considered to be the parents' duty because it is through their children that they could pay back their debt to their own parents (see 1938:30-31).

This account suggests that Chinese religious feelings toward the family are most responsible for the strong son preference. We know that son preferences are not uncommon in the world, gender inequality seems to exist everywhere, economic

conditions themselves are self-evident as material-centred, and institutional environments were not unique among so many socialist societies. What else is specifically responsible for such overwhelming son preference among Chinese women? Inferentially, the pursuit of an explanation suggests a culture specific phenomenon. Thus, to the present author, the answer seems to lie in a central belief of Confucianism -- piety. To assess this, it is useful to recall Weber's comparative analysis of religious characteristics of Chinese Confucianism.

One the one hand, Chinese people are secular. Right up to the present, a large proportion of Chinese still have no thought of salvation, original sin, and providence. Confucianism was the state's religion before the twentieth century and is still most people's daily morality, regardless of any kind of "Western" ideology diffusion -- Christianity or Buddhism (which Chinese people used to call "Western scripture"). It actually is no more than an ethic and a layman's morality for the land of the living world, not the world to come.

On the other hand, Chinese people are not irreligious. As Weber ([1920]1984) says: "The Confucian belief in predestination by nature means something different from the Puritan belief in predestination geared toward a personal, omnipotent god, which, while it certainly still resolutely and clearly rejects the goodness of providence, at the same time nevertheless keeps an eye on man's interests in the hereafter" (p.67). In the mind of Chinese people, life will be gone after death as natural and usual, but his family name should survive in this world after his death. The survival of his family's name is a non-material but essential need for Chinese people. Because of this, a religious motivation arises. As Weber says: "By far the *strongest force influencing attitudes to life*

was feeling of piety within the family based on the belief in spirits. It was this which ultimately made possible and controlled the solidarity of the kinship associates ... This strong solidarity was in its own way *wholly religiously motivated*" (p.75) [italics mine]. This suggestion rightly depicts the typical religious element of Chinese culture as ancestor worship.

After more than a half century, Weber's idea about the religious characteristics of China's culture seems still to hold in the contemporary China, both in Taiwan and on the mainland. Kung (1989) offers us interesting evidence and insights for this issue, it is worth quoting at length:

> In spite of an enormous injection of personnel, money, and time, in spite of forty years of unhindered missionary work, Christianity is stagnating there. Only 3.5 percent of the nineteen million Taiwanese could be won over to Christianity; and a large proportion of these are from the non-Chinese aboriginal population. And yet, Chinese folk religion is experiencing an unparalleled revival after extended political and cultural suppression under the Japanese colonizers (1895-1945). This flowering of a Chinese folk piety mixed with Buddhist, Taoist, and Confucian elements can be seen above all in the restoration and new construction of numerous temples. In Taiwan there are apparently around twelve thousand altogether. How is this development to be explained? It is more than a matter of economic prosperity, it also has to do with the search for spiritual sources in the traditions of one's own people and with the yearning for religious security in the cycle of the seasons, with all the feasts and pilgrimages that the new media of communication encourage.
>
> But travelling today from Taiwan to the Chinese mainland, one immediately notices that the beginnings of a similar trend can be observed wherever a temple has been restored to religious (and not just museum) use. Even on ordinary weekdays, one can find thousands of joyful people, old and young, visiting these temples. And much as plain folklore and increasing tourism may also be involved (as in Christianity), all these various practices with incense sticks and divination lots, these prostrations

> before a god, before the Taoist Three Pure Ones, or before the deified Buddhas are certainly not just folklore! Thus for instance, the 'All Souls' Day (to use a Christian expression) that is celebrated in all Sinicized countries and now again on the Chinese mainland is supposed to free all the wandering souls from their suffering. (pp.48-49)

This account clearly suggests that while Chinese believe something definitely different from Christian belief, they are indeed "not irreligious". To understand what is the folk religion and its relation with the other three teachings: Confucianism, Taoism, and Buddhism in China, we need a few more words.

First, the folk religion, as Jochim (1986) says, refers to "the unwritten religious beliefs and practices of average people within traditional Chinese society" (p.6). Why is it religion? This is because a vast array of gods were worshipped (such as the Lord of the Stove who watched over family on behalf of the Jade Emperor in Heaven, the Earth God who took care of the well-being of small local area, the God of the City Wall Moat who was responsible for the area of jurisdiction, as well as Confucius and Lao Tzu and celestial Buddhas), and ghosts as well as demons propitiated (Jochim, 1986:12-16; Wickeri, 1988: 28-32; Ching, 1989). More important, as Kung (1989) says, it is because

> all these religious practices, all the rites and symbols, teachings and myths, are in some form grounded in the transcendent. They are supplied with *supernatural, heavenly, divine authority* and secured with temporal, even other-worldly and external sanctions. (p.48)

Behind this folk religion are

> *basic human needs*: the need for protection and help, for consolation and encouragement, for an explanation and interpretation of human existence and this world ... These religious phenomena are grounded in an existential depth such as is seldom achieved by the legal, political, and even aesthetic realms, in sofar as these are actually "secular" and separated from the religious at all. It is no wonder then that people will defend themselves

> with hands and feet, with their mind, their hearts, their feelings, if they are attacked at this profound religious level and threatened with the loss of what is most sacred to them. (p.48) [italics mine]

All these point to one important suggestion that the culture of the ordinary Chinese people has something more than an ethic and layman's morality. That is a non-material but still people's essential and sacred need.

Second, although there were distinctions between the three "great traditions" (Confucianism, Taoism, or Buddhism) at the elite level, as Jochim (1986) says, Chinese popular belief "was above all an eclectic mixture of the great tradition's Three Teachings" (p.15). It is noteworthy that for Chinese people, the spiritual divine beings, just as human beings were not responsible for, but rather, subordinate to the way the universe operates. For them, the universe, so-called Tao or Heaven or something else, was "conceived of as the ultimate power or principle *within* the natural course of things, not as a Lord and Creator of the universe who is even greater than nature itself" (p.17). It is because of this almost naturalistic conception of the spiritual dimension, the "diffusion" of various forms of religions could not bring the majority of Chinese people exclusively to one particular spiritual group. As Wickeri (1988) says: "To the great frustration of generations of Christian missionaries, it was difficult for the Chinese to understand why one could not be Christian, Buddhist and Taoist all at the same time" (p.30). It is on this basis that one can conclude that the Chinese culture is not irreligious but at the same time it is rather secular and very different from the religion of the West.

Last but not least, as Jochim (1986) says: "Reverence for ancestors has been part of life for virtually all Chinese, regardless of their involvement with other forms of religion or their belief in gods and ghosts" (p.14). It is known that Confucianism

identified itself with life within the family; Buddhism as well as Taoism defined themselves away from family life. However, as Jochim (1986) says:

> Syncretic lay religions, whether worshipping Buddhist or Taoist deities, rarely failed to sanction the code of familial morals found in classical Confucian sources; and they often featured a hierarchy of leaders with titles borrowed from Chinese kinship terminology. Even more noteworthy, despite Buddhism's demand for celibacy and its ostensible abandonment of family life, it evolved in China by making similar compromises with the family system. (p.162)

It is this final account that completes what we would like to see about the kernel of "not irreligious" Chinese culture. The sacred need of "filial respect" toward parents for Chinese people was as self-evident as knowing an old proverb "blood is thicker than water". It is noteworthy that in the secular mind of Chinese people, life will be gone after death but there should be an undying memory or spirit in the afterlife ensured by offspring (see Ahern, 1973:166; Ching, 1989:28; Jochim, 1986:170; Chao, 1983:71-131). There is not any other stronger not irreligious feeling than this piety towards family continuity in a Chinese life and spirit.[5]

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[5] It is interesting to note that after one century of "cultural imperialism" by the wave of missions to China along with the *Opium War*, Pius XII finally had to revise the "definitive" papal decisions with published decrees of toleration regarding the veneration of ancestors in 1939 (Kung, 1989:247). In addition, the Chinese Christian, *Stanislaus Lokuang*, archbishop of Taipei and rector of Fu-Jen University, had to face the challenging question "'How can one be at the same time authentically Chinese and Christian?' by following attitude: An authentic Chinese must have a deep esteem for matters of the spirit. He must respect Heaven and his Ancestors. He must observe the Confucian moral code. He must cultivate the five virtues of charity, justice, temperance, fidelity, and prudence. He must have filial piety to build family. An authentic Christian must love God above all things, and his neighbour as himself. He must observe the Ten Commandments. He must put eternal life as the final aim of his life. When we compare the conditions of these two types of life, we find that they are not contradictory to one another. They reciprocally complete one another" (*Concilium* 126[1979]:89, quoted from Kung, 1989:277). All these may help to understand the special feature of China's family-

It is important to point out here that the Chinese tradition of family as the fundamental social unit and ancestor worship as the central religious feeling was actually manipulated by the state since the Han Dynasty (206 B.C. - 220 A.D.). While lifting Confucianism as state orthodoxy, or so-called ideology, the state could rule the society simply according to familial principles. As Lang (1946) points out, the peculiar feature of Chinese civilization which Confucius and his disciples found useful in strengthening authority in the family and state was the lofty position of the old men (p.10). It was to harmonize people's relationship with agriculture and political organization under a patriarchal hierarchy framework. At first, Confucianism was adopted as the state ideology. As a ruling ideology, then, Confucianism had sunk deeply enough into the consciousness of the majority of the people and became their culture and their life, as well as religion, from generations to generations, dynasties to dynasties.[6] The principles of Confucianism appears so secular and humane that it penetrates people's minds and pervades every corner of China's society. However, it is also so religious that the growth of non-familial forms of religion in China was never successful.

To the author's limited knowledge, almost all previous studies of Chinese son preference have neglected the fact that son preference is the Chinese mental life or spiritual anchor (Chinese people call it spiritual prop). It is because of this "not irreligious" belief, Chinese people are socialized to have a strong preference for son from

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centred culture.

[6] Note that even the Manchus, who invaded China and overthrew the Ming Dynasty (1368-1644) and found China's last dynasty, still needed to adapt themselves to Confucianism, Han's culture, for the sake of legitimizing their seizure of power and for the convenience of controlling Chinese people.

generations to generations. Chinese people all know very well a saying by Mencius (372-289 B.C.), the Second Sage of Confucianism: "There are three things which are un-filial and greatest of them is to have no posterity" (quoted in Chai and Chai, 1962:81). The mechanism of this socialization is that, as Weber ([1920]1984) says, the wholly religiously motivated feeling of "the unlimited filial piety which children owed towards their parents (this was owed to the mother as well as the father) was, of all the virtues, quite unconditionally the most important, as was repeatedly impressed upon people" (p.52).

Different from Western religious people who believe that there is one God who will take care of human life after this world, and also different from non-religious people who are indifferent to the life after this world, Chinese laymen who centre a sense of piety towards family continuity rather than piety towards a celestial God have to have sons to fulfil this not irreligious obligation before closing their eyes forever.[7] This conclusion seems to be able to explain why son preference is so pervasive in spite of

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[7] With regard to the influences of religions in the world on population behaviour, Carroll (1983) provides excellent introduction. Here, we only refer to one of the Eastern religious influence, Hinduism. According to May and Heer's (1968) study of son preference of Indian family, it is found that religious belief and *sraddha* ceremony also link son to father's life after this world: it is a son who "performs the *sraddha* rites which save the father from going to hell" (p.200). There would appear to be no inconsistency between this finding and the inference on Chinese people's strong need for son. It seems that religious Indians have strong son preference is because Hindu religion attaches son to certain rites. On the other hand, according to Karki's (1988) study of son preference in Nepalese *Hindu* society, for the first response, 71 percent of rural husbands and 67 percent rural wives give religious ritual reasons for wanting sons; 18 percent of husbands and 24 percent of wives give old age security as reasons; and only *six or five percent* of husbands and wives, respectively, give *family continuity* as reason. For the second response, old age security is emphasized following the most important religion reason. This tends to suggest that *in a religious society family continuity is not a prior concern as that in China.*

different age cohorts, education backgrounds, and rural/urban residences, and occupational status in a free-market society such as Taiwan.

Before turning to a discussion of other forces of son preference, it is necessary to briefly mention the mechanism by which son preference is perpetuated in recent mainland China. As it has been documented in the books of Parish and Whyte (1978), Stacey (1983), and Wolf (1985), the traditional Confucian lineage beliefs have been branded as "superstitious" and made illegal as against the socialist doctrine. Ancestor worship was abandoned and the ancestral halls were transformed to new use during the land reform in 1950s, and domestic ancestral tablets were burned during the Cultural Revolution in 1960s. But as Wolf (1985) observed,

> many of the homes I interviewed in had pictures of deceased relatives, incense sticks, and makeshift bits of religious paraphernalia ... Qing Ming, the traditional day for cleaning the graves of the ancestors and making offerings to them, is now a national memorial day, but after the children get home from school trips to the graves of martyrs, the family still treks off to the mountains (usually no more than a hill) to visit the family graves. The children may joke about ghosts and act superior to it all, but they learn their place in the long line of relatives who were there before they were born and who depend on them to continue on in the years ahead. (p.247-248)

It is noteworthy that such activities have been largely constrained, but not eliminated, in China's cities.

Second to the not irreligious characteristic of Chinese beliefs, Chinese traditional institutions also exerted their influence for son preference. As Little (1989) points out, historically the classical examination system in traditional China "induced the sons of the elite to endure the lengthy, arduous process of classical teaching by offering successful examination takers the gains of office -- prestige, power, and wealth" (1989:247). What

happens on the two sides of China presently?

In Taiwan, it is found that although educational opportunities were relatively equal for the sexes, the opportunity structures in employment and income were heavily biased in favour of males (Greenhalgh, 1985). In mainland China, it is reported that in spite of the government's commitment to gender egalitarianism, the education institutional settings still discriminate against women "in most the same ways and for most the same reasons as non-socialists do" (Ogden, 1989:330). The evidence shows that only those young women who achieve a higher entrance examination score than young men of same cohort can enter key schools, universities, and even technician schools. As Ogden (1989) tells, "the educational system still contributes to a self-fulfilling prophecy: Because men will be the future innovators and leaders, it is pointless to take the education of women after elementary school too seriously" (p.330).

Finally, the force of a persistent son preference in mainland rural China is deeply rooted in a family economy. The stable family economy in mainland China has been detailed in the previous discussion and needs no repetition. The fact that the stable economy nourished the traditional "not irreligious" beliefs no doubt strongly affects Chinese peasants' desire for sons.

Clearly son preference is a salient feature of Chinese culture mentality and a reflection of a stable rural family economy. Therefore in China, especially in mainland China, it plays a major role in justifying the constraints of political and administrative institutions on fertility. Studying its effect on fertility under China's institutional environments, one of the most institutionalized social systems in the world, will be useful for a comprehensive understanding of the social dynamics between institutions and

culture, as well as economic foundations.

2.3.4 The Puzzle of Chinese Son Preference Study

Existing studies of Chinese son preference have shown that although the Chinese government promoted sexual equality for decades the preference for sons is still "very pronounced" at the present in mainland China (Arnold and Liu, 1986; Feeney and Yu, 1986; Banister, 1987; Arnold, 1988; Vaughan, Chen, and Qian, 1988; Coale, Li, and Han, 1988). The evidence for son preference is found in two major observations by using the data of China's 1982 One-Per-Thousand National Fertility Sample Survey. First, the son preference effect on family planning and contraceptive prevalence is clear. Arnold (1988) finds that:

> The survey yielded evidence of the persistence of son preference in nearly every part of China (with exception of Beijing and Shanghai), although the preference is not as strong as in some other countries with confucian traditions, such as South Korea. Couples with one girl are less likely to sign up for the one-child certificate than couples with one boy and they are twice as likely to renounce the certificate once they have received it. Moreover, couples without a boy are less likely to be using contraception than are couples with at least one boy (1988:49).

Second, evidence of the son preference is found in fertility itself. Feeney and Yu (1986) bring forward further evidence of Chinese son preference by examining the decline of the parity progression ratio since 1963. Chinese families' desire for at least one son is found "overriding": "The decline for women whose first birth is a son is about twice as great as the decline for women whose first birth was a daughter" in 1979; "The decline for women who have one or two sons is substantially greater than the decline for women

who have no sons" (p.7).

In addition, in a multiple classification analysis (MCA) of the 1985 Chinese In-depth Fertility Survey data, Vaughan, Chen, and Qian (1988) find that women who have at least one son are much more likely to be sterilized than those with no son. However, having a son makes little difference in any contraceptive use or effective methods (sterilization, pill, IUD, and injection) except in families with two or more than two children. All these findings suggest that it is useful to study further the son preference effect, as one indicator of the cultural effects on fertility transition within the context of China's socio-political constraints.

However, the existing son preference studies provide us with some other striking findings and one unexpected conclusion. First, as Arnold (1988) says, while a preference for sons is still evident in China, "it is not currently an overriding concern of most Chinese couples" (p.49) and "does not have a strong impact on contraceptive use in China " (p.51). It is observed that while about 69 percent of single child families with a boy were using contraception, 63 percent of single child couples who have only one daughter were using contraception at the time of survey. In addition, the contraception use differentials by sex composition of children are also found rather modest at any parity. Based on this finding, Arnold (1988) suggests: "Those couples may have preferred to have a son, but their preferences were not so strong that they were ignoring the one-child policy" (p.49).

This important finding provides us insight about the relation between son preference and birth control. The fact that a "rather modest" son preference effect on current contraceptive prevalence indicates a powerful institutional effect. It is noteworthy

that, as Arnold (1988) suggests, "in general, sex preference does not pose a substantial barrier to the success of family planning programmes" (p.52). This evidence seemingly buttresses the institutional determinists' perspective: it is not economic conditions or economic rationale or culture but institutions that are so important in making the fertility decline work in a developing country.

Secondly, estimated magnitudes of difference between observed proportions of contraceptive use or parity progression from sampled population with son preference and estimated proportions with allegedly eliminated son preference are found to be very modest. As reported, contraception use rate in 1982 would increase by only 1.8 percentage points (70.9 observed versus 72.7 estimated) in the absence of sex preference for children (Arnold, 1988); the total fertility rate (TFR) calculated from parity progression ratios would decline nine percent from 1981 value of 2.65 children per women to 2.42 children per women (Feeney and Liu, 1986:18).

Based on these findings, especially the estimated small effect on contraceptive use, a striking conclusion has been suggested: "Therefore, even if sex preference attitudes remain unchanged in China, their effect on *fertility* and family planning is likely to be quite small in the future" (Arnold, 1988:52)[italics mine]. Such a conclusion appears to end further study of son preference effect on fertility. How are we to reconcile the contradictory evidence that some observed statistics show substantial son preference while that the estimated statistics indicate that son preference effect is very trivial. Recalling the theoretical view of son preference as one important feature of Chinese culture, this result seems quite perplexing.

It is puzzling, how a pronounced son preference would turn out to have only a

very small effect on fertility control and fertility. Arnold and Liu (1986), Arnold (1988), and Feeney and Yu (1986) provide two reasons apart from policy impact implying that son preference effect on contraception and parity progression is likely to be modest. First, it refers to a sheer biological chance by which the large majority of families could produce one or two boys fairly early in their child-bearing years so that the strong son preference has rather limited fertility effect.

Second, it is related to the way of estimation. In general, sex preference has no effect on contraceptive use and on parity progression of childless women and only a minor effect on contraceptive use of one birth women. Thus, the overall effect of son preference on contraception and fertility is attenuated. According to the China's 1982 National Fertility Survey sample distribution by Arnold (1988, Table 7), 30 percent of married women had either no children or only one child at the time of survey. Using the same data set, Feeney and Yu (1986) calculate the total fertility rate (TFR) from parity progression ratios and find that the contribution of first birth to the total fertility rate is 0.99, or nearly one child per women, which accounts for 37 percent of the total fertility rate in 1981 (2.648).[8]

Notice here, the first reason is correct but should be accepted with caution. As Park (1986) rightly points out:

> as the family size-norm declines, the fertility impact of sex preference may increase considerably, provided the degree of sex preference remains unchanged. Suppose that in a particular country people want at least one

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[8] According to Feeney and Yu (1986, 1987), the total fertility rate (TFR) can be calculated from period parity progression ratios as follows,

$$TFR = p_0 + p_0p_1 + p_0p_1p_2 + ...,$$

where p_0 denotes the proportion of women progressing to first birth, the term p_0p_1 indicates the proportion of women progressing from first to second birth and so on.

> boy and their family size norm is two children. Then 75 percent of couples would stop at two and 25 percent would try again. If the family size norm alone were changed to one, 50 percent of couples would stop at one but the rest will go on. (p.12)

That is the case in China. According to Song (1981), a well-known chief designer of Chinese one-child-family policy, the goal of one-child-family policy is to "keep China's total fertility rate at 1.7 per couple," and "[by] 1990, the total fertility rate should be brought down to 1.5 per couple and maintained at this level" (p.31). Under this strong effort of birth control, the percentage of couples reaching the desire of at least one son completely by chance will be much smaller.

If we take the one-child-family policy rather seriously by assuming a strong preference for a son and a family size norm is *two*, the biological chance will produce 25 percent of no son families who would try again among mothers with no more than two children. That means the total fertility rate per family will be

$$2 * 0.75 + 3 * .25 = 2.25.$$

The attributable son preference effect on total fertility will increase 13 percent above the two children family norm.

If we take the one-child-family policy very seriously and assume that the family size norm is *one* only and given that the biological chance will provide 50 percent of chance for a family to have at least one son, the total fertility rate per family will be

$$1 * 0.50 + 2 * 0.50 = 1.50.$$

The son preference effect on total fertility rate increase will be almost 50 percent. If we take the infant mortality and survival insurance into consideration, which would mean, there is a preference for two sons, the son preference effect on total fertility rate will be

much higher.

The second reason tells a bit of the "secret" of the puzzle. Notice that the inclusion of childless mothers (10 percent of the sample) into the estimation of son preference effect is constant, no matter what gender preference is. However, we should not take the minor effect of son preference on family planning for families with single children as granted. The observed similar high rates of contraceptive use for single child families (63.1 percent for one girl family versus 69.3 percent for one boy family) is indicative of a strong effect of institutional constraints. It is government's strong efforts that brought about the existing similar high rates of contraception use among 20 percent single child family in the total sample, and in turn it attenuates the overall effect of son preference on family planning. This neglected evidence and its related fertility behaviour will lead us to some important findings. We will discuss it in full detail later.

Concerning parity progression, there is something similar to the above contraception issue. According to Feeney and Yu's (1986) study, 37 percent of fertility has been achieved before having second birth, this fertility cannot account for son preference effect. However, the remaining variation is still very big and needs explanation. It is noteworthy that 85.9 percent of mothers progress from parity one to two and 56.1 from two to three. Thus, up to parity three the parity progression ratios account for 88 percent of total fertility rate in an amount of 2.32. Even parity one to parity two alone accounts for 32 percent of total fertility rate (its component value is 0.85); parity one to two plus parity two to three themselves account for half of the total fertility (its component value is 1.33). Notice that if only those no son families would progress to higher parity the parity progression should be lower than 50 percent. The observed high

parity progression ratios clearly indicate a preference for more than one son.

Actually the parity one to parity two progression ratios differential by sex is only 0.04, as shown by Feeney and Yu (1986, Table on p.13). Therefore, it is the very large proportion of women progressing from parity one to two regardless of the sex of children that is most responsible for the small effect of preference for a son. Importantly, we should say that under China's one-child family policy it is not only that the biological chance makes the effect of son preference small, but also that one son is not enough makes the variation by gender composition so small. It is the assumption of preference for *a* son which makes the concluded estimation become a puzzle.

Knowing the reasons for the puzzle does not mean that the analysis can stop here. There is something more important that needs a discussion. This relates to the high rate of contraceptive use for single child families regardless of sex of children. First, it is noteworthy that although the estimated 1.8 percentage improvement of contraceptive use seems very low, the observed contraceptive use differential by sex among single child families is truly small: six percent. Here, we fully accept Arnold's suggestion that Chinese couples' strong son preference does not make them ignore the one-child policy. And actually this finding reveals the great extent that China's one-child-family birth control had reached.

Secondly, one should also bear in mind that the compliance to family planning programmes, i.e. currently using contraception, does not end fertility itself. Current high rate of contraception prevalence does not mean that those couples who are using contraception will not produce any more births. Even Arnold and Liu's (1986) study has provided valuable information buttressing the present speculation.

Arnold and Liu (1986) show that in spite of the penalties that are assessed upon the birth of second child, many recipients of one-child certificate had gone on to have a second child by the time of survey in 1981. Although the variation among provinces is large, many provinces have registered that the renouncement rate was around 21 percent (Shaanxi, Hebei, Fujian, Hunan) to 34.3 percent (Shanxi). It is striking to note that such high renouncement rate occurred not longer than two years after the release of the one-child-family policy. Because there were about 88 percent of recipients of one-child certificate using contraception by the time of survey (see Arnold and Liu, 1986, Table 3, 5 and p.235), we suspect that most couples who renounced the one-child certificates to have a second child did use contraception after first birth but later sought to have a second birth.

Surprisingly, based on high rates of contraceptive prevalence and estimated minor son preference on contraceptive use, Arnold (1988) concludes that "even if sex preference attitudes remain unchanged in China, its effect on *fertility* and family planning is likely to be quite small in the future" (p.52) [italics mine]. Jumping from an estimated minor son preference effect on contraception prevalence to an alleged same minor son preference effect on fertility, needs one important assumption as a major premise for such reasoning. That is, couples use contraception mainly for the purpose of terminating fertility. Actually this was indeed the goal that China's one-child-family policy makers intended to reach. Taking this assumption for granted appears to be consistent with the overwhelming impact of one-child-family policy.

However, this conclusion totally omits one important possibility. That is, women in childbearing age can use contraceptive methods for the purpose of "*spacing*" births, in

addition to "*stopping*" births, namely, family limitation.[9] Such spacing behaviour would be quite common if some women comply with the policy at the beginning by using a reversible method or receiving the one-child certificate, but later renounce their previous compliance to have an additional "out-of-quota" birth. Actually, the evidence of using contraception for the purpose of spacing is rather evident in the data (refer to Arnold and Liu, 1986: Table 3,5 and p.235).

Although the spacing issue of contraception has received increasing attention (Page and Lesthaeghe, 1981; Freedman et al., 1981; Nortman, 1982; Tsui, 1985; Hobcraft, 1985; Lightbourne, 1985, David et al., 1988), its implication and effect on fertility is not well understood by demographers, especially Chinese fertility transition investigators. As Vaughan et al. (1988) says: "Use of contraception for spacing purposes is uncommon in China and closed intervals tend to be short. On the other hand, since fertility is low and childbearing completed at an early age, the open interval can be very long" (p.3). Is contraceptive use for spacing uncommon in present China? If stopping is the main purpose of contraceptive use, Arnold's (1988) striking conclusion would be saved. This can only be assessed by moving forward to more recent information about the updated fertility level.

According to China's 1987 One Percent Population Survey, Feeney et al. (1989) find that although the overall total fertility trend continues low around 1981 level with some fluctuation, 94 percent of rural women progress from first to second births as well

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[9] The fertility-limiting behaviours have two alternatives: one is "stopping" behaviour, which refers to the truncation or termination of childbearing after desired family size has been achieved; "spacing" behaviour, the another one, is the intentional lengthening of inter-birth intervals or delay childbearing (see Anderton, 1989).

as 21 percent of urban women in 1986-1987. Assuming a constant contraceptive prevalence mainly for stopping purposes and continuous official birth control efforts, the fact that two thirds of women with single child were using contraception in 1981 (not to mention abortions) should not result in a rate over two children per family over 1980s. Up to date information indicates that contraceptive use for spacing purpose is not uncommon.

Hence, in order to have a better understanding of the real fertility trend, one should depart from a static assumption which sees family size limitation as the only purpose of using contraception, to a dynamic concern which sees contraceptive use as a means not only for stopping but also for spacing corresponding to the sequential-decision demand for children. It is a sequential-decision process of demand for children rather than a single-decision static assumption that makes the issue of spacing pattern of contraception very important, especially in studying the Chinese fertility transition. The spacing pattern under a sequential demand for children reveals an important feature of Chinese fertility behaviour. We will discuss this issue in detail later. To study this, we are to move to individual behaviour approach.

2.4 Approach to Individual Behaviour:

Turning back to the consideration of the limitations of the state's powerful population control program, a study of individual behaviour in response to the institutional political control is called for. As many studies point out, despite an almost uniform enormous pressure exerted on urban and rural couples to accept the one-child family norm, the

Chinese were only prepared to reduce fertility from six to three or even two children, but were "very resistant to the one-child norm" (Freedman and Guo, 1988:131-136; Banister, 1987; Aird, 1981:119-227; Wasserstrom, 1987:269-276). This is because the present leadership has faced its central problem -- that of the credibility of the state in effecting alleged long-term social change by persuading people to disregard their short-term interest in favour of long-term national interest (Croll, 1985:1-36). Much evidence shows that popular resistance to government policy is so strong, though it is sporadic and uncoordinated on a couple-by-couple basis, that adjustments in the direction of allowing two children were announced by the central leadership in 1984 (Banister, 1987:359-366; Davin, 1985:37-82; Greenhalgh, 1986:508; Zeng, 1989).

Why is the individual behaviour in response to the institutional impacts so important in understanding China's current fertility history? A simple answer can be derived from the facts mentioned above. That is because even China's institutional setting, one of the most centralized planning control systems over people in the world, has kept changing, from the failure of the great leap forward to the negation of Mao's cultural revolution and up to the present economic and political reforms. Although all these changes are remedies *within* the existing social system as a whole, they are sufficient enough to show that institutions are not immutable. The fact is that the institutional governors themselves are watching the people's reaction all the time very carefully, why should social investigators omit people's reaction to the institutional constraints? Why should our theoretical perception only see things (institutions) but not people?

A further theoretical explanation of the importance of individual behaviour under the institutional setting needs further elaboration. Recall McNicoll's (1980) *administrative*

man, whereby institutionalists see a human being as an adaptive man from the institutional perspective. In the extreme of this approach, what *administrative man* can do under his environment is seemingly to surrender himself to existing institutional settings. Such a perspective, therefore, can successfully single out one important part of social environment -- social organizational background -- in explaining the key causal source for social change.

However, the institutional determinist perspective neglects that, as Little (1989) puts it,

> [institutions] constitute part of the social environment of action within which individuals act and thus constitute background causal conditions. Institutions work only through the individuals who constitute them, and they themselves are to be explained in terms of the incentives and constraints that define the environment of action of the individuals who created them. (p.220)

This proposition expresses an idea that institutions "supervene upon the behaviours of many individuals and that in turn constrain and direct the behaviour of individuals" (Little, 1989:248). Clearly, the *interaction* between the administrative man (or woman) and environment constraints is not one-way static *from the top down*, but two-way dynamic - not only from the top down but also *from the bottom up*. Thus, the process of how individuals act in response to the institutional constraints should be taken into a consideration in the theoretical framework.

In addition to the interaction between individual and institutional constraints, the dynamic process under social environments also involves social, cultural, and economic reality. When family economy and culture factors act hand in hand together at low-level, especially in rural areas of China, their potential power cannot be broken down. We know

that in China individuals could not act as a group independently of the single party's control and the mode of production in China is politically collective. However, the mode of production in rural areas is still family and 80 percent of the population are still living there. Their behaviour thus is not only constrained by the political institutional settings but also shaped by their life-long cultural economic environment. In studying China's fertility transition, therefore, we need an approach which sees not only things (institutions) but also individual action.

In analyzing China's fertility transition under a concrete low-level social environment context, Greenhalgh (1988) proposes an insightful *fertility-as-mobility* explanatory framework. In contrast to the existing approaches, Greenhalgh actually has incorporated many components which were separately emphasized by different approaches before into her explanatory framework. Although she calls for moving beyond culture to institutional settings time and again, actually she is aware of the importance of culture and individual behaviour in China's fertility change.

First let us refer to the opportunity environment, a central concern of her framework. As Greenhalgh criticizes, until very recently the existing explanations of fertility decline have paid more attention to the *fertility value* than to fertility *behaviour*. The *fertility value* here refers, implicitly by Greenhalgh, to individual economic rationality of benefits and costs of children. Rather, what Greenhalgh emphasizes in her framework is that

> childbearing aspirations are not primarily ends in themselves, but means to other, larger ends, and that these broader goals are related to couples' desires to secure and, if possible, also advance their position in their social reference groups, be they neighbourhoods, villages, or national societies. (1988:667)

This proposition is to link fertility decision making to other decisions. This perception is in agreement with McNicoll's (1980) perspective of fertility decline in China's Guangdong province as well as in Indonesian Bali provinces. As McNicoll says: "In both cases, fertility control has operated by linking fertility decision making to other decisions within the province of local administration, and attempting to weaken or even sever its link with family economic strategies" (1980:453). It is China's institutions which can deliberately link fertility decision making to individual mobility that reduce individual fertility demand.

For Greenhalgh (1986), "fertility is a subset of a group of *behaviour*, or *strategy*, aimed at advancing up a goal hierarchy ranging from security to mobility" (p.630). Viewing fertility in respect of mobility allows us to consider fertility motivation, or rationale, beyond the pan-human needs to the economically, and institutionally specific environments. It is such opportunity environments that adds the political rationale of benefits and costs to the economic rationale on individuals strategy, that is so called "to shape" people's rationale and even culture.[10] Here, the economic-cultural rationale and its theoretical relationship to institutional settings are not well conceptualized. Perhaps due to intrinsic constraints on institutional perspectives, a further discussion of the positions of these factors in her explanatory framework is touched upon lightly.

Second, it is noteworthy that the major task of the *fertility-as-mobility* approach

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[10] In 1989 Greenhalgh develops this idea more clear. Distinguishing between the anthropological view of viewing actors as passive agents who react to institutions and the micro-economic perspective treating people as individualistic decision-makers, Greenhalgh regards "actors as strategists operating in an environment shaped by historically specific political and economic forces" (1989:445). Also notice that Greenhalgh here does not mention that fertility behaviour is also cultural specific.

"is to sketch the linkages between certain macro-level sociopolitical and socioeconomic institutions and micro-level fertility behaviour" (p.637). We will see immediately that the explanatory framework actually incorporates individual behaviour into its institutional approach. On the one hand, social structure is viewed as setting limits to individual social action by establishing the costs and benefits of children. In contemporary rural China, it is the imposition of institutions that mediates between the family and economy in the countryside -- team, brigade, commune, work group, study group, and party cell -- that made political costs of children as weighty as traditional economic costs; and in cities, it is the dual hierarchy of intermediate institutions -- the work unit and resident unit -- that controlled virtually every aspect of urban life from above and usurped the traditional functions of family and removed much of its power to control its affairs, and even detached fertility from mobility and security.

On the other hand, the family is the basic unit that bears the costs and enjoys the benefits of children. It is Chinese families themselves who acted in response to their own society-specific institutional setting that brought on the fertility decline so *rapidly* by "applying and acting on traditional (economic) or modified-traditional (political-cum-economic) cost-benefit analyses of how best to secure and advance their interests" (p.667). Thus, the alleged "long-term national interest" instilled by institutional pressure from top down is translated, or internalized into *administrative man*'s rationality. The "wisest strategy" is

> *to show political compliance by adopting contraception* and, where relevant, accepting one-child certificates, then enjoy any proffered bonuses while *waiting for the policy to change*." (p.661)[italics mine]

This proposition describes the typical characteristic of Chinese fertility behaviour under

the constraints of institutions. That is, people are waiting for change.

Up to this point, Greenhalgh's analysis has directly touched this important issue, however, it immediately leaves this point, paying attention to the question of why a dramatic fertility decline is so possible in China. The questions of how far a dramatic fertility decline could reach and how this dramatic fertility decline was carried out by Chinese people are to be explained by us. The difference for these two sets of questions is that the former focuses on how *administrative man confirms* the constraints of social and political institutions from the top down; the latter is interested in how he *acts* in response to an all-embracing environment which includes not only political and economic institutions but also cultural "mentality" from both the bottom up and the top down. In a sense, the latter is a logical continuation of the former approach.

Notice that the *wait-for-change* fertility strategy is seemingly developed by the people who have been facing a strong dilemma between mobility and fertility, between institutional constraints and economic and cultural needs. Individuals may comply with institutional constraints with short term tolerance; however, they could hardly give up their unfulfilled interests. They may change once the chance comes: they are ready for change all the time. The unexpected speed and extent of economic reform in rural and urban China for the last decades have already shown how voluntarily the people welcome the economic reform in contrast to the one-child-family policy. As one Chinese demographer already hints:

> The masses are unhappy with the policy of having only one child. Since the policy has changed frequently, they hope that the policy will one day be relaxed so that they will be able to achieve their purpose of having more children. ... In some areas, some of the masses even take an advantage of the weakness of confusion in our policy to rush into having a

second child. (Cheng, 1981:4, quoted from Banister, 1987:359)

This analysis most succinctly depicts how Chinese people wait for chance to change their fertility.

To the author's limited knowledge of the present Chinese people's common feeling, *waiting-for-change* may best represent the typical feature of Chinese fertility strategy. Chinese couples, especially peasant families, have a strong *wait-for-change* motivation because it is nourished by a traditional "not irreligious" culture and rooted in a stable family economy. Its analysis could reveal a dynamic process with very Chinese characteristics. Its dynamic path is to be revealed through individual fertility behaviour in response to the state's enormous pressure for population control.

Unfortunately, few studies have ever attempted to investigate such dynamics and accordingly construct a model for an empirical test. Even Greenhalgh's fertility-as-mobility explanatory framework, though it provides us with a very insightful perspective, has not yet addressed this issue. As Greenhalgh (1988) says, the framework is only at an "interpretive level" and "not empirically falsifiable" (p.632). How to construct a workable approach to test Chinese *wait-for-change* fertility strategy is a bit challenging. I will refer to a dynamic model building discussion in the following section.

2.5 Dynamic Model as Synthesis:

To study the *wait-for-change* strategy of the Chinese family, we need a model which can take into account not only the institutional constraints but also cultural effect and individual behaviour. We need a dynamic model to see if a *wait-for-change* strategy really

underlies Chinese women's reproductive dynamics.

It is well known that the recent extensive reconstruction of demographic transition theory, under the aegis of the United States National Academy of Sciences, has devoted much attention to Easterlin's (1975, 1978a, 1981, 1982, 1983) conceptual basis of his *dynamic* model for specifying the *path* or *mechanism* of fertility decline. The model is conceptually formulated as the interplay between demand and supply; that is, the demand for children or fertility regulation (*i.e.* contraceptive use) and the supply of children. Incorporating these three central concepts into a synthesis develops the basic thrusts of classical transition theory and embraces the central factors of both adjustment process and diffusion process in a manner that permits empirical investigation.[11] The contribution the Easterlin's dynamic structure makes to the fertility transition theory is that it does produce a valuable synthetic framework for conceptualizing fertility transition with operational approach (Chen, 1986; Montgomery, 1987).

Though the theoretical synthesis indeed provides a neat conceptual scheme for capturing the changing pattern of fertility, Easterlin's model only considers a voluntary family program influence on the reduction of unwanted number of children. It does not take governmental "induced" birth control campaigns into consideration. To improve Easterlin's framework to fit this new fertility transition pattern, Wang (1990) modifies the

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[11] The *Adjustment* theory emphasizes the effects of motivation under certain socioeconomic circumstance, especially the information about child mortality, as decisive factors on fertility decline. The process is well depicted by Carlsson, G. (1966:149-174); In contrast, the *Innovation* theory stresses the effect of the spread of information about contraception on fertility decline. The classical transition theory has been turned upside down by Knodel and van de Walle's (1979) striking paper: "Lessons from the Past: Policy Implications of Historical Fertility Studies", (pp.217-245). The antithesis of transition theory is to say that even without the adjustment process (change in taste), the diffusion of the concept and means of control alone can cause fertility to decline.

model to fit China's situation where individual actual fertility levels dropped below their own demand levels for children. The new conceptual scheme specifies a downward deviation of actual fertility (C_n - an actual induced fertility level in response to the strength of birth control campaign) from the demand (C_d - desired number of surviving children) as a gap between individual preferred family size and the one-child-family policy. The gap is considered as an extent of "social sacrifice" to the society by individuals who comply with the population policy. With this modification, therefore, Easterlin's synthesis can be extended to examine the strength of institutional impact on individuals if we can measure the individual's own demand.

However, Easterlin's synthesis has one intrinsic problem. The problem involves a static assumption that individuals' demands for children, or "tastes", are acquired mostly through early socialization experience. As Easterlin (1978b) says:

> If the couple's resources are abundant relative to their aspirations, they will feel freer to have children. If their resources are scarce relative to aspirations, they will be hesitant about having children. In assessing resources I use a measure that seeks to capture the earning outlook for young adult males. For material aspirations I use the income situation in the young adult's families of orientation, specifically, their parents' family when they were growing up, *on the theory that the period of adolescent development is critical in the formation of the material aspirations of the young adults*. This model, combining a resource constraint with a taste or "aspirations" variable, both of which are observable, tracks quite well both the upsurge and subsequent decline in American fertility. (p.315) [italics mine]

Although Easterlin notices that the demand, or taste, is a variable in contrast to some economists' treatment of taste as constant, he only regards the demand as a variable in terms of different populations at one point in time rather than the same population or

individuals at different points in time. Therefore, he still could not get rid of a static assumption for demand and his model cannot avoid being criticized as "a static or one-period model" (Montgomery, 1987) rather than a real dynamic model. This problem is related to a basic problem of "one-decision model" in contrast to "sequential-decision model".

According to Udry (1983), there are two models of the process of fertility decision making. The first one is called one-decision model because it assumes that the demand for children will be fixed for couples through their marriage since they marry under the circumstances surrounding them. And the second one is called sequential-decision model since it assumes that the demand for children is constantly changing in response to unanticipated intervening events. The former is based on the thought that socialization in childhood and youth shapes people's fertility values and preference and is adopted by economists "as simplifications of utility theory without invoking socialization models" (p.117).

Notice that the one-decision model is sometimes called "fixed target intention model" which refers to individual target fertility (desired fertility). The conventional wisdom assumes that individual couples had in mind complete fertility target at the initiation of childbearing and would try to achieve the goal over their marriage, though the timing of the achievement of this target is affected by subsequent events. This assumption is buttressed by the well-known fact that a cohort completed fertility has greater stability over time than that of a period fertility, which is indicative of "a tendency for real groups of women to even out their experience so as to achieve notional reproductive targets or norms" (quoted from Hobcraft et al.'s comment, 1982:20).

Recently this static assumption of fixed target intention or one-decision model has been challenged by some demographers from their empirical findings. First, the fact that many women change their reported desired family size over a five-year period indicates that the target intention is not immutable (Westoff and Ryder, 1977; Hobcraft et al., 1982). As Westoff and Ryder (1977) say, "Perhaps answers to questions about intentions are implicitly conditional: 'This is how I think I will behave if things stay the way they are now, but, if they don't, I may change my mind'" (p.449).

Second, the evidence of stronger period effect on cohort completed fertility than cohort effect suggests that the supposedly constant cohort effect directed by a fixed target intention is not fixed. As Page (1977) puts it:

> Demographers have become increasingly accustomed to thinking of fertility in terms of cohort experience; in this framework, period effects tend to be viewed as contributing irregularities to cohort patterns. Here, by twisting the data kaleidoscope a different way, we have focused on the *existence of period regularities*. Our data show that, at any given time, all birth and marriage cohorts react, in some sense, as a single unit to whatever factors determine the general level of fertility at that time.... It is as if each cohort were characterized by a latent exponential decline in its fertility as it passes through marriage, interrupted only by period effects to which all cohorts respond by proportionately the same amount. (p.104)

This finding is consistent with the fact that the war cohorts who had delayed childbearing "show signs of overcompensation during the immediate postwar period but subsequently have lower than expected rates" (Hobcraft et al., 1982:30). This change is partly because childbearing is substituted by other activities (Rindfuss and Bumpass, 1978).

Third, results from two different comparative studies of WFS data, one among Bangladesh, Colombia, Indonesia, Jamaica, Jordan, Kenya, Korea, Mexico and Sri Lanka by Rodriguez et al. (1984), and another among the Philippines, Malaysia, and Indonesia

by Trussell et al. (1985), suggest a lack of *birth order effect* on the subsequent birth interval and on the probability of progressing to the next birth intervals, with the exception of Korea. As Rodriguez et al. (1984) write:

> Almost all theoretical statements about childbearing behaviour are rooted in statements about individual "target" levels of fertility. The more extreme of such theoretical statements assume targets are immutably fixed early in the reproductive career. Weaker versions assume an element of sequential decision-making, perhaps with decisions made about each pregnancy in turn. Yet our results suggest a distinct lack of pattern in cessation of childbearing by birth order (or in timing for that matter), at least beyond the second. (p.26)

This proposition in a sense coincides with Page's (1977) finding on the importance of period event effects which largely represent the institutional impact. However, the former even goes further in challenging the sequential-decision model.

Note that the finding of Rodriguez et al. (1984) has been challenged by Gilks' (1986) new finding. According to a re-examination of the time-pattern of birth order effect from the same data set, Gilks says: "Strong evidence of increasing birth-order-related fertility control with time has been found" (p.454). A detail discussion of this problem will be found in the next chapter. Although the findings are from different dimensions, all the criticism point to the same central problem that the static assumption of demand for children ignores social pressure.

With regard to the consideration for adjustment to social and cultural constraints, Lesthaeghe (1980) argues that "women would not start off by programming their entire reproductive history (or continue to follow a handed-down script); rather, they would proceed from birth to birth by acting on the major components of each successive birth interval" (p.542). This is because "individuals would gradually move to a definition of

means and ends as a result of a cognitive learning process (i.e. empiricism) rather than starting off from some sort of cost-benefit analysis aimed at the maximization of utilities on the basis of clearly and a priori defined goals and criteria" (p.542). In this sense, women's fertility rationality is to "satisfy" rather than "maximize", to use McNicoll's (1980:450) terms, and is to apply certain fertility *wait-for-change* strategy time after time.

Notice that some demographers have questioned and challenged the Easterlin's model's assumptions while they were attempting to reconstruct the fertility transition model under Easterlin's framework. The "rarely realistic" assumptions of "single decision model", they criticize, "are made for convenience to permit analysis of data collected for other purposes or to make the mathematical analysis tractable, rather than for theoretical reason" (McClelland, 1983).

What they suggest, instead, is that demand for children should be seen as a "conditional decision process" which is based not only on a constantly changing socio-economic circumstance but also on "individual births themselves" (Namboodiri, 1983). "Since the children are usually acquired one by one, couples can base their childbearing intentions on previous outcomes, and on their cumulative knowledge and experience". For instance, "the birth of an infant of the 'wrong' sex might trigger reformulation of plans" (Lee and Bulatao, 1983). That is to say, the fertility behaviour is not only the function of some deterministic variables but also "a contingent sequence of actions, a sequence in which what has already happened influences the action to be taken next" (Namboodiri, 1972).

A sequential-decision model, which assumes that fertility decisions are made one birth at a time and based on constantly changing socio-economic circumstances, seems

more relevant and valid for China's case where fertility actors are *wait-for-change* strategists. Pursuing the socio-cultural effect and individual's behaviour under the constraints of institutions we definitely need a sequential-decision model to depict the extent of "*receptivity*",[12] *conformity* or *compliance* of contemporary Chinese women of childbearing age in response to the state's population target.

However, we should bear in mind that the evidence that fertility decisions are made sequentially does not rule out a possibility that couples may have their target fertility intention. Without such target intention, it is hard to imagine where the fertility strategy, especially the *wait-for-change* strategy can stand. On the one hand, we see that there is great inertia in fertility decisions (Leibenstein, 1981), especially when the culture effect is one of the main concerns, such as that Chinese peasants wait for the chance to make up the postponed births. On the other hand, the target fertility intention seems quite "conditional", to use Westoff and Ryder's (1977) word. It is so vague that the strategists themselves can only make temporal decisions based on temporal situations to see whether or not it is "unpropitious" for childbearing.

How to reconcile this dilemma? According to the reasoning so far, we suggest that Chinese couples do have target fertility intention at the initiation of childbearing due to a strong culture effect, especially son preference. However, this target fertility is not necessarily equal to a completed family size intention. It is likely to be a goal for having at least a *survivor son* "as soon as possible" (Greenhalgh and Bongaarts, 1986:18). How long and how many births one should produce to achieve this goal totally depends on the

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[12] Coale (1983) suggests that the rapid fertility decline in China may be related the *receptivity* of traditional Chinese culture to those forms of behaviour which precipitate low fertility.

situation of environments and the random chance of gender composition of children. At this point, the decision is very conditional or sequential. This is consistent with our need for a dynamic model to incorporate both a "social pressure" but also a traditional culture, in this analysis son preference, into consideration.

Why do we need a dynamic model to incorporate the approaches to institutions, culture, and individuals together? First, since the individual is the agent of social change any study of institutional or traditional culture effect has to be investigated through individual fertility behaviour. Secondly, individual behaviour seems to be a more reliable source for examining such effect compared to individual verbal response about attitudes toward the traditional and current political culture norm. Since the traditional Chinese culture or norms have been constantly stamped out as "feudal" ideas for about four decades, any inference about the presence of such traditional norms from an actor's verbal description of his/her mental state may be simply naive. As Ryder (1983) rightly comments, generally, if an actor is asked "what norms constituted conditions for his acts, ... the actor is likely to present a moral image, in providing a reason for any act, which is bent in the direction of the normatively acceptable" (p.24).

Thus the alternative is to "observe what people do and what they refrain from doing, inferring from uniformities of behaviour the presence of norms which would make them explicable" (Ryder, 1983:25; Levy, 1952). To probe this, Adler (1956) takes the position that:

> What people do is all that can be known about their values. The meaning of an action can be grasped without recourse to any kind of value concept *if meaning is understood as the probability of other events preceding or following it.* (p.272)[italics mine]

This proposition seems especially valid in studying how Chinese women apply *wait-for-change* fertility strategy under a very strong political norm of one-child-family. Although the survey interviewers were supposedly to ensure the confidentiality of responses, during the face-to-face interviews "some basic level carders and mass activists were invited as guides to assist in the publicity as well as organizational work" (Department of Population Statistics, 1986:14). Therefore, it is very likely that the responses of interviewed women were more apt to be rationalizations of the norms.[13]

However, in inferring the meaning from individual behaviour rather than relying on those direct answers to attitude questions, Ryder (1983) correctly warns that:

> Yet if norms are inferred rather than observed, they may permit a more compelling account of the situation but they are not really part of the analysis, *unless one is prepared to reason circuitously*. Where the evidence for an explanatory variable is the behaviour it is invoked to explain, the relationship is scientifically impotent because it is irrefutable. (p.25)[italic mine]

In the present analysis, no matter how difficult the inference of the effect of traditional norms is, the distinction of such traditional norms from the "modern norms" (political policy) lies in the depiction of how the individual acts.

Secondly, to study the social change one must go through the mechanism of how an individual behaves in response to the constraints of environment. It is only through interaction among those salient contending factors that social investigators can find out

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[13] According to the China's In-Depth Fertility Survey for Guangdong in 1987, only about three percent of interviews were conducted at the presence of local officials, while the information on the Shaanxi in 1985 is not available. In addition, as Hermalint and Liu's (1990) study finds, the responses to questions on family size preferences in China's face-to-face In-Depth Fertility Survey were more likely to be under-reported than in non-face-to-face survey.

their effect on the course of fertility transition. This is why the present study stresses time and again that although the institutional approach, such as fertility-as-mobility framework, rightly emphasizes the institutional effect from a politically downward controlling on shaping people's choice of goals and strategies, it does not rule out the crucial influence of traditional culture on fertility strategy application. And it emphasizes that since the traditional not irreligious culture has its spiritual logic inertia and is also deeply rooted at an intact socio-economic structure in rural areas since the Revolution, it could keep its independent features and momentum. In response to the imposition of control from the top down, the motivation and enthusiasm for improving one's lot are from the bottom up.

It is these two-way dialectic process that makes for social change. As Little (1989) says:

> In the social world the chief mechanism of change is individual action within a specific social and natural environment. (p.221)
> ...
> To explain a given social phenomenon, it is sufficient to account for: (1) the circumstances of choice that constitute the environment of action; (2) the strategies that rational, prudent persons would pursue in those circumstances; and (3) the aggregate effects of those strategies. (p.223)

This proposition expresses the idea that it is possible to construct an explanatory model to fit and summarize the reality better by simply synthesizing the most salient institutional background effect and culture effect through an individual's actual behaviourial life course.

Therefore, the major objective of this study is to investigate and model the dynamic path of how Chinese women brought about the fertility decline by applying the *wait-for-change* fertility strategy in response to the government's overwhelming policy. In order to carry out this objective, there is one more important thing that needs to be

discussed. That is related to what Ryder (1983) calls "the time pattern of fertility":

> The centre-piece of reproductive strategy may in fact not be the parity norm at all, but rather a set of time pattern norms. Lesthaeghe (1980) has drawn attention to three questions which cultures answer in different ways: when do people *start* reproduction, how do they *space* reproduction and when do they *stop* reproduction? Acceptance of norms with respect to these *temporal dimensions* of reproduction would itself have the by-product of a particular parity, as an average outcome, not in direct response to any quantitative orientation but as the indirect consequence of the time constraints themselves. It is not far-fetched to propose that *the time pattern of reproduction*, relative to the respondent's age and stage in the family life cycle, *may be weighted more heavily than a particular population size for the family, especially if the plan is sequentially formulated.* (p.19)[italics mine]

Ryder's argument succinctly depicts an important relationship between the timing and size of fertility. It is norms in the time pattern of fertility that determine a population's regular fertility behaviour and realization of the vague target fertility. When a population experiences dramatic intervening events, such as China's one-child-family policy, the time pattern of reproduction is more important because the family size norm is reduced, the span of parity progression is longer and the timing variation is more salient.

In addition to the important effect of time-pattern on the parity pattern of fertility, time-pattern fertility can reveal two other important effects. First, it refers to the effect on the individual from "a whole host of contemporaneous influences, including economic conditions and availability of contraception" (Gilks, 1986:438; Page, 1976; Hobcraft and Casterline, 1983). This refers to a *period effect*. In studying China's fertility transition, one must pay great attention to the period effect because it clearly represents China's population policy effect. Only by discerning the timing of birth control policy can the present thesis show clear individual response to the institutional impact.

Second, it also refers to the influence of an individual's past history on his/her

subsequent behaviour. This refers to a *cohort effect.* Although the *cohort effect* consists of all the period effects at one point in time, it accumulates those period effects and become their history. As Namboodiri (1980) says, "Time is historic" since every historic moment has its own "inheritance" (pp.85-86). Following Ryder's (1965) cohort theory promoted in his classic paper, one may understand the special nature of cohort effect:

> The cases for the cohort as a temporal unit in the analysis of social change rests on a set of primitive notions: persons of age a in time t are those who were age a-1 in time t-1; transformations of the social world modify people of different ages in different ways; *the effects of these transformations are persistent. In this way a cohort meaning is implanted in the age-time specification.* (p.861) [italics mine]

This important proposition suggests that there are persistent transformations of past events in each individual or cohort's life at one point in timing leaving an imprint on all subsequent behaviour (Hobcraft et al., 1982, 1983). It is through time that individuals or cohorts develop their own history and develop from their history.

To understand the persistent feature of cohort effect, it is necessary to mention the irreversible feature of individual biographic relevant actions in a life course from a newly proposed *biographic theory* by Birg et al. (1989). This biographic theory reads the life course as *biographic sequence* because all basic human actions, like marriage and birth of children, have irreversible consequences. For example, divorce is often practically impossible due to high cost, or morally impossible because of the responsibility of parenthood. As they put it:

> Because of this irreversibility it is possible to constitute a "time-architecture" of the human life course. Some basic phenomena of development like growth, maturity and aging would be unimaginable without the principle of irreversibility. The principle of irreversibility of biographic consequences represents the most important principle of theory.

> It is even more elementary as the principle of causality. The question whether event A is followed by event B or vice versa can be answered principally by perfect evidence whereas the question whether A is the cause of B or vice versa cannot be answered with the same degree of evidence (David Hume). Even if B follows A, B might be an anticipated event causally connected with A. (p.8)

This proposition expresses an important idea that individual past history has a causal chain effect on long-term commitments. It is this chain effect that brings a persistent feature of cohort effect. Moreover, this proposition also suggests that all the important decisions in a life course are made not simply under the constraints of social environment but also depending on history or so-called biography. If one chooses sterilization, the contraceptive consequence is irreversible. The decision depends on gender composition of children and societal pressure. This idea helps us to clarify the essentials of sequential-decision model and the importance of studying the timing of biographic events in life course. As we will see in the next chapter, in order to study Chinese *wait-for-change* fertility strategy, the present thesis is to focus on the maternity history, one part of the family life course.

CHAPTER III

CHINESE MATERNITY HISTORY STUDY

3.1 Discussions of Important Findings of Existing Maternity History Studies

The study of maternity history, as Mode (1985) says, "is sometimes referred to as birth interval analysis ... [It] entails following cohorts of women over long time periods, which may, particularly in the analysis of historical data, include entire reproductive careers, starting with marriage to the onset of sterility" (p.112). Since the average family size has fallen rapidly in many parts of the world now, more of the variation in fertility behaviour occurs in the timing, as opposed to the quantity, of children. Demographers are giving greater attention to the timing of birth, namely, maternity history analysis. Birth intervals of women in developing countries have been studied by using WFS data (Rodriguez et al., 1984; Hobcraft, 1983; Hobcraft and McDonald, 1984; Trussell et al., 1985; Gilks, 1986; Bumpass et al., 1986; Rindfuss et al., 1984, 1987; Guilkey et al., 1988). Studies on the reproductive process of women in developed countries are also well documented; for example, for Swedish women (Page, 1977; Heckman et al., 1985), American women (Bumpass et al., 1978; Marini and Hodsdon, 1981), as well as Canadian women (Balakrishnan et al., 1988; Rajulton et al., 1990). Chinese women's reproductive processes have begun to receive some attention (Department of Population Statistics of China's State Statistical Bureau, 1987; Feeney and Yu, 1987; Feeney et al., 1989; Coale et al., 1988; Li, 1989; Tu, 1989).

One striking finding of existing birth interval studies is from Rodriguez et al. (1984). As they report, achieved parity exerts little independent influence on the reproductive process while the length of earlier birth intervals plays a major role in affecting the timing and quantity of subsequent childbearing. They found that it is not the target fertility *intention* (which is allegedly immutably fixed early in the reproductive career) but the earlier actual birth *behaviour* (namely birth intervals) that is crucial in affecting the consequent reproductive process. Therefore, as they say: "there seems to be an in-built momentum to the reproductive process, whereby earlier behaviour and socio-economic differences fundamentally determine the remainder of childbearing experience" (p.26). Based on the finding of a consistent time-pattern of birth intervals and little effect of birth order *per se* on succeeding birth intervals, they call for "a more holistic approach to modelling the transitions in the childbearing process" rather than "by breaking down the reproductive process too finely" for each order (p.28).

However, such a finding has been partially challenged by Gilks' (1986) reexamination of the same data set. First, he finds that the substantial previous birth interval effect on current fertility is actually an effect of "tempo of past reproduction", namely this effect is shown with shorter durations in earlier time of birth intervals only. Secondly, a strong evidence of "increasing birth-order-related fertility control with time has been found" (p.454). Thirdly, "it has been shown that the effects of both contraception and breastfeeding on fertility are large and negative, especially at short durations, although they do not appear to underlie the 'tempo of reproduction' effects on fertility" (p.454).

According to Gilks (1986), the contraception problem refers to its very variable

effect: "it tends to have an initial negative impact on fertility, becoming positive at about 40 months' duration" (p.448). It is recognized that such variety may be due to an incorrect assumption that contraceptive use is uniform through the birth interval. Because many women change their contraceptive use behaviour within the later part of the duration of a birth interval, the above assumption does not hold. How to solve this problem? Gilks provides a surprising suggestion; that is, "the remedy is simply to omit these cases from the analysis" (p.448). It seems to the present author that if this treatment is applied, especially when the number of such women is "substantial" as Gilks reports, the time-pattern of contraceptive use for birth spacing would be totally distorted.

In spite of the different findings, these two important studies of reproductive process both point in one important direction. That is, further study of human reproductive processes should look from a "holistic" view point and look for its underlying behaviour factors affecting the "tempo" of reproduction. As Gilks (1986) finally suggests, further work is to "improve the measure of 'tempo' of previous reproduction and to discover its underlying behaviourial, social and economic factors, should be undertaken" (p.454). These factors include the use of contraception for spacing, abortion, breastfeeding, and unobserved heterogeneity such as fecundability and coital frequency (Rodriguez et al., 1984; Trussell et al., 1985; Gilks, 1986).

Now, let us turn to Bumpass et al. (1986) and Rindfuss et al. (1987) striking findings, which question the lack of fit between theory and empirical result of individual level studies. They notice that the conventional wisdom argued convincingly that socioeconomic variables could not have a direct effect on fertility; rather, they have to operate through the "intermediate", or "proximate variables" by an indirect path to affect

the birth interval dynamics (Davis and Blake, 1956; Bongaarts, 1978, 1982). In fact, results of aggregate analysis at the country level shows that all of the important variation in fertility was captured by variations of four principal "proximate determinants" -- marital status, breastfeeding, contraception and induced abortion (Bongaarts, 1978, 1982). It is expected that the way in which socio-economic variables must affect birth interval dynamics at individual level is schematized in Figure 3.1 (from Rindfuss et al., 1987). It is expected that once the effects of those four "intermediate", or "proximate variables", are controlled, the remaining effects of socioeconomic variables on fertility should disappear.

However, as Bumpass et al. (1986) and Rindfuss et al. (1987) first point out, the results of existing empirical studies at the individual level[1] often turn out to be that the observed *significant* socioeconomic effects on birth interval dynamics are only marginally changed by multivariate control for breastfeeding, contraception, and other proximate variables. The fact that the "significant variations in fertility frequently cannot be explained by measures of the proximate variables" (Rindfuss, 1987:813) means that there appears to be a direct path from the background variables to fertility dynamics. They thus question the discrepancy between the empirical micro-level results and what conventional wisdom expects theoretically by proposing rather different observed birth interval pathways, which seemingly contradicts the conventional wisdom (see Figure 3.2).

How to explain the unexpected direct pathway from background variables to birth

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[1] The empirical results refers to the World Fertility Survey data analyses covering over 13 countries: Korea (Bumpass et al., 1986), Peru (Palloni, 1984), Indonesia, Malaysia, and the Philippines (Trussell et al., 1985), and Dominican Republic, Fiji, Jordan, Mexico, Panama, Sri Lanka, Ghana, and Cameroon, etc. (Kallan and Udry, 1986).

Figure 3.1 *A model of the "conventional wisdom" of the pathways whereby socioeconomic variables affect birth interval dynamics*

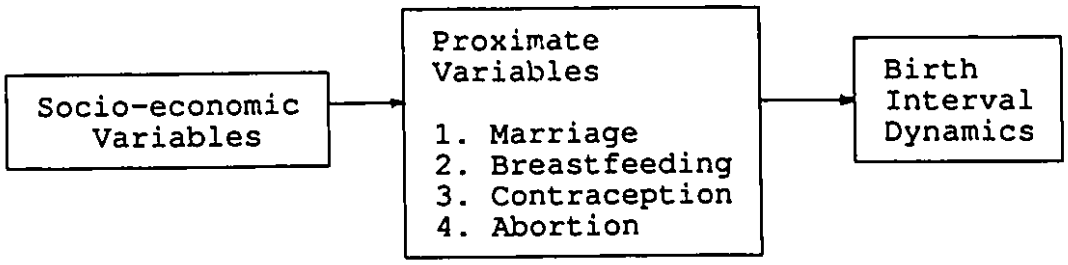
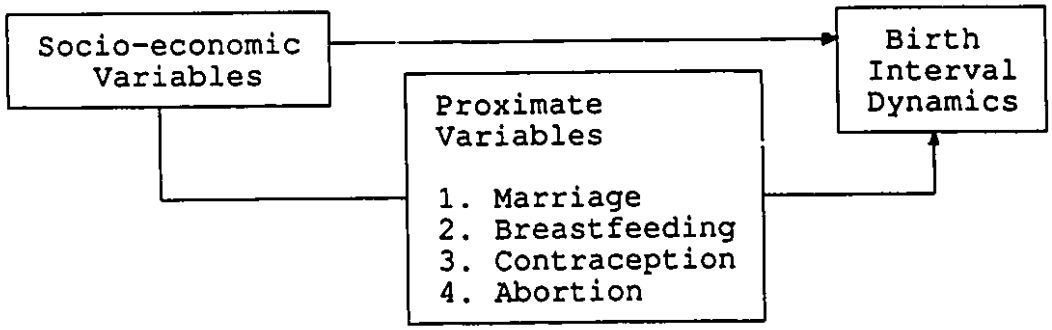


Figure 3.2 *Empirical evidence linking socioeconomic variables to birth interval dynamics*



Source: these two figures are derived from Rindfuss et al. (1987:815,820).

interval dynamics? Rindfuss et al. (1987) suggest "two most likely explanations". The first refers to a measurement error problem, namely, poor data quality of the principal proximate determinants of fertility. For example, all that is best known is the contraceptive use status, namely, whether a method was ever used, during each interval. It is suspected that the puzzle of conventional wisdom might be solved once we replace the variable of contraceptive use status with a new one as the date of contraceptive use. The second explanation relates to the omission of other critical proximate variables, such as coital frequency, sexually transmitted diseases, or sperm quality. It is believed that "we see no other viable alternative to solve the puzzle that so many recent studies have posed. Indeed, until such advances are made, attempts to understand differential fertility in terms of the proximate determinants at the individual level may be at a dead end" (1987:826).

Although Rindfuss et al. conclusion seems too strong, their finding of the incapacity of those principal "proximate determinants" in explaining all of the important variation in fertility at individual level sheds light on a further development of model building for birth interval dynamics. To put it differently, the question itself helps us to focus on the unexpected direct pathway from individual background variables to birth interval dynamics.

Given our previous theoretical inquiry about Chinese women's *wait-for-change* strategy, it is time to turn our attention to another likely explanation for the lack of fit between theory and results, especially the problem of incapacity of a principal "proximate determinants" -- contraceptive use. First we notice that most existing birth interval dynamics studies have been limited to examining the timing, the so-called "tempo", of reproduction directly from birth to next birth only. While it has been increasingly

recognized that "contraception may be substituted for abstinence or amenorrhoea as a spacing mechanism" (Trussell et al., 1989:436; Page and Lesthaeghe, 1981; Rodriguez and Hobcraft, 1980; Gilks, 1986; Trussell et al., 1989; Guilkey et al., 1988), the contraceptive variable is often used as a covariate in the model by showing its negative effect, important in its right sign of direction, on the "tempo" of reproduction process (Palloni, 1984; Bumpass et al., 1986; Trussell et al., 1985, 1989).

Because the previous WFS data only indicate whether a contraception method was used within a birth interval and not date of its use, conventional birth interval studies do not know the time-pattern of contraception initiation in each birth interval. We suspect that the perplexing positive effect of contraception on birth interval which shows up by breaking down the duration of birth interval finely (see Gilks, 1986) may lie in the lack of time-pattern of contraceptive use. It is important to emphasize here that the time-pattern of contraceptive use is related not only to an onset of contraceptive use but also to a duration of its use.

The observed result that an initial negative effect of contraception on fertility later turns to be positive at about the third year after a birth is a very important finding and one should not simply omit it. It signifies that in Gilks' (1986) study many women used contraception for spacing the birth interval before and terminated the use sometime later to have a subsequent birth at about the fourth year since previous birth. The positive effect of contraception on fertility at the third year seemingly results from a measurement error for those previous users who were no longer contraceptive users by the fourth year. Notice that the previous contraceptive users who dropped the contraception are likely to have a faster speed of birth timing than the non-users who were very likely to be less

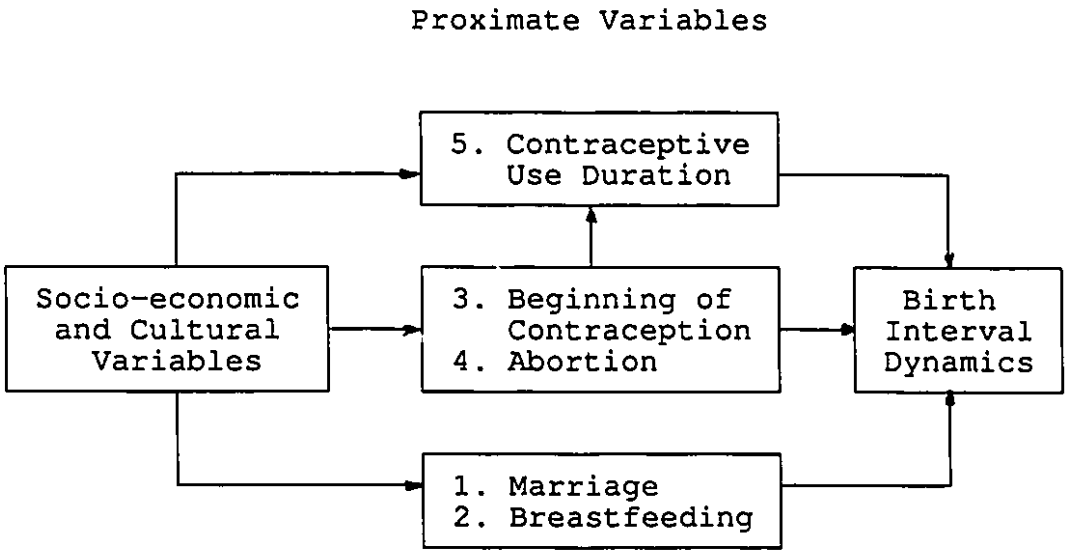
fecund because few fecund women who did not protect themselves from fertility could "survive" the risk of having a subsequent birth by four years duration after a birth.

What ties these diverse findings of birth interval dynamics together? All seems to point to a direction that we should pay greater attention to the time-pattern of contraceptive use for spacing. Thus, a conventional model linking background variables to birth interval dynamics is adapted as it is shown in Figure 3.3. The new model singles out the onset of contraception as a "proximate variable" standing between the background variables and fertility dynamics. Then a new "proximate variable" called duration of use is inserted between the onset of contraception and fertility dynamics and between the background variables and fertility dynamics as well.

How do the dynamics described here differ from that of conventional reproductive process studies? Note that in the conventional birth history studies, the contraceptive use is treated only as a covariate. The covariate, or so called *intermediate determinant* (Davis and Blake, 1956; Bongaarts, 1978), is used to indicate its constant effect in "shifting, upward or downward, a time-varying baseline hazard function, $\lambda_0(t)$, associated with a baseline group of individuals" (Teachman, 1982). However, as a covariate, duration of contraception has not been taken into account, yet. The present new model sees maternity history as a dynamic process between births and contraceptive uses. The dynamic process refers not only to transitions between births directly but also transitions from birth to onset of contraception and from initiation of contraceptive use to a subsequent birth.

Singling out the duration of contraception as another important "proximate determinant" of birth interval dynamics is due to two main reasons. First, it refers to the spacing behaviour of contraceptive users in the modern world. The omission of such a

Figure 3.3 *A modified model scheme of the pathways linking socio-economic and cultural background variables to birth interval dynamics*



"proximate variable" in the conventional birth interval dynamics model building is understandable in the sense that modern contraceptive use starts for the purpose of stopping rather than spacing. But the omission becomes unacceptable in studies of modern fertility behaviour while contraception is increasingly prevalent in modern societies (see Knodel and Chayovan, 1990). That is, once the presumably most important proximate determinant of fertility plays not only a stopping role but also a spacing role in deterring or delaying fertility, the model of birth interval dynamics has to take the duration of use into account.

The second important consideration is that socio-economic background variables do determine the duration of contraception. Such a new specification of the model is especially important for our theoretical inquiry which assumes that the variation of fertility among Chinese women who apply the *wait-for-change* strategy to comply with the birth control policy by using some reversible contraceptive method after a birth is directly related to socio-economic and cultural variables. That is to say, the background variables affect not only women's decisions of whether to wait by adopting contraception but also how long they can wait in continuing the contraceptive use.

3.2 Chinese Maternity History Analysis

Thanks to China's In-Depth Fertility Surveys (1985, 1987) we have good information on maternity history and potential information for reconstructing the timing of contraceptive

use in each birth interval.[2] They enable us to build empirical models to analyze not only the effect of contraceptive use on birth timing but also the transition probabilities from a birth to the onset of contraception use and from its use to a new birth and so on. What do these new reproduction dynamics signify? We will see later that it is this new dynamics that signifies Chinese *wait-for-change* fertility strategy underlying the reproduction process "with Chinese characteristics".

The present author also benefits considerably from the theoretical reasoning mentioned in the previous chapter. It is this theoretical inquiry that prompts our interest to seek a new dynamic process. This is perhaps most in agreement with the calling of Rodriguez et al. (1984) for a "holistic" approach to study birth history rather than by blindly breaking down the reproductive process too finely (p.28). Nevertheless, as the present author thinks, there would appear to be no inconsistency between reference to a "holistic" approach and adherence to a sequential maternity dynamic history, especially by adding the crucial "proximate determinant", duration of contraceptive use, in each birth interval.

Let us see how an addition of duration of contraceptive use into the model signifies Chinese *wait-for-change* fertility strategy underlying the reproductive process "with Chinese characteristics". Here the so-called "Chinese characteristics" refer to the fact that contraception is not simply substituted for abstinence or amenorrhoea but is compulsively enforced over an individual for stopping a birth, by state's policy makers.

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[2] The Chinese In-Depth Fertility Surveys provide the date when individual started to use a contraception in each closed pregnancy interval, and the duration of current contraception use for open pregnancy interval. Through a cautious reconstruction, the timing of contraception use initiation in each birth interval, closed or open, can be obtained.

However, this is only part of the story about Chinese characteristics of fertility transition. Another part of the story is that knowing the force of the government policy on contraceptive use for stopping fertility below parity three or even two, Chinese couples actually tend to adopt contraception for spacing purposes with the hope that some time later the birth control policy will be changed soon.

Concerning the interaction between individuals *waiting-for-change* behaviour and institutional constraints, Saith's (1987) following observation can be a good example. Those couples who have abortions often renew their conceptions with expectations that they are able to extend their family size beyond the limit prescribed according to their local regulations which are uncertain and not always enforced. However, the situation turns out to be totally out of those couples' expectation. As Saith (1987) puts it,

> the couples concerned decided to have a second child in the full knowledge of the array of economic disincentives triggered off by their step. What accounts for the decision to abort is not a belated realisation of such disincentives, but the *sudden* discovery of the range and strength of *extra-economic pressures* that are simultaneously brought to bear on the women pregnant with a second child. Women's leaders, team leaders, party officials, SCFP [single-child-family-program] workers, neighbours, team or work group colleagues, unite in a barrage of propaganda and argumentation directed at the women with the intention of making her revise the decision and agree to an abortion. The result is frequently a case of rather late abortion, terminating a pregnancy of more than four months' duration. This network of extra-economic "persuasion" operated even prior to the SCFP. What is new is its intensity in the present situation, emphasising the rather large overlap between persuasion and outright coercion. (pp.244-245) [italics mine]

These observations provide important evidence on how Chinese couples apply *wait-for-change* strategy for their fertility behaviour under the "extra-economic pressures" of the

political institutional settings.[3]

To the author's limited knowledge of ordinary Chinese people's feelings, there is one thing that could be added to explain the above observation. The conflict between "extra-economic pressure" from the top down and resistance from the bottom up is also because, there is no specific birth control law that citizens must follow, instead, there are expedient measures, so-called policies.[4] Therefore, couples have dared economic hardship by not following the political norm and really going ahead to have non-prescribed births or conceptions. Since the two-children-family policy and one-child-family policy are never justified by statutory law, many families tend to view such policy as an expedient measure. This is actual weakness of the institutional constraints. Therefore, the more individuals realized that the chance for change had come, or that it is not worthwhile to wait any longer, the more contraceptive users would use it for spacing purposes, rather than stopping after first or second birth.

Saith's (1987) analysis provides at least two important observations for the present Chinese maternity history analysis. First, to many couples who wanted an "out-of-quota"

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[3] It should be noted that the emphasis of the "extra-economic pressures" does not rule out the fact that Chinese local officials have been encouraged by the central leadership to use economic incentives to one-child couples who pledge to have no more births and economic disincentives for those who do not comply with government policy (see Chen and Kols, 1982:J601-604).

[4] As Chen and Kols (1982) say: "Because of lack of consensus among the leadership, the National People's Congress did not pass a proposed law instituting incentives and disincentives, and instead the CCP central Committee compromised by issuing an open letter to all Party and Communist Youth League members endorsing the one-child Campaign" (p.J-600). We notice that this point is also mentioned by Bongaarts and Greenhalgh (1985:592). Notice that in 1982 China's Constitution was indeed revised to include articles that require citizens to practice birth planning (China's Population Information Centre, 1983:1; Kaufman, 1989:708). But the "law" does not specify that citizens are required to have certain number of children.

birth, material disincentives were still affordable but the "extra-economic pressure" was irresistible. This important evidence signifies a rationale of institutional approach which emphasizes institutional environment as a key determinant of birth control and plays down the importance of material condition disincentives. Second, there was intensive conflict between individuals who desperately wanted an "out-of-quota" birth and the institutional constraints of stringent birth control rules. This suggests that Chinese maternity histories since 1970s must be different from the maternity histories of women in most countries of the world. The distinctive point is that the time-pattern of contraception use which reflects how individuals and institutions interact is crucial in depicting the most important feature of the Chinese fertility transition dynamics.

So far we have made it clear that it is this special *manner* of "*induced*" birth control behaviour that underlies the special birth spacing and birth stopping time-pattern of contraceptive use in the maternity histories of Chinese women. Because the state provides of contraception to the individual mainly for terminating births rather than for substituting abstinence or amenorrhoea, and because many one-child or two-children couples are ready to use contraception for spacing only, study of the time-pattern of contraceptive use in the maternity history of Chinese women becomes most important. For these reasons, it is the author's belief that the addition of *duration of contraceptive use* in the maternity history will significantly enhance the study of Chinese *wait-for-change* fertility strategy underlying the Chinese reproductive process. In doing so, the present thesis turns to specific hypotheses.

3.3 Hypotheses

Since the seemingly most irresistible effect on fertility is from the institutional environment through a uniform policy enforcement over individuals at certain periods in time, we first expect that there will be a strong period effect which reflects the government's powerful birth control policy in spite of individual socio-economic-cultural background variation. Under this general expectation, there are some hypotheses:

(1) The stronger the birth control period effect exerted by China's political institutions exerts, the smaller (or insignificant) will be the contraception use differentials by residence, education, and gender compositions of children for each parity, and age at first marriage.

However, the period effect should be temporal, as its definition means, and the institutional impact is expected to be reinforced or countered by effects of individual background variables, especially economic and cultural factors. Using residence and education as socio-economic variables, and son preference behaviour as a cultural proxy variable, and age at marriage as a demographic variable, a second set of hypotheses is formulated:

(2) After starting contraceptive use, the speed of having another birth will be faster for women without sons, living in rural areas, who are less educated, and married early. This is to see whether there is a strong spacing pattern of contraceptive use under the overwhelming constraints of government policy.

(3) After controlling for the contraceptive use and other principal "proximate determinants" in a conventional multivariate analysis of birth interval dynamics

the significant background variable effect on fertility is likely to disappear for cohorts whose contraceptive use variation is significant and the duration of use is not significant; the significant background variable effect is only marginally changed for cohorts whose contraceptive use duration variation is significant.

3.4 Data and Settings

The data for this thesis were taken from the In-depth Fertility Surveys conducted by the State Statistical Bureau of China, with the technical assistance of the Research Institute of the International Statistical Institute, in Shaanxi in April 1985 and in Guangdong in April-May 1987. Under a stratified multi-stage clustered random sampling scheme, representative samples of 4,084 ever-married Shaanxi women and of 6654 ever-married Guangdong women aged 15-49 were selected. The overall response rates are 93.4 percent and 97.3 per cent for Shaanxi and Guangdong sample surveys, respectively (Department of Population Statistics of State Statistical Bureau, 1986, 1989). Such a high response rate seems to be impossible without "support from the government at all levels" and especially the "guides" of basic level cadres and mass activists in the publicity as well as organizational work during the data collection (Department of Population Statistics of State Statistical Bureau, 1986:14).

The data quality on age reporting seems to be good as revealed in the conversion of the traditional Chinese lunar calendar into solar calendar. This is very important for event-history analysis because it relies heavily on the reported timing of event from retrospective survey data. Although the updated Guangdong Second Phase In-depth

Fertility Survey Data have been occasionally found to contain some misreported birth dates, in general the quality of both Shaanxi and Guangdong data sets is good.

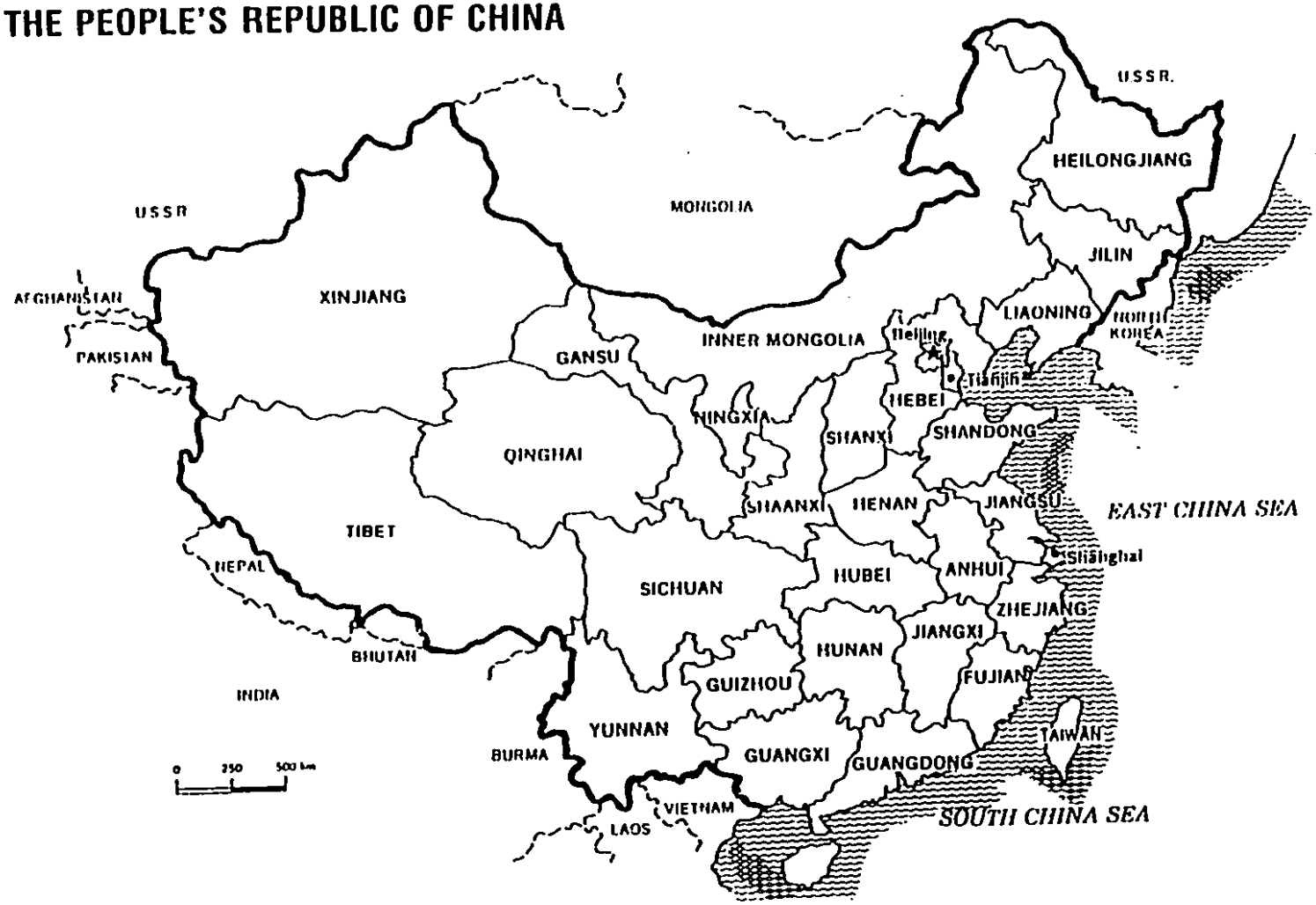
Moreover, the data set contains novel and rich information about maternity history: not only marriage history, birth history, pregnancy history but also the timing and method of contraceptive use following each pregnancy interval. The information on contraceptive use for each pregnancy interval enables us to reconstruct the timing of contraceptive use history for each birth interval. Therefore, it provides a valuable resource to examine how Chinese women applied the *wait-for-change* strategy under the frequently changing socio-political circumstance.

Shaanxi is one of the inland provinces of China situated on the middle Yellow River, China's second largest river, with a population over 28 million in 1982 (see Figure 3.4). This overwhelmingly Han Chinese province has more than 80 percent of the population living in the rural area (see Table 3.1). It was in this provincial area (the Wei River Valley along the middle reaches of the Yellow River) that "was once the cradle of Chinese culture" (Vermeer, 1987:1). Moreover, the "cradle of the revolution" -- Yenan -- was also in this area as the headquarters of CCP during the World War Two period (Fairbank et al., 1973:889). However, Shaanxi is still a less developed province of China (Peng, 1988:654; Tu, 1989:333). Net Per Capita Income of Peasants is about 25 percent lower than the national average from 1978 to 1986 (see Table 3.1).

Located on the far south coast of China with her third largest river, Pearl River, Guangdong province had a population more than 59 million in 1982 (see Figure 3.4). The majority of the population in the province is also Han but the proportion of minority groups is larger (18 percent) than that of Shaanxi (five percent) according to the 1982

FIGURE 3.4

THE PEOPLE'S REPUBLIC OF CHINA



Source: Tien, H. 1983:4

Table 3.1 *Population distribution and net per capita income of peasants - China, Shaanxi and Guangdong, selected years, 1978-1986*

Year	Population(1000)		Rural Population		Peasant Net Per Capita Income		
	Shaanxi	Guangdong	Shaanxi	Guangdong	China	Shaanxi	Guangdong
1953*	15881	34770					
1964*	20767	40448					
1978					133.6	na	182.30
1980	28310	57800	0.84	0.83	191.33	142.49	274.37
1981					223.44	177.17	325.37
1982*	28904	59300	0.81	0.81			
1983					309.77	236.14	395.92
1984	29660	61660	0.83	0.81	355.33	262.53	425.34
1985	30020	62530	0.82	0.79	397.60	295.26	495.31
1986					423.76	298.98	546.43

Source: * Figure is from 1953, 1964, and 1982 census; The proportion of rural population refers to rural residence. Other population figures for Shaanxi provinces are quoted from Greenhalgh's (1989:14) table 1. The Guangdong population figures are from *Guangdong Tong ji Nan Jian, 1986:107)*. The proportion of rural population refers to agriculture. Figures of the net income of peasant are from *Statistical Yearbook of China,* 1987. Hongkong:Longman Group (Far East) Ltd., p.622

census (State Statistical Bureau, 1985:218) because Guangdong has Li-Miao and Zhung-Yao minority autonomous regions. Guangdong has distinctively large emigration to overseas since the mid-nineteenth century. It is said that more than half of all overseas Chinese who emigrated abroad for work came from Guangdong (Parish and Whyte, 1978). Historically, during the "infamous British *Opium War* [1840-1842] waged for the benefit of British opium exports from India to China" (Kung, 1989:244), it was at the village of San-yuan-li, the suburb of Canton, where ten thousand irate Cantonese peasants launched an attack on British force troops. This incident has been hailed by Chinese as the "first sign of Chinese nationalism" (Hsu, 1990:189; Fairbank et al., 1973:458-459). The leadership of the *Taiping peasant movement* (1850-1866) was from Guangdong Hakkas. The *national revolution* (1911-1912), which overthrew the last emperor of the Manchu dynasty, was led by Dr. Sun Yat-sen, a Cantonese, and had its early development in Guangdong.[5] Recently, since China's post-cultural revolution, when the government adopted an "open door" policy, Guangdong established China's first special economic zones, first in Shengzheng, later in Zhu-hai, allowing foreigners to establish corporations in Guangdong since the 1980s.

Table 3.1 shows some general information about the rural population distribution and rural economic background for these two different provinces. We can see that these two provinces have similar provincial proportions of rural populations. There have been significant rural per capita income improvement for the two provinces, as well as China as a whole, since the 1978 economic reform. However, the rate of economic improvement

[5] The well-known military school of the national revolution, Huang-pu military school, precedented by General Chiang Kai-shek and cooperated by Communists including Zhou Enlai, was located in Canton as well.

in Guangdong is far above the national average and almost double that of Shaanxi province.

Table 3.2 shows that the investment in fixed assets of the rural areas in Guangdong is much higher than Shaanxi at the collective and individual levels, respectively. The greater economic achievement of the Guangdong peasants seems to derive largely from the "open door" policy in favour of this costal province, compared with the inland province Shaanxi. Table 3.3 presents the per capita consumption of major food by national average and these two provinces. We can see that on average the living standard of Guangdong peasants is much better than that of Shaanxi. The consumption of vegetables and meat by Guangdong peasants is almost twice that of Shaanxi peasants, not to mention sea food.

Nevertheless, it is interesting to know that the fertility levels in Shaanxi were very close to the countrywide average for the last four decades since 1949. From Table 3.4 we can see that with a "modernization" level well below the national average Shaanxi province has achieved a much more rapid decline of total fertility rate (2.42) than the countrywide total fertility level (2.71) in 1981, though its total fertility rates were higher before 1971 when the government started to tighten up the fertility rate. It is noteworthy that the much more rapid fertility decline in Shaanxi than in the national average was achieved largely by reducing rural fertility since the 1970s.

Ironically, Guangdong goes exactly the opposite way. From Table 3.4 we also see that total fertility rates in Guangdong before 1971 were always lower than the national average as well as Shaanxi (except during the three year famine period). But after 1971, Guangdong peasants' total fertility rates declined slower than the national average and

Table 3.2 *Investment in fixed assets of rural collective-owned units and individuals, 1986 (unit:Rmb 100 million)*

Province	Collective-owned units		Individuals		
	New economic organization	Joint Total	Purchase fixed assets for production	For residential building	Total
Shaanxi	0.07	2.76	2.03	7.42	11.89
Guangdong	0.75	20.74	4.30	22.09	31.96

Source: *Statistical Yearbook of China,* 1987. Hongkong:Longman Group (Far East) Ltd.:125-127

Table 3.3 *Per capita consumption of major food, China, Shaanxi, and Guangdong, selected years 1980-1986 (unit: kg.)*

Food	China			Shaanxi			Guangdong		
	1980	1985	1986	1980	1985	1986	1980	1985	1986
Grain	257.2	257.5	259.3	205.9	256.5	237.0	292.0	256.1	255.6
Vegetable	127.2	131.1	133.7	69.7	65.8	69.0	115.5	118.5	125.4
Edible oil	2.5	4.0	4.2	1.8	3.2	3.2	2.4	3.2	3.2
Meat	7.8	11.0	11.8	5.4	5.6	6.4	6.6	12.6	14.0
Poultry	0.7	1.0	1.1	0.1	0.1	0.1	2.2	3.4	3.5
Egg	1.2	2.1	2.1	0.4	1.3	1.3	0.8	1.2	1.3
Fish, shrimp	1.1	1.6	1.9	0.03	0.01	0.03	4.2	8.4	9.1

Source: State Statistical Bureau (ed.), *Statistical Yearbook of China, 1987.* Hongkong:Longman Group (Far East) Ltd., p.624-626

Table 3.4 *Total fertility rates by city and rural area, China, Shaanxi, and Guangdong, 1949-1982.*

Year	China			Shaanxi			Guangdong		
	City	Rural	Total	City	Rural	Total	City	Rural	Total
1949	5.51	5.54	5.54	5.24	5.64	5.57	5.25	4.65	4.76
1954	6.04	5.94	5.96	6.67	6.09	6.22	5.34	5.28	5.29
1959	4.36	4.20	4.23	4.41	4.65	4.60	4.35	4.76	4.69
1964	4.42	6.50	6.12	4.24	6.64	6.15	4.18	6.20	5.85
1969	3.30	6.20	5.67	3.65	5.87	5.46	2.82	6.18	5.55
1970	3.22	6.31	5.75	3.34	6.01	5.51	2.76	6.20	5.56
1971	2.83	5.96	5.40	3.07	5.67	5.20	2.76	6.20	5.37
1972	2.56	5.43	4.92	2.79	5.84	5.27	2.55	5.90	5.29
1973	2.36	4.98	4.51	2.32	4.90	4.43	2.39	5.35	4.81
1974	1.94	4.62	4.15	1.64	4.73	4.19	1.93	4.99	4.43
1975	1.76	3.97	3.58	1.95	3.60	3.30	1.75	4.26	3.81
1976	1.60	3.61	3.25	2.00	3.47	3.23	1.44	4.29	3.78
1977	1.57	3.14	2.87	2.19	2.76	2.65	1.35	3.75	3.32
1978	1.40	3.00	2.75	2.12	2.87	2.74	1.24	4.10	3.58
1979	1.40	3.10	2.80	1.62	3.15	2.93	1.38	4.26	3.74
1980	1.20	2.56	2.32	1.52	2.31	2.20	1.55	3.95	3.51
1981	1.47	2.99	2.71	1.52	2.60	2.42	1.49	4.34	3.83
1982	1.50	2.86	2.62	1.26	2.79	2.54	1.08	3.52	3.08
1983	1.34	2.78	2.42	na	na	2.47	na	na	2.98
1984	1.22	2.70	2.35	na	na	2.60	na	na	2.89
1985	1.21	2.48	2.20	na	na	2.64	na	na	2.56
1986	1.24	2.77	2.42	na	na	2.96	na	na	2.70
1987	1.36	2.94	2.59	na	na	2.97	na	na	2.76

Source: Coale and Chen (1989): *Basic data on fertility in the provinces of China, 1940-82.* Papers of the East-west Population Institute, No. 104; Countrywide TFR for 1983-87 from Department of Population Statistics (1989): *China's Population Statistics Yearbook*:131. Beijing:Kexuejisuwenxian.

much slower than that of Shaanxi. Up to 1982, while the urban Guangdong women's total fertility rate was lower than the national urban average and Shaanxi urban level, the rural total fertility rate in Guangdong is 24 percent higher than the national rural level and 26 percent higher than Shaanxi rural rate.

Table 3.5 shows that the faster fertility decline in Shaanxi than Guangdong since 1970s was achieved by a higher compliance with the government birth control policy, especially the one-child-family policy. But, it is noteworthy that a very high rate of one-child certificate recipients of Shaanxi one-child couples (34.4 percent) which was almost triple of that of Guangdong (12.8) was accompanied by a typically high renounced rate of received certificates (21.5 percent) which was more than twice as great as the national average and more than twenty times as many as the renounced rate in Guangdong. It seems that Shaanxi women do have strong a stronger propensity to apply the *wait-for-change* strategy to have achieved their target fertility in their fertility process at a faster rate than Guangdong women.

For these two provincial populations with very different fertility behaviour, what we know from the 1982 census is that both of them have about 81 percent of population in rural area (see Table 3.1), and Shaanxi has a seven percent higher illiteracy and semi-literacy rate than Guangdong but two percent greater rate of junior middle school education than Guangdong. It seems that the evidence of a relatively low fertility rate before 1970s for Guangdong and high fertility rate for Shaanxi would support the modernization approach. However, such an approach may have a hard time in explaining the opposite fertility trends of these same two provinces since 1970s. While the institutional approach may explain the evidence of a faster declining fertility trend in

Table 3.5 *Contraceptive prevalence indicators by percentage, China, Shaanxi, and Guangdong, 1982*

Indicators	China			Shaanxi			Guangdong		
	Girl	Boy	Total	Girl	Boy	Total	Girl	Boy	Total
One-child certificate recipients among one-child couples in 1982	34.0	40.3	37.5	30.5	37.3	34.4	13.5	12.2	12.8
One-child certificate recipients having 2nd child in 1982	12.5	6.7	9.0	25.2	19.2	21.5	1.9	0.0	0.9
One-child couples using contraception in 1982	63.1	69.3	66.5	63.7	72.8	68.9	35.8	41.4	38.7

Source: Unpublished tables from the 1982 One-Per-Thousand National Sample Fertility Survey, quoted from Arnold and Liu (1986), Table 1 (p.228), 3 and 4 (pp.232-233).

Shaanxi with a low modernization level, it would also have a difficult time in reconciling the reluctant decline of fertility under similar constraints of the social political institutional settings in Guangdong, which actually had started on the right track of fertility decline well before 1970s. Therefore, studying the fertility behaviour pattern of Shaanxi and Guangdong women by taking the additional cultural effect into consideration may shed insight into the understanding of China's fertility transition.

In order to carry out the objective of examining the pattern of how Chinese women apply the *wait-for-change* strategy, the present thesis focuses on two major period effects representing the institutional impact of the two China's governmental birth control campaigns. The first one is the 1970s birth control campaign -- *wan xi shao*: later (marriage), longer (intervals between births), fewer (children). The second one is the one-child family campaign since 1979. How to measure these period effects? The matter has to be handled with circumspection.

Notice that the countrywide *wan xi shao* campaign actually soon adopted a two-child family policy, "couched in terms of the Zhou Enlai model of 'one is not too few, two are good, three are too many'"(Tien, 1983:32). In Shaanxi, it is reported that a number of prefectures and cities started to encourage two-child families and undo previous rules that had rewarded couples for having large families in 1973 (see Zhu Chunzhu, 1988; Greenhalgh, 1989). Therefore, 1974, one year after the release of the provincial government's two-child-family new norm propaganda, should be a proximate year of Shaanxi local governments following the central leadership to put the new norm into effect. That is to say, 1974 roughly represents a time when a red traffic signal is shown and two or more children families must stop "entering" fertility any more.

For Guangdong province, what we have known about the timing of implementing a two-child-family norm is that around 1975 the birth planning norm was first "two are best", "spacing four years between two births" and later changed to "one is best, at most two" (Zhu et al., 1988:405). A more precise time is not available. But according to Chen and Kols (1982: 587)[6] and Greenhalgh's (1989c) reports that "in 1977 a limit of two children was established for couples in all areas" (p.8), therefore, the timing for implementing a two-child-family policy in Guangdong is set in 1977 under a rather conservative assumption that Guangdong provincial government was one of most reluctant followers of central planning leadership in executing the two-child-family policy.

Regarding the period of a more forceful national one-child family campaign, a selection of 1981 is based on a scrutiny of actual campaign implementation in Shaanxi again. It is known that the nationwide one-child family was announced in January 1979. Shaanxi was among the first provinces in 1979 to "follow closely" the central government's call to draw up regulations promoting the one-child policy by four levels of the administrative system (province, municipality, township, and village). However, the period of 1979-1980 in Shaanxi is argued as a transition phase between *wan xi shao*

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[6] As Chen and Kols (1982) report: "In 1977 the concept [of fewer children] was changed to mean two children in rural as well as urban areas". Another source for the timing of official two-child-family norm started in Guangdong is from a reporter of Guangdong in 1980: "Two years ago, a deputy secretary of the Boluo county party committee had a third child. Last year the daughter of a deputy secretary of the county CCP committee in charge of planned parenthood work also gave birth to a third child. The masses said, 'If the top does not lead well, then the bottom gets confused; if the policies are not implemented correctly, the reason is to be found in the top'" (Guangdong radio on failure to implement population control program, May 20, 1980, quoted from Chen and Kols, 1982:J-584). The fact that the events of those two carders who violated the two-child-family norm in 1978 and 1979, respectively, resulted in a strong reaction by the masses seems to indicate indirectly that the timing of Guangdong provincial two-child-family norm was very likely to be effective in 1977.

policy era and the "mature" one-child policy period rather than as an initiation of one-child policy period (Greenhalgh, 1989b:18,20). It seems that the period of 1979-1980 is like a time when a yellow traffic signal is shown and a red signal is about to appear.

When is a red signal on for one-child policy to be implemented at the provincial level? According to Greenhalgh's (1989b) assessment of Shaanxi birth control documents, the Shaanxi provincial leadership and a number of prefectures and municipalities began to demand that each couple have only one child "in early 1980" (p.20). Like the way of deciding what year is a proximate time when a red signal of two-child policy is shown, the present thesis, therefore, chooses 1981 as the time for government turning a red signal on to stopping Chinese couples having a second baby. For Guangdong province, the timing of one-child-family campaign also began in 1980. According to Zhu et al. (1988), "in early 1980, [Guangdong] began to advocate generally that each couple have one child" (p.414). Therefore, for Guangdong, we take 1981, one year after the initiation of the one-child-family campaign, as the timing for a red signal to stop women having a second child in all areas.

Notice that the selection of the timing for the two different birth control campaigns should not be interpreted as exactly the time all relevant individuals would face the stopping signal. In some areas (i.e. cities) it may appear earlier while in some others later. However, it is supposed that at the end of 1973 and 1980, all individuals should be very well informed about the government two-child and one-child policy, respectively. Those who still proceed to have an additional child on the red signal are violating the rule openly or under some special permission. Because we do not know who are to be allowed to have additional children permissibly under those special conditions, the present study

can only assume that they are randomly distributed in different groups and their under-identification would not produce a biased estimate.

It is also possible that due to the existence of local autonomy to some extent, uniform birth control policy has never been implemented as "cutting with one stroke of the knife" (yi dao qie), so that some families still can have additional children permissibly in their local areas. Nevertheless, in such cases those couples actually departed from the central leadership's stopping line and defied the will of the government's policy.

The author is also aware that since 1984 the central leadership made a concession to rural couples for having more than one child. However, as Greenhalgh (1989) found, it is only until April 1985, while at the time the Shaanxi survey was being conducted, that the local city governmental began to initiate modification of previous policy in Shaanxi. Therefore, the event of having additional children is not mainly the result of large scale government's concession. Instead, it is more likely the result of the people's will or the so-called "traditional norm".

For Guangdong, the situation is more complicated because the survey was done two years later and sampled Guangdong women were more likely to experience a relaxed one-child-family policy control. But according to the new provincial policy, only a few one-child couples were allowed to have a second child by at least four years duration after the first birth, such as those mothers whose first child was a girl. Therefore, the timing of a second birth will be important for knowing how Guangdong women behaved in response to such conditional relaxation of the one-child-family policy.

In order to distinguish Chinese women's fertility behaviour in response to government policy impact, the present thesis has to make some selections with

circumspection. First of all, the present study is to use *marriage cohort* rather than *birth cohort* as the cohort measure. As Hobcraft and Casterline (1983) suggest, although both cohort measures may capture cumulative effects of social environment in which the individual grew up, entry cohort (marriage cohort) may be a better measure than birth cohort for use in societies where contraceptive availability and use have increased. This is because attitudes and norms about reproduction may be more closely reflected by the effect of entry cohort (marriage cohort) to the extent that these are determined by *common* experiences of women at different contraceptive contexts and stages of the reproductive career. Notice that the present study selects two entry cohorts (marriage cohorts) on the base of the year of entry for the two provinces respectively to capture two major period effects of the two recent Chinese birth control campaigns.

To select the marriage cohorts which could reflect two important birth campaign period effects, the present study focuses on cohorts that could have had a third birth since 1974 in Shaanxi and 1977 in Guangdong and having a second birth since 1981 for both provinces. Therefore, in studying the period effect of the first phase birth control campaign, we have to exclude those women who had a third child before 1974 and 1977 for the Shaanxi and Guangdong women, respectively. In addition, a woman who had a second child before 1981 is to be excluded from the studied sample for the second phase of birth control campaign in the two provinces respectively. However, without special caution, such restrictions may cause a serious selectivity problem especially when we want to examine the effect of gender composition of children and other background variables on the timing of a new birth. This is because women with no sons or other characteristics are more likely to have a new baby faster or even well before the marked

points of time than those women with sons or other characteristics.

A careful examination of the marriage cohorts and their birth orders indicates that a marriage cohort 1969-1977 has only 0.7 percent of women having a third birth before 1974 (8 out of 1080); with only one year earlier, a marriage cohort 1968 has 21 percent of women having a third birth before 1974 (28 over 136). It seems that the year of 1969 is a lower bound as the earliest year for a marriage cohort in the first phase birth campaign analysis.

Furthermore, the choice of an upper bound as the latest year for this marriage cohort is based on a possible minimum marriage duration which allows a woman to have three children. According to Bongaarts and Potters (1983), birth interval segments comprise a constant nine months full-term pregnancy, a minimum of five months waiting time to conception, and a period postpartum amenorrhoea which is a function of breastfeeding. The mean duration of postpartum amenorrhea can be estimated by the following formula:

$$A = 1.753EXP(0.1396*B-0.001872*B^2)$$

where A is the mean duration of postpartum amenorrhea in months, B is the mean duration of breastfeeding in months.

In Shaanxi, the mean duration of breastfeeding is twenty months (Department of Population Statistics of State Statistical Bureau, 1986:83) which yields an average of 13.5 months of estimated mean duration of postpartum amenorrhea. In sum, we obtain about six years as the minimum marriage duration to have a third birth (three times of five months waiting to conceptions plus three times of nine months gestation duration and plus two time of 13.5 months postpartum amenorrhea). This figure indicates that choosing

1977 as an upper bound of the latest year for this marriage cohort allows women to have a reasonable opportunity to have a third birth before the survey. The empirical examination of original data confirms that the 1977 marriage cohort still has 26 percent of women having three children after 1974; but one year later, only 12 percent of the 1978 marriage cohort has three children. Thus, it is satisfactory to select this marriage cohort for the first phase analysis by excluding eight women who had their third birth before 1974 (see Table 3.6).

Turning to the choice of marriage cohort for the second phase birth control campaign, a reexamination of the original sample shows that the year of 1978 is an appropriate lower bound as the earliest year to see people's reaction of whether or not they would have a second birth after the red signal for stopping any second birth was on. As a result, only 1.6 percent (14 out of 901) of marriage cohort 1978-1982 has a second birth before 1981; but one year earlier, 27 percent (31 out of 115) of the 1977 marriage cohort have second births before 1981.

With regard to an upper bound as the latest year to see the one-child-policy effect, it seems that 3.5 years is the minimum marriage duration to have a third birth (two times of five months waiting for conceptions plus two times nine months gestation duration, and plus one time of 13.5 months postpartum amenorrhea). This figure exceeds the marriage duration for marriage cohort after 1982, because its maximum marriage duration is only about 2.3 years up to the time of the survey (April, 1985) and it does not provide this marriage cohort with enough exposure time to the risk of having a second birth. The observation of 1983 marriage cohort indeed shows that only 0.9 percent (2 out of 218) of women have a second birth. Therefore, the present thesis selects women married during

Table 3.6 *Original sample distribution by certain characteristics for different marriage cohorts of Shaanxi sample (1985) and Guangdong sample (1987)*

Variable	Shaanxi Marriage Cohort 1969-1977		Shaanxi Marriage Cohort 1978-1982		Guangdong Marriage Cohort 1971-1977		Guangdong Marriage Cohort 1978-1983	
First marriage status								
Intact	1044	96.7%	891	98.9%	1484	97.6%	1967	98.8%
Widow	13	1.2%	2	0.2%	11	0.7%	3	0.2%
Divorce	21	1.9%	8	0.9%	1	0.1%	2	0.1%
Separation	1	0.1%	0		0		1	0.1%
Not applicable	1	0.1%	0		24	1.6%	17	0.9%
Child 1/2 died before Child 2/3								
No	969	89.7%	875	97.1%	1421	93.5%	1891	95.0%
Yes	111	10.3%	26	2.9%	99	6.5%	99	5.0%
Year of child 2 born								
Before 1981		-	14	1.6%		-	49	2.5%
Since 1981		-	407	45.2%		-	1330	66.8%
No child 2		-	480	53.3%		-	611	30.7%
Year of child 3 born								
Before 1974	8	0.7%	-		Before 1977: 51	3.4%	-	
Since 1974	493	45.6%	-		Since 1977: 894	58.8%	-	
No child 3	579	53.6%	-		No child 3: 575	37.8%	-	
Nationality								
Han		na		na	1494	98.3%	1937	97.3%
Minority		na		na	26	1.7%	53	2.7%

(table continues)

Table 3.6 (*continued*)

Variable	Shaanxi Marriage Cohort 1969-1977		Shaanxi Marriage Cohort 1978-1982		Guangdong Marriage Cohort 1971-1977		Guangdong Marriage Cohort 1978-1983	
Residence								
City	149	13.8%	164	18.2%	125	8.2%	202	10.2%
Town	61	5.6%	57	6.3%	150	9.9%	229	11.5%
Rural	870	80.6%	680	75.5%	1245	81.9%	1559	78.3%
Education								
No school	508	47.0%	261	29.0%	330	21.7%	297	14.9%
Primary	362	33.5%	204	22.6%	839	55.2%	898	45.1%
Secondary	167	15.5%	257	28.5%	243	16.0%	496	24.9%
High school	38	3.5%	175	19.4%	101	6.6%	281	14.1%
University	5	0.5%	4	0.4%	7	0.5%	18	0.9%
Children Ever Born								
Childless	17	1.6%	44	4.9%	12	0.8%	31	1.6%
One	106	9.8%	436	48.4%	92	6.1%	580	29.1%
Two	456	42.2%	368	40.8%	471	31.0%	913	45.9%
Three	357	33.1%	48	5.3%	547	36.0%	364	18.3%
Four or more	144	13.3%	5	0.5%	398	26.2%	102	5.1%
Total (N)	1080		901		1520		1990	

1978 and 1982 only, excluding 14 women who had their second birth before 1981 (see Table 3.6).

Considering Guangdong sample, since we have decided that 1977 is the year in which the red signal to stop having a third birth was turned on in the province, an entry cohort of women married during 1971 to 1977 is selected with the same logic as that in selecting the Shaanxi marriage cohort exposed to the two-child-family policy. Since we have skipped three years from 1974 to select the year of 1977 as the time point for seeing the two-child-family policy impact, the lower bound as the earliest year for seeing people's reaction whether or not they would have a third birth after the red signal was on should be lifted up to 1972 to minimize the selectivity problem.[7] However, to keep the original sample as large as possible and those women who married since 1970s, during the *wan xi shao* birth control campaign, the present study first selects a marriage cohort from the years 1971 to 1977. In doing so, the present study excludes 51 women who had their third birth before 1977 (see Table 3.6).

In addition, a selection of Guangdong marriage cohort under the one-child-family policy impact is similar to the Shaanxi sample but its upper bound as the latest year is extended one more year to 1983. This is because the Guangdong sample was conducted two years later and thus the sampled women had longer exposure time to the risk of

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[7] If we select marriage cohort from 1972 to 1977, there are only 17 women who had a third birth before 1977, which is only 1.3 percent (17 out of 1318) of the sub-sample size. For women married in 1971 alone there were 34 women who had a third birth before 1977, which occupies 16.8 percent (34 out of 202) of the group women. Moreover, among these 34 mothers who had a third birth before 1977 already, 19 of them are mothers of two girls and only 4 of them are mothers of two boys. Thus, excluding those who had a third birth before 1977 may result in an underestimation of the probability of son preference effect on the third birth in Guangdong though the bias would be rather small.

having a second birth than Shaanxi sampled women. To repeat, the second marriage cohort for Guangdong is from 1978 to 1983 while excluding 49 women who had their second birth before 1981 (see Table 3.6).

Beside the consideration of marriage cohort selection, the second selection is to exclude those women whose child died before the birth date of a subsequent birth (up to the third birth) while keeping those women with any child death which occurred after the subsequent baby was born (up to the third birth). This is because they are the exception to the China's birth control policy: there is no motivation for families with infant or child death to practice family planning and not to have another birth and no reason for government to punish such families for having another birth. Because the positive effect of infant and child mortality on speeding the fertility is already well-known (see Chen, 1986) and its negative effect on the use of contraception is obvious, to avoid any confusion resulting from such exceptions to the mandatory birth control policy, the present thesis does not include this event in the model. Table 3.6 shows that more than 10 percent of the 1969-1977 marriage cohort and about three percent of the Shaanxi 1978-1982 marriage cohort is to be excluded from the sub-sample due to some infant or child death. The percentages for Guangdong 1971-1977 and 1978-1983 marriage cohorts are 6.5 percent and 5 percent, respectively. It is noteworthy that the longer the marriage duration, the higher the infant or child death percentage.

The third selection is to exclude any twin birth up to the third birth parity. This selection is important because the present thesis is especially interested in the differential of order-specific birth interval, and without distinguishing the multiple birth from others the parity effect will be incorrect. The fourth selection is to exclude ethnic minority

women from the present government birth control policy impact study because ethnic groups "have been excused from Chinese birth planning campaigns" (Chen and Kols, 1982:J-580). The individual data of the Guangdong sample linked with household data has provided us with this information. From Table 3.6 we can see that the present study is to exclude 1.7 percent and 2.7 percent of ethnic group women from 1971-1977 and 1978-1983 marriage cohorts, respectively. For the Shaanxi sample, since such information at the individual level data is not yet available to the author, there is no further selection. According to the 1982 census, the proportion of minority ethnic groups in Shaanxi is much smaller (0.5 percent) than that in Guangdong (1.8 percent) (see State Statistical Bureau, 1985:218). Therefore, it seems that the problem of not excluding the ethnic group for Shaanxi sample is negligible.

All in all, the final sub-sample sizes for 1969-1977 and 1978-1982 marriage cohorts in Shaanxi are 918 and 806, respectively. For Guangdong sample, the final sub-sample sizes for 1971-1977 and 1978-1983 marriage cohorts are 1308 and 1728, respectively. After certain selections we are to analyze two marriage cohorts for each province to see the timing of additional births under the policy constraints for those married women who did not have any additional births before the red signal was supposedly on, and who did not have any infant or child who died before any subsequent birth up to the third birth, as well as those women who did not have any twins up to the third birth. It is likely that there are other unspecified exceptions of birth control policy. However, those cases seem to be few and randomly located among the groups which we are to examine. Therefore, the present study is to infer the events and timing of having additional birth from the analysis of selected sub-samples on how they apply the *wait-for-*

change strategy to "make-up" their fertility.

3.5 Variables and Model

In the present Chinese maternity history analysis, the first variable is the timing of each birth. The construction of such a variable is very straightforward because the survey data have provided the exact date of each birth. Because conventional birth interval studies have paid much attention to this variable, the present study needs no repetition.

The second variable is the timing of contraceptive use in each birth interval. Since the main interest of the present thesis is to analyze Chinese women's *wait-for-change* fertility behaviour under the constraints of two recent governmental birth control campaigns which only allowed couples to have two or even one child, respectively, we focus on the contraceptive use behaviour in the second birth interval (i.e. from first birth to second birth) and third birth interval (i.e. from second birth to third birth) only. Since the survey data have provided us with detailed information on the timing of contraceptive use in each closed pregnancy interval and open pregnancy interval, one can reconstruct a new variable of contraceptive use in each birth interval.

However, to construct such a variable is not as straightforward as constructing the birth timing variable. It needs greater care. For example, a woman's first live birth might result from any pregnancy from parity one to three or even higher due to some previous miscarriage or induced abortion for medical reasons, which occurred before the first live birth. For the same reason, her second live birth might result from any pregnancy from parity two up to seven or even higher. The matter is to locate the correct date when this

woman started to use contraception after her previous birth and before her subsequent birth. For example, if a woman initiated a contraceptive use right after a live birth and before a subsequent pregnancy, we can simply calculate the date of contraceptive use by adding the "time elapsed before starting using the method" to the date of the previous birth. On the other hand, if a woman used any method after several miscarriages or abortions following a live birth, her date of contraceptive use in the birth interval should be estimated not from the date of the previous live birth but the date of relevant pregnancy preceding the initiation of contraceptive use. To put it more specifically, let us explain the construction of such an important variable step by step in detail.

The first step is to construct the date of contraceptive use in a birth interval from the information of closed pregnancy intervals. We decide that if a woman used any contraceptive method rather than sterilization after the first live birth and before the second live birth, she is specified as a reversible contraceptive method user in the second birth interval. The same is the case in constructing a third birth interval. That is, if a woman used any reversible method after the second live birth but before the third live birth, she is specified as a user of reversible method in the third birth interval. The exact timing of initiating the contraceptive use in a birth interval is taken by adding the "time elapsed before she started using the method" to the exact date of an immediately previous pregnancy.

It is important to emphasize that the base of time point for calculating the date of the onset of contraceptive use in each birth interval is the date of an immediately previous *pregnancy* rather than a previous live *birth*. This is to avoid any misdate which might result from some cases in which women started using a method not right after a live birth

but after a miscarriage; therefore, the timing of initiation is not necessarily to be based on the timing of the previous birth date. In general, after locating the immediate previous pregnancy before which a woman started using a method, one should take the *ended date* of previous pregnancy as the base of timing and add the elapsed time of a method used before a subsequent pregnancy.

The second step is to construct the date of induced abortion done for birth planning only. The present study considers the event of induced abortion for the purpose of birth planning the same as using a reversible method. This is because the major objective of studying the *wait-for-change* strategy fertility behaviour is to see how Chinese women use *any* method to space or stop their reproduction process.

How to locate the timing of such contraceptive related induced abortion? The ways to do it from the two samples are different. For the Shaanxi sample the induced abortion information is available from women's pregnancy outcome history and is clearly distinguished from other non-live pregnancy events such as spontaneous abortion. In constructing the timing of induced abortion for the purpose of birth planning this study restricts it to those women who reported somewhere else that they had one or more induced abortions for the purpose of family planning and that they did not have any induced abortion for other reasons such as illness. To make the present analysis of contraceptive use as clear as possible we deliberately take such a conservative treatment though it might underestimate induced abortions for purpose of birth planning to some extent by excluding those women who had more than one induced abortion for either birth planning or other reasons.

But fortunately, in the present samples there are only one or two such cases, thus

the possible underestimation is negligible. In general, the date of any family planning related induced abortion occurring after the first birth and before the second birth, and before using any other method in the same birth interval, is taken as the date of contraceptive use after the first birth. Similarly, the date of any family planning related abortion occurring after the second but before the third birth and before using any other method in the same birth interval is coded as the timing of contraceptive use after the second birth.

Regarding the Guangdong sample, the induced abortion information is not available from the pregnancy outcome history directly but is retrievable from summary information of all non-live birth history. In doing so we should locate the earliest parity of non-live pregnancy which was classified as "terminated" and occurred after first and before second birth and before using any other method in the same birth interval. According to the original questionnaire (China's Statistical Bureau, 1987), the variable of "pregnancy terminated" was derived from the survey question whether a respondent's non-live pregnancy was aborted. In addition to a distinction of abortion from other non-live pregnancy, the timing of abortion is restricted to the family planning related abortions which occurred for those women who reported somewhere else that they had one or more abortions only for the purpose of family planning and never had any abortion due to illness or other reasons.

The reason for such a treatment is the same as that for Shaanxi sample and needs no repetition. Actual overlapped cases for women who had experienced induced abortion for both family planning and illness reasons is only one or two in Guangdong sample. Thus the potential underestimation of such an event is negligible. Moreover, dealing with

the timing of abortion from the Guangdong data, one should be very cautious in specifying the date of family planning related abortion for those women whose induced abortion for family planning reasons occurred before the second and the third live birth but after some induced abortion due to illness right after the first and second birth, respectively.

The third step is to construct the timing of reversible contraceptive use in the open birth interval from the information of open pregnancy interval. After specifying the contraceptive use and family planning related abortion for each birth interval up to the third one, we still have a number of women who might use contraception after the first or third birth not being taken account. They are the women who were one-child or two-children mothers and did not have any non-live birth after a first or second live birth so that the questions on contraceptive use in closed pregnancy intervals were skipped for them. For them, the timing of contraceptive use information can be retrieved from the sample by the information of "duration of current use" or "duration of use in the open interval" for Shaanxi sample data. That is, by taking the date of the survey minus the duration of contraceptive use from the open interval (the present study takes the earlier one from either "current use" or from "used in open interval"), we go backward to estimate the starting point of contraceptive use.

Because the information only refers to duration of the use for the open interval from the Shaanxi sample data, the exact timing of use would be rather crude. Some women who were current users of a method by the time of the survey might use some other methods before using the current method in the same open interval. Also, there are some women who were not current users but did use some method before in the open

interval. For both cases, the cut point date to count backward should be earlier than the time of survey. Because of the limitation of the Shaanxi data, we apply a conservative treatment by taking the time of survey as a base to calculate the date of initiation of contraceptive use.

The Guangdong sample questionnaire design is an improvement on the earlier design for Shaanxi. The question of an exact date of first use in the open interval replaces the questions of "duration of current use" and "duration of use in open interval" in the first phase sample questionnaire. Therefore, the timing of use in the open interval is much more accurate from the Guangdong sample data than that of the Shaanxi sample data.

After having all the information ready from the above three steps, we can construct the dates of contraceptive use after first birth and second birth from a women's earliest time of using reversible contraceptive method in a closed pregnancy interval or family planning related induced abortion in each birth interval. In addition, the open interval information is the last resource of specifying the date of contraceptive initiation after a first and second birth for those who were not pregnant after a first and second birth until the time of survey, respectively. Creating the variable of the timing of reversible contraceptive use is important for us to know how Chinese women apply *wait-for-change* strategy in their fertility process as we will see in the next chapter.

The fourth variable is the date of sterilization. For the Shaanxi sample the information on the timing of sterilization is available for both contraceptive reasons and other reasons so that we can identify the exact date when a woman terminated her child-bearing process for a known reason. With regard to Guangdong sample, it turns out that the date of sterilization is almost exclusively restricted to those done for contraceptive

reasons, leaving the date of sterilization for a number of sterilized women for non-contraceptive reasons unidentifiable (i.e. there are 31 and 199 women for 1971-1977 and 1978-1983 Guangdong marriage cohorts, respectively, whose date of "non-contraceptive sterilization" is missing). Considering this problem, the present analysis treats those women who had "non-contraceptive sterilization" as missing in their "open" birth interval rather than including them into the group who were censored by the time of survey, since the former might have terminated their reproduction long before the time of survey.

It is found that in the 1971-77 marriage cohort there are only four women who belong to this missing group and have fewer than three births. Thus, the loss of sample cases is negligible. For 1978-1983 marriage cohort, however, among 193 women who had "non-contraceptive sterilization", 24 women had only one child and 123 women had two births only. Why, in the Guangdong younger marriage cohort, so many women, especially city residents (not shown in the table), took to sterilization for non-contraceptive reasons? This is a puzzle not solved by the present study. For the objectives of the present thesis, the decision to exclude those "non-contraceptively sterilized" women from the related open birth interval is to be as conservative as possible. It does not let those women with unknown timing of sterilization enter the censored group at all so that any estimation of the life table analysis is only likely to be underestimated rather than overestimated.

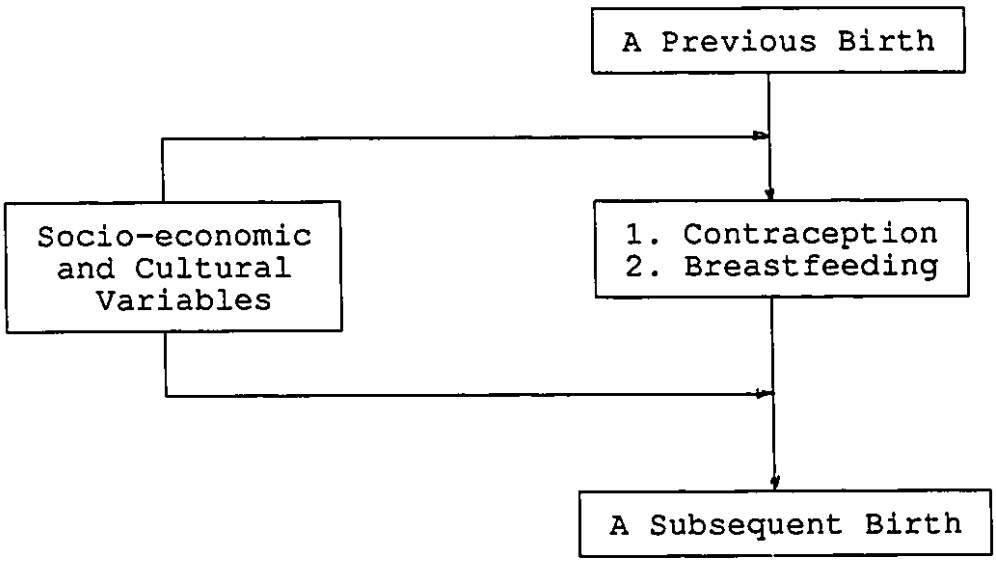
To our regret, we are not able to reconstruct the duration of reversible contraceptive methods used from the data set. All that is retrievable from China's In-Depth Fertility Survey data is when a first method was used during the birth interval and duration of the first and the last method in the interval. Since the dates of last method used were not available it is hard to make any estimate for when users "terminated" their

uses. In addition, there were a number of women who reportedly became pregnant while using a method which make a specification of the duration of use vague. Were these women's birth due to method failure? We do not know. There is speculation that "some reported method failures may have been intentional unapproved pregnancies" (Kaufman et al., 1990:726). The existing possibilities of reporting a deliberate termination of a contraceptive use for reason of "becoming pregnant" as "pregnant while using" makes the effort of estimating a duration of use very unreliable.

Given these limitations, the present study drops the attempt of reconstructing duration of contraceptive use, a supposedly critical "proximate determinant" for solving the puzzle of a direct linkage between background variables and birth interval dynamics in the conventional birth interval analysis. Due to the lack of a good measurement, the model scheme proposed by the present study, which has shown in Figure 3.3, needs a revision. The revised model is to single out the beginning of contraception since a birth as a *immediate state*, or so-called *transition state*, in the birth interval, which is shown in Figure 3.5. That is to say, the birth interval is to be *decomposed* into two stages. The first stage is to examine the transition from a birth to the first use of a method. The second stage is to analyze the transition from the beginning of reversible contraceptive method use to a subsequent birth.

The new model scheme signifies that contraceptive use itself is part of birth interval dynamics, namely a *transition process* through which socio-economic and cultural background variables assumably can have direct effect on the process of each transition, especially on an unknown waiting time of termination of any method. The reason for such an assumption lies in the previous notation that among women who arrived at the

Figure 3.5 *A revised new two-stage model of pathways linking socio-economic and cultural background variables to birth interval dynamics*



contraceptive use state by using a reversible method as a first method after a birth, there are some who were in fact still exposed to the risk of pregnancy through the course of the interval due to the unknown risk of failure rate of the method or unknown intentional termination of use. No matter what the case would be, the *decomposed* birth interval dynamics since the use of a reversible method is seemingly affected by the socio-economic and cultural background variables again. Therefore, the present study is to replace the proposed new "proximate variable" of duration of use with *two-stage* sequential analysis by setting the contraceptive use as a *transition state* rather than as a covariate.

Notice that the new model tentatively puts breastfeeding as a transition state in the birth interval dynamics as an alternative path to non-contraceptive users along the reproductive process. It is well-known that breastfeeding appears to be a primary determinant of the birth interval in populations with "natural" fertility behaviour. The impact is found to result from the prolonged lactational amenorrhea, with later weaning leading to a later decline in the sucking stimulus and later return of menses (Henry, 1961; Knodel, 1977; Jain and Bongaarts, 1981; Simpson-Hebert and Huffman, 1981; Bongaarts and Potter, 1983; Laukaran and Winikoff, 1985; Smith, 1985; Anderson et al., 1986;). A recent study reassessing the contraceptive effect of breastfeeding has questioned the conventional "unidirectional" model, though it is still found that breastfeeding and amenorrhoea are "undeniably correlated" (Santow, 1987:160). Therefore, breastfeeding could be singled out as a primary proximate variable among non-contraceptive users.

Here we regard breastfeeding as a transition state simply because a consideration that the birth interval is also not only related to whether women breastfed but also

duration of lactation, namely, when they weaned. However, we see this only as a tentative treatment because such duration effect is still not clear (Tu, 1989; Bumpass et al., 1986; Gilks, 1986; Rindfuss et al., 1987) and because the birth interval of non-users is not the main interest of the present study.

3.6 Methods

In studying Chinese maternity history the present thesis mainly uses the event history analysis methods, especially the proportional hazards model proposed by Cox (1972). The proportional hazards model combines the virtues of life table techniques with multiple regression analysis. Utilizing the life-table technique, the proportional hazards model can eliminate the potential biases associated with the censoring problem of truncated observations. It can also account for the fact that the pace at which birth timing occurs may not be constant over time, namely, it is age dependent. By allowing the formulation of equations relating independent variables to the hazard function similar to the conventional least-squares regression, population heterogeneity is captured by a set of covariates included in the proportional hazard model. An excellent discussion on the distinction of the proportional hazard models from discrete-time hazard models and other common methods is to be found in Teachman (1982).

Using the hazard rates[8] of having a subsequent birth and starting to use a

[8] The hazard rate $h(t)$ is comparable to the force of mortality in the familiar life table of survival. It can be interpreted as the instantaneous probability of having a subsequent birth or marital dissolution at some "exact" time t provided that the event has not occurred prior to that time. Notice that the values of hazard rates themselves are not really (conditional) probabilities because they can be greater than one.

contraceptive method at an exact time as "dependent variables" respectively, we see how different socio-economic and gender composition variables influence the timing of a subsequent birth and contraceptive use and a subsequent birth after using a contraceptive method under the constraint of governmental birth control policy. The functional relationship between the predicted hazard rate (or *risk*) and the covariates of Cox's (1972) proportional hazards model is

$$h(t; x) = h_0(t) \exp(\beta x)$$

where $h(t; x)$ denotes the hazard function, risk, at time t for a woman with certain gender composition of children and other characteristics. The $h_0(t)$ is an arbitrary and unspecified baseline duration-dependent risk for women with the standard set of conditions $x = 0$. The factor $\exp(\beta)$ is the *relative risk* associated with having a certain gender composition of children and other characteristics vector x that do not vary with time. β is the estimated regression parameter specifying the effect of covariate, such as the effect of gender composition, on the risk, which is the main interest in the Cox's (1972) model.

To this point, the covariates were taken as time-constant from the beginning and over the course of survival time. In many cases, however, the values of the covariates may depend upon time (see Cox and Oakes, 1984; Kalbfleisch and Prentice, 1980; Blossfeld et al., 1989). To take the time-dependent covariates into account, the equation can be rewritten as

$$h(t; x(t)) = h_0(t) \exp(\beta x(t))$$

in which the hazard at t depends on the current value of the covariate vector $x(t)$ (Kalbfleisch and Prentice, 1980:132). As Moreno-Navarro (1987) says: "The use of concomitant effects changing over time allows the conditional hazards to converge or

cross, which is a more realistic assumption than that underpinning the proportional hazard model, that is, the log-additivity of effects" (p.26).

Although the estimated proportional hazards coefficients are important in determining the effects of the covariates in shifting the time-varying baseline hazard function, they do not provide "actual estimates of number and timing" (Teachman, 1982:1043) for selected groups directly. To obtain the estimated probability for various groups of individuals, net of other independent variables, we need to know another important life table value: the survivor function[9]. With knowledge of the hazard function, the survivor function for T, given certain gender composition and other characteristics vector x, can be written as

$$S(t; \mathrm{x}) = S_0(t)^{\exp(\beta \mathrm{x})} .$$

Where $S_0(t)$ is the baseline survivor function which can be estimated from the survivor function with mean values of covariates (Cox, 1972; Menken et al., 1981; Balakrishnan et al., 1987).

It is important to note that the present analysis of maternity history considers a model of "transitions into multiple end states", which brings concern about the "competing risks" problem (Blossfeld et al., 1989; Kalbfleisch and Prentice, 1980; Allison, 1984). For example, after having a birth, a woman might make a transition to a subsequent birth state or terminate her reproductive career by having sterilization for the purposes of family planning or other medical reasons. The event of having a sterilization actually removes

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[9] The survivor function $S(t)$ gives the probability that an individual remains in the state ("survives") until time t, that is, that an event has not yet occurred. It is a non-increasing function of time, approaching zero as time elapses. The complement of $S(t)$, i.e., 1 - $S(t)$, is used in the present study to denote the cumulative probabilities of having a subsequent birth.

that individual from the risk of transition to a subsequent birth state.

Because the computer programs of hazards model are usually limited to examine the "multiple kinds of events" separately (Allison, 1984) by using a single-decrement life table, the solution to the competing risk problem is achieved by regarding the competing risks (events) of types other than the one remaining in the model as censored at the individual's transition time to the competing events. The present hazards model analysis of subsequent-birth timing, therefore, is done by regarding the women using sterilization after a birth as being exposed to the "risk" of having a subsequent birth until a transition into the competing event of having sterilization. The treatment of competing risks by such "removal" of other risk types is based on a strong assumption about the independence among different risks.

CHAPTER IV

DATA ANALYSIS AND RESULTS

4.1 Simple Percentage Distribution Analysis

The present data analysis starts with percentage distribution study; to do so is to get some sense of a general picture of original observed fertility differentials before any further statistical manipulation. The observed distributions also serve as the base line for any further elaboration of the data.

Table 4.1 shows first that in general the two provinces have similar rural distributions for those married before 1978 and after. However, the Shaanxi cohorts contain relatively higher proportion of city residents and lower proportions of town residents than the Guangdong counterparts. Since the fertility level of town women is always in the middle of the two extremes set by city and countryside, to some extent the resident distribution difference itself may give some weight for lowering Shaanxi fertility rates but raising Guangdong fertility rates.

Secondly, the education distribution shows that the proportions of no-school women are higher in the Shaanxi cohorts than in the Guangdong cohorts, though in general the more recent marriage cohorts tend to be more educated. We also note that the proportions with secondary education or higher in the Shaanxi cohorts are slightly higher than that in the Guangdong cohorts. Since many studies have found that the negative relationship between fertility and education can be found only when one crosses the

Table 4.1 *Selected sub-sample distribution of certain characteristics, Shaanxi (1985) and Guangdong (1987)*

Variable	Shaanxi				Guangdong			
	1969-1977		1978-1982		1971-1977		1978-1983	
Residence								
City	133	14.5%	152	18.9%	116	8.9%	195	11.3%
Town	49	5.3%	47	5.8%	132	10.1%	214	12.4%
Rural	736	80.2%	607	75.3%	1060	81.0%	1319	76.3%
Education								
No school	425	46.3%	231	28.7%	272	20.8%	258	14.9%
Primary	307	33.4%	176	21.8%	728	55.7%	770	44.6%
Secondary +	186	20.3%	399	49.5%	308	23.5%	700	40.5%
Age at first marriage								
< 20 year	428	46.6%	153	19.0%	330	25.2%	301	17.4%
20-22 year	355	38.7%	343	42.6%	511	39.1%	570	33.0%
23 year +	135	14.7%	310	38.5%	467	35.7%	857	49.6%
Mean Marriage age (year)	20.4	(2.5)	22.2	(2.4)	22.0	(2.9)	22.9	(3.1)
Current age								
< 25 year	6	0.7%	187	23.2%	1	0.1%	272	15.7%
25-29 year	168	18.3%	513	63.6%	84	6.4%	752	43.5%
30-34 year	590	64.3%	104	12.9%	692	52.9%	626	36.2%
35-39 year	147	16.0%	1	0.1%	461	35.2%	76	4.4%
40 year +	7	0.8%	1	0.1%	70	5.4%	2	0.1%
Mean age (year)	32.3	(2.8)	26.9	(2.8)	34.6	(3.1)	29.1	(3.6)

Note: Figures in the parentheses indicate standard deviations. (Table continues)

Table 4.1 (*continued*)

Variable	Shaanxi 1969-1977		Shaanxi 1978-1982		Guangdong 1971-1977		Guangdong 1978-1983	
Child ever born								
1	102	11.1%	426	52.9%	89	6.8%	566	32.8%
2	428	46.6%	343	42.6%	454	34.7%	845	48.9%
3	295	32.1%	34	4.2%	478	36.5%	262	15.2%
4+	93	10.1%	3	0.4%	287	21.9%	55	3.2%
Year of Birth	Parity 3		Parity 2		Parity 3		Parity 2	
1974-1976	87	22.4%	-		-		-	
1977-1980	151	38.9%	-		369	48.2%	-	
1981-1984	146	37.6%	355	93.4%	360	47.1%	700	60.2%
1985+	4	1.0%	25	6.6%	36	4.7%	462	39.8%
Total	388	100.0%	380	100.0%	765	100.0%	1162	100.0%
Child No. wanted at mar.								
0	1	0.1%	-		-		-	
1	15	1.6%	72	8.9%	20	1.5%	49	2.8%
2	303	33.0%	341	42.3%	284	21.7%	597	34.5%
3	119	13.0%	81	10.0%	320	24.5%	372	21.5%
4	53	5.8%	28	3.5%	239	18.3%	253	14.6%
5+	2	0.2%	2	0.2%	20	1.5%	20	1.2%
Didn't think about it:	414	45.1%	276	34.2%	412	31.5%	418	24.2%
As many as possible:	11	1.2%	6	0.7%	13	1.0%	19	1.1%
Total	918	100.0%	806	100.0%	1308	100.0%	1728	100.0%

secondary education threshold, the difference of no-school distributions for the two samples may be inconsequential.

The third variable is age at marriage, a demographic variable, usually representing women's nuptiality history and here especially indicating women's previous compliance with the late marriage policy if they were married since the 1970s. Notice that in the 1970s the late marriage policy "urged" women to postpone marriage to the ages 25 and 23 in city and rural areas, respectively, though the Chinese new marriage law passed in 1980 sets the minimum age of marriage at 20 for women (Chen and Kols, 1982). The present result shows that there was a trend toward getting married later as time went on. For example, in Shaanxi the percentage being married before age 20 among the older marriage cohort is 28 percent higher (46.6 versus 19 percent) than that among the younger counterparts, while the percentage being married after 22 among the younger marriage cohort is 24 per cent higher (38.5 versus 14.7 percent) than that among the older counterparts. Likewise, in Guangdong the percentage married before age 20 in the older marriage cohort is 8 per cent higher (25.2 versus 17.4 per cent) than that in the younger counterparts, but the percentage married after 22 among younger marriage cohort is 14 per cent (49.6 versus 35.7 per cent) higher than among older counterparts.

We can also see that the percentage of late marriage is higher for the Guangdong women than that of the Shaanxi counterparts. In fact, the Guangdong women's mean ages of first marriage are relatively higher than that of their Shaanxi counterparts: 22 and 23 for Guangdong older and younger marriage cohorts in comparison to 20 and 22 for Shaanxi older and younger marriage cohorts, respectively. Therefore, despite a stubborn higher provincial fertility rate, the Guangdong women were not to be blamed for being

"irrational". At least they experienced the late marriage revolution, a well-known first fertility transition revolution (Coale, 1975, 1984), no slower than the Shaanxi women.[1]

Fourthly, as we consider the current age distribution, we see that the mean current age were 32.3, 26.9, 34.6 and 29.1 for the Shaanxi and the Guangdong older and younger marriage cohorts, respectively. The result indicates that on average the ages of the Shaanxi old and younger marriage cohorts were slightly younger than their Guangdong counterparts, respectively. More specifically, we find that a large majority of women were currently at the age of 25 to 34, and few women were currently at the upper age bound of 40 and lower age bound of 24 by the time of survey, especially for the older marriage cohorts. This indicates that the selected older marriage women's fecundability would not vary much because "it is believed that fecundability increases between puberty and some age between 20 and 25 years, maintains a plateau up to 30 years and decreases after that" (Henry, 1976:98).

On tne other hand, in the younger marriage cohorts, 23 per cent and 16 per cent of women were currently aged 24 or younger for the Shaanxi and the Guangdong women, respectively. It indicates that the selected younger marriage cohorts consist of a considerable number of women who just started their reproductive careers by the time of survey not long ago. These women might tend to be relatively less fecund due to the effect of temporary sterility resulting from delivery (Henry, 1976:97).

Fifthly, as we turn to the number of children ever born distribution, we can see

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[1] We notice that the two mean ages of marriage of the older marriage cohorts from the two provinces are not exactly comparable since the Shaanxi cohort includes some women who were married before 1971 and not exposed to the constraints of late marriage policy and its mean age of marriage tends to be older. But for the younger marriage cohorts, the mean ages of marriage of the two provinces should be comparable.

that the parity distribution differential by marriage cohorts between the two provinces are quite substantial. The result shows that 42 per cent of the Shaanxi older marriage women had a third birth after the provincial government turned the red signal on (after 1974), compared to 58 per cent of the Guangdong older marriage women who had a third birth after the provincial red signal was on (after 1977). Notice that among those women who had an "out-of-quota" birth after local government turned on a red signal, we have excluded those who had an infant or child death before a second or third birth, or had twins up to a third birth. Although in general the percentages of women who broke the rule are substantially high, Shaanxi women seems to be less likely to break the two-children-family rule than their Guangdong counterparts.

With regard to the parity distributions of the more recent marriage cohorts, we see that 47 per cent of the Shaanxi younger marriage women and 67 per cent of the Guangdong recently married women had their second birth during the one-child-family campaign. The higher proportion (20 per cent higher) of second birth among Guangdong women than that among the Shaanxi women might be attributable to a propensity differential or institutional environment difference by the two provinces. Here it is difficult to tell which of the two potential causes is most salient in affecting the fertility differential because local governments' implementation of the birth control policy and couples' reaction to it is often interdependent.

On the other hand, the fact of a higher second birth percentage among the Guangdong recently married women than that among their Shaanxi counterpart might be partly due to the former being surveyed two years later and consequently having longer exposure time to the risk of having a second birth. In other words, the Guangdong women

were less likely to be affected by the *censoring* problem than the Shaanxi counterparts.[2] Therefore, if we simply read the observed percentage as the probability of having an "out-of-quota" birth (an additional birth who was not permitted by the birth control policy), the more censored cases a cohort has, the more likely the probability of second birth would be underestimated. Moreover, the result shows that the Guangdong recently married women had a higher percentage of third birth than the Shaanxi counterparts (18 versus 4.6 per cent). Again, this is not only due to a behavioral difference by the two provinces but also related to a censoring artifact weighted more heavily in the Shaanxi recently married cohort.

The year of the "out-of-quota" birth is the sixth variable shown in Table 4.1. We see that among the 388 women of the Shaanxi older marriage cohort who had their third birth after 1974, 39 per cent of them had their third birth after 1980 when the one-child-family policy was widespread. For the 765 Guangdong older marriage women who had their third birth after 1977, 52 per cent of them had a third child born after 1980. Notice that the occurrence of these births were absolutely forbidden by any rule of birth control policies. Despite an extreme constraint set by government's wisdom, the observed high proportions of the "out-of-quota" births in the Shaanxi and the Guangdong older marriage cohorts are striking. Here we should keep in mind that what we have seen is simply a *direct* observed percentage distribution before any statistical manipulation on the censoring problem.

When we turn to the year of second birth among the recently married women who

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[2] Here *censoring* refers to the early truncation of an incomplete reproductive process at the time of survey (see Rodriguez and Hobcraft, 1980).

had their second birth after 1980, we see that 93 percent of the Shaanxi women and 60 per cent of the Guangdong women had their second birth before 1985 when central government just relaxed the one-child-family policy temporarily. It is clear here that among the Shaanxi women who had their "out-of-quota" births almost all of their second births occurred during the "high tide of one-child campaign", rather than in the period of policy relaxation. However, the Guangdong case is somewhat different because the survey was conducted two years later and provincial birth planning administrative leadership might concede a right of second birth to a rural couple whose first child was a daughter in an earlier time before the "shift" of the central leadership's birth control policy in mid-1980s.

Lastly, Table 4.1 shows the number of children the married women wanted by the time they were first married. We see that a substantially large percentage of the women did not think about a specific number of children as a desired family size when they started their family building process. Such percentages are ranging from the lowest as 25 per cent in the Guangdong recently married cohort to the highest as 46 per cent in the Shaanxi older marriage cohort. This result is consistent with our previous conjecture that, on the one hand, couples do not necessarily have a desired family size as their fertility target at the initiation of family formation. On the other hand, we should bear in mind that while someone did not think about a desired family size does not necessarily mean that she did not consider her target fertility. Sometimes it might be more rational for a woman not to think about the exact number of wanted births but to desire at least a son as her target fertility because the gender of birth is a random variable.

We also notice that there is an increased concern about a desired family size

among recent marriage cohorts than among older marriage cohorts. Such a trend is seemingly accompanied by a reduction of the birth quota per family permitted by the government. The fact of an increasing awareness of the family size may in a sense reflect the extent of penetration or "diffusion" of the birth planning program organized by the governments. In general, the smaller the birth quota per family permitted, the more seriously a newly wedded couple would discuss whether and how they would comply with the control.

Following the discussion of target fertility, one may be interested in the desired family size differentials by residence and education. These are shown in Table 4.2. It is found that in the Shaanxi older marriage cohort, only education shows a significant variation in whether women thought about the desired family size, while in the Shaanxi younger marriage cohort only urban residence presents such significantly variation. For the Guangdong women, both education and urban residence show significant differences in whether or not a newly wedded couple thought about their desired family size. It is noteworthy that the percentage having thought about the desired family size by each subgroup of the Guangdong cohorts is always higher (except for the no school group) than the Shaanxi counterparts. It is clear here that the constantly higher fertility rates of the Guangdong women than those of Shaanxi women and Chinese women on average since the government tightened the birth control was not likely the result of Guangdong women being less aware of the birth planning or more irrational. Instead, the higher Guangdong fertility is more likely to be the result of a rational goal.

Now we turn to a percentage distribution of contraceptive use in each birth interval. Table 4.3 shows the percentage of contraceptive use after first birth by each

Table 4.2 *Percentage of women who had thought about the wanted number of children when they were first married, Shaanxi (1985) and Guangdong (1987)*

Variable	Shaanxi		Guangdong	
	1969-1977	1978-1982	1971-1977	1978-1983
Place of usual residence				
City/town	57.5 (181)	70.9* (199)	74.6** (248)	81.4** (409)
Rural	52.7 (736)	63.1 (607)	65.8 (1060)	72.6 (1319)
Education				
No school	41.9** (425)	61.0 (231)	51.8** (272)	55.0** (258)
Primary	34.1 (307)	63.6 (176)	69.0 (728)	74.7 (770)
Secondary +	63.8 (185)	67.9 (399)	77.9 (308)	82.0 (700)

*: X^2 test $p < 0.05$; **: X^2 test $p < 0.01$.

Table 4.3 Percentage of contraceptive use after first birth by different characteristics, Shaanxi and Guangdong

Variable	Shaanxi		Guangdong	
	1969-1977	1978-1982	1971-1977	1978-1983
Children ever born				
1	81.4** (102)	66.2** (426)	96.6** (89)	77.7** (566)
2	39.5 (428)	31.2 (343)	48.2 (454)	34.4 (845)
3+	18.8 (388)	27.0 (37)	17.1 (765)	6.9 (317)
Gender of 1st child				
Boy	38.4* (476)	52.5 (406)	34.5 (658)	47.6* (893)
Girl	32.1 (442)	46.5 (400)	32.2 (650)	39.3 (835)
Residence				
City/town	46.7** (182)	66.8** (199)	60.9** (248)	78.7** (409)
Rural	32.6 (736)	43.9 (607)	26.9 (1060)	32.7 (1319)
Education				
No school	28.0** (425)	39.4** (231)	20.6** (272)	22.1** (258)
Primary	32.9 (307)	42.0 (176)	30.6 (728)	38.3 (770)
Secondary +	56.5 (186)	58.6 (399)	51.0 (308)	57.3 (700)
Age at marriage				
<20 years	30.4** (428)	33.3** (153)	23.0** (330)	26.2** (301)
20-22 years	34.1 (355)	46.6 (343)	30.9 (511)	32.1 (570)
23 years +	54.8 (135)	60.6 (310)	43.3 (467)	57.3 (857)
Total	35.4 (918)	49.5 (806)	33.3 (1308)	43.6 (1728)

Note: sample size for each category is in parenthesis; * X^2 test $p < 0.05$; ** $X^{2\,test}$ $p < 0.01$.

cohort. Contraceptive use here refers not only to reversible method (REVE), including induced abortion for the purpose of family planning only, but also to nonreversible method: sterilization (STER). Since the number of women who were sterilized after first birth is low in both provinces the present table does not distinguish the reversible method from reversible one.

From Table 4.3 we see that in general the percentages using contraceptive method after the first birth for the Shaanxi marriage cohorts are only slightly higher than that for the Guangdong marriage cohorts. For example, the difference is only two per cent (35.4 versus 33.3 per cent) between the Shaanxi and the Guangdong older cohorts and six percent between the Shaanxi and the Guangdong younger marriage cohorts (49.5 versus 43.6 per cent). Since it is believed that the Guangdong recently married cohort would be less affected by the censoring problem, if we take the censoring problem into account, the contraceptive prevalence differential would be somewhat larger between the two recently married cohorts.

Comparing the two cohorts married in different periods within each province, the percentage of contraceptive use for the recent marriage cohort is always higher than older marriage cohort, with a difference of about 14 per cent (49.5 versus 35.4 per cent) and 10 per cent (43.6 versus 33.3 per cent) for the Shaanxi and the Guangdong women, respectively. The increase is probably the result of a better contraceptive knowledge education, which was "diffused" through birth control programs and a thorough institutional control of individual's contraceptive use, accompanied by any immediate resolution once the use failed, such as induced abortion. In addition, the relatively larger difference between the two Shaanxi cohorts than that between the two Guangdong cohorts

is partly due to the fact that the Shaanxi older marriage cohort consists of a considerable number of women who were married before 1970s and thus tend to have a larger range of variation than their Guangdong counterparts.

Turning to the percentage of contraceptive use after first birth by number of children ever born, we see that generally the percentages using contraception after first birth were very high for women who had only one child, especially for older married cohorts. For example, the percentages of users among single-child families are 81 per cent and 97 per cent for the Shaanxi and the Guangdong older marriage cohorts, respectively, compared to 66 per cent and 78 per cent for the Shaanxi and the Guangdong younger marriage cohorts, respectively. Why is this so? Since the time of the survey permits older cohorts to have long enough exposure time to the risk of second birth, our result of a higher percentage of users after first birth among older marriage cohort than younger cohort must be related to a selectivity problem rather than censoring problem. It is understandable that the majority of the older marriage cohorts should have enough time to have a second birth if they wanted to do so prior to termination of the survey. Therefore, those who still stayed at the first birth tend to be selected on a number of characteristics like more educated and/or non-rural residence and thus tend to be more likely to use contraception.

More importantly, from the information of contraceptive use after first birth by number of children ever born, we can obtain the percentage of *real spacers,* those who did use a method after first birth but later on had another birth, among total contraceptive

users[3]. To get such percentage, one can simply multiply the percentage of users in each group by its sample size to obtain an absolute number of users in each group first, and then recalculate the percentage of *real spacers* of contraceptive use. It is found that over 75 per cent [(0.395*428 +0.188*388)/(0.354*918)] of the Shaanxi older marriage women and 80 per cent [(0.482*454+0.171*765)/(0.333*1308)] of the Guangdong older marriage women who did use contraceptive method since the first birth had second birth again, respectively.

The most remarkable finding is that the percentages of *real spacers* for the Shaanxi and the Guangdong recently married women are 29 per cent [(0.312*343+0.27*37)/(0.495*806)] and 42 per cent [(0.344*845+0.069*317)/(0.436*1728)], respectively. The reason for the relatively lower percentages of *real spacers* in recently married cohorts than older marriage cohorts lies in two factors. One is related to the censoring problem. This is especially true for Shaanxi women who were surveyed two years earlier. Another factor is related to a real period effect of the one-child-family birth control campaign which severely forbade the recently married cohorts to have a second birth. Nevertheless, the observed percentages of *real spacers* among younger marriage cohorts are still substantially high and striking. These results clearly indicate that one should not take for granted that a high rate of contraceptive use among Chinese women would guarantee a consistently low rate of fertility. It tells us that women's compliance to the birth planning policy by using contraceptive method does not mean that they complied with the policy unconditionally. It is the spacing behaviour that brings the Chinese fertility decline study

[3] Here, "all users" include sterilized women who had only single child, who consist of three and one for Shaanxi older and younger marriage cohorts respectively, and six for Guangdong two cohorts, respectively.

forward.

The second variable is the gender of first child. The result shows that only in the Shaanxi older marriage cohort and the Guangdong younger marriage cohort gender of first child has significant effect on contraception use differential. In these two cohorts, the percentage using contraception among women with a boy are six per cent higher (38.4 versus 32.1 percent) and eight per cent higher (47.6 versus 39.3 per cent) than that of women with a girl for the Shaanxi and the Guangdong cohorts, respectively. Why only these two cohorts? What we know about the Shaanxi older cohort is that when the majority of this cohort had a first birth the birth control policy implementation was likely still based on "persuasion" rather than "mobilization".[4] It seems that when the policy was less compulsory the son preference was effective. In addition, when the policy was relaxed in the mid-1980s to allow a couple with a single girl to have second birth, the contraceptive use for the Guangdong recent marriage cohort differed largely by gender of first child again.

On the other hand, in the Shaanxi recent marriage cohort and Guangdong older marriage cohort the contraceptive use variation by gender of first child was non-significant. It is very likely the result of a rather uniformed "mobilization" of contraceptive use in each area without regard to the sex of the first child since the mid-1970s to early 1980s. It shows that the effect of the political institutional settings was so overwhelming that the son preference effect, one of the Chinese culture effect,

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[4] The difference between "mobilization" and "persuasion" stages can be seen from a rural official's words in an interview: "Mobilization is different from persuasion. We persuade people to do this or that, but we mobilized the people to do this or that when we fail to persuade them in spite of our efforts. We hope they will understand later" (Quoted from Chen and Kols, 1982:J-578).

"withdrew". At this point, the institutional approach holds.

Thirdly, the result of contraceptive use difference after first birth by residence is always significant and large. For example, in the Guangdong cohorts the percentage of contraceptive users after first birth among women living in non-rural areas is 34 per cent higher (60.9 versus 26.9 per cent) and 46 per cent higher (78.7 versus 32.7 per cent) than that among women living in rural areas for older and younger marriage cohorts, respectively. For the Shaanxi cohorts, the percentage for non-rural women is 14 per cent higher (46.7 versus 32.6 percent) and 23 per cent higher (66.8 versus 43.9 percent) than that for rural women. This confirms again that institutional setting is indeed a powerful factor in affecting the women's contraceptive use behaviour. As has been mentioned before, rural residence represents not only family economic mode of production but also a collective rather than a state controlled working and earning system. The effect of residence represents a more comprehensive institutional environment effect than a period effect which mainly reflects the government's policy changes. To some extent, residence effect reflects local governments' capacity in executing the central leadership's policy with regard to birth control. Therefore, the differences in contraceptive use between rural and non-rural areas are more pronounced than by any other characteristics within either rural or non-rural areas.

Fourthly, the result shows that the relationship between contraceptive use and education and between contraceptive use and age at marriage respectively are always significant for each marriage cohort. The higher the education level or later age at marriage, the larger the percentage of contraceptive use after first birth. It is understandable that the political education of "interest of state" was more accepted by

educated women since they were not only more "open-minded" and "flexible" under a "diffusion" of new norm, but also more likely to be associated with better working positions and living conditions and thus more vulnerable to a bigger loss if they did not follow the rule of birth control policy to use contraception than were less educated women.

Finally, the result shows that the greater a woman's age at marriage, the more likely she was to use contraception after the first birth. Here, the age at marriage can be seen as an indicator of women's earlier compliance with the family planning program. A women's age of marriage reflected her propensity to comply with the *wan xi shao* policy rule. Nuptiality history is directly related to fertility history.

Consider now contraceptive use after the second birth as shown in Table 4.4. Since many women were sterilized for purposes of family planning after a second birth, Table 4.4 shows the percentage using reversible method, including induced abortion (for purpose of family planning only), and non-reversible method only for purpose of family planning among women with at least two children for each cohort. Such a distinction is made to enable one to find the percentage of *stoppers* among contraceptive users. In general, it is found that the percentage using a method after the second birth is always higher than after the first birth for each cohort. It indicates that in China the two-children-family size norm was in effect. In addition, the percentage differences of total use (sterilization plus reversible methods) between two cohorts married in different periods within each province are quite small, only 5.1 per cent (0.43+0.224 versus 0.274+0.329) and 0.4 per cent (0.251+0.289 versus 0.134+0.41) for Shaanxi and Guangdong, respectively. However, there are more stoppers in the younger marriage cohorts.

Table 4.4 *Percentage of contraceptive use after the second birth by different characteristics, Shaanxi and Guangdong*

Variable	Shaanxi						Guangdong					
	1969–1977			1978–1982			1971–1977			1978–1983		
	REVE	STER	N	REVE	STER	N	REVE	STER	N	REVE	STER	N
Children born		**			**			**			**	
2	47.7	42.8	(428)	26.8	36.4	(343)	20.0	77.5	(454)	13.3	56.3	(845)
3	37.9	na	(388)	32.4	na	(37)	28.1	na	(765)	13.9	na	(317)
Gender composition		**			**			**			**	
Two boys	39.7	26.7	(214)	17.4	50.0	(86)	24.8	35.4	(302)	14.2	57.3	(309)
Two girls	44.1	8.0	(188)	31.7	17.1	(82)	18.5	18.8	(276)	12.6	10.9	(247)
Balanced	44.2	26.8	(414)	29.7	32.1	(212)	28.1	30.1	(641)	13.4	44.9	(606)
Residence		**						**			**	
City/town	55.9	21.3	(136)	36.2	31.0	(58)	36.0	45.5	(178)	15.0	49.5	(107)
Rural	40.4	22.6	(680)	25.8	33.2	(322)	23.2	26.0	(1041)	13.3	40.1	(1055)
Education		**						**			*	
No school	41.3	17.4	(397)	29.7	31.7	(145)	14.8	23.3	(270)	10.6	41.1	(207)
Primary	43.2	24.9	(285)	25.0	38.6	(88)	27.3	27.6	(699)	13.7	39.5	(582)
Secondary+	47.8	32.1	(134)	26.5	30.6	(147)	30.0	38.4	(250)	14.5	43.2	(373)
Age at marriage								**			**	
< 20 year	42.0	20.2	(405)	26.5	26.5	(68)	23.6	19.9	(322)	15.4	32.1	(234)
20–22 year	42.7	24.0	(321)	28.2	35.4	(181)	25.7	27.9	(491)	11.6	38.6	(430)
23 years +	48.9	26.7	(90)	26.7	32.8	(131)	25.6	37.2	(406)	14.1	47.2	(498)
Total	43.0	22.4	(816)	27.4	32.9	(380)	25.1	28.9	(1219)	13.4	41.0	(1162)

*: X^2 $p < 0.05$; **: X^2 $p < 0.01$.
REVE: reversible contraceptive method;
STER: sterilization.

Moreover, the percentage of women who were sterilized after having two children for the purposes of family planning is increasing from the Shaanxi older marriage cohort (22 per cent) to the Guangdong recent marriage cohort (41 per cent). All these figures indicate that women with at least two children in all the marriage cohorts are increasingly subject to the same birth control rule: "Never a third!"

On the other hand, the results show that the percentage of contraceptive use after the second birth among the Guangdong women who had at least two children still fell behind that of the Shaanxi counterparts though the gap decreased from 11 per cent (0.43+0.224 versus 0.251+0.289) between the two older marriage cohorts to six per cent (0.274+0.329 versus 0.134+0.41) between the two more recently married cohorts. It suggests again that Guangdong women were less willing to comply with the birth control policy than Shaanxi women even after having two children. Why? To know this, a further inspection of contraceptive use after the second birth by different key characteristics is needed.

Now let us first consider the contraceptive use differential after second birth by number of children ever born for older marriage cohorts. We see that among all contraceptive users, including reversible and non-reversible method users, 28 per cent [(0.379*388)/((0.43+0.224)*816)] of the Shaanxi older marriage women and 33 per cent [(0.281*765/((0.251+0.289)*1219)] of the Guangdong older marriage women had a third birth. Furthermore, among those women who used a reversible method as the first method after second birth, including women who used a reversible method first but had

sterilization later,[5] 40 percent of the Shaanxi older marriage cohort and 43 per cent of their Guangdong counterparts had a third birth, respectively. It is expected that if the censoring is taken into account, the proportion of real spacers would be even higher.

The fact that substantially large proportions of women who used contraception before had an "out-of-quota" birth later in the two provinces is clear enough to reject the existing assumption that few Chinese women knew of and used contraception for the purposes of spacing birth. Recall the results of Table 4.1 wherein about 39 per cent and 52 per cent of third births were born after 1980 for Shaanxi and Guangdong older marriage cohorts respectively, despite the fact that Chinese institutions had tried hard to put second births to an end under the one-child-family policy. To repeat, the results suggest that compliance with the birth planning policy by using contraceptive method does not end the fertility process.

Secondly, the results show that contraceptive use differential after second birth by gender composition is always significant for each cohort. The percentage using contraception among women with two girls is much lower than among women with at least one son. The gaps in use between women with two girls and two boys were 14 per cent (0.397+0.267 versus 0.441+0.08), 19 per cent (0.174+0.50 versus 0.317+0.171), 23 per cent (0.248+0.354 versus 0.185+0.188), and 48 per cent (0.142+0.573 versus 0.126+ 0.109) for the Shaanxi and the Guangdong older and recent marriage cohorts, respectively. In addition to an apparent son preference pattern in contraceptive use, the results show

[5] Here there are 18, 8, 191 and 63 two-children mothers who first used some reversible method and later had sterilization after second birth for the Shaanxi older and younger marriage cohorts and Guangdong older and younger marriage cohorts, respectively.

a two-son preference pattern of contraceptive as the percentage of contraceptive use is lower after second birth for most women with balanced gender composition, except among the Shaanxi 1969-77 marriage cohort. This is also true for the pattern of sterilization after a second birth by comparisons of gender compositions. The finding of an increasingly strong son preference effect on contraceptive use as time went on among women with at least two children is different from our previous finding of contraceptive use pattern after first birth. It seems that the cultural factor, son preference, was showing its salient effect while individual couples had used up their "quota" of "at most two" births and were confronted with government's tougher control.

Thirdly, the results show that contraceptive use differences after second birth by place of usual residence are much smaller compared with that of contraceptive use after first birth by residence (see Tables 4.3 and 4.4). The difference of contraceptive use by residence for the Shaanxi recently married women is not significant. Moreover, the pattern of sterilization is also quite similar, except for the Guangdong older marriage cohort. The convergence of contraceptive use differences after second birth by residence reflects an uniform "never a third" birth control policy effect across all rural and non-rural institutional settings.

However, we should keep in mind that the convergence of contraceptive use differences by residence for all cohorts and especially an insignificant result for Shaanxi recently married cohort may also involve a selectivity problem because there were much fewer non-rural women having a second child after the one-child-family policy turned on a red signal since 1981. This can be seen in the results of Table 4.3 that in the younger marriage cohorts, only 29 per cent and 26 per cent of non-rural women had second births

for Shaanxi and Guangdong women, respectively, while 53 and even 80 per cent of rural women had a second birth in the corresponding provinces.

Finally, only in the Guangdong cohorts do we find that education and age at marriage have a significant effect on the contraceptive use variation after second birth. For the Shaanxi cohorts, contraceptive use after second birth turns out to be not as regular as was contraceptive use after first birth, indicating that, after having a second birth, education and age at marriage no longer play important roles in affecting contraceptive use under the "never a third" stringent control. The insignificant result may also be affected by the selectivity problem mentioned above.

All in all, our rather lengthy explanations of simple percentage distributions provide some *direct* information on how Chinese apply a *wait-for-change* strategy in their fertility process while facing the red signal which attempts to stop them from having "out-of-quota" births. This simple but important data analysis seems to be consistent with the theoretical reasoning on Chinese women's *wait-for-change* strategy behaviour. To assess it further, we now turn to event history analysis.

4.2 Event History Analysis

As Blossfeld (1989) says: "By 'event history analysis' we mean statistical methods used to analyze time intervals between successive state transitions or events" (p.11). In the following event history analysis we will largely refer to life table analysis because life table technique serves as "one of the most common methods applied to analyze waiting times and life expectancies" (Blossfeld, 1989:42). Life table analysis is also essential for

the proportional-hazard multiple regression model developed later. The application of life table analysis on the present Chinese wait-for-change fertility analysis is important because we have seen that the results of simple percentage distribution analysis are likely to be affected by censoring which must be handled by the life table method, a basic and fundamental way of studying "life time", which refers to the actual length of life of an individual, or a survival time, measured from some particular starting point as "non-negative-valued variable" (Lawless, 1982:1). The following event analysis will first examine some of the most relevant simple life table results and then move on to some proportional-hazard model analysis which combines life table techniques with multiple regression techniques.

4.2.1 Birth Interval Analysis - A Conventional Maternity History Study

The conventional method of studying maternity history is to follow a series of birth intervals. Much attention to birth interval analysis has been paid by many researchers who have examined *direct transition* from birth to birth. In addition, for convenience of presentation, the cumulative proportion of women having a subsequent birth by single months of duration since the previous birth -- which is often defined as *distribution function* (complement of *survival function*) and sometimes called as "*birth function*" -- is often singled out to represent life table functions (Rodriguez and Hobcraft, 1980:12; Marini and Hodsdon, 1981; Hobcraft and Casterline, 1983; Rindfuss et al., 1984, Rindfuss et al., 1987; Rodriguez et al., 1984; Trussell et al., 1985; Bumpass et al., 1978, 1986; Guilkey et al., 1988).

The present study first follows this conventional method by generating a number of life tables to get a firsthand picture of fertility differentials. The cumulative distribution function, a complement of survival function, is presented by one year duration to five years duration only. This is to keep the information of the birth spacing process as short and clear cut as possible. The result of changing birth function along duration is to show the waiting time of Chinese women in applying their wait-for-change strategy in their fertility behaviour under the severe constraint of institutional settings.

The fertility transition differential is examined mainly by some conventional variables, such as the place of usual residence which represents the economic mode of production of an individual's economic and institutional background; education, which is a commonly used variable indicating individual modernization achievement; and gender composition of children, an indicator of the Chinese family-centred culture. In addition, age at marriage, a demographic variable, is used to represent an individual's history of compliance to the later marriage policy at the very beginning of family formation. Although the In-depth Fertility Survey data set provide many potential variables for such differential analysis, this study has to limit the number of variables to keep it to a manageable size. For our main interest of examining the independent effects of socio-economic and cultural variables on the Chinese reproductive process under the constraint of institutional settings, the selected variables are deemed appropriate.

Table 4.5 shows the cumulative probability of having a subsequent birth after first and second birth. Since the politically correct family size norm had reduced dramatically to two and then to one only from the mid-1970s to 1980s, the present study of institutional impact is aimed at the transition states by which individuals moved just one

Table 4.5 *Life table estimate of cumulative probabilities of* ***having a subsequent birth*** *after first and second birth,* ***Shaanxi*** *(1985) and* ***Guangdong*** *(1987)*

Marriage cohort	N	Years since last birth 1	2	3	4	5
		From parity one to two				
Shaanxi:						
1969-1977	918	.004	.222	.543	.712	.819
1978-1982	806	.003	.201	.460	.617	.718
Guangdong:						
1971-1977	1306	.007	.279	.655	.813	.896
1978-1983	1703	.008	.295	.564	.674	.758
		From parity two to three				
Shaanxi:						
1969-1977	815	.004	.101	.288	.415	.480
1978-1982	378	.004	.167	.432	.432	-
Guangdong:						
1971-1977	1208	.004	.177	.511	.664	.734
1978-1983	1029	.006	.320	.685	.824	.864

or, at most, two steps beyond the official birth quota control. First, let's look at the cohorts married before 1978 under the constraint of the two children-family birth control policy. Comparing the speed of having a third birth with that of second birth for the same cohort married before 1978, we can see that women in both provinces had slowed down their reproduction process by 26 per cent (54.3 versus 28.8 per cent) and 14 per cent (65.5 versus 51.1 per cent) by three years duration[6] and by 34 per cent (81.9 versus 48 per cent) and 16 per cent (89.6 versus 73.4 per cent) in 5 years for the Shaanxi and the Guangdong, respectively. The remarkable reduction of reproductive speed is clearly indicative of how powerful institutional effect on birth control can be.

It is noteworthy, however, that under the two-child-family policy in the mid-1970s, the probability of having a third birth by five years duration is 48 per cent among the Shaanxi older marriage women (all the third births occurred after 1974), 73 per cent among the Guangdong counterparts (all the third births occurred after 1977), respectively. That is to say, in Shaanxi almost half of the mothers with at least two children are likely to break the government's rule of birth control policy by having a third birth, not to mention the extremely high probability of having a third birth among the Guangdong women.

Secondly, considering the birth function in the more recent marriage cohorts, who were under the one-child-family policy constraint, we can see that the speed of having a

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[6] According to China's *wan xi shao* campaign policy in 1970s, women were asked to space their birth interval longer than three years and four years in countryside and city, respectively (Chen and Kols, 1982). But during the one-child-family campaign, women were required to space the interval longer than four years for those who might be excused from one-child-family policy to have one more "try" only (see Greenhalgh, 1989b:25; China's population information centre, 1983:97).

second birth is slower than that of the previous marriage generation in each province. The probabilities of moving to second birth at the end of four years are reduced by 10 per cent (71.2 versus 61.7 per cent) among the Shaanxi recently married women and 14 per cent (81.3 versus 67.4 per cent) among the Guangdong recently married women, compared with the second birth speed of the older marriage cohort within each province. This reduction indicates again a dramatic institutional birth control impact on slowing down the second birth timing, especially in Guangdong.

The estimated accumulated probability of having a second birth after 1981 is as high as at least 62 per cent by only four years duration in both provinces. Such high probabilities of having a second birth under the constraint of the one-child-family policy are very striking. Notice that the estimated probabilities of second birth by four years reflect the extent of Chinese women's compliance with government's birth control rule. Since the relaxed policy still insisted that those under excused conditions could only have a second birth after four years, especially in Guangdong province, this figure indicates that about two thirds of women would break the rule even under any relatively lenient birth control policy in the mid-1980s (See China's population information centre, 1983, 1985).

More surprisingly, the probabilities of having a third birth for the two children mothers in the more recent marriage cohorts are 43 and 69 per cent in three year duration, with a speed of 14 per cent (43.2 versus 28.8 per cent) and 17 per cent (68.5 versus 51.1 per cent) faster than their previous marriage generations by the same duration for the Shaanxi and the Guangdong cohorts, respectively. For the Guangdong women, the estimated probability reaches 82 per cent in only four years duration, a striking speed of

third birth timing. We should keep in mind that certainly such a rapid timing is caused by a selectivity problem. That is, under the severe government control, only about half of the total Shaanxi mothers and 60 per cent of all Guangdong mothers who arrived at the second birth state were selected in our third birth timing analysis. The sample disproportionately excluded more women living in city, and those more educated, married later, or having two sons. The selected women in the third-birth timing analysis are more likely to have a stronger propensity of speeding the third birth. In addition, these recently married women are very selective in the sense that they had already broken the rule by having a second birth while the government is tightening the control over individual births. Nevertheless, the proportion of the sample size is substantially large, especially for Guangdong cohort. The fact that in the two provinces about half to 82 per cent of two children mothers who were married after 1977 dared to have a third birth in only four years is clear enough to tell how individuals reacted in response to the institutional birth control.

To understand which women are likely to wait longer and who are not, a closer statistical comparison of transition probabilities by some commonly used socio-economic, demographic, as well as cultural variables, becomes necessary. Table 4.6 and 4.7 show such comparisons of the second birth timing by different characteristics for the Shaanxi and the Guangdong marriage cohorts, respectively. In general, the results show that all but one of the birth functions by different socio-economic, cultural, and age at marriage characteristics for each province are declining between the two marriage generations. The only exception is the women who were married after age 22 in the Shaanxi recent marriage cohort, shown in Table 4.6. They had sped up their second birth as time passed

Table 4.6 *Life table estimate of cumulative probabilities of* ***having a second birth*** *after the first birth by different characteristics,* ***Shaanxi*** *(1985)*

Variable	N	Years since last birth 1	2	3	4	5
		1969-1977 cohort:				
Gender composition*						
Boy	476	.002	.195	.519	.679	.793
Girl	442	.007	.252	.570	.748	.848
Residence**						
City/town	182	.006	.160	.431	.637	.711
Rural	736	.004	.238	.571	.731	.847
Education**						
No school	425	.007	.234	.585	.741	.837
Primary	307	.003	.229	.563	.738	.882
Secondary +	186	.000	.185	.415	.602	.675
Age at marriage**						
< 20 year	428	.005	.236	.578	.761	.871
20-22 year	355	.003	.243	.571	.729	.851
23 year +	135	.007	.126	.363	.513	.575
		1978-1982 cohort:				
Gender composition**						
Boy	406	.000	.166	.415	.558	.642
Girl	400	.005	.237	.506	.681	.808
Residence**						
City/town	199	.000	.116	.280	.405	.479
Rural	607	.003	.229	.518	.681	.782
Education**						
No school	231	.004	.268	.527	.716	.821
Primary	176	.000	.178	.493	.673	.730
Secondary +	399	.003	.169	.401	.508	.618
Age at marriage**						
< 20 year	153	.000	.257	.508	.567	.740
20-22 year	343	.006	.222	.511	.688	.795
23 year +	310	.000	.154	.385	.524	.629

* $p < 0.05$; ** $p < 0.01$.

Table 4.7 *Life table estimate of cumulative probabilities of* ***having a second birth*** *after the first birth by different characteristics,* ***Guangdong*** *(1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1977 cohort:				
Gender composition**						
Boy	656	.008	.249	.621	.795	.880
Girl	650	.006	.309	.689	.832	.912
Residence**						
City/town	248	.004	.182	.388	.531	.635
Rural	1058	.008	.302	.717	.879	.957
Education**						
No school	272	.011	.287	.710	.865	.973
Primary	726	.004	.293	.694	.853	.927
Secondary +	308	.010	.237	.513	.675	.758
Age at marriage**						
< 20 year	330	.009	.268	.690	.865	.945
20-22 year	510	.004	.293	.687	.857	.931
23 year +	466	.009	.271	.594	.729	.824
		1978-1983 cohort:				
Gender composition						
Boy	883	.009	.285	.545	.664	.748
Girl	820	.006	.305	.585	.685	.768
Residence**						
City/town	400	.008	.104	.219	.263	.285
Rural	1303	.008	.353	.671	.802	.902
Education**						
No school	250	.004	.361	.700	.865	.933
Primary	762	.008	.329	.611	.723	.842
Secondary +	691	.009	.232	.462	.549	.593
Age at marriage**						
< 20 year	297	.010	.316	.687	.835	.906
20-22 year	560	.009	.373	.680	.769	.845
23 year +	846	.006	.235	.445	.559	.655

* $p < 0.05$; ** $p < 0.01$.

and their probability of having a second birth by five years duration is 5.4 per cent (62.9 versus 57.5 per cent) higher than their older marriage generation, indicating a well-known "catching-up" effect (Kendall, 1979; McDonald et al., 1981; Freedman and Casterline, 1982). In general, the thorough decline of second birth speed across all major socio-economic and cultural, as well as demographic variables, indicates an overwhelming period effect resulting from institutional constraint.

The most remarkable feature of birth function is in residence differentials. Comparing the non-rural birth functions between two cohorts married in different periods, the cumulative probabilities of having a second birth in five years are reduced by 23 per cent (71.1 versus 47.9 per cent) and 35 per cent (63.5 versus 28.5 per cent) for the Shaanxi and the Guangdong women, respectively. In contrast, among rural women, the corresponding reductions in the probabilities are only 6.5 per cent (84.7 versus 78.2 per cent) and 5.5 per cent (95.7 versus 90.2 per cent) for the Shaanxi and the Guangdong women. Clearly, socio-economic conditions have significant effects on the variation of compliance with birth control policy. In addition to the changes between marriage cohorts, birth function variation at the end of five years by residence is found to be as great as 30 per cent (47.9 versus 78.2 per cent) for the Shaanxi more recently married women, while the gap between rural and non-rural is 62 per cent (28.5 versus 90.2 per cent) for the Guangdong counterparts. These two largest reductions make other factors fall far behind in affecting the Chinese fertility decline during the one-child-family policy period.

Considering the birth function difference by gender of first child, the results reveal that a son preference pattern is clear and statistically significant in all marriage cohorts except for the Guangdong recently married women. For example, the probability of a

second birth by the end of five years reduces by 15 per cent (79.3 versus 64.2 per cent) for women with a son, compared with only a four per cent (84.8 versus 80.8 per cent) reduction for women with a daughter between the two marriage cohorts in the Shaanxi cohort, which is shown in Table 4.6. Alternatively, as Table 4.7 shows, the corresponding decreases are greater for the Guangdong women, ranging from 13 per cent (88 versus 74.8 per cent) to 14 per cent (91.2 versus 76.8 per cent). Can we say that the Guangdong recently married women did not have a strong son preference while they were heading to a second birth?

A careful inspection of the birth functions of the two recently married cohorts reveals that the behaviour of women from the two provinces are quite different in terms of their gender preference. First, the fertility differential by gender of first child is larger in the Shaanxi cohort than in the Guangdong cohort among recently married women in Shaanxi, the probability of a second birth by five years duration after a first son is 17 per cent lower (64.2 versus 80.8 per cent) than after a first daughter, 11 per cent lower (64.2 versus 74.8 per cent) than after a first son in the Guangdong counterparts. Secondly, the probability of a second birth after a first daughter for the Shaanxi recently married women is only four per cent higher (80.8 versus 76.8 per cent) than the Guangdong counterparts, while the corresponding probability for Shaanxi recently married women with a son is 11 percent lower (64.2 versus 74.8 percent) than their Guangdong counterparts. It seems that the Guangdong women with one son were not as satisfied as their Shaanxi counterparts and prepared to slow down the speed of second birth. This indicates that the Guangdong recently married women might have a two-sons preference, instead of a son preference. It is probable due to such a two-sons preference that the effect of gender of first child for

the Guangdong recently married women is not significant on fertility variation.

With regard to the birth function differences by education and age at marriage, it is found that the more educated or later married a woman is, the slower the speed of second birth. Such a relationship is found to be statistically significant for the two recent marriage cohorts of the two provinces. The only exception is the Shaanxi recently married women who were married before age 20 (they actually broke the rule of later marriage policy once before), turn out to have longer waiting time of a second birth than women who were married at age 20 to 22. Does this mean that these women who did not follow the later marriage policy rule later changed their fertility behaviour by complying with the birth policy? It seems that this conjecture is hardly possible because the results from Table 4.3 show that age at marriage is always positively related to the percentage of contraceptive use. For example, women who were married before age 20 were least likely to use any contraception.

Then, is such a lower speed of second birth timing related to a higher secondarily sterility problem, which is defined as the failure to change parity status, given that the present parity status is not zero and that contraception is not practised (Pittenger, 1973:114)? We generate a simple correlation between current age of women with their age at marriage for this cohort and the result turns out to be 86 per cent and statistically significant at 0.001 level. It means that the younger the age at marriage, the younger the current age would be. Therefore, it is likely that the low relative risk of second birth timing for earlier marriage women is associated with their current younger age which probably affect their fecundity directly through the effect of temporary sterility from delivery (Henry, 1976:97). But since this is the result from a single life table analysis, we

had better wait to see the results of multivariate analysis.

It is found that in the Guangdong recently married cohort the differences of second birth probabilities at the end of five years by education and age at marriage are 34 per cent (93.3 versus 59.3 per cent) between no education and secondary educated women and 25 per cent (90.6 versus 65.5 per cent) between women married before age 20 and after 22, while the corresponding probability variations are only 20 and 11 per cent for their Shaanxi counterparts. Although the second birth speed of the Guangdong less educated and early married women is always much faster than that of their Shaanxi counterparts, the second birth speed of the Guangdong secondary educated and married after age 22 women is not. This finding indicates that the stubborn high fertility of the Guangdong is related to a larger fertility variation by different socio-economic characteristics. The striking contrast between relatively heterogeneous Guangdong women's fertility behaviour and rather homogeneous Shaanxi women's fertility behaviour seems to suggest that the regional fertility differentials are not only the result of the differences of local governments' implementing central leadership's birth control commands but also related to individuals' propensity under the influence of their socio-economic background situation.

Considering the possible differences of institutional settings by the two provinces, it is felt that the connotation of institutional settings is too broad to be generally discussed. At the administrative local provincial government level, one can hardly blame the persistent high fertility on the Guangdong local governments since there is evidence that they had tried very hard to carry out the command from central leadership. The fact that the non-rural women of the Guangdong cohorts had always had lower birth functions

than their the Shaanxi counterparts is evidence of this. As Table 4.7 shows, the recently married Guangdong women have only 0.29 probability of having a second birth by five year duration, a very low speed, while the corresponding probability of their Shaanxi counterparts is 0.48.

As we move to the third birth timing analysis by different characteristics among women married before 1978 under the constraint of the two-child-family policy in the second half of 1970s, we can see that the speed of third birth timing of each subgroup is dramatically reduced. As seen in Table 4.8, in the Shaanxi older marriage cohort the third-birth probabilities at the end of five years by gender composition of children, residence, education and age at marriage are within a range between 33 to 66 per cent only, compared with the first birth probabilities by the same duration and the same cohort ranging from 58 per cent to 88 per cent (see Table 4.6). Moreover, the third birth probabilities by different characteristics among the Guangdong older marriage women have greater variance, ranging from 34 per cent to 86 per cent (see Table 4.9), compared with their second birth probabilities which only varied from 64 per cent to 97 per cent (see Table 4.7). The results indicate that the government's two-children-family policy was quite effective.

A remarkable feature of the third birth speed variations by different characteristics is that the probabilities of the third birth are reduced more than 30 per cent than the second birth for each subgroup among the Shaanxi older marriage women, except for the women who had no son (differ by 19 per cent) and married after age 22 (differ by 23 per cent). The reason for a relatively smaller decline of probability of the third birth compared with the second birth for women married late after age 22 may lie in the fact that these

Table 4.8 *Life table estimate of cumulative probabilities of having a* ***third birth*** *after a second birth by different characteristics,* ***Shaanxi*** *(1985)*

Variable	N	Years since last birth 1	2	3	4	5
		1969-1977 cohort:				
Gender composition**						
Two boys	213	.005	.112	.286	.430	.486
Two girls	188	.011	.141	.384	.576	.661
Balanced	414	.000	.075	.243	.325	.384
Residence*						
City/town	135	.000	.072	.205	.360	.388
Rural	680	.005	.106	.305	.426	.499
Education**						
No school	396	.008	.129	.336	.450	.516
Primary	285	.000	.065	.256	.414	.494
Secondary +	134	.000	.092	.216	.303	.327
Age at marriage*						
< 20 year	405	.008	.104	.317	.421	.506
20-22 year	320	.000	.105	.284	.446	.481
23 year	90	.000	.067	.165	.266	.341

* $p < 0.05$; ** $p < 0.01$.

Table 4.9 *Life table estimate of cumulative probabilities of* ***having a third birth*** *after a second birth by different characteristics,* ***Guangdong*** *(1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1977 cohort:				
Gender composition**						
Two boys	301	.004	.172	.472	.619	.681
Two girls	275	.004	.193	.649	.796	.856
Balanced	632	.004	.173	.466	.623	.702
Residence**						
City/town	177	.000	.117	.254	.318	.337
Rural	1031	.004	.188	.554	.719	.798
Education**						
No school	267	.008	.261	.646	.797	.863
Primary	692	.003	.153	.500	.636	.731
Secondary +	249	.000	.154	.395	.532	.594
Age at marriage**						
< 20 year	320	.007	.196	.577	.764	.818
20-22 year	488	.000	.182	.537	.677	.751
23 year +	400	.006	.155	.424	.560	.640
		1978-1983 cohort:				
Gender composition**						
Two boys	278	.014	.234	.686	.828	.828
Two girls	211	.000	.399	.779	.908	.935
Balanced	540	.006	.302	.623	.763	.826
					in 5.5 y:	(.865)
Residence						
City/town	97	.000	.240	.584	.644	.644
Rural	932	.006	.328	.693	.839	.880
Education						
No school	186	.000	.306	.762	.837	.918
Primary	514	.009	.324	.688	.834	.863
Secondary +	329	.005	.323	.609	.791	.837
Age at marriage*						
< 20 year	200	.020	.222	.606	.734	.734
20-22 year	385	.000	.349	.727	.865	.919
23 year +	444	.004	.348	.687	.833	.889

* $p < 0.05$; ** $p < 0.01$.

women had already initiated a rapid decline of birth from parity one, leaving room for a further decline of subsequent birth speed smaller. On the other hand, the distinctive low reduction of third birth probabilities among women without a son is no doubt affected by a son preference, though the reduction is still quite substantial.

For the Guangdong older marriage women, we see from the Table 4.9 that the probability of the third birth by five year duration has dropped more than 11 per cent than the second birth for every subgroup, except for women with two daughters whose corresponding probability has reduced only 6 per cent (85.6 versus 91.2 per cent) (compare with the figure in Table 4.7). It is found that the cumulative probability of third birth at the end of five and half years for women with a balanced gender composition of children is slightly higher than those with two son families (86.5 versus 82.8 per cent), while the corresponding probability of the Shaanxi older marriage women with balanced gender composition of children is lower than those with two sons. It seems that there was a likely two-sons preference among the Guangdong older marriage women, compared to a relatively balanced gender composition preference among their Shaanxi counterparts.

It is noteworthy that, similar to the remarkable feature of second birth probability variations among recently married women, the third birth probability variations by different characteristics vary more for the Guangdong older marriage women than their Shaanxi counterparts, except for variations by the gender compositions. This is especially the case with residence. As the occurrence of a third birth was not officially allowed since the mid-1970s and that of a second birth was severely controlled in the 1980s, the larger the fertility variations a cohort had, the more likely individuals' propensity toward birth control policy would be affected by their socio-economic and cultural background. It

clearly shows that individual reaction towards the impact of political institutions is one important dimension of fertility transition dynamics and further study of this dimension is worth while.

As we have noticed, there is a similarity between the two provinces with regard to their outstanding gender composition effect on the third birth timing variations. This is seemingly consistent with the theoretical argument on the independent role of culture in response to the overwhelming impact of institutional constraint. For the sake of obtaining the independent effect of each independent variable, the present study moves to a multivariate analysis. However, before leaving the lengthy explanations of these single life table results, a few words on the third birth function of the Guangdong recently married cohort are in order. Originally our main interest in the recently married cohorts was on the second birth timing rather than a third birth timing because of a selectivity problem. Since only less than a quarter of the non-rural women entered the second birth stage and actually most of them lived in a town rather than city and the majority of selected women were rural residents, the selected women tend to be more likely to have out-of-quota births.

However, because the sample size of the selected Guangdong recently married women with at least two children is substantially large (1029), the result of third birth function for the Guangdong recent married cohort is shown in Table 4.9 (due to the small sample size problem the results of the Shaanxi recent marriage cohort is dropped). We see that the cumulative probabilities of third birth are extremely high (from 0.64 to 0.94 by five years duration). This indicates that the majority of the Guangdong women who had broken the rule to have a second birth, were very likely to break the rule again by

having a third birth during the one-child-family birth control campaign. Moreover, these women tend to have a faster speed of a third birth than that of a second birth (compare Table 4.7) among the same recently married women and than that of a third birth among their older marriage counterparts (see Table 4.9).

When we turn to the third birth timing differences by age at marriage, we find that the probabilities of third birth for women who married at age below 20 is much lower than that of women married late (see Table 4.9). We know that the contraceptive use rate among early marriage women was lowest of all age at marriage groups, which was shown in Table 4.4. This means that the unusual low probability of the third birth is not likely resulting from contraceptive use. A simple correlation between current age and age of marriage is found to be as high as 0.89 and statistically significant at 0.0001 level. It means that the younger the age at marriage, the younger the current age would be. Therefore, it is likely that the low relative risk of third birth timing for earlier marriage women is associated with their current younger age which, in turn, probably affect their fecundity due to the effect of temporary sterility from delivery (Henry, 1976:97). But since this is the result from a single life table analysis, again we would like to wait to see the multivariate analysis results.

In general, all the single life table results show that the gender composition variable, a culture proxy, is seemingly playing a challenging role against and independent of the constraint of institutional setting represented by the implicit period effect and residence influence. To generate the independent effect of each covariate controlling for confounding effects, we now turn to the multivariate analysis. Table 4.10 and Table 4.11 show the results of estimated proportional-hazard regression, namely the relative risk (e^b)

Table 4.10 *Estimated relative risk (e^b) of the second-birth timing, Shaanxi (1985)*

Variable	1969-1977 Mar. Cohort					1978-1982 Mar. Cohort			
	1	2	3	4	5	1	2	3	4
Residence									
City/town	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Rural	1.359**	1.296*	1.290*	1.289*	1.347**	2.163**	2.049**	1.633**	1.779**
Education									
No school	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Primary	1.059	1.056	1.112	1.089	1.102	0.826	0.837	0.903	0.857
Secondary +	0.665**	0.793*	1.084	0.952	0.917	0.799	0.829	0.968	0.908
Gender composition									
Girl	1.188*	1.158*	1.134	1.143	1.163*	1.533**	1.554**	1.334**	1.428**
Age at marriage									
< 20 year		0.990	1.050	1.020			0.931	1.003	0.989
20-22 year		1.000	1.000	1.000			1.000	1.000	1.000
23 year +		0.541**	0.598**	0.588**			0.821	0.976	0.931
Contra. after birth 1									
Yes			0.368**	0.453[a]**	.361**			0.240**	0.307[a]**
X^2	51.0**	74.2**	230.5**	173.0**	213.9**	53.4**	56.1**	231.1**	169.6**
df	4	6	7	7	5	4	6	7	7
N	918	918	918	918	918	806	806	806	806
3 Tests (p)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

a: Time-dependent covariate; * $p < 0.05$; ** $p < 0.01$.

Table 4.11 *Estimated relative risk (e^b) of the second-birth timing, Guangdong (1987)*

Variable	1971-1977 Mar. Cohort				1978-1983 Mar. Cohort			
	1	2	3	4	1	2	3	4
Residence								
City/town	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Rural	2.567**	2.484**	1.945**	2.069**	5.503**	4.918**	3.081**	3.386**
Education								
No school	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Primary	0.989	1.003	1.096	1.083	0.859	0.884	1.061	1.048
Secondary +	0.784**	0.799*	1.036	1.003	0.785**	0.763**	1.029	1.007
Gender composition								
Girl	1.130*	1.129*	1.148*	1.141**	1.114	1.101	1.010	1.039
Age at marriage								
< 20 year		0.974	0.874	0.888		0.925	0.843*	0.846**
20-22 year		1.000	1.000	1.000		1.000	1.000	1.000
23 year +		0.857*	0.906	0.904		0.699**	0.847*	0.828**
Contracepted after birth 1								
Yes			0.379**	0.418[a]**			0.265**	0.295[a]**
X^2	179.8**	184.5**	381.7**	348.6**	373.4**	405.2**	798.4**	729.6**
df	4	6	7	7	4	6	7	7
N	1306	1306	1306	1306	1703	1703	1703	1703
3 Tests (p)	0.0001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

a: Time-dependent covariate; * $p < 0.05$; ** $p < 0.01$.

of the second birth timing for the Shaanxi and the Guangdong marriage cohorts, respectively. There are four models with different sets of covariates adding hierarchically one more covariate for each cohort. This is done to find out some independent effects of and possible confounding effects between covariates. A relative risk of (e^b) of 1.0 means that the variable has no effect upon the birth timing and is otherwise smaller than or greater than 1.0 when the variable has a relatively lower or higher risk to the reference group, the so-called baseline hazard function. The way to calculate the percentage change in the baseline hazard function associated with a certain variable, or a category of a predictor variable, is equal to (e^b - 1)*100 (Teachman, 1982, 1985; Blossfeld et al., 1989).

As we can see in Table 4.10, the first model includes only three socio-economic and cultural covariates: residence, education, and gender of first child.The second model adds age at marriage, one demographic variable. The third and the fourth models add the *contraceptive use after first birth*, including both reversible and non-reversible methods, as non-time-dependent and *time-dependent* covariates, respectively. In general, we find that the estimated independent effect of each covariate is consistent with our hypotheses. The results of Model 1 and Model 2 show that women who lived in rural areas, had only a daughter, had married earlier, and were less educated were more likely to have second birth.

One exception is found that among the Guangdong recently married women, gender of first child does not show statistically significant effects on the birth timing variation (see Table 4.11). Its likely explanation seems to be that for the Guangdong recently married women, one son was not good enough. Did they prefer a balanced gender composition or two sons? We should wait for further analysis since the results are

not clear at this point. Another exception is found in the Shaanxi recent marriage cohort, in which education and age at marriage do not show statistically significant effects on the second birth timing after controlling for residence and gender of first child. This confirms the speculation from previous single life table results that the reason for such insignificance may lie in a rather uniform compliance with birth policy within the same region.

Moving to Model 3 and 4, we can see that contraceptive use after first birth is the most powerful factor affecting the birth timing across all the marriage cohorts. As we see the model goodness of fit has been substantially improved when contraceptive use was introduced. For example, the χ^2 is 230.5 with seven degrees of freedom, indicating the introduction of covariates significantly improves the fit.

More importantly, the effect of gender of first child turns out to be no longer statistically significant after controlling for contraceptive use since first birth for the Shaanxi older marriage women, indicating a likely confounding effect between gender preference and use of contraception. And this seems to be theoretically sound, since it is likely that women who have only a daughter were less likely to use contraception than women with a son so that a cultural proximate variable is fully explained away by the powerful *intermediate proximate* determinant, contraception use (Davis and Blake, 1956; Bongaarts, 1978).

However, the result of the disappearance of significant gender effect on fertility after controlling for contraceptive use among the Shaanxi older marriage women is only an exception of the present findings. Other socio-economic background covariates, such as rural residence, education, age at marriage, and especially the gender of first child in

the other two cohorts are still statistically significant after controlling for contraceptive use. Is this due to a "poor data quality" problem of contraceptive use measurement such as lack of the dates of use within an interval? This question has recently puzzled demographers; that is, the discrepancy between conventional wisdom that socio-economic variables could only affect fertility dynamics indirectly through some "intermediate" or "proximate variables" and existing empirical findings of persistent significant effects of socio-economic variables on fertility before and after controlling for those principal "proximate variables" (Rindfuss et al., 1987:820; Bumpass et al., 1986).

China's In-depth Fertility Survey data provides enough information to construct the exact date of contraceptive use within each birth interval. Model 4 replaces the non-time-dependent covariate with a time-dependent covariate, *age at contraceptive use after first birth* according to a more realistic consideration that women may initiate the use of contraception method on different dates. Results are actually quite similar to those estimated by a time-constant covariate, contraceptive use status after first birth, in Model 3.

It is noteworthy that the present models do not include marital status and breastfeeding covariates, which are two of four commonly used principal "proximate determinants" as mentioned before. The reason for not including marital status covariate is simply because the selections of present two marriage cohorts in each province have been restricted to married women only. For breastfeeding, the decision of excluding it from the models is based on Tu's (1989) finding from the data analysis of the Shaanxi and Shanghai In-Depth Fertility Surveys in 1985. As he reports, "the relationship between breastfeeding and the length of subsequent birth intervals is relatively weak, due to a high

proportion of women who have used contraceptive methods in both regions" (p.338).

The most remarkable feature of the results after controlling for a *time-dependent covariate* is that major birth timing variations across socio-economic and cultural groups are still statistically significant even after the effect of presumably most important proximate determinant of fertility is controlled by exact date of its onset. Why are they the same again? Is that because conventional wisdom omits some critical proximate variables such as *coital frequency* or *fecundity* as suggested by Rindfuss et al. (1987)? Or is it a model building problem? We leave this important question to be answered at the end of data analysis, as it is best to answer it by an integrating analysis.

Now let us move to the parity three multivariate analysis, which is shown in Table 4.12 for the Shaanxi and the Guangdong older marriage cohorts, respectively, and Table 4.13 for the Guangdong recently married cohort, while dropping the Shaanxi recently marriage cohort due to a too small sample size. It is found that for all three cohorts the effect of two daughters category is always statistically significant, indicating a strong son preference pattern. More remarkably, the results of statistically significant interaction effect involving balanced gender composition and rural residence for the Guangdong older marriage cohort indicates that there is a two son preference in the rural Guangdong. To calculate the relative effect of balanced gender composition by taking the effect of interaction term into account, one can simply multiply the main effect with the interaction effect. For the present balanced gender effect, we obtain that 2.036*0.556*2.127 = 2.408. This value means that the rural women with balanced gender composition have a relative 141 per cent higher risk of having a third birth than women with sons in rural areas or women with any gender composition in the non-rural areas.

Table 4.12 Estimated relative risk (e^b) of the third birth timing, Shaanxi (1985) and Guangdong (1987)

Variable	Shaanxi 1971-77 Mar. Cohort				Guangdong 1971-77 Mar. Cohort				
	1	2	3	4	1	2	3	4	5
Residence									
Rural	1.179	1.136	1.008	1.028	3.503**	3.376**	2.036*	1.796**	2.450**
Education									
Primary	0.841	0.852	0.989	0.834	0.709**	0.733**	0.734**	0.887	0.869
Secondary+	0.515**	0.565**	0.872	0.577**	0.651**	0.678**	0.677**	1.020	0.875
Gender composition									
Two girls	1.811**	1.807**	1.151	1.815**	1.717**	1.732**	1.242	1.021	1.299**
Balanced	0.820	0.805	0.787	0.849	1.155	1.128	0.556	0.979	1.091
Girls*Rural							1.192		
Balance*Rural							2.127*		
Age at marriage									
< 20 year		0.964	0.923	0.929		1.174	1.174	0.976	1.093
23 year +		0.616*	0.593*	0.607*		0.781**	0.786**	0.865	0.838*
Contracepted after birth 2									
Yes			0.178**	0.503[a]**				0.257**	0.285[a]**
X^2	66.8**	71.3**	349.7**	113.0**	147.0**	165.6**	169.2**	512.4**	385.5**
df	5	7	8	8	5	7	9	8	8
N	815	815	815	815	1208	1208	1208	1208	1208
3 Tests (p)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

a: Time-dependent covariate; * $p < 0.05$; ** $p < 0.01$.

Table 4.13 *Estimated relative risk (e^b) of the third birth timing, Guangdong (1987)*

Variable	1978-83 Marriage Cohort 1	2	3	4
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	1.537	1.645*	1.205	1.373
Education				
No school	1.000	1.000	1.000	1.000
Primary	0.965	0.988	1.065	1.099
Secondary +	0.898	0.922	1.018	1.054
Gender composition				
Two boys	1.000	1.000	1.000	1.000
Two girls	1.521*	1.464*	0.965	1.170
Balanced	1.041	1.048	0.872	0.932
Age at marriage				
< 20 year		0.701*	0.728*	0.726*
20-22 year		1.000	1.000	1.000
23 year +		0.963	1.087	1.075
Contracepted after birth 2				
Yes			0.281**	0.359[a]**
No			1.000	1.000
X^2	15.6**	21.1**	92.5**	58.4**
df	5	7	8	8
N	1029	1029	1029	1029
3 Tests (p)	0.01	0.005	0.0001	0.0001

a: Time-dependent covariate;
* $p < 0.05$;
** $p < 0.01$.

The results of an insignificant interaction effect involving rural and two daughters categories among the Guangdong older marriage women indicates that in general the Guangdong women with two daughters have higher risk of third birth no matter where they lived.[7] Another remarkable result is that after controlling for contraceptive use status after second birth, a time-constant covariate, the always significant effect of two daughters category turns out to be insignificant, though sometimes it is still significant after controlling for age of contraceptive use after second birth, a time-dependent covariate. This suggests the existence of confounding effects between contraceptive use and gender composition. In addition, we have run several models by including the contraceptive use after *first birth* as a covariate to see if previous spacers for *second birth* timing would have lower risk of *third birth* timing. However, the results all turn out to be insignificant. This suggests that women's waiting time for a third birth was quite independent of their previous compliance with policy with regard to the use of contraception. It seems that the "never a third" policy strongly affected mothers with two children to adjust their fertility behaviour again.

Now let's look at the fecundity problem left by previous single life table analysis. Recall the result from Table 4.10 that the lower speed of second-birth timing of Shaanxi recently marriage cohort who were married before age 20 is no longer significant in the multivariate analysis. But the lower speed of third-birth timing of Guangdong recently married cohort who were married before age 20 is still statistically significant even in the

[7] But actually, the transition from second to third birth can only be studied for a subset of women with 2 or more children which consists of women who most likely lived in rural areas or towns while few women who lived in cities had two children under the stringent constraint of birth control policy.

multivariate analysis, which is shown in Table 4.13. Thus, the question of its cause is still not answered. A further inspection is needed in the future for solving this puzzle.

Before closing the discussion of the results achieved from a conventional maternity history analysis, let us summarize some major findings. In general, the results show that for the non-rural women who had at least secondary education, married at age after 22 and had at least one son, their waiting time to have a second birth under the constraint of one-child-family policy since 1979, or to have a third birth under the two-children-family policy from the mid-1970s, would be statistically significantly longer than other groups. The contraceptive use proximate variable effect is indeed the most important intermediate variable affecting the birth timing though it still could only partially explain away some socio-economic or gender effects. So far, what we have known is who are more likely to have out-of-quota births under the constraints of institutional settings. However, how the spacers apply the *wait-for-change* strategy in their fertility behaviour is not known yet. To see this, we now turn to a two-stage analysis, or intermediate stage analysis, of the transition from a birth to onset of contraceptive use and the transition from start of reversible method use to a subsequent birth.

4.2.2 Wait-for-change Strategy Analysis - An Intermediate Stage Analysis

We now consider contraceptive use as a intermediate stage in a birth interval. To do this, we are to "decompose" the transition from a birth to a subsequent birth, a conventional way of maternity history analysis, into two major stages. First, the transition occurs from a birth to the onset of contraception use after that birth, which is simply called a "first

move". The "next move" is from the use of contraception, here referring to any reversible method as first method used after the birth, to a subsequent birth.

In the first stage, the occurrence of any reversible or non-reversible method use is taken as a "first move". In fact, by "first move" we mean when contraceptive use is initiated after first and second birth, respectively. That is, a transition from a birth directly to the beginning of contraceptive use no matter whether from first or second birth. Here, we are mainly interested in the cumulative probability of contraceptive use, or so-called distribution function of contraceptive use, which indicates the extent of the Chinese women's compliance with the birth control policy in terms of the use of contraception.

Yet, as we know, the "first move" does not necessarily end the reproduction process if it is a move to a reversible contraception method use. Thus, after the first stage analysis, we are to move to a second stage analysis by inspecting the "next move" of those women who had already made a "first move". Here women who had sterilization as a first method in the first stage are not included in the stage two analysis because sterilization put them into an "absorbing" state, which makes a transition from the state "sterilization" to the state "having a birth again" impossible. But those women who use a reversible method first after a birth and later on had sterilization are included since they had been exposed to the risk of having another birth for a certain duration before the sterilization. We may call them "reluctant stoppers".

In the second stage, we are mainly interested in the new kind of birth function directly from the onset of a reversible method use, rather than directly from a previous birth, to a new birth. The new birth function of the "next move" is expected to reveal the most remarkable feature of the Chinese fertility transition: how a Chinese woman applies

the wait-for-change strategy in moving on to have an "extra" birth, or so called "out-of-quota" birth, after complying with the government's birth control policy by using some reversible contraception method.

4.2.2.1 First Stage: Contraception Function Analysis

Considering the "first move" after the first birth and second birth, respectively, Table 4.14 shows that in general there is a trend over time toward increasing the contraceptive use after birth. First, the estimated contraception functions, namely accumulated probabilities of using a contraceptive method, after first birth and second birth are always higher for cohorts married after 1977 than before 1978 for each province, respectively. For example, the probabilities of contraceptive use after first birth at the end of four years among the recently married women are 25 per cent higher (64.7 versus 40.2 per cent) and 14 per cent higher (51.8 versus 37.4 per cent) than the older marriage women for the Shaanxi and the Guangdong provinces, respectively. As we move on to second birth we can see a similar trend of increasing contraceptive use among recent marriage cohorts than older ones. The estimated contraceptive use probabilities after second birth by four years duration among recent marriage women are 31 per cent greater (93.3 versus 62 per cent) and 11 per cent greater (72.5 versus 61.1 per cent) than older marriage women for the Shaanxi and the Guangdong cohorts, respectively.

Moreover, we can see that the percentage increases of the contraceptive use after second birth compared to use after first birth are similar for all cohorts in the two provinces. For example, compared with the contraceptive use since first birth, the

Table 4.14 *Life table estimate of cumulative probabilities of* ***starting contraceptive use*** *after a first and second child born,* ***Shaanxi*** *(1985) and* ***Guangdong*** *(1987)*

Marriage cohort	N	Years since last birth 1	2	3	4	5	6	7
		From parity one						
Shaanxi:								
1969-1977	918	.232	.312	.377	.402	.412	.446	.530
1978-1982	806	.310	.476	.575	.647	.647	.765	-
Guangdong:								
1971-1977	1308	.236	.322	.355	.374	.406	.439	.439
1978-1983	1706	.325	.439	.481	.518	.538	.622	-
		From parity two						
Shaanxi:								
1969-1977	815	.293	.456	.544	.620	.696	.789	.850
1978-1982	378	.440	.732	.879	.933	-	-	-
Guangdong:								
1971-1977	1211	.370	.489	.557	.611	.668	.726	.853
1978-1983	1030	.475	.610	.681	.725	.804	-	-

estimated contraceptive use probabilities since second birth by four years duration increase by 22 per cent (62 versus 40.2 per cent), 29 per cent (93.3 versus 64.7 per cent), 24 per cent (61.1 versus 37.4 per cent) and 21 per cent (72.5 versus 51.8 per cent) for the older and recent marriage cohorts in Shaanxi and Guangdong, respectively. The trend of an increasing contraceptive use after second birth compared to use after first birth for each cohort of the two provinces is clearly indicative of an effective institutional constraint over individual compliance with the "never a third" birth control policy.

On the other hand, the result of Table 4.14 also shows a strong regional pattern of contraceptive use. We can see that the estimated contraceptive use probabilities after first birth and second birth among the Shaanxi women are *increasingly* higher than their Guangdong counterparts. For example, the estimated cumulative probability of contraceptive use after first birth by four year duration among Shaanxi older marriage women is only three per cent higher (40.2 versus 37.4 per cent) than their Guangdong counterparts, while the corresponding probability of the Shaanxi recently married women goes up by 13 per cent (64.7 versus 51.8 per cent) over their Guangdong counterparts. Moreover, as we move on to contraceptive use after second birth, we find again that compared with the Guangdong counterparts, the corresponding probabilities of the Shaanxi women are from only one per cent higher (62 versus 61.1 per cent) for older marriage cohort up to 21 per cent greater (93.3 versus 72.5 per cent) for recently married cohort. It seems that the Shaanxi and the Guangdong women did have a similar pattern of compliance with birth control policy in the earlier phase of campaigns but later the Guangdong younger marriage generation fell far behind their Shaanxi counterparts. Such changing regional patterns of contraceptive use is indicative of a likely strong period

effect resulting from a momentum effect of the one-child-family policy relaxation in the mid-1980s.

But in general, as Table 4.14 shows, at the end of seven years after second birth, more than 85 percent of older marriage cohorts would use contraception since the two-children-family policy was in effect. By six years duration after first birth, 77 percent of Shaanxi recently married women and 62 percent of Guangdong recently married women would use contraception during the one-child-family campaign. It suggests that the majority of Chinese couples were willing to comply with the birth control policy by using contraception.

Now let us turn to the analysis of contraceptive use variations by different characteristics, which is shown in Table 4.15 to Table 4.18. First, we can see that all the comparisons which are statistically significant are consistent with the theoretically expected direction. That is, non-rural residence, higher education, older age at first marriage, and having a son resulted in rapid contraceptive use timing more so than rural residence, lower education, younger age at marriage, and no son. The differential patterns are so clear that there is no need for further elaboration.

However, the statistically non-significant results, especially the one related to gender composition, is worth discussing further. Notice that the contraceptive use variations after first birth by gender of first child are not statistically significant for all marriage cohorts except the Guangdong recently married cohort. In contrast, strikingly, the contraception use variations after second birth by gender composition of children turn out to be statistically significant for all marriage cohorts except the Shaanxi older marriage cohort.

Table 4.15 *Life table estimate of cumulative probabilities of* ***starting contraceptive use after a first birth*** *by different characteristics,* ***Shaanxi*** *(1985)*

Variable	N	Years since last birth 1	2	3	4	5
		1969-1977 cohort:				
Gender composition						
Boy	476	.235	.328	.412	.439	.456
Girl	442	.229	.294	.336	.357	.357
Residence*						
City/town	182	.243	.414	.498	.498	.498
Rural	736	.230	.285	.345	.377	.390
Education**						
No school	425	.188	.253	.295	.322	.322
Primary	307	.248	.297	.350	.360	.396
Secondary +	186	.308	.467	.601	.639	.639
Age at marriage**						
< 20 year	428	.190	.263	.325	.355	.355
20-22 year	355	.251	.316	.360	.360	.390
23 year +	135	.319	.453	.568	.624	.624
		1978-1982 cohort:				
Gender composition						
Boy	406	.327	.502	.597	.683	.683
Girl	400	.294	.449	.552	.604	.604
Residence**						
City/town	199	.376	.623	.724	.833	.833
Rural	607	.288	.425	.520	.569	.569
Education**						
No school	231	.276	.379	.435	.495	.495
Primary	176	.249	.391	.511	.548	.548
Secondary +	399	.357	.573	.681	.773	.773
Age at marriage**						
< 20 year	153	.210	.321	.488	.488	.488
20-22 year	343	.318	.458	.502	.576	.576
23 year +	310	.350	.565	.693	.773	.773

* $p < 0.05$;
** $p < 0.01$.

Table 4.16 *Life table estimate of cumulative probabilities of* ***starting contraceptive use after a first birth by different characteristics, Guangdong*** *(1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1978 cohort:				
Gender composition						
Boy	658	.251	.338	.362	.382	.422
Girl	650	.221	.307	.349	.365	.391
Residence**						
City/town	248	.396	.581	.650	.665	.694
Rural	1060	.199	.262	.282	.302	.333
Education**						
No school	272	.151	.200	.214	.241	.241
Primary	728	.226	.299	.322	.336	.389
Secondary +	308	.335	.487	.561	.580	.580
Age at marriage**						
< 20 year	330	.183	.225	.230	.230	.265
20-22 year	511	.217	.293	.338	.359	.450
23 year +	467	.294	.425	.468	.505	.505
		1978-1983 cohort:				
Gender composition**						
Boy	884	.356	.473	.520	.574	.605
Girl	822	.292	.403	.438	.448	.448
Residence**						
City/town	402	.583	.783	.857	.909	.945
Rural	1304	.246	.331	.359	.386	.386
Education**						
No school	251	.172	.224	.238	.308	.308
Primary	762	.291	.383	.435	.453	.453
Secondary +	693	.419	.580	.622	.677	.720
Age at marriage**						
< 20 year	297	.197	.259	.307	.307	.307
20-22 year	560	.236	.327	.354	.387	.455
23 year +	849	.429	.576	.622	.666	.666

* $p < 0.05$;
* $p < 0.01$.

Table 4.17 *Life table estimate of cumulative probabilities of starting contraceptive use after a second birth by different characteristics, Shaanxi (1985)*

Variable	N	Years since last birth 1	2	3	4	5
		1969-1977 cohort:				
Gender composition[a]						
Two boys	213	.294	.401	.501	.576	.668
Two girls	188	.278	.429	.477	.504	.557
Balanced	414	.299	.496	.593	.683	.756
Residence**						
City/town	135	.333	.586	.691	.704	.777
Rural	680	.285	.429	.514	.601	.679
Education*						
No school	396	.273	.429	.515	.566	.651
Primary	285	.282	.442	.528	.624	.685
Secondary +	134	.373	.563	.659	.748	.832
Age at marriage						
< 20 year	405	.289	.433	.514	.564	.727
20-22 year	320	.286	.450	.554	.672	.755
23 year +	90	.337	.575	.643	.685	.800
		1978-1982 cohort:				
Gender composition*						
Two boys	86	.463	.840	.927	.927	-
Two girls	80	.402	.488	.719	.859	-
Balanced	212	.445	.779	.922	.974	-
Residence						
City/town	58	.437	.734	.939	.939	-
Rural	320	.441	.732	.864	.942	-
Education						
No school	144	.446	.706	.918	-	-
Primary	87	.439	.781	.934	-	-
Secondary +	147	.436	.732	.830	.906	-
Age at marriage						
< 20 year	67	.429	.643	.881	-	-
20-22 year	180	.485	.750	.896	.937	-
23 year +	131	.386	.744	.860	.933	-

a: $p > 0.05$ for the Lee-Desu and breslow tests but $p < 0.05$ for Cox-Mantel and Tarone-Ware tests;

* $p < 0.057$; ** $p < 0.01$.

Table 4.18 *Life table estimate of cumulative probabilities of starting contraceptive use after a second birth by different characteristics, Guangdong (1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1977 cohort:				
Gender composition**						
Two boys	301	.382	.525	.617	.678	.790
Two girls	275	.255	.346	.369	.417	.460
Balanced	635	.414	.535	.607	.657	.688
Residence**						
City/town	178	.506	.726	.833	.889	.933
Rural	1033	.346	.448	.508	.559	.613
Education**						
No school	267	.270	.334	.409	.446	.526
Primary	694	.377	.506	.562	.600	.631
Secondary +	250	.456	.605	.699	.805	.895
Age at marriage**						
< 20 year	320	.307	.412	.431	.505	.557
20-22 year	489	.326	.458	.575	.610	.663
23 year +	402	.473	.589	.636	.691	.751
		1978-1983 cohort:				
Gender composition**						
Two boys	279	.629	.774	.861	.896	-
Two girls	211	.211	.272	.286	.345	-
Balanced	540	.499	.657	.730	.765	.832
Residence						
City/town	97	.584	.733	.826	.826	-
Rural	933	.464	.598	.666	.718	.798
Education						
No school	186	.395	.536	.664	.664	.888
Primary	514	.472	.594	.659	.749	.749
Secondary +	330	.526	.678	.720	.720	-
Age at marriage**						
< 20 year	200	.405	.534	.620	.744	.744
20-22 year	385	.436	.563	.625	.649	.825
23 year +	445	.541	.686	.758	.780	.780

** $p < 0.01$; Others are not significant at 0.05 level.

How are we to explain such a dramatic change of gender effects on contraceptive use from first birth to a second? On the one hand, the explanation for all but one cohort having an insignificant gender effect on contraceptive use is that, in general, Chinese women were willing to comply with the central leadership's calling that "the interests of individuals must 'voluntarily be subordinated' to the interests of the state" (Chen and Kols, 1982:J-603) by using contraception to postpone a second birth. The birth control program was successful to such an extent that Chinese women did not bother much about their first child's gender to use contraception. Recall that the proportion of women sterilized after first birth is small, it is likely that many users used contraception for the purpose of spacing second birth interval. They could afford a longer waiting time by not having a second birth no matter what gender preference they had. This is why the gender effect is not significant for two older cohorts in two provinces.

The unique statistically significant gender effect of the first child among Guangdong younger marriage women (see Table 4. 16) seems to indicate that the younger marriage generation whose first child was not a son fell far behind those women who had a son. Notice that actually compared with the Guangdong older married women with no sons, the estimated probability of contraceptive use by four years duration among Guangdong recently married women with no son has increased by 8 per cent (36.5 versus 44.8 per cent). It apparently indicates that the significant gender effect on the use is not likely the result of an increasing unwillingness to comply with the birth control policy. Instead, it is likely because the Guangdong recently married women who had a son were more willing to wait by using contraception than those women who did not have a son, so that the gap is enlarged between the two groups.

As we move on to contraceptive use after second birth, the situation has dramatically switched. The result now shows that for all the cohorts, except the Shaanxi older marriage cohort, the contraceptive use variations by gender composition are statistically significant. Table 4.17 and 4.18 show that the estimated cumulative probabilities of contraceptive use at the end of three years after second birth among women with two sons increase by 21 per cent (92.7 versus 71.9 per cent), 25 per cent (61.7 versus 36.9 per cent) and 58 per cent (86.1 versus 28.6 per cent) than women with two daughters for the Shaanxi women married since 1978 and the Guangdong women married before 1978 and since 1978, respectively. Compared with the contraceptive use differentials by first child's gender, as shown in Table 4.15 and 4.17, the differences were only utmost up to eight per cent by three years duration. How do we explain this dramatic switch?

It is interesting to find that, in general, the estimated cumulative probabilities of contraceptive use after second birth are much higher than after first birth right from the first year to the end of five years for all cohorts, with the exception of the Guangdong recently married women with two daughters. For example, compared with contraceptive use timing after first birth, the probabilities of contraceptive use after second birth by four years duration go up by 15 per cent (35.7 versus 50.4 per cent), 26 per cent (60.4 versus 85.9 per cent) and five per cent (36.5 versus 41.7 per cent) for all women without a son in the Shaanxi older, younger, and the Guangdong older marriage cohorts, respectively. This is consistent with our previous finding of a general trend toward increasing use of contraception from older cohorts to younger cohorts and from the time they had a first birth to having a second birth.

A striking feature of ccntraceptive use differentials by gender compositions is that the start of contraceptive use by women with two sons sped up. For example, their probabilities of beginning use by three years have reached 0.93, 0.62 and 0.86 for the Shaanxi younger, the Guangdong older and younger marriage cohorts, respectively. This is a dramatic increase of contraceptive use speed. Now as we compare the corresponding probabilities by women with two sons and two daughters, we can find that by two years duration the corresponding probability of women with two sons is 1.7 times as great as women with two daughters in the Shaanxi younger marriage cohort; by three years duration, the corresponding proportion of women with two sons are 1.7 times (0.617/0.369) and three times (0.861/0.286) as high as women with two daughters in the Guangdong older and younger marriage cohorts, respectively. It is now clear that the reason why there is such a dramatic switch of contraceptive use differentials by gender compositions lies not in the behaviour change of women who had two daughters with an actually gradual increase of contraceptive use after second birth over first birth, but in a dramatic behaviour change of women with two sons by an unprecedented faster speed of contraceptive use. Notice that women with balanced gender composition have similar, though somewhat slower, contraceptive use speed to those with two sons, indicating that a son preference indeed plays an important role in affecting women's compliance with birth control policy.

The exception of the Guangdong younger cohort seems to have another story. Compared with the speed of starting contraceptive use after first birth, the probability of use after second birth by three years duration for women with no son has dropped by 15

per cent (28.6 versus 43.8 per cent) in the Guangdong recent marriage cohort.[8] We should keep in mind that no matter how lenient Guangdong birth control policy would be, every mother should comply with the "never a third" birth policy by using contraception. Recall that the Guangdong recently married cohort has an unique statistically significant gender effect on contraceptive use after first birth in the two provinces, it is now clearer that the Guangdong recently married women's son preference was so strong that it actually challenged a tougher constraint of birth control policy over mothers with two children.

Finally, the insignificant effect of gender composition on contraceptive use after second birth for the Shaanxi older marriage cohort, as shown in Table 4.17, may partially be due to the fact that the survival curves cross each other by the two year duration (see Blossfeld, 1989). In addition, we can see that the estimated probability variations by gender composition of two children are as small as only two to three percent from the first year to the third year, getting as high as eight to eleven percent from the fourth year to fifth year. Our various test statistics show that the differences of survivor functions of contraceptive use after second birth by gender composition of women with two children are not statistically significant with the Lee-Desu test of life table method and Breslow statistic of Kaplan-Meier estimator (or the product-limit estimator) but significant with Cox-Mantel statistic and Tarone-Ware statistic of Kaplan-Meier estimator. It is known that the former two tests stress the difference of the survivor functions at beginning of the process and the Cox-Mantel test emphasizes increasing differences at the end of the

[8] Actually, the drop of contraceptive use probabilities is found from one year duration (8% lower) up to the fourth year (10%) for women with no son in Guangdong recent married cohort (see Table 4.16 and 4.18).

process (Blossfeld, 1989), while the Tarone-Ware test serves as a compromise between the above two sets of tests and "maintains power across a wider range of alternatives than do the other two tests" (Benedetti et al., 1990:750). Therefore, the obtained different statistical test results suggest that the trend of contraceptive use differentials among the Shaanxi older marriage women are not very different from the significant variations of other marriage cohorts, except the Guangdong younger marriage cohort.

Now we turn to multivariate analysis of the contraception use after first and second birth. Table 4.19 to Table 4.22 show the results of proportional-hazard regression, namely relative risk (e^b) of contraceptive-use timing after first birth and second birth, respectively. Generally, all the significant effects are consistent with our theoretical expectation, that is, non-rural residence, secondary education (especially in Shaanxi there seem to be a threshold effect at the secondary education level), age at marriage after 22, and having sons are more likely to result in higher risk of contraceptive use than others.

However, the results also show that son preference did not play an important role in contraceptive use after first birth for all but one cohort, namely the Guangdong younger marriage cohort. It is also found that after second birth the effect of two-daughters composition category on the contraceptive-use timing is always statistically significant after controlling for other covariates, except for the Shaanxi older marriage cohort. All these findings are consistent with those from single life table and thus their explanation need no repetition.

But there are something new in Table 4.20. First, we see that the interaction effect involving rural residence and having a daughter on contraceptive-use timing after first birth in the Guangdong younger marriage cohort is statistically significant. This means

Table 4.19 *Estimated relative risk (e^b) of the contraceptive-use timing after the first birth, Shaanxi (1985)*

Variable	1969-77 Mar. Cohort 1	1969-77 Mar. Cohort 2	1978-82 Mar. Cohort 1	1978-82 Mar. Cohort 2
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	0.956	0.992	0.677**	0.748*
Education				
No school	1.000	1.000	1.000	1.000
Primary	1.218	1.202	1.007	0.992
Secondary +	2.191**	1.948**	1.477**	1.396*
Gender com.				
Boy	1.000	1.000	1.000	1.000
Girl	0.867	0.873	0.873	0.863
Age at mar.				
< 20 year		0.956		0.781
20-22 year		1.000		1.000
23 year +		1.350*		1.197
X^2	42.0**	47.9**	40.2**	46.5**
df	4	6	4	6
N	918	918	806	806
3 Tests (p)	0.0001	0.0001	0.0001	0.0001

* $p < 0.05$;
** $p < 0.01$.

Table 4.20 *Estimated relative risk (e^b) of the contraceptive-use timing after the first birth, Guangdong (1987)*

Variable	1971-77 Mar.Cohort 1	1971-77 Mar.Cohort 2	1978-83 Mar. Cohort 1	1978-83 Mar. Cohort 2	1978-83 Mar. Cohort 3
Residence					
City/town	1.000	1.000	1.000	1.000	1.000
Rural	0.455**	0.481**	0.335**	0.413**	0.504**
Education					
No school	1.000	1.000	1.000	1.000	1.000
Primary	1.511**	1.506**	1.826**	1.790**	1.788**
Secondary +	2.167**	2.080**	2.315**	2.501**	2.534**
Gender com.					
Boy	1.000	1.000	1.000	1.000	1.000
Girl	0.979	0.985	0.839*	0.862*	1.113
Interaction					
Rural*Girl					0.641**
Age at mar.					
< 20 year		0.710*		0.881	0.883
20-22 year		1.000		1.000	1.000
23 year +		1.287*		1.826**	1.842**
X^2	126.9**	147.7**	346.9**	412.2**	415.6**
df	4	6	4	6	7
N	1308	1308	1706	1706	1706
3 Tests (p)	0.0001	0.0001	0.0001	0.0001	0.0001

* $p < 0.05$;
** $p < 0.01$.

Table 4.21 *Estimated relative risk (e^b) of the contraceptive-use timing after the second birth, Shaanxi (1985)*

Variable	1969-77 Mar. Cohort 1	2	3	1978-82 Mar. Cohort 1	2	3
Residence						
City/town	1.000	1.000	1.000	1.000	1.000	1.000
Rural	0.791	0.800	0.759*	0.859	0.853	0.830
Education						
No school	1.000	1.000	1.000	1.000	1.000	1.000
Primary	1.114	1.097	1.066	1.063	1.086	1.068
Secondary +	1.398**	1.332*	1.215	0.900	0.888	0.874
Gender composition						
Two boys	1.000	1.000	1.000	1.000	1.000	1.000
Two girls	0.874	0.870	0.900	0.472**	0.474**	0.480**
Balanced	1.185	1.179	1.166	0.886	0.897	0.904
Age at marriage						
< 20 year		0.901	0.904		0.727	0.754
20-22 year		1.000	1.000		1.000	1.000
23 year +		1.021	1.000		0.881	0.875
Contracepted after birth 1						
Yes			1.617**			1.161
No			1.000			1.000
X^2	25.9**	27.2**	55.1**	15.93**	19.0**	20.0**
df	5	7	8	5	7	8
N	815	815	815	378	378	378
3 Tests (p)	0.0001	0.0001	0.0001	0.01	0.01	0.01

* $p < 0.05$;
** $p < 0.01$.

Table 4.22 Estimated relative risk (e^b) of the contraceptive-use timing after second birth, Guangdong

Variable	1971-1978 Marriage Cohort 1	2	3	1978-1983 Marriage Cohort 1	2	3
Residence						
Rural	0.552**	0.566**	0.651**	0.806	0.868	0.938
Education						
Primary	1.540**	1.541**	1.480**	1.179	1.180	1.071
Secondary +	1.948**	1.916**	1.769**	1.282*	1.339*	1.176
Gender composition						
Two girls	0.529**	0.530**	0.513**	0.214**	0.217**	0.242**
Balanced	0.969	0.989	0.969	0.671**	0.685**	0.691**
Age at marriage						
< 20 year		0.813*	0.850		0.845	0.841
23 year +		1.308**	1.235*		1.281**	1.098
Contracepted after birth 1						
Yes			2.200**			2.690**
X^2	119.4**	141.6**	243.7**	129.8**	145.9**	300.7**
df	5	7	8	5	7	8
N	1211	1211	1211	1030	1030	1030
3 Tests (p)	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

* $p < 0.05$; ** $p < 0.01$.

that not all Guangdong women presented a son preference in respect to pattern of contraception use after a first birth, but only rural women presented a strong son preference. This is a more realistic picture of the Guangdong women's contraception-use behaviour; namely, women living in city would not or could not have contraception-use affected by a son preference.

Last but not least, Table 4.21 and Table 4.22 show a remarkable feature of contraceptive use that, in general, except for the Shaanxi younger marriage cohort, the previous contraceptive use behaviour after first birth positively affects the contraception use behaviour after second birth. It seems to be good news for demographers and family planning program administrators. Once a new norm is accepted for some reason it would be carried out again in a new but similar situation. But, we are not at the end of our story, yet. After the "first move" from each childbirth to an onset of contraception use, what did Chinese do? This is the crucial question the present study is to answer.

4.2.2.2 Stage Two: New Birth Function Analysis

We now turn our attention to a "next move" to childbirth again after the "first move" from childbirth to the onset of a contraceptive method. At this stage, as mentioned above, women who used a reversible method as their first method after child birth were selected in the sub-sample. Some women may have used reversible methods first, such as IUD, pills, or an induced abortion, for the purpose of spacing the next birth, but later changed their minds to have a sterilization for themselves or their husbands because of the "diffusion" of family planning program changed their motivation or illness. These women

are considered censored by the time they or their husbands had sterilization. Women who used a non-reversible method, namely, sterilization, either for the purposes of family planning or medical reasons as the first method after childbirth are not included since their arrival at the so-called "absorbing" state makes any "next move" impossible.

Table 4.23 shows the new birth function (estimated cumulative probability of a subsequent birth) since the onset of a reversible method use after first birth and second birth, respectively for the Shaanxi and the Guangdong women respectively. The results show one of the most striking findings of our *wait-for-change* strategy analysis, that is, 54 per cent of the Shaanxi women and 46 per cent of the Guangdong women who were married after 1978 and had complied with birth control policy during one-child-family campaign by using a reversible method after first birth would have a second birth by 4 years duration. Furthermore, by five years duration, 73 per cent and 57 per cent of these users would have moved on to the second birth state for the same Shaanxi and Guangdong cohorts, respectively. Recall that the observed percentages of real "spacers" of contraceptive use from the simple distribution were 29 and 42 percent for Shaanxi and Guangdong recently married women, respectively.

Such substantially high probabilities of "renouncement" of Chinese women's previous compliance with the birth control policy indicates a strong tendency to have two children under the constraint of the one-child per family policy. This feature is especially salient among the Shaanxi women because they generally not only have a higher probability of using contraception but also have a higher probability of renouncement of contraceptive use than their Guangdong counterparts. To the extent that such "renouncement" behaviour of the Chinese compliers with one-child-family policy is a

Table 4.23 *Life table estimate of cumulative probabilities of* ***having a subsequent birth*** *after using a* ***reversible contraceptive method*** *following a first and second birth,* ***Shaanxi*** *(1985) and* ***Guangdong*** *(1987)*

Marriage cohort	N	Years since start of contraception use 1	2	3	4	5
		To parity two				
Shaanxi:						
1969-1977	320	.019	.246	.472	.598	.715
1978-1982	387	.011	.173	.408	.535	.727
Guangdong:						
1971-1977	434	.016	.280	.516	.691	.773
1978-1983	748	.015	.187	.317	.453	.567
		To parity three				
Shaanxi:						
1969-1977	365	.011	.120	.248	.343	.387
1978-1982	109	.016	.229	.486	.486	-
Guangdong:						
1971-1977	493	.011	.181	.345	.449	.505
1978-1983	216	.014	.390	.605	.646	.725

reaction to official birth planning policy, it is important for demographers to develop theoretical explanations adequate to the challenge revealed in the statistics and to move beyond the wisdom of modernization, diffusion, and institutional approaches and to reject the conventional assumption that Chinese women used contraception mainly for purpose of stopping fertility.

It should be noted that the new second-birth functions of the younger marriage cohorts are always lower from one year duration to four year duration than that of the older marriage cohorts among the Shaanxi and the Guangdong women, respectively. The results of recently married women slowing down the speed of a second birth can be explained by a period effect of the one-child-family campaign which tightened the control of birth quota to only one from three and two since 1970s. However, at the end of five years, the probability of second birth after using a reversible method among the younger marriage women exceeds that of older marriage cohort in Shaanxi. It seems that when birth control was tightened up by changing from a two-children-family norm to a one-child-family norm, Shaanxi couples still tended to take advantage of any chance to have a second birth by renouncing their compliance with birth control policy.

As we move on to the third-birth function, Table 4.23 once again reveals another striking finding. That is, the estimated probabilities of having a third birth five years after the start of using a reversible method since the second birth are 0.39 and 0.51 for the Shaanxi and the Guangdong older marriage cohorts, respectively. We notice that the older marriage cohorts have slowed down the speed of third birth since using contraception, compared with their speed of having second birth. The reductions of the new third birth functions can be attributed to a period effect of the "never a third" policy. Nevertheless,

under such stringent constraint, the renouncement rates are still substantially high. The finding of such considerable high probabilities of third birth after start of using contraception under the "never a third" rule is once again consistent with our theoretical reasoning on the *wait-for-change* strategy and inconsistent with the existing assumption that Chinese women used contraception mainly for purpose of stopping fertility.

Finally, when we look at the younger marriage cohorts, we find that their speed of third-birth after using a reversible method is much faster than their older marriage generations. We notice that these women belong to very selective subsets of cohorts. These subsets were very selective in the sense that they consist of women who not only had two children in relatively quick succession but also used some reversible method after second birth to wait for a while by no more than six years maximum observed marriage duration for the Shaanxi recently married women and eight years maximum observed marriage duration for the Guangdong recently married women, respectively.[9] Recall that the proportions of all women with at least two children who had sterilization after second-birth among younger marriage women are 11 per cent higher (32.9 versus 22.4 per cent) and 12 per cent higher (40.9 versus 28.9 per cent) than that of older marriage women in Shaanxi and guangdong, respectively (see Table 4.4 bottom row). In addition, there were about 27 and 13 percent of all recently married mothers with at least two children who used a reversible method, compared to 43 and 25 per cent in older marriage cohorts for

[9] For Shaanxi recently married cohort, since we chose 1978 as the earliest year of entering this marriage cohort and the survey was conducted in April, 1985 we obtain 1985-1978-0.7=6 years of maximum possible marriage durations; for Guangdong younger marriage cohort, as 1978 is also the earliest year of entry for the marriage cohort but they were surveyed in April and May, 1987, their maximum marriage duration is 1987-1978-0.6=8 years.

the Shaanxi and the Guangdong women, respectively (see Table 4.4 bottom row again). Such selective recently married mothers would tend to be a more typical example of Chinese women who applied *wait-for-change* strategy to have an "absolutely not" allowed third birth.

To see the detailed new birth function after the start of reversible method use after a childbirth, we turn to new birth function differentials analysis by different characteristics. Let us focus first on the recently married women's new second-birth functions after the start of reversible contraception method use after first birth under the constraints of the one-child birth control policy. We see from Table 4.24 that the Shaanxi recently married women who had a single daughter, or lived in rural areas, or married at age 20-22 significantly sped up their second birth, compared to others. By four years duration after the start of reversible method use, over 62 per cent would have a second birth. At the fifth year, the corresponding probabilities reach 80 percent or higher. In addition, the differences of second-birth functions by four year duration between rural and non-rural, between single son and single daughter, and between marriage at 20-22 and over 22 are 34 per cent (61.8 versus 27.8 per cent), 23 per cent (43.5 versus 66.8 per cent) and 20 per cent (67.4 versus 47 per cent), respectively. It means the majority of rural women who were married at age 20-22 or had no son would finally have a second birth no matter how long they had waited by using some reversible method. By the way, the reason for an unusually low probability of second birth among women married before age 22 is not clear and needs a multivariate analysis.

However, the result of an insignificant variation in new second-birth function by education among the Shaanxi recently married women suggests that education, a

Table 4.24 *Life table estimate of cumulative probabilities of* ***having a second birth after using reversible contraceptive method*** *following a first birth by different characteristics,* ***Shaanxi*** *(1985)*

Variable	N	Years since using contraceptive 1	2	3	4	5
		1969-1977 cohort:				
Gender composition						
Boy	179	.017	.272	.466	.578	.668
Girl	141	.021	.213	.478	.622	.770
Residence**						
City/town	85	.035	.248	.357	.480	.507
Rural	235	.013	.245	.513	.639	.787
Education*						
No school	117	.000	.265	.479	.615	.752
Primary	100	.020	.264	.550	.684	.827
Secondary +	103	.039	.206	.387	.490	.557
Age at marriage**						
<20 year	128	.008	.276	.515	.674	.824
20-22 year	118	.017	.274	.525	.665	.784
23 year +	74	.041	.149	.313	.355	.403
		1978-1982 cohort:				
Gender composition*						
Boy	209	.016	.146	.350	.435	.673
Girl	178	.006	.207	.482	.668	.795
Residence**						
City/town	125	.009	.089	.194	.278	.344
Rural	262	.013	.208	.486	.618	.815
Education						
No school	87	.012	.214	.414	.603	.815
Primary	74	.014	.195	.477	.574	.669
Secondary +	226	.010	.146	.378	.472	.676
Age at marriage**						
<20 year	49	.000	.053	.221	.283	.283
20-22 year	157	.007	.249	.520	.674	.858
23 year +	181	.318	.125	.359	.470	.690

* $p < 0.05$; ** $p < 0.01$.

commonly used indicator of "personal modernization level", does not matter in affecting women's *wait-for-change* behaviour. Instead, socio-economic institutional settings (usual place of residence), personal compliance to the late marriage policy (age at marriage after 22), and son preference as culture factor (gender of first child), are the major factors significantly affecting women's "renouncement" behaviour. It seems that our main theoretical concern on the interaction between institutional setting and culture is on the right track.

Secondly, we see from Table 4.25 that the Guangdong recently married women who lived in rural areas, had lower education, or married at age 20-22 are more likely to speed up a second-birth after the start of contraceptive use than others. The finding of a significant variation in second birth timing by education among the Guangdong women seems to warn us not to be complacent over a theoretical simplification by a result of the Shaanxi sample. "Personal modernization level" did affect Guangdong women's *wait-for-change* behaviour.

Again, in contrast to the Shaanxi result, the gender of first child clearly did not affect the Guangdong women's second-birth timing after using a reversible method. It should be noted that the gender of first child has statistically significant effects on the arrival of the state of contraceptive use among the Guangdong recently married women, while such effects are insignificant among the Shaanxi counterpart. It means that the Guangdong contraceptive users after first birth might be more selective and tend to be higher educated and modern and hence tend to wait longer time (or more likely to be stoppers) than the Shaanxi counterparts. In fact, the Guangdong recently married women who used reversible methods after first birth tend to have lower probabilities of second

Table 4.25 *Life table estimate of cumulative probabilities of* ***having a second birth after using reversible contraceptive method*** *following a first birth by different characteristics,* ***Guangdong*** *(1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1977 cohort:				
Gender composition**						
Boy	226	.018	.244	.454	.635	.718
Girl	208	.014	.318	.584	.753	.833
Residence**						
City/town	151	.000	.139	.253	.376	.492
Rural	283	.025	.354	.656	.858	.920
Education**						
No school	56	.036	.339	.661	.880	.960
Primary	221	.014	.327	.607	.788	.863
Secondary +	157	.013	.191	.338	.489	.582
Age at marriage**						
<20 year	76	.026	.329	.685	.849	.979
20-22 year	157	.026	.359	.597	.754	.829
23 year +	201	.005	.199	.400	.583	.688
		1978-1983 cohort:				
Gender composition						
Boy	421	.015	.198	.330	.467	.593
Girl	327	.016	.172	.301	.445	.533
Residence**						
City/town	319	.006	.050	.091	.124	.151
Rural	429	.022	.291	.493	.709	.862
Education**						
No school	57	.000	.274	.580	.814	.848
Primary	294	.017	.254	.397	.580	.755
Secondary +	397	.016	.124	.220	.230	.236
Age at marriage**						
<20 year	79	.204	.230	.249	.270	.283
20-22 year	181	.017	.267	.375	.528	.644
23 year +	488	.010	.141	.272	.399	.505

* $p < 0.05$; ** $p < 0.01$.

birth than their Shaanxi counterparts no matter what the gender of the first child was. This finding, therefore, is consistent with our suspicion of selectivity problem.

A comparison of the new second-birth functions between two recently married cohorts in the two provinces by the same characteristics reveals some interesting differences. We see from Table 4.24 and 4.25 that the new second-birth functions are much lower for the Guangdong women who lived in non-rural areas, had secondary education or higher, and were married at age 20 or older than that of each of the same subgroup of the Shaanxi counterparts. In contrast, the Guangdong women who were rural residents, and had primary education or lower would have a faster speed of second birth after the start of using reversible methods after first birth than that of their Shaanxi counterparts. In general, we see once again that the new second-birth differentials have narrowed for the Shaanxi women with different background variables but quite divergent for the Guangdong women, except for the gender effect.

This clearly suggests that a generally higher fertility rate of the Guangdong women was related to a lower probability of using contraception after a first birth in rural areas and a higher probability of second birth after the start of a reversible method use, compared with their Shaanxi counterparts. Moreover, the reason why in Guangdong the rural fertility was higher and the non-rural fertility was lower than the Shaanxi counterparts and national average lies in the divergence of contraceptive use behaviour (including its "renouncement" behaviour) between the rural and the non-rural Guangdong women, compared to a narrowing variation of contraceptive use behaviour among the Shaanxi counterparts.

Is it that the Guangdong recently married non-rural women were under more

stringent birth control constraint and rural women experienced less severe birth control than their Shaanxi counterparts? Or is it that the constraint of both provincial institutional settings were similar but the Shaanxi rural women were more willing to comply with the birth control policy than the Guangdong counterparts? A third possibility is rather interactive; that is, the Guangdong rural women's resistance to the official birth control was so strong that the local governments had to adjust their implementation of central leadership's uniform policy. It seems that the last explanation is most likely to be close to the reality since the Guangdong non-rural women were more likely to comply with the birth control policy than the Shaanxi counterparts. Moreover, much evidence has suggested that the Guangdong rural birth control implementation at the earlier stage of the official birth control campaigns was no less stringent than other rural areas (see Parish and Whyte, 1978; Banister, 1987).

As we move on to the new third birth function we only consider the older marriage cohorts from the two provinces because few recently married women had enough exposure time to the third birth if they used some reversible method after second birth. The third birth variation by different background variables are all statistically significant and shown in Table 4.26 and 4.27. This finding is consistent with our theoretical expectation. That is, the women who lived in rural areas, had lower education, married earlier, and had no son were more likely to have third births than others. The most striking feature of the estimated third birth probabilities after start of reversible method use is that among the women who had two daughters and used to comply with birth control policy by using reversible methods after second birth by eight years duration, 88 per cent and 74 per cent of them had a third birth, compared to corresponding

Table 4.26 *Life table estimate of cumulative probabilities of* ***having a third birth after using reversible contraceptive method*** *following a second birth by different characteristics,* ***Shaanxi*** *(1985)*

Variable	N	Years since last birth 1	2	3	4	5	8
		1969-1977 cohort:					
Gender composition**							
Two boys	91	.023	.149	.259	.325	.370	.370
Two girls	83	.025	.191	.353	.590	.681	.878
Balanced	191	.000	.076	.199	.248	.275	.379
Residence*							
City/town	79	.013	.090	.171	.214	.245	.329
Rural	286	.011	.128	.270	.379	.428	.522
Education*							
No school	167	.006	.131	.253	.335	.382	.521
Primary	131	.016	.136	.296	.407	.470	.512
Secondary +	67	.015	.061	.145	.237	.237	.294
Age at marriage*							
<20 year	178	.012	.158	.280	.366	.424	.549
20-22 year	143	.007	.094	.232	.348	.386	.438
23 year +	44	.023	.047	.172	.228	.228	.273

* $p < 0.05$; ** $p < 0.01$.

Table 4.27 *Life table estimate of cumulative probabilities of* ***having a third birth after using reversible contraceptive method*** *following a second birth by different characteristics,* ***Guangdong*** *(1987)*

Variable	N	Years since using contraception 1	2	3	4	5	8
		1971-1977 cohort:					
Gender composition*							
Two boys	133	.008	.153	.309	.413	.439	.508
Two girls	72	.029	.297	.441	.573	.672	.738
Balanced	288	.007	.164	.336	.432	.493	.565
Residence**							
City/town	119	.009	.083	.103	.162	.189	.206
Rural	374	.011	.213	.423	.541	.608	.707
Education*							
No school	66	.000	.238	.495	.591	.654	.654
Primary	296	.018	.191	.353	.454	.510	.601
Secondary +	131	.000	.134	.256	.369	.422	.464
Age at marriage**							
<20 year	106	.010	.211	.398	.536	.605	.692
20-22 year	188	.011	.223	.387	.498	.551	.639
23 year +	199	.011	.125	.275	.351	.400	.429

* $p < 0.05$; ** $p < 0.01$.

probabilities of 0.37 and 0.51 among the women with two sons, 0.38 and 0.57 among the women with balanced gender composition for the Shaanxi and the Guangdong older marriage cohorts, respectively.

The same results of significant third birth variations by gender composition also reveals another important feature of gender preference. That is, in the Shaanxi older marriage cohort, the probability of third birth after the start of reversible method use by five years duration among the women with two sons is 10 percent (37 versus 27.5 per cent) higher than that of women with balanced gender composition of children, while by three more years duration, at the eighth year, the latter catches up with the speed of the former (though just one percent higher). The Shaanxi women appeared to have a balanced gender preference at earlier years after the start of reversible method use because they tend to slow down the third birth from the first year up to fifth year, compared with the women with two boys. However, the convergence of such difference by three more years duration indicates that balance of gender composition may not be the real fertility goal of the Shaanxi older marriage women. Instead, the real goal of fertility by the great majority of the Shaanxi older marriage women was to have at least a son and it must be attained no matter how long they had to wait by temporarily using some reversible method to space the third birth interval.

Now we turn to multivariate analysis of new birth timing after the start of reversible method use after first birth and second birth, respectively. Table 4.28 and Table 4.29 show that residence effect on the second birth timing variations after the start of reversible method use is always statistically significant and has the biggest impact. We can see that after controlling for other background variables, including age at marriage,

Table 4.28 Estimated *relative risk (e^b) of the second-birth timing after starting to use contraception following the first birth, Shaanxi (1985)*

Variable	1969-77 Mar. Cohort 1	1969-77 Mar. Cohort 2	1978-82 Mar. Cohort 1	1978-82 Mar. Cohort 2
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	1.983**	1.801**	3.841**	4.001**
Education				
No school	1.000	1.000	1.000	1.000
Primary	1.241	1.201	0.935	1.027
Secondary +	0.804	0.998	1.187	1.304
Gender composition				
Boy	1.000	1.000	1.000	1.000
Girl	1.132	1.094	2.060**	2.023**
Age at marriage				
< 20 year		1.031		0.285**
20-22 year		1.000		1.000
23 year +		0.452**		0.644*
X^2	31.49**	47.35**	35.75**	53.01**
df	4	6	4	6
N	310	310	387	387
3 Tests (p)	0.0001	0.0001	0.0001	0.0001

* $p < 0.05$;
** $p < 0.01$.

Table 4.29 *Estimated relative risk (e^b) of the second-birth timing after starting to use contraception following the first birth, Guangdong (1987)*

Variable	1971-77 Mar. Cohort 1	1971-77 Mar. Cohort 2	1978-83 Mar. Cohort 1	1978-83 Mar. Cohort 2
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	3.058**	2.856**	8.442**	7.935**
Education				
No school	1.000	1.000	1.000	1.000
Primary	0.907	0.930	0.821	0.827
Secondary +	0.625**	0.639*	0.647*	0.624*
Gender composition				
Boy	1.000	1.000	1.000	1.000
Girl	1.251*	1.238*	1.047	1.046
Age at marriage				
< 20 year		1.082		1.340
20-22 year		1.000		1.000
23 year +		0.809		0.950
X^2	124.0**	127.7**	246.2**	251.5**
df	4	6	4	6
N	434	434	748	748
3 Tests (p)	0.0001	0.0001	0.0001	0.0001

* $p < 0.05$;
** $p < 0.01$.

women who lived in rural areas have 80 per cent [(1.801-1.0)*100%], 300 per cent [(4.001-1.0)*100%], 186 per cent [(2.856-1.0)*100%], and 694 per cent [(7.935-1.0) *100%] higher risk of having a second birth than women who lived in non-rural areas for the Shaanxi and the Guangdong older and recent marriage cohorts, respectively (see Model 2 in each cohort).

This is consistent with our expectation that rural women are most likely to give up their compliance with birth control policy to have a second birth. This strong residence differential suggests that institutional settings indeed have a most powerful impact on individual waiting time of second birth. However, the institutional settings here refer not simply the administrative organizations. Instead, they mean something more broad. As we have noted, the rural/non-rural differential under the same central planning leadership is largely related to the mode of economic production differential. This is especially true since the rural economic reforms from the late-1970s, the rural families have obtained more independence than non-rural women. Therefore, the rural economic local community settings seem to play a supportive role for individuals to have shorter waiting time of second birth under the constraints of central leadership and local governments.

Table 4.28 and 4.29 also show that the effect of gender of first child is statistically significant in the second birth timing for the Shaanxi younger marriage cohort and the Guangdong older marriage cohort, respectively, after the effect of the most powerful residence determinant and other background covariates are controlled. For example, in the Shaanxi recently married cohort, women with a daughter have 102 per cent [(2.023-1.0)*100%] higher risk of second birth after the start of reversible method use than women with a son. For the Guangdong older marriage women, the corresponding risk is

24 per cent [(1.238-1.0)*100%] higher for women with a daughter than women with a son. The finding suggests that son preference, one typical reflection of Chinese family-centred culture, indeed plays a significantly independent role in affecting individual waiting time of second birth after complying with the birth control policy though this independent effect did not show up in the waiting time of start of contraceptive use. Clearly, this is consistent with our theoretical discussion on Chinese women's *wait-for-change* fertility strategy and needs no repetition.

The insignificant gender effect on the second birth timing after the start of using reversible methods for the Shaanxi older cohort is indicative of the absence of the one-child-family policy period effect since the occurrence of second birth is not constrained by the two-children norm during the *wan, xi, shao* campaign. The insignificant gender effect on the second birth differential after the start of reversible method use for Guangdong younger marriage cohort can be explained by a two-son preference.

In addition, we notice that in the Shaanxi younger marriage cohort, after controlling for other background variables, the estimation of the second birth timing for earliest age at marriage (before age 20) still yields a significantly lower relative risk of 72 per cent [(0.285-1.0)*100%] than middle age at marriage. It seems that such an unusual slow speed of second birth after using reversible methods among women who did not comply with the later marriage policy is quite perplexing. Is it related to a shorter exposure time to the risk since they tend to be younger? We leave this question to future study. In addition, Shaanxi women who married after age 22 following the late marriage policy have 55 per cent [(0.452-1.0)*100%] and 36 per cent [(0.644-1.0)*100%] lower risk of second birth than women married at age 20-22 for the older and younger marriage

cohorts, respectively. It seems that in Shaanxi if women postponed their marriage as official policy demanded, they tend to be less likely to "renounce" their compliance with birth contro! policy. However, this is not the case for the Guangdong women since their age at marriage does not have a significant effect on second birth timing.

Moreover, we can see that after other covariates are controlled, education does not have any significant effect on second birth timing in each of the Shaanxi cohorts though such a significant effect did exist in a single life table test for older cohort (compare Table 4.28 with Table 4.24). In contrast, we find that Guangdong women with secondary or higher education have significant 36 per cent [(0.639-1.0)*100%] and 38 per cent [(0.624-1.0)*100%] lower risks of second birth after the start of reversible methods than women with no school education for older and younger cohorts, respectively (see Table 4.29). However, the differences between no school and primary school are found to be not significant at all. These findings have one important implication that in Guangdong in order to slow down the rapid speed of second birth there is a strong need to improve women's education level to at least secondary level, a threshold of so-called "personal modernization level".

Now we move on to the proportional-hazard regression result of third-birth timing since the initiation of reversible methods after second birth for the older marriage cohorts only. A most remarkable feature from Table 4.30 is the outstanding gender effect. As we can see, in Shaanxi, gender effect is the only covariate which has statistically significant effects on the third birth differential after the start of reversible methods, while in Guangdong, gender effect is still outstanding, competing with a most powerful residence effect. Recall that in the Shaanxi cohort, the residence effect on third birth differential

Table 4.30 *Estimated relative risk (e^b) of the third-birth timing after starting to use contraception following the second birth, Shaanxi (1985) and Guangdong (1987)*

Variable	Shaanxi 1969-77 Cohort 1	Shaanxi 1969-77 Cohort 2	Guangdong 78-82 Cohort 1	Guangdong 78-82 Cohort 2
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	1.378	1.321	5.233**	4.900**
Education				
No school	1.000	1.000	1.000	1.000
Primary	1.087	1.137	0.811	0.902
Secondary +	0.486*	0.598	0.840	0.904
Gender composition				
Two boys	1.000	1.000	1.000	1.000
Two girls	2.638**	2.615**	2.276**	2.352**
Balanced	0.824	0.795	1.359	1.345
Age at marriage				
< 20 year		-1.186		1.127
20-22 year		1.000		1.000
23 year +		0.672		0.676*
X^2	55.36**	58.04**	69.4**	79.0**
df	5	7	5	7
N	365	365	493	493
3 Tests (p)	0.0001	0.0001	0.0001	0.0001

* $p < 0.05$;
** $p < 0.01$.

was statistically significant in a single life table test but now is not when the gender effect is controlled (compare Table 4.30 with Table 4.26). These findings clearly indicate that son preference effect on Chinese women's fertility was indeed profound and enduring no matter how long they had to wait if they used reversible methods after second birth.[10] This conclusion is again consistent with our theoretical expectation that son preference, one of the typical characteristics of Chinese family-oriented culture, is a critically important determinant independently affecting the application of the *wait-for-change* strategy fertility behaviour.

When we look at the estimated effects of residence, education, and age at marriage, we find that they only occasionally have statistically significant effects on the third birth differentials. In doing the multivariate analysis of the third birth timing after onset of a reversible method after second birth, we have also tried to include the contraceptive use status covariate after *first* birth into the models for the two provinces. The results turn out to be statistically insignificant for the covariate. It means that use of contraceptive method for spacing second birth does not affect the spacing behaviour of the third birth interval.

In sum, we have seen from the single life table estimates (Table 4.23) that among recently married women who used reversible methods after first birth, 73 per cent and 57 per cent of them would "renounce" their compliance with one-child-family policy to have a second birth by five years duration after the start of use in Shaanxi and Guangdong,

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[10] Recall that 0.88 and 0.74 of women with no son would have a third birth after the start of reversible methods for Shaanxi and Guangdong older marriage cohorts, respectively, which were shown in Table 4.26 and 4.27. In addition, eight percent and 19 per cent of women with no son had sterilization after second birth for Shaanxi and Guangdong older marriage cohorts respectively, which are shown in Table 4.4.

respectively. We also find that the estimated probabilities of third birth after the start of reversible method use by five years duration are 39 per cent and 51 per cent for Shaanxi and Guangdong older marriage cohorts, respectively, indicating that the probabilities of "renouncement" of previous compliance with two-children-family policy and one-child-family policy are substantially high and consistent with our theoretical argument on Chinese women's *wait-for-change* fertility behaviour.

It is found that the Guangdong recently married women's second-birth probability after contraceptive use by five years duration is 16 per cent slower (56.7 versus 72.7 per cent) than the Shaanxi counterpart (see Table 4.23). This could be partially explained by a selectivity problem since the proportion of contraceptive users among the Guangdong women is six per cent lower (43.6 versus 49.5 per cent) than the Shaanxi counterparts (see Table 4.3). Since Guangdong rural women who had no son and less education were less likely to comply with the birth control policy by using contraception than their Shaanxi counterparts, the selected women here (compliers) were more likely to be the non-rural residents, had sons and higher education and tend to be relatively more determined to comply with the policy than their Shaanxi counterparts. It is also partially due to a confounding effect that the second birth probability among the Guangdong recently married non-rural women is 19 per cent lower (15.1 versus 34.4 per cent) than the Shaanxi counterparts (see Table 4.24 and 4.25).

To obtain the independent effect of each covariate, we run some multivariate analysis. We find that son preference effect persists through two birth control campaigns, namely, the two-children-family campaign in late 1970s, and the one-child-family campaign in 1980s. In addition, the result of the statistically insignificant effect of first

child's gender on the second-birth timing after the start of reversible method use among the Guangdong recently married women is likely related to a two-sons preference. As common sense says that it is a gamble which has to be played at least twice. More importantly, son preference effect becomes more outstanding in the third birth timing after the start of reversible method use, competing with the effect of residence, a most powerful predictor of such "renouncement" behaviour.

What we have confirmed is that son preference, one important reflection of Chinese family-centred culture, indeed has its independent effect on Chinese women's *wait-for-change* fertility behaviour. That is, many Chinese couples, especially rural families, could afford some time to wait for a change by using reversible methods after a birth to comply with the birth control policy. However, their waiting time would be not too long. Those couples who lived in rural areas, with no sons, are more likely to renounce their previous compliance to have a second or third birth under the constraint of one-child-family policy and two-children-family policy, respectively.

4.2.3 "Natural" Marital Fertility Path Analysis - For Non-contraceptors Only

After tracing a series of reproductive stages where women moved successively from a birth to onset of contraceptive use and from start of use to a subsequent birth, and so on, we have followed all component paths of the "controlled" marital fertility behaviour. So far, however, what we have not examined is the path of "natural" marital fertility, the transition directly from a birth to a subsequent birth in the absence of contraceptive use or induced abortion (Henry, 1961, 1976; Bongaarts and Potter, 1983). Obviously, the

study of this "natural" fertility process refers to birth interval analysis for non-contraceptive users only. In studying this process, what concerns us most is the question: is there any significant "natural" fertility differential by certain socio-economic or cultural factors? In other words, does any background variable affect the speed of birth among those Chinese women who did not comply with the birth control policy? In fact, the following study of "natural" marital fertility path is an alternative to the previous two stage analysis, though each providing an important component path that modern Chinese women might have experienced.

Table 4.31 shows the estimated cumulative probabilities of second-birth and third-birth from single life tables for the Shaanxi and the Guangdong marriage cohorts, respectively. We first see that all the probabilities of second birth by three years duration would reach over 68 per cent, and by five years duration would be 93 per cent or higher. The probabilities of third-birth by three years duration are 60 percent or higher. Such rather homogeneous high probabilities of birth for non-users seems quite "natural", compared with the speed of birth among all women from the conventional birth interval analysis (see Table 4.5). It is clear that the "natural" waiting time to have the out-of-quota birth is much shorter than the "controlled" waiting time of extra birth. For example, the cumulative probabilities of second birth at the end of fourth year among the non-contraceptors are 25 percent higher (86.8 versus 61.7 percent) and 24.3 percent higher (91.7 versus 67.4 percent) than that of all women for Shaanxi and Guangdong younger marriage cohorts respectively under the same impact of the one-child-family campaign. In addition, the cumulative probabilities of third birth at the end of fourth year among the non-contraceptors are 36.6 percent higher (78.1 versus 41.5 percent) and 25.8 percent

Table 4.31 *Life table estimate of cumulative probabilities of* ***having a subsequent birth*** *after a birth parity one and two for* ***non-contraceptors, Shaanxi*** *(1985) and* ***Guangdong*** *(1987)*

Marriage cohort	N	Years since last birth 1	2	3	4	5
		From parity one to two				
Shaanxi:						
1969-1977	593	.007	.299	.684	.840	.927
1978-1982	407	.005	.357	.709	.868	.953
Guangdong:						
1971-1977	872	.010	.371	.796	.928	.979
1978-1983	954	.013	.465	.820	.917	.965
		From parity two to three				
Shaanxi:						
1969-1977	282	.007	.237	.598	.781	.866
1978-1982	151	.011	.344	.709	-	-
Guangdong:						
1971-1977	558	.007	.290	.774	.922	.969
1978-1983	407	.010	.429	.804	.909	.963

higher (92.2 versus 73.4 percent) than that of all women for Shaanxi and Guangdong older marriage cohorts respectively since the two-children-family policy was in effect.

However, as we carefully compare the probabilities of subsequent birth across the two provinces for each pair of marriage cohorts married in a similar period, an interesting observation in Table 4.31 is that the speed of "natural" fertility among the Guangdong non-users is always faster than that of the Shaanxi women. For example, the probabilities of second birth by three years duration among the Guangdong non-users are 11 percent higher (79.6 versus 68.4 per cent) and 11 per cent higher (82 versus 70.9 percent) than the Shaanxi non-users for older and younger marriage cohorts, respectively. Moreover, the third birth probability by three years duration among Guangdong women are 18 per cent greater (77.4 versus 59.8 per cent) and 10 per cent greater (80.4 versus 70.9 per cent) than the Shaanxi non-users for the older and younger marriage cohorts, respectively. It is also noteworthy that such provincial "natural" fertility differentials are converging by five years birth interval. Why is it so? Is this related to individual background variables?

As we look at Table 4.32 to Table 4.35, we find that almost all the "natural" fertility differentials by different background variables are not statistically significant for each cohort in each province. It means that individual background variables do not have significant effects on "natural" fertility. Therefore, we can safely say that within each province, the "natural" fertility is rather *homogeneous*. Now we can further focus our attention on the provincial "natural" fertility differentials beyond the individual level. This mainly refers to the breastfeeding pattern differences between the two provinces.

Why is breastfeeding important here? This is because breastfeeding appears to be a primary determinant of the birth interval in populations with "natural" fertility

Table 4.32 *Life table estimate of cumulative probabilities of* ***having a second birth*** *after the first birth by different characteristics for* ***non-contraceptors, Shaanxi*** *(1985)*

Variable	N	Years since last birth 1	2	3	4	5
		1969-1977 cohort:				
Residence						
City/town	97	.010	.240	.615	.867	.935
Rural	496	.006	.311	.698	.835	.926
Education						
No school	306	.010	.288	.690	.834	.908
Primary	206	.005	.296	.676	.829	.951
Secondary +	81	.000	.350	.688	.895	.942
Gender composition						
Boy	293	.003	.266	.666	.814	.916
Girl	300	.010	.331	.703	.866	.939
Age at marriage						
< 20 year	298	.007	.296	.711	.872	.945
20-22 year	234	.004	.312	.671	.815	.928
23 year +	61	.016	.262	.607	.744	.836
		1978-1982 cohort:				
Residence						
City/town	66	.000	.280	.668	.871	.945
Rural	341	.006	.372	.716	.867	.952
Education						
No school	140	.007	.398	.723	.870	.970
Primary	102	.000	.307	.707	.899	.899
Secondary +	165	.006	.348	.695	.845	.948
Gender composition						
Boy	193	.000	.331	.666	.857	.932
Girl	214	.010	.379	.745	.877	.973
Age at marriage						
< 20 year	102	.000	.408	.775	.910	1.000
20-22 year	183	.011	.352	.667	.844	.927
23 year +	122	.000	.328	.727	.877	.944

Note: no comparison within each variable is significant at 0.05 level.

Table 4.33 *Life table estimate of cumulative probabilities of* ***having a second birth*** *after the first birth by different characteristics for* ***non-contraceptors, Guangdong*** *(1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1977 cohort:				
Gender composition						
Boy	431	.012	.341	.768	.922	.981
Girl	441	.009	.400	.823	.934	.977
Residence						
City/town	97	.010	.381	.742	.897	.959
Rural	775	.010	.370	.802	.932	.982
Education						
No school	216	.014	.329	.769	.899	.981
Primary	505	.006	.375	.802	.929	.972
Secondary +	151	.020	.417	.815	.967	-
Age at marriage*						
< 20 year	254	.012	.312	.751	.897	.972
20-22 year	353	.006	.377	.799	.943	.992
23 year +	265	.015	.419	.834	.937	.968
		1978-1982 cohort:				
Gender composition						
Boy	460	.015	.474	.806	.917	.966
Girl	494	.010	.457	.833	.917	.963
Residence						
City/town	80	.026	.453	.875	.917	.950
Rural	874	.012	.467	.815	.917	.964
Education						
No school	194	.005	.428	.777	.896	.977
Primary	467	.013	.462	.807	.903	.955
Secondary +	293	.017	.495	.870	.955	.976
Age at marriage*						
< 20 year	218	.014	.400	.804	.909	.970
20-22 year	377	.013	.496	.854	.940	.972
20 year +	359	.011	.472	.793	.897	.953

* $p < 0.05$.

Table 4.34 *Life table estimate of cumulative probabilities of* ***having a third birth*** *after a second birth by different characteristics for* ***non-contraceptors, Shaanxi*** *(1985)*

Variable	N	Years since last birth 1	2	3	4	5
		1969-1977 cohort:				
Gender composition						
Two boys	72	.014	.264	.611	.850	.917
Two girls	90	.011	.245	.591	.766	.870
Balanced	120	.000	.215	.596	.751	.829
Residence						
City/town	31	.000	.258	.548	.883	.961
Rural	251	.008	.235	.605	.767	.853
Education						
No school	164	.013	.271	.607	.772	.863
Primary	91	.000	.149	.537	.782	.859
Secondary +	a					
Age at marriage						
<20 year	153	.013	.216	.591	.740	.845
20-22 year	107	.000	.272	.630	.849	.888
23 year +	a					

Note: No comparison within each variable is significant at 0.05 level;
a: Sample size <= 30.

Table 4.35 *Life table estimate of cumulative probabilities of* ***having a third birth*** *after a second birth by different characteristics for* ***non-contraceptors, Guangdong*** *(1987)*

Variable	N	Years since last birth 1	2	3	4	5
		1971-1977 cohort:				
Gender composition						
Two boys	120	.008	.325	.792	.942	.983
Two girls	173	.006	.244	.785	.922	.964
Balanced	265	.008	.305	.759	.912	.966
Residence*						
City/town	33	.000	.531	.937	-	-
Rural	525	.008	.276	.764	.917	.967
Education						
No school	165	.012	.352	.788	.905	.962
Primary	314	.006	.248	.759	.923	.968
Secondary +	79	.000	.331	.807	.949	.987
Age at marriage						
< 20 year	181	.011	.267	.771	.927	.966
20-22 year	228	.000	.305	.805	.925	.965
23 year +	149	.013	.295	.732	.910	.979
		1978-1983 cohort:				
Gender composition						
Two boys	62	.035	.423	.876	.938	-
Two girls	154	.000	.418	.814	.957	-
Balanced	191	.011	.439	.775	.864	.937
Residence						
City/town	a					
Rural	378	.011	.426	.809	.917	.968
Education						
No school	81	.000	.401	.854	.896	-
Primary	210	.015	.431	.810	.922	.961
Secondary +	116	.009	.446	.743	.900	-
Age at marriage						
< 20 year	91	.034	.312	.748	.902	.902
20-22 year	169	.000	.435	.808	.924	.975
23 year +	147	.007	.491	.834	.900	-

* $p < 0.05$; a: Sample size <= 30.

behaviour. As many studies point out, the birth interval impact is the result of the prolonged lactational amenorrhea, with later weaning leading to a later decline in the sucking stimulus and later return of menses (Henry, 1961; Knodel, 1977; Smith, 1985; Simpson-Hebert and Huffman, 1981; Bongaarts and Potter, 1983; Laukaran and Winikoff, 1985). Although a recent excellent paper by Santow (1987) has questioned the conventional "unidirectional" model in reassessing the contraceptive effect of breastfeeding, it is still found that breastfeeding and amenorrhoea are "undeniably correlated" (p.160). Moreover, Lesthaeghe and Page (1980), and Lesthaeghe et al. (1981), found that the relationship between length of breastfeeding and postpartum amenorrhoea is likely to be logistic rather than linear. As they say: "the duration of amenorrhoea is probably not very much increased by prolonging lactation beyond an average of about 24 months, nor does it decrease as steeply once the average of duration of breastfeeding falls below about seven months" (Lesthaeghe et al., 1981:8).

Considering the importance of breastfeeding (especially its short duration effect) in regulating fertility behaviour, we generate the cumulative probabilities of weaning since lactation of first birth and second birth and mainly focus on the one and half year durations, which are shown in Table 4.36. The results show that the majority of the Guangdong non-users would wean at the end of one and half years after first birth and second birth respectively, while Shaanxi counterparts are not. The estimated proportions weaned at the end of one and a half years (eighteen months) among the Guangdong women are 28 per cent higher (73.9 versus 46.3 per cent) and 29 per cent higher (79.2 versus 50.1 per cent) than the Shaanxi counterparts since lactation after first birth for older and younger cohorts, respectively. The probabilities of weaning since lactation after

Table 4.36 *Life table estimate of cumulative probabilities of* ***weaning since lactation*** *of child parity one and two for* ***non-contraceptors, Shaanxi*** *(1985) and* ***Guangdong*** *(1987)*

Marriage cohort	N	Months since lactation 6	12	18	24
		Parity one			
Shaanxi:					
1969-1977	572	.039	.164	.463	.643
1978-1982	395	.179	.275	.501	.710
Guangdong:					
1971-1977	868	.006	.157	.739	.852
1978-1983	965	.017	.237	.792	.874
		Parity two			
Shaanxi:					
1969-1977	270	.030	.116	.345	.536
1978-1982	142	.113	.125	.348	.642
Guangdong:					
1971-1977	559	.005	.145	.703	.831
1978-1983	519	.026	.182	.709	.829

second birth by one and a half years (eighteen months) among the Guangdong women are 36 per cent greater (70.3 versus 34.5 percent) and 36 per cent greater (70.9 versus 34.8 per cent) than the Shaanxi women for the corresponding cohorts, respectively. Such remarkable features of a consistently much earlier weaning at the end of one and a half years among the Guangdong women than that of the Shaanxi women coincides with the previous interesting finding that the Guangdong non-users's speed of "natural" birth by 3 years birth interval is faster than the Shaanxi counterparts. Could this provincial difference of breastfeeding patterns explain a regional "natural" fertility differentials?

In order to confirm the speculation of breastfeeding effect on fertility we generate some multivariate analysis of second birth and third birth timing among non-users by including breastfeeding as a time-dependent covariate into Cox's model. Table 4.37 and 4.38 show that few individual background covariates have significant effect on the "natural" fertility dynamics except the weaning time of breastfeeding, which almost has a unique statistically significant effect on the timing of "natural" fertility. We see that at each distinct failure time the instantaneous hazard of having a subsequent birth for a weaning woman is about four times as great as that for a woman who is still lactating. This finding clearly indicates that breastfeeding indeed is a "primary determinant" of natural fertility.

We notice that the global chi-square value of the model test for the Shaanxi younger marriage cohort turns out to be only 12.5 with 8 degrees of freedom and not statistically significant at 0.05 level, leading to the inference that the estimated model does not explain the data better than the model without covariates. This is probably due more to a small sample size (only 142 women) than to the problem of existing "ties"

Table 4.37 *Estimated relative risk (e^b) of the **second-birth timing** after the first birth for **non-contraceptors**, Shaanxi (1985) and Guangdong (1987)*

Variable	Shaanxi Mar. Cohort < 1978	Shaanxi Mar. Cohort 1978+	Guangdong Mar. Cohort <1978	Guangdong Mar. Cohort 1978+
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	1.181	0.955	1.194	0.994
Education				
No school	1.000	1.000	1.000	1.000
Primary	1.055	0.912	1.089	1.104
Secondary +	1.185	0.957	1.273*	1.237*
Gender composition				
Boy	1.000	1.000	1.000	1.000
Girl	1.099	1.243	0.077	0.978
Age at marriage				
< 20 year	1.150	1.413*	0.894	0.856
20-22 year	1.000	1.000	1.000	1.000
23 year +	0.737*	1.101	1.014	0.907
Weaning of child 1[a]				
Yes	4.546**	4.534**	4.108**	6.210**
No	1.000	1.000	1.000	1.000
X^2	131.9**	63.4**	84.4**	116.6**
df	7	7	7	7
N	1593	1407	872	954
3 Tests (p)	0.0001	0.0001	0.0001	0.0001

a: time-dependent covariate;
* $p < 0.05$;
** $p < 0.001$.

Table 4.38 *Estimated relative risk (e^b) of the* ***third-birth timing*** *after the second birth for* ***non-contraceptors****, Shaanxi (1985) and Guangdong (1987)*

Variable	Shaanxi Mar. Cohort < 1978	Shaanxi Mar. Cohort 1978+	Guangdong Mar. Cohort <1978	Guangdong Mar. Cohort 1978+
Residence				
City/town	1.000	1.000	1.000	1.000
Rural	0.834	2.569	0.637*	1.438
Education				
No school	1.000	1.000	1.000	1.000
Primary	0.926	0.492	0.933	1.075
Secondary +	1.364	0.593	1.118	1.083
Gender composition				
Two boys	1.000	1.000	1.000	1.000
Two girls	0.805	0.556	0.822	0.926
Balanced	0.864	0.964	0.920	0.934
Age at marriage				
< 20 year	0.882	1.538	0.986	0.775
20-22 year	1.000	1.000	1.000	1.000
23 year +	0.635	1.531	0.894	1.140
Weaning of child 2[a]				
Yes	5.431**	18.525**	4.574**	3.278**
No	1.000	1.000	1.000	1.000
X^2	73.0**	12.5	57.8**	116.6**
df	8	8	8	7
N	282	151	558	407
3 Tests (p)	0.0001	#	0.0001	0.001

a: time-dependent covariate;
#: only LRATIO test is significant at 0.05 level;
* $p < 0.05$;
** $p < 0.001$.

among time to weaning since seven out of eight models fit the data very well.

So far our findings of the "natural" fertility patterns have confirmed that breastfeeding duration is indeed highly correlated with a "natural" fertility timing. In addition, we have seen that other background variables do not play important roles in affecting such "non-controlled" fertility behaviour after controlling for the "proximate determinant" -- breastfeeding. With these two points in mind, we now can conclude that the regional pattern of "natural" fertility differentials is probably due to a regional pattern of breastfeeding differentials.

Having determined the breastfeeding pattern as the primary determinant of regional fertility differentials, we now wonder if these regional patterns of breastfeeding behaviour are affected by different regional customs? Looking back to the results from Table 4.36, we find that the cumulative weaning probabilities of each birth parity between the older and younger marriage cohorts in each province are quite similar, especially the weaning time of first child is almost identical between the two cohorts in each province. For example, the differences of weaning function of first child by one and a half years are only four per cent (46.3 versus 50.1 per cent) and five per cent (73.9 versus 79.2 per cent) for Shaanxi and Guangdong cohorts, respectively. Moreover, the differences of weaning function of second child by one and a half years are less than 0.6 per cent (34.5 versus 34.8 per cent or 70.3 versus 70.9 per cent) for the two provincial cohorts, respectively.

Since the weaning functions of first birth among older married women were not likely to be affected by the birth control campaigns, it seems that the general regional breastfeeding differentials are probably customized by local people well before the birth

control campaign. If this assumption holds, we might safely conclude that a faster speed of birth timing among the Guangdong women than the Shaanxi women is likely resulting from a traditional local custom of shorter breastfeeding patterns. In turn, such differences are more likely to be related to the environmental, climatic, or nutritional differentials between the two provinces on the whole than between finer individual background variations. Clearly, now we have to extend our theoretical hypothesis that cultural factor does have strong independent effect on fertility even under a stringent constraint of political institutions by adding a possible regional norm of breastfeeding, though the reason for this is still not clear.

4.2.4 Integrating the Component Paths -- Explaining the Puzzle of Conventional Maternity History Analysis

We now have completed analysis of the two major "competing paths": "controlled" fertility path through which fertility is deliberately regulated by having contraceptive methods or induced abortion; and "natural" fertility path which is the alternative to the former, namely parity progression in the absence of contraceptive use and induced abortion. The obtained information confirms that individual socio-economic and cultural background variables do have significant effects on the "controlled" fertility two-stage path dynamics all the way through, while few such variables provide us with a significant breakdown of the homogeneous "uncontrolled" fertility path dynamics, except the weaning time. Given all this information, we are to nail down the puzzle of conventional wisdom of birth interval dynamics, which was discussed by Bumpass et al. (1986) and Rindfuss

et al. (1987). Since we have known that Chinese women's "natural" fertility path dynamics is quite homogeneous, we tend to focus on the "controlled" fertility path dynamics in solving the puzzle.

Recall that our modified one-stage model of birth interval dynamics (see Figure 3.3) expects that by inserting duration of contraceptive use in the conventional model, some principal proximate variables should be able to explain all the effects of socio-economic and cultural variables. Since the present study only selects women whose marriages were intact and relationship between breastfeeding and birth interval length is found relatively weak due to a confounding effect of contraceptive use (Tu, 1987:338), our "controlled" fertility path analysis focuses on contraceptive use, which in fact includes two principal "proximate determinants" -- contraceptive use and induced abortion for family planning. In the absence of a good measure of duration of use we substituted a two-stage transition model (see Figure 3.4) in place of the modified one-stage model to capture all the possible effects of contraceptive use. Since these two-stage model analyses were done separately it is necessary to integrate the results.

Table 4.39 shows comparisons of the results of transition to second birth from the conventional models of birth interval analysis and from the new two-stage transition models. The table shows the statistical significance of hazard-regression coefficients from the different models. Since our objective is to see whether or not the significant effects of fertility differentials were fully explained by the contraceptive use variable and to explain the puzzle of why there would be a persistent background variable effect after controlling for contraception, we only consider those effects of background variables which were statistically significant in the conventional models before controlling for the

Table 4.39 *Comparison of models following conventional wisdom and models with two-stages moving towards a second-birth*

	Birth 1 to Birth 2								Birth 1 to Contraception				Contraception to Birth 2			
	X69-77		X78-82		G71-77		G78-83		X69-77	X78-82	G71-77	G78-83	X69-77	X78-82	G71-77	G78-83
	NC	C	NC	C	NC	C	NC	C								
Residence																
Rural	*	*	*	*	*	*	*	*	–	*	*	*	*	*	*	*
Education																
Secondary	*	–			*	–	*	–	*		*	*	–		*	*
Gender																
Girl	*	–	*	*	*	*			–	–	–		–	*	*	
Marriage Age																
23 Year +	*	*			*	–	*	*	*		*	*	*		–	–

Note: X69-77: Shaanxi 1969-1977 marriage cohort;
X78-82: Shaanxi 1978-1982 marriage cohort;
G71-77: Guangdong 1971-1977 marriage cohort;
G78-83: Guangdong 1978-1983 marriage cohort;
NC: Model does not control the contraceptive use;
C : Model controls contraceptive use, a time-dependent covariate;
* : Variable effect is statistically significant;
– : Variable effect is not statistically significant;
Non-significant effects of variables from conventional model are not included.

contraceptive use. Notice that the variable of contraceptive use refers to the time-dependent covariate here because it seems more accurate than a time-constant covariate.

The list of statistical significance status of hazard-regression coefficients in the first column of "Birth 1 to Birth 2" are selected from the conventional birth interval Model 2s and 4s of Table 4.10 and 4.11 for each cohort. We can see from this part of the list that the residence effect on the birth interval dynamics is always significant before and after controlling for contraception, while the impact of education, gender of first child, and age at marriage is quite variable with and without such control. Now it is clear that we are challenged by the same puzzle raised by Rindfuss et al, that is, why routinely significant fertility differentials cannot be explained by some principal proximate variables like contraception and breastfeeding (1987). What we are attempting to do here is to explain why some significant effects of background variables are persistent and some are not.

To see this, let us shift our attention to the list of statistical significance status of the hazard-regression coefficients in the middle column of "Birth 1 to Contraception" (which are selected from the results of our stage one Model 2s of Table 4.19 and 4.20) and in the third column of "Contraception to Birth 2" (which are chosen from the second stage Model 2s of Table 4.28 and 4.29) by each cohort, corresponding to the results shown in the first column. Since few women ever had sterilization after first birth little information would be lost by selecting only those women who used reversible methods as the first method after first birth. Therefore, to explain the puzzle of conventional birth interval analysis by integrating the decomposed chain effects is quite straightforward. Now once we link the results of two stage analyses together from the middle and third

columns a possible interpretation of the conventional puzzle suggests itself.

First, we see that residence has a significant effect not only on the contraceptive use differentials, except for the Shaanxi older marriage cohort, but also on second birth timing variations after the start of reversible method use. It means that residence not only affects the timing of contraceptive use but also the timing of terminating the contraceptive use and subsequently the timing of second birth. It is clear that in the conventional birth interval analysis the important variation of "controlled" fertility affected by residence could be captured only partially by difference in contraceptive use at the first stage. Since residence continuously affects subsequent second birth timing differentials after onset of contraception, probably due to its effect on the unobserved duration of contraceptive use (or the timing of its termination), it is understandable why we still see the persistence of significant residence differences in the conventional second birth timing analysis net of the contraceptive use "proximate variable".

Secondly, let us look at the education effect from the first column list. We see that its significant sign has changed after controlling for contraceptive use in the Shaanxi older marriage cohort from the conventional birth interval analysis result. It seems that contraceptive use does fully explain all the education variation on fertility here. Is this explanation consistent with the finding of two stage analyses? As we see the list on the right side along the same row in the middle and third column for the same older marriage cohort we satisfactorily find that education has a significant effect on contraceptive use differential but not on second birth after using contraception, indicating probably no significant effect on duration of contraceptive use. It is clear that the reason why, once the effect of contraception is controlled the remaining effect of education on second birth

approaches zero, lies in the fact that education only affects contraceptive use but not the second birth timing after using contraception, again probably resulting from no effect on contraceptive use duration differential.

Thirdly, as we turn back to the gender effect of first child on the conventional second birth timing for the Shaanxi younger marriage cohort and the Guangdong older marriage cohort respectively, we find that the result is the same as that of residence effect for the Shaanxi older marriage cohort. That is, the gender effect is persistent before and after controlling for contraception from conventional birth interval analysis (see the first column). In contrast, the gender effect on contraceptive use is not statistically significant but on the second birth timing among reversible method users is (see the second and third columns). It means that by controlling for contraceptive use the conventional model virtually controls nothing in the conventional fertility variations. In other words, since the gender effect only "emerges" after using a reversible method, namely, it only affects the unobserved duration of contraceptive use, the important "proximate variable" of contraceptive use could not capture gender's effect on fertility differentials.

The fourth variable is age at marriage. We see that the significant effect of age at marriage on conventional fertility differential either still exists or disappears after controlling for the contraceptive use from the conventional birth interval analysis for the Shaanxi and the Guangdong older marriage cohorts, respectively (see first column). Again these results are consistent with the findings from the two stage analyses for the two cohorts, respectively (see middle and third columns). That is, in the Shaanxi older marriage cohort, since age at marriage has a continuously significant effect on both contraceptive use and second birth after the start of reversible method use, the effect of

age at marriage on fertility is persistent in the conventional birth interval dynamics after contraceptive use is controlled. In the Guangdong older marriage cohort, since age at marriage only significantly affects contraceptive use differential but not the second birth timing variation after start of reversible method use, the effect of age at marriage disappears after contraceptive use is controlled in the conventional model.

So far we have seen clearly that so long as there is significant variation in subsequent birth timing after onset of contraception by socio-economic or cultural background variables among contraceptive users (which most likely results from an unknown variation in duration of contraceptive use affected by those background variables), the significant variation in subsequent birth timing by background variables from the conventional birth interval model is not likely to be fully explained by the most important "proximate variable" -- contraceptive use only. However, if the effect of those background variables on the subsequent birth timing among contraceptive users is not significant, contraceptive use variable itself tends to be a capable "proximate determinant" to explain fully the significant birth timing variation in a conventional birth interval model at micro-level.

Notice that sometimes this rule varies. As one may have been aware, in the list of Table 4.39 there are some exceptions we skipped in our previous discussion. Now let us turn back to inspect them in detail. The first exception occurred in education for two Guangdong marriage cohorts. We see from the first column that the significant effect of education on fertility variation has approached zero after controlling for contraceptive use from conventional birth interval model. It implies that there should be no significant education effect on the second stage renewed fertility differential among contraceptive

users. However, the education effects on the two stage transition differentials (see middle and third columns) turn out to be both significant. Why does the significant education effect on second birth timing after the start of contraceptive use, or presumed duration of contraceptive use, not exist in the conventional birth interval model after controlling for contraceptive use? Apparently this is not what we expect.

However, recall that there are significant "natural" fertility variations by education among non-contraceptive users for the two Guangdong cohorts, respectively, which was shown in Table 4.37. Comparing the findings on education effects from Table 4.29 and 4.37, we have two contradictory results: among all women who had at least secondary education, contraceptive users had a longer waiting time of second birth, while non-contraceptive users had a shorter waiting time of second birth than women with no school education. It is likely that the contradictory education effects by users and non-users *offset* their "net" effect, or *disturb* their "integrated" effect for users and non-users together, leading the education effect approach zero after controlling for contraception.

The second exception is the gender effect in the Shaanxi older marriage cohort. We see that the significant gender effect on birth interval variation has changed to zero after controlling for contraception in the conventional models though gender of first child has no significant effect on anyone of the two stage transition differential. What would be the cause for such a strange change after controlling for contraception which obviously does not play any "proximate" role or acts as substitute for gender effect? Fortunately, we have some clue from the original results of conventional birth interval analysis. As we turn back to the results of the Model 5 from Table 4.10, we see that the significant gender effect on second birth differential still exists after controlling for contraception when the

age at marriage variable is not included in the conventional birth interval model. Therefore, the disappearance of a significant gender effect is seemingly not simply the result of contraceptive use being controlled. Instead, it is likely the result of controlling a presumed confounding effect of age at marriage and contraceptive use, which has not been taken into account in the two stage analysis.

The final special case is age at marriage in the Guangdong recently married cohort. As we see from Table 4.39 again, its significant effect on second birth variation is persistent before and after controlling for contraception in the conventional birth interval models (see column one), while it has significant effect on the first stage transition differential but not on the second stage transition variation (see columns two and three). This finding implies that there is something else (certainly not contraception) which is related to the age at marriage, affecting second birth dynamics but not being considered in the models. What is it?

Recall the results of single life table test that among Guangdong recently married non-contraceptive users age at marriage does have significant effect on "natural" fertility variation (see Table 4.33) while age at marriage effect is not significant any more in a multivariate hazard-regression analysis after the breastfeeding (as time-dependent covariate) effect is controlled (see Table 4.37). Therefore, it is very likely that the persistence of the significant age at marriage effect in the conventional birth interval models lies in the omission of controlling for a presumed confounding effect of breastfeeding duration and age at marriage. This finding has a important implication for our previous rule; that is, beside contraception, which is definitely a most important "proximate determinant" in the conventional birth interval analysis, breastfeeding is

another non-negligible important "proximate determinant", especially in "uncontrolled" fertility dynamics.

Now we have completed a thorough examination of the diversified outcomes of original significant effects by socio-economic and cultural background variables on second birth variations after controlling for a simple but most important "proximate determinant" -- contraceptive use as a time-dependent covariate -- in the conventional birth interval models. We have obtained quite satisfactory explanations from the two "competing paths" analyses, especially from the "controlled" fertility path by a two-stage decomposition analyses, for such diversified results from a conventional birth interval analysis without bothering about the details, such as coital frequency, sperm quality, etc.

The present thesis would like to go over the comparison of the results from the conventional third birth interval analysis and from two stage analyses. However, considering the size of this data analysis and the possible repetition of what occurred in the second birth interval analysis, we have decided to leave the discussion here. Also, the explanation for the results of the conventional third birth interval analysis may need more careful consideration because there are a considerable number of women who had sterilization after second birth, which is found significantly related to the gender composition of children for all cohorts but not necessarily related to other socio-economic variables (see Table 4.4). Since our second stage analysis of third birth timing only includes those women who used reversible methods as the first method after second birth, any attempt at integrating the component paths together should have taken the variation of sterilization into account, too. Nevertheless, a circumspection of further explication for a third birth interval analysis does not mean that our previous findings are not able to

solve the puzzle of conventional wisdom on the third birth interval dynamics.

We now turn to a brief discussion of some substantive findings from our previous conventional analysis and two stage analysis of birth interval dynamics. First, we find that local socio-economic institutional setting differences, which include the mode of economic production difference and daily life environment differences, affect not only a start of contraceptive use but also a "renewed" fertility (a new birth after using contraception) by renouncing their previous use of contraception. That is to say, Chinese women who lived in rural areas were less likely to be constrained by the political institutional settings to control their fertility in that they were less likely to use contraception (even if they used some reversible method they were more likely to terminate it by a shorter duration for the purposes of renewing fertility) than women who lived in cities and towns.

However, given a fertility differential by residence, we are interested in something affecting couples' fertility independently of those institutional constraints. We expect that son preference, which manifests the most remarkable family-oriented feature of Chinese "not irreligious" traditional culture, would have a salient effect on women's fertility behaviour independent of those constraints from outside. In fact, we find that gender composition of children does have significant effect on the fertility variation after residence and other background variables are controlled. It means that women under a similar constraint of local institutional settings, especially in rural areas, behaved differently in accordance with the gender composition of children.

More importantly, we find that gender effect often does not show up in the first stage transition process, namely a "first move" from a birth to start of contraceptive use, but "emerges" in the second stage transition process, i.e. a "next move" from start of

reversible method use to a new birth. Based on the finding that couples without a son were often not less likely to comply with the birth control policy by using contraception than are couples with at least a son, the existing belief that in modern-day Chinese persistent son preferences "were not so strong that they were ignoring the one-child policy" (Arnold, 1988:49) is partially true. However, the new evidence from our finding also reveals that such belief is somewhat outdated. This is because our finding clearly shows that the significant son preference effect on fertility differential would "emerge" after Chinese women complied with the birth control policy.

Beside a general son preference, we also find that there is a strong two-sons preference among the Guangdong rural women while there is a weak balanced gender composition preference among the Shaanxi women. For example, we have found a significant interaction effect involving balanced gender composition and rural residence on the third birth timing (see Model 3 in Table 4.12) and on start of contraceptive use (see Model 4 in Table 4.22) even when the effects of other background variables are controlled from the conventional birth interval analysis for the Guangdong older and younger marriage cohorts, respectively. For the Shaanxi women, however, we find that women who had balanced gender composition of children tend to have slowest speed of third birth among all types of gender composition from a single life table test (see Table 4.8) while such significant effect does not exist in the results of multivariate analyses (see Table 4.12). How are we to explain this phenomena?

There are three main possibilities. The first is that the Shaanxi women were generally under a more stringent and uniform institutional control than their Guangdong counterparts, especially during the one-child-family campaign. This seems to be consistent

with the finding that in Shaanxi usually son preference has no significant effect on contraceptive use variation after first birth while in Guangdong it has, especially for recently married women (see Table 4.19 and 4.20). However, we can hardly assume that Guangdong local governments would have allowed couples to manifest a *two son* preference by having a third birth. A second explanation is, therefore, that perhaps the Shaanxi rural women were more willing to comply with birth control policy than the Guangdong counterparts. It means that the Shaanxi rural women have stronger propensity to apply *wait-for-change* strategy in their fertility process than their Guangdong counterparts. The third explanation is that the strong son preference of the Guangdong rural couples was so persistent that the local governments had to concede a right of having second birth to rural couples without son. It seems that this explanation is closer to the reality since the Guangdong governments did not relax the one-child policy in non-rural areas and the implementation of birth control campaigns at the earlier stage in Guangdong rural areas was not less stringent than in other provinces.

Moreover, we have found that Shaanxi women generally have not only a higher probability of complying with birth control policy by using contraception but also a higher probability of renouncing their previous compliance by having an "out-of-quota" birth after using contraception than their Guangdong counterparts. This finding indicates that Shaanxi women's greater propensity to comply with the birth control policy was quite temporal and conditional.

A more important finding is that in the two provinces more than 56 percent of Chinese women who were married after 1978 and had complied with the one-child-family policy by using contraception after first birth would have a second birth by five years

duration since onset of contraceptive method use. To the extent that such a "renouncement" behaviour of Chinese compliers in response to the stringent one-child-family policy, especially in Shaanxi, is a reaction to official policy constraints, it is important to develop theoretical explanations adequate to the challenge revealed in the statistics and to move beyond the wisdom of modernization, diffusion, and institutional approaches.

CHAPTER V

SUMMARY AND CONCLUSIONS

The present study started by reviewing what has been theoretically proposed to contribute to our understanding of China's dramatic fertility decline in the last two decades. We know that the debate between the modernization approach and the policy approach as to what caused China's recent dramatic fertility decline centres on an old question of whether the economic rationality or the cultural rationality is more important in fertility decision-making. The debate is open to a question of how could it become possible for couples in China to bring the fertility decline to such an extraordinary extent and rapidity far beyond the societal level of economic development and policy diffusion process.

Then, the institutional approach (McNicoll, 1978, 1980, 1989; McNicoll and Cain, 1990; Greenhalgh, 1988, 1989c) emerges to ask a new question of how individual rationality functions in a structured society as a whole. As a result, the institutional approach seems to be fruitful in answering the old question resulting from the above mentioned debate. It has revealed that the success of China's dramatic fertility decline is not simply a result of either modernization or policy diffusion (with implied coercion) or a combination of the above two, but largely the result of people's compliance to an opportunity structure governed by a sophisticated political and administrative organization setting accumulated by party and government (McNicoll, 1980; Greenhalgh, 1988, 1989c).

This new approach first rightly seeks the linkage between the objective social reality and individual subjectivity by focusing on an opportunity structure constraint over individual rationale, which moves beyond the one-sided view of the policy determinists

on the cohesive nature of the diffusion. Secondly, the institutional approach successfully singles out a non-material, or so-called non-economic, structure but which is still a palpable force, competing with the tangible economic factors in governing fertility trends. This structure refers basically to the social and administrative organizations which are not only external to human action but also capable of constraining people's rationality as a competing force to the well accepted economic institutions.

Moving from a conventional socio-economic decision-making *variable*, namely a tangible "cost and benefit of value", to a *constant* , i.e. a palpable institutional setting, the institutional determinist's view throws light on theorizing the demographic behaviour sociologically rather than economically. It makes an important advancement in fertility decline theory and deserves great attention. However, it still needs some improvement. In seeking something "tangible" for explaining how a demographic transition can happen independently of economic development, the institutional approach tends to move to its extreme by reifying an organizational role and setting aside the importance of culture simply because of its supposedly "intangibility" and "variety" (see McNicoll and Cain, 1990; Greenhalgh, 1988, 1989a).

We have noticed that the institutional determinist, before moving to the extreme, nowhere denies the existence of limits of the institutional power. As Greenhalgh (1986) observed, China's fertility policy shifts toward a more lenient direction during 1984-1986 was the result of policy-makers' discovery that to ask the majority of couples to follow the one-child-family "was impossible in the present cultural context" (p.508). The socio-cultural reality here refers mainly to China's patrilineal society with a strong son preference which exerts a strong resistance to the official policy. As a result, policy shifts

allows an only-daughter-family to have a second birth in all rural areas (Zeng, 1989) though they might vary in other respects in different provinces. Therefore, we conclude that China's leaders actually made a concession to the peasants' strong desire for more than one child, especially in the face of their son preference. The concession, in turn, confirms our speculation about the limitation of institutional settings in controlling individual fertility behaviour.

How to explain the population policy shifts from the institutional perspective? Constrained by the logic of explaining behaviour *within* a given structural setting, which actually is developing or changing corresponding to a social dynamics as a whole, institutionalists have not been able to provide a convincing answer, especially when they shift their explanation of policy changes from the cultural reality back to the institution itself. It is the concern of how institutional settings change or interact with people or *vice versa* which turns our understanding of China's fertility transition to a broader perspective. Since culture effect is often the major target to blame for the setback of the one-child-family in rural areas, the present study is interested in what the main feature of Chinese culture is and whether or not it plays an important role, independent of economic factors, in affecting couples' fertility behaviour under the constraint of institutional settings.

To understand the definition and function of culture, we find that Blau's (1967) dialectic thought, which suggest that culture itself has its own mental momentum which drives people to justify all existing social orders and even challenge them, is what we are seeking. As Lesthaeghe and Surkyn (1989) further convince us, people's cultural values have an essential non-material need which can play a recursive and reverse causal role

in social change with a "counter-institutional content" (p.5). All these insightful propositions lead us to consider that both socio-political institutions and culture may in fact belong to a higher layer of society in comparison with the economic foundation, no matter whether they belong to the superstructure of society and which is more "tangible" and which is not. They both are involved in a dialectic process of interactions with the economic foundation of society while keeping their own accumulated momentum. Especially when culture values are rooted in a deep economic foundation like the Chinese rural family economy, people's non-material need can be reinforced and has its drive to justify the rationale of existing institutional constraints.

It is well-known that Chinese culture is most remarkably family-centred because family is the social, ideological and ritual entity and converging point for the Chinese, especially peasants, by which they have continuity in time and place between the past and after life. It is thus understandable why, up to the present, the concern of family continuity still motivated most Chinese peasant families to act as a collective entity rather than as individuals (see Weber [1920]1984; Harrell, 1985; Nee, 1985; Bongaarts and Greenhalgh, 1985; Huang, 1989; Ogden, 1989). However, the existing social investigators of cultural influence on fertility, both inside and outside of China, with few exceptions, often simply read the traditional Chinese family-centred values as evidence of "cultural lag" (or labelled as "feudal mentality"), slated for eventual demise along the alleged modernization path. We believe that this perspective can ultimately lead to emphasize either the modernization effect or population policy effect and to play down the socio-cultural factor effect in China's fertility decline process.

In contrast to the existing stereotype that the family-centred Chinese tradition is

"culture lag", we introduce Stacy (1983), who, in an insightful essay on China's socialist revolution, characterizes the nature of the Chinese socialist revolution as a peasants' revolution in which the Chinese peasants' rational consciousness for restoring their traditional moral economy actively helped Communist-induced revolution and that they defended themselves for protection and enhancement of peasant family economy. It means that actually the traditional family moral economy and patriarchal culture act hand-in-hand by playing an active role in the process of the Chinese socialist revolution, and both effects on fertility must be significantly strong and evident even under the domain of the state's political control.

This speculation has been vindicated by recent economic reforms started in rural areas since 1978. The most striking feature of the reforms is that this original small-scale adjustment in the collective sector was enthusiastically and voluntarily pushed by rural people with its great unexpected extent of decollectivization and speed of economic development over almost all of the rural China (Croll, 1987). In fact, opening a small hole of economic reform as a slight concession by the institution to the peasants immediately results in a big break of collectivisation. This signifies that the intensity toward protection of peasant family economy in the rural sectors is so strong that the rural economic reforms have gone totally beyond the constraints of institutions.

Moreover, as we have noticed before, the enhancement of such traditional family economy by peasants has led to a corresponding revival of traditional social values in the countryside, especially the son preference, which is blamed for the fertility increase. It is evident that the stringent birth control policy runs counter to such so-called side-effects of economic reform, namely the increasing demand for labour within the peasant

household (see Croll, 1987; Saith, 1987). Since we know the confrontation between the institutional settings and peasant mentality ended with a concession by the former to the latter with the population policy shifts, a study of the interaction between these two factors is theoretically important.

To carry out this objective, the present study seeks to understand what the critical feature Chinese culture has because it seems to be a spectre constantly haunting the world of Chinese couples. To tackle the puzzle we pay attention to Chinese couples' common concern of fertility, that is, the son preference. From the striking evidence of a persistent son preference across time and space and different institutional settings (Coombs and Sun, 1978; Freedman, 1987), we must seek the forces behind the son preference from the culturally specific domain rather than the gender inequality system, and reasons of economic conditions which are not unique among so many societies with son preference. After a study of Weber's ([1920]1984) classic comparative analysis of the differences in religious characteristics between Confucianism and Puritanism, and study of contemporary Chinese folk religion (Kung, 1989; Jochim, 1986; Wickeri, 1988; Ching, 1989), we find out the special feature of Chinese cultural spectre. We find that although the majority of Chinese common people are secular due to a naturalistic mentality which traditionally regards the ultimate power or principle as part of nature rather than as a Lord and Creator of nature (Jochim, 1986), they still have something more than an ethic and layman's morality as their essential and sacred need. The sacred need refers to the piety toward family continuity and parents, which indeed has connotation of both secular and religious elements.

To the author's limited knowledge, almost all previous studies of Chinese son

preference have neglected the fact that family-centred culture, especially son preference, is the mental life or spiritual anchor of the Chinese, especially the peasant. As we reason further, different from Western religious people who believe that there is one God who will take care of human life after this world, and from non-religious people who are indifferent to the life after this world, Chinese laymen who centre a sense of piety towards family continuity rather than piety towards a celestial God have to have sons to fulfil this not irreligious obligation before leaving this world. Clearly, we conclude that the son preference is a salient feature of the Chinese cultural mentality and a reflection of a constant rural family economic foundation. We believe that son preference plays a major independent role in the confrontation of institutional settings besides the "side-effect" of economic reform on Chinese women's fertility behaviour.

After the discussion of an approach to socio-culture, we turn to empirical contradictory evidence between the observed statistics which show a strong son preference and that of estimated statistics of son preference which turn out to be trivial and negligible (Arnold and Liu, 1986; Arnold, 1988; Feeney and Yu, 1986). We can fully accept Arnold's (1988) conclusion that Chinese couples' strong son preference does not make them ignore the one-child policy in terms of the prevalence of contraceptive use. It is this important finding that reveals the great extent to which Chinese one-child-family birth control had reached. It indicates how powerful the institutional effect is. However, we are puzzled by his further conclusion that "even if sex preference attitudes remain unchanged in China, its effect on fertility and family planning is likely to be quite small in the future" (p.52). And furthermore, as Arnold (1988) concludes, the authorities' efforts to "counteract the effect of sex preference on fertility and family planning [which] were

based primarily on untested assumptions about the strength of the effect of sex preference, rather than on reliable empirical evidence, ... are not likely to have a major salutary impact on fertility rates or on family planning acceptance rates" (p.52). We suspect that the latter conclusions are misleading, especially since their estimations are based on the result of the authority's efforts to reduce son preference.

The present study finds the estimates involved have some statistical artifact. For example, it is likely that the neglected actual two children preference effect or two sons preference makes the observed variation by gender composition at lower parity level small and causes the estimation (which is only based on a son preference) to become a puzzle. In addition, as hinted at by Park (1986), we find that simple probability reasoning is good enough for us to understand how much effect a son preference would produce under a two-children-family norm and one-child-family norm.

More importantly, the present study suspects that Arnold's (1988) strong conclusion of negligible son preference effect on fertility, which jumps from the finding of small son preference effect on contraceptive use, totally omits the possibility that women in childbearing age can use contraception for spacing birth in addition to stopping birth. We know that using contraception does not necessarily end fertility if the reversible method is used for spacing only. And the important empirical evidence reported by Arnold and Liu (1986) has revealed that, in spite of the formidable penalties, many recipients of one-child certificates had gone on to have a second child by the time of survey in 1981, which was just two years after the start of the one-child-family campaign. Linking this evidence with the fact that the majority of the recipients of one-child certificate were using contraception by the time of survey (see Arnold and Liu, 1986,

Table 3,5 and p.235), we suspect that most of the couples who renounced their compliance with one-child-family policy were real contraceptive use spacers. It is the question of whether the spacing pattern of contraceptive use among Chinese contraceptive users is substantial that leads the present study to conduct a series of empirical tests.

Before closing our theoretical discussion on the different approaches to Chinese fertility decline, the present study suggests that an individual behaviour approach is also necessary for studying the interaction between institutional effects and cultural effects. Why is individual behaviour in response to the institutional impact so important in understanding China's current fertility decline process? The first and most straightforward answer is the fact that the institutional settings, especially China's (one of the most allegedly "immovable and basically unchangeable" centralized planning control social systems in the world [Hollander, 1982:328]), are kept changing in response to people's reactions as shown by frequent shifts and reforms. Common sense tells us that the institutional governors themselves are watching the people's reaction very carefully all the time, so why should social investigators omit people's reaction to the institutional constraints? Why should our theoretical perception only see things (institutions) but not people? Clearly, the interaction between the people and the institutional settings is not a one-way static from the top down but a two-way dynamic; namely, not only from the top down but also the bottom up.[1]

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[1] To up date, we are happy to know that McNicoll's institutional approach also works from bottom up. In a recent article, Greenhalgh (1990) tells: "McNicoll [no date], *in practice if not in the theory*, works from the bottom up, first outlining the cognitive environment of individual demographic decisions, then sketching in local institutional and cultural configurations, and finally colouring in the large forces shaping institutional changes" (p.87). Recall what McNicoll and Cain (1990) warn that the institutional determinist's extreme is to "understate the potential sources of resistance to efforts at

The second reason for the individual approach is actually attributable to Greenhalgh's (1988) insightful *fertility-as-mobility* approach, which "is to sketch the linkage between certain macro-level sociopolitical and socio-economic institutions and micro-level fertility behaviour" (p.637). As she states, "fertility is a subset of a group of behaviour, or strategy, aimed at advancing up a goal hierarchy ranging from security to mobility" (p.630). We have found that although Greenhalgh (1988, 1989a) calls for moving beyond culture to institutional settings time and time again, the explanatory framework actually incorporates individual behaviour and cultural effects into its institutional approach. That is, beside emphasizing the control from the top down at various imposed institutions which are intermediate between the family and the economy in the countryside and everywhere in urban life, she also notices that family is a basic unit bearing the costs of enjoying the benefits of children. It is Chinese families themselves who acted in response to their own society-specific institutional settings that brought on the fertility decline so rapidly "by applying and acting on traditional (economic) or modified-traditional (political-cum-economic) cost-benefit analyses of how best to secure and advance their interests" (p.667). Thus, the alleged "long-term national interests" instilled by institutional pressure from the top down is translated, or internalized, into individual rationality. For the individual, the "wisest strategy" of fertility is "to show political compliance by adopting contraception and ... then enjoy any proffered bonuses while waiting for the policy to change" (p.661).

We have found that Greenhalgh's last proposition is especially worth developing

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institutional reform" (p.55)[italics mine], we now understand more about their insight on the institution importance.

further, though its original focus is still from top down,[2] particularly on questions of how individuals comply with the constraint of institutional settings or why a dramatic fertility decline is possible in China. Since we are not only interested in the former question of how such an "administrative man" (McNicoll, 1980) confirms the constraints of socio-political institutions from the top down but also how such an individual acts in response to an all-embracing environment which also includes economic foundations and cultural "mentality" effects from the bottom up.

Considering such a two-way dynamic, a *wait-for-change* strategy is directly developed from Greenhalgh's last proposition. This strategy is seemingly developed by the people who have been facing a dilemma between mobility and fertility, between political institutional constraints and economic and cultural needs. Individuals may comply with the socio-political institutional constraints with short term tolerance in terms of "sacrificing" the interests of the generations who were born around the 1960s and 1970s for the good of the state (Chen and Kols, 1982:J-600; Wang, 1990:17). However, they could hardly give up their unfulfilled interests because if the promise given by the institutional guards is not kept, they may rush up once the chance came: they are ready for change all the time.

According to the author's limited knowledge of the present Chinese common

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[2] It is interesting to know that up to the present, Greenhalgh (1990) still prefers the top down institutional approach -- so-called political economy which is distinguished from McNicoll's institutional approach. As she says: "A political economic demographer is more likely to work from the top down, beginning with an understanding of the historically developed global forces -- the world market, the international state system, and so on -- that shape local demographic regimes, next identifying the ways these impinge on regional, national, and local institutional environments, and finally tracing their effects on individual fertility behaviour" (p.87).

feeling, *wait-for-change* strategy may best represent the typical feature of Chinese "fertility-as-mobility" strategy. This is because at first the majority of Chinese couples were indeed "solidly behind the new national program" of national modernization since the late 1970s after years of "the immediate threats of political attack" (Whyte and Parish, 1984:327). But Chinese people were tempered in the great storms of political struggle during the cultural revolution, and they (especially the peasants who are not only the carriers of the China's socialist revolution and development but also legitimately the masters of the state) own the right to say "no" to the policy-makers for changes if the latter do not serve the people well. In this respect, researchers outside of China should understand that to carry the initial success of fertility control to the end (the year of 2000) is not as easy for the policy decision makers as what the former thought. The governors, or so-called public servants, have to watch for people's reactions all the time. Based on these considerations, we believe that a study of how Chinese couples apply the *wait-for-change* strategy to their fertility behaviour under the constraints of socio-economic and cultural and institutional environments will be fruitful.

We find that to conceptualize the *wait-for-change* strategy, we need to reconcile the debate between the "one-decision model" (or so-called "fixed target intention model" or "individual target fertility model" of conventional wisdom) with the "sequential-decision model". We notice that the conventional wisdom assumes that individual couples have in mind a complete fertility target at the initiation of childbearing and would try to achieve the goal through marriage though the timing of the achievement of this target is affected by subsequent events. This assumption is buttressed by the well-known fact that a cohort complete fertility has greater stability over time than that of period fertility (see

Hobcraft et al., 1982; Udry, 1983). By contrast, the recent popular sequential-decision model assumes that fertility decisions are made one birth at a time and based on constantly changing socio-economic circumstances. Its empirical evidence is numerous, such as the findings that the target fertility is merely "implicitly conditional" but not immutable (Westoff and Ryder, 1977; Hobcraft et al., 1982), and that the supposedly constant cohort effect directed by a fixed target intention is not constant according to the evidence of a stronger period effect on cohort complete fertility than cohort effect (Page, 1977); further, the war cohorts who had delayed childbearing did not make up their fertility as high as expected (Hobcraft et al., 1982).

The sequential-decision model seems more relevant and valid for the current Chinese situation because the period effect of the birth control policy is stronger than the cohort effect. However, the present study finds that a conditional fertility intention does not mean no target fertility intention or fertility goal. If we do not leave room to the target fertility it will be hard to assess the "great inertia" (Leibenstein, 1981) exerted by a pronounced culture effect. To reconcile this dilemma, the present study suggests that Chinese target fertility is likely to be a goal for having at least a survivor son "as soon as possible" (Greenhalgh and Bongaarts, 1986:18). But how long it will take and how many births one should produce to achieve this goal is dependent on the situation of environment and the random chance of the gender composition of children. Therefore, we expect that the sooner a couple has achieved that fixed goal, the better they comply with the birth control policy to stop fertility.

Finally, we emphasize that the dynamic model for the *wait-for-change* strategy analysis is to focus on individual behaviour rather than on individual verbal description

of his/her mental state due to the possibility of rationalizations of the norms (Ryder, 1983). In addition, since the individual is the agent of social change and individual action is the mechanism of such change (Little 1989:221), the *wait-for-change* strategy analysis model is to fit and summarize the reality sufficiently by parsimoniously synthesizing the most salient institutional and cultural effects through an individual's actual behavioral life course. The life course concern is to bring us to the discussion of empirical maternity history analysis.

Now, we turn to the bridge between theoretical reasoning and empirical data analysis, that is, the model building, and constructions of variables. In the model building step, we start from examining the main important relevant findings of existing maternity history studies, so-called birth interval analyses. The actual starting point for the present study is to tackle the puzzle of the conventional birth interval analysis revealed by Bumpass et al. (1986) and Rindfuss et al. (1987). The puzzle here refers to the incapacity of those well-known principle "proximate determinists" (such as contraceptive use, induced abortion, breastfeeding, and marriage) to explain all of the important fertility variations at an individual level originating from individual background variables to birth interval dynamics. By tying the diverse findings of birth interval dynamics together, we find that all seem to point to an importance of the time-pattern of contraceptive use for spacing. The present study develops a tentative new model by singling out the onset of contraceptive use as one "proximate variable" standing between the background variables and fertility dynamics. A new "proximate variable" called duration of contraceptive use is inserted between the onset of contraception and fertility dynamics and between the background variables and fertility dynamics as well (see Figure 3.3).

The present tentative new model sees maternity history as a dynamic process between births and contraceptive use. The dynamic process refers to transitions between births directly and transitions from birth to onset of contraception and then to a subsequent birth. Singling out the duration of contraception as a new "proximate variable" is to take the spacing behaviour of contraceptive use into account and allow the individual background variables to affect the duration of contraceptive use. In the present Chinese *wait-for-change* strategy analysis, the addition of duration of contraception means that the background variables can affect not only women's decisions of whether or not to wait by using contraception but also how long they can wait in continuing the contraceptive use.

However, we are not able to reconstruct the duration of contraceptive use variable from the data set. Given the limitations, the present study drops the attempt of testing the new model with duration of contraceptive use. To make up for this, we develop a new model which is shown in Figure 3.4. The new model singles out the beginning of contraception as an *immediate state*, or so-called *transition state*, rather than as a covariate often seen in the conventional birth interval analysis. That is to say, the birth interval is to be *decomposed* into two stages. The first stage is from a birth to the beginning of contraception after that birth. A second one is from the beginning of reversible method use to a subsequent birth.

The new model signifies that contraceptive use itself is part of birth interval dynamics, namely a *transition process* through which socio-economic and cultural background variables can have a direct effect on the path of each transition, especially on an unknown or *un-observable* waiting time of termination of any method. The reason for such a model conceptualization lies in the previous notation that among women who

arrived at the contraceptive use state by using a reversible method as a first method, they were, in fact, still exposed to the risk of pregnancy due to the unknown risk of failure rate of the method or unknown intentional termination of use. The point is that no matter what the case may be, the *decomposed* birth interval dynamic since the use of a reversible method is seemingly affected by the socio-economic and cultural background variables again.

In addition to the two stage conceptualization, which is seen as the path of "controlled" marital fertility process, the new model also includes its competing path of "natural" marital fertility process which refers to birth interval analysis for non-contraceptive users only. In studying this "natural" fertility process, we are mainly interested in a question of whether there is any significant "natural" fertility differentials by certain socio-economic and cultural factors. In other words, does any background variable affect the speed of birth among those Chinese women who did not comply with the birth control policy? In fact, the two paths are complementary, each providing an important component path that modern Chinese women might have experienced. In the "natural" fertility path of the new model, we tentatively put breastfeeding as a transition state because we suspect that the weaning time (or duration of breastfeeding) may again affect the timing of subsequent birth. Since this variable is available from the data set, we actually can simply use it as a covariate.

We have also discussed that the present new model building is consistent with our theoretical concern of the *wait-for-change* strategy analysis because contraceptive use behaviour itself can reveal how Chinese couples comply with the birth control policy: not only can it reveal who would comply but also how long they would comply and who

would wait longer or shorter periods. Since the contraceptive use is compulsively enforced over individuals for stopping fertility by China's institutional "guards", rather than as a substitute for abstinence or amenorrhoea, the "manner" of contraceptive use behaviour (including induced abortion for purposes of family planning) (Saith, 1987:243) is to reveal Chinese couples' compliance behaviour.

After summarizing our basic rationale of the model building, we skip the hypotheses part because they are straightforward and need no repetition. What we want to emphasize is the data selection and variable construction. We have found Shaanxi and Guangdong provincial samples are especially interesting because they presented two relatively different geographic, socio-economic, and fertility trends under the constraints of the same central planning leadership. Before the data analysis at an individual level, the existing aggregate information shows that before the 1970s, Guangdong had lower fertility rates than Shaanxi and the national average, while Shaanxi fertility was higher than Guangdong and the countrywide average. This evidence seems to buttress the modernization approach because the provincial fertility trend is positively related to a provincial economic development level. However, this approach is obviously not working in explaining the opposite fertility trends since the 1970s. Although the institutional approach may explain well the dramatic fertility decline in Shaanxi, it has difficulty in reconciling the reluctant decline of Guangdong fertility (which actually had started the fertility decline and was on the right track well before the 1970s) under the similar constraints of the social and political institutional settings. Therefore, a comparative study between these two provinces will be especially interesting for our understanding not only the socio-political institutional effect (period effect) but also socio-economic and

especially cultural effects.

In this study the rationale to choose marriage cohorts rather than age cohorts is also discussed. One major principle of our subsample selection is to save as large a sample size as possible and as conservative as possible if some selection criteria are not definite. To do so is to make the selectivity as small as possible. For the sake of baseline reference, the present study presents the original sample distribution information so that any one can easily obtain the original "raw" material before any statistical "refinement".

The heart of the empirical work lies in variable reconstruction. Here we mainly refer to the variables of the contraceptive use between each birth interval, including induced abortion for purposes of family planning. Thanks to China's excellent In-depth Fertility Survey two phases data set, the present author is able to reconstruct the desired variables on the first attempt from the available information on contraceptive use between each pregnancy interval. The rationale of such reconstruction is presented in this study in detail and needs no repetition.

Now, we have crossed the bridge from the theory through the model building to our empirical data analysis. Since the marriage cohort selections are carefully matched with the two major national birth control campaign periods, and the timing of contraceptive use after birth (for parity one and two only in this study) is well reconstructed, the present study is able to generate some novel findings. First, by integrating the results of the component paths, the present study has solved the puzzle of conventional birth interval analysis. Its answer is found mainly in a commonly neglected spacing pattern of contraceptive use in birth interval dynamics. It reveals that in the modern society, fertility behaviour analysis has to take the spacing pattern of

contraceptive use into consideration.

In addition, this study has made a first attempt at characterizing patterns of *wait-for-change* strategy fertility behaviour among Chinese couples who were exposed to the risk of having out-of-quota births during the *wan xi shao* and one-child-family national birth control campaigns, respectively. The first remarkable common feature of Chinese couples' fertility behaviour is that people were largely willing to comply with the birth control policy by using contraception when the constraints of the political institutional settings were stringent. Despite different individual backgrounds, Chinese couples' compliance behaviour was quite homogeneous across the personal modernization level, previous personal history of compliance with marriage policy, and gender composition of children in the same region or residence. However, when the policy was relaxed the background variable effects on the compliance differentials were significant again, such as Guangdong recent marriage women whose contraceptive use timing after first birth is significantly affected by all socio-economic and cultural effects. These findings clearly show that the impact of political institutional settings from the top down is indeed powerful.

Secondly, as we move on to the fertility behaviour since starting contraceptive use, we find that the situation changed. Generally, the socio-economic factors, son preference, and age at marriage significantly affect Chinese women's waiting time for change, namely parity change. This is especially true for residence and gender composition effects. A strong spacing pattern of contraceptive use by individual background variables is observed and a substantially high probability of renouncing the previous compliance with birth control policy is found across all cohorts. These findings for first time reveal that socio-

economic and cultural effects from the bottom up on Chinese fertility behaviour were indeed profound and enduring. It seems that these factors did not gain the initiative by striking first in the face of political institutional impact. However, a profound silence at the beginning did not mean the background effects were weak. Ordinary Chinese people, especially peasants, were under all-embracing constraints of institutional settings and cultural tradition, rather than just political institutional control. If the promise given from the top was not attractive any more, The people's commitment to the new values would be "cooling" (Whyte and Parish, 1984:329). As a result, there would be more and more couples giving up their compliance with the birth control policy. For them, the conservative alternative was to turn back to the traditional trajectory. This is what was happening in the rural economic reforms. Peasants were simply reaching backward toward their traditional moral economy (similar to what Stacy [1983] said for China's socialist revolution), and traditional cultural norms (Saith, 1984; Croll, 1984).

Here, it seems that our theoretical model works in catching the effects from the top down and the bottom up. The two-way interactive dynamic is buttressed by the results from our two stage analysis results. What we have contributed to the understanding of China's fertility decline here is not the former conception (that is, from the top down), which has been largely addressed by the policy approach and institutional approach, but the latter conception (from the bottom up), which was attempted by the modernization approach from a different perspective. Since the modernization approach looked at socio-economic or cultural effects from a static dichotomous perspective (namely, it viewed individual background as either modern or non-modern), this approach is not able to explain the ordinary people's *wait-for-change* strategy behaviour. It is only through a

dynamic approach that one can discern the tortuous road Chinese women had experienced and then reveal such significant effects.

What is the lesson for the Chinese policy-makers here? It is simple but not easy: The majority of the people, especially the peasants, only believe in facts, not beautiful empty words. The more sacrifice the policy-makers asked people to make, and the more beautiful empty promises given out to the people, the sooner the people tried to make up for the change. As Manegold et al. (1990) reported, in present China: "'People say if the light is green, drive as fast as you can .... If it is red, go around it'. That could serve as a motto for how to deal with today's leadership" (p.38). Is this true or not? It is at least consistent with our empirical findings.

What else can the policy-makers learn? Since there is a two-way interactive dynamic "social regularity" (if there is any social regularity), the policy decision makers should not only *watch* people all the time, but also *listen* to them, if these decision makers are to be the real public servants, instead of lords. To let the dream of modernization come true, the Chinese nation needs something more than the Four Modernization -- agriculture, industry, science and technology, and national defense. To keep the people compliant with the state's birth control policy, the state should be able to warm up "the cooling of commitment to socialist values". Otherwise, traditional culture may win back the heart of the people, not only in rural areas but also in the cities sooner or later.

Considering the cultural values, we must introduce Whyte and Parish's (1984) insightful discussion on contemporary Chinese urban life, which is often regarded as the leading feature of future of China. As they find,

> there are complaints about their [refer to the young Chinese] lack of initiative both in China and abroad. ... We suspect that one of the problems may be the destruction of the old beliefs about ancestors and obligation to the family line. Those beliefs still remain strong in much of the rest of East Asia which has become famed for its dedicated workers and rapid economic progress. If this source of motivation has been destroyed in China and nothing has been found to replace it -- or if the dedication to the nation that was present before the Cultural Revolution has been permanently lost among the young -- China may be forever impaired in its effort to modernize in a hurry, and it may long lag behind such rapidly growing Chinese settings as Singapore, Hong Kong, and Taiwan. (p.328-9)

Now, there seems to be two scenarios facing the Chinese policy makers: if they continuously proclaim the Western nuclear family norm to the younger generations, then ultimately the forbidden Western individualism will flood in; if they revert to the family-centred cultural tradition, as the rural economic reform has, the son preference will cause the total fertility rate to rise to three. The questions are: why is one-child per family norm conceived as the best? What is the real optimum population size and a reasonable speed of fertility for the people? To make such a decision for one billion people is not an easy job, it should not be taken in a hurry, and it must also be discussed by and with the people.

References

Adler, F. (1956): The Value Concept in Sociology, *American Journal of Sociology,* 62:272.

Ahern, Emily (1973): *The Cult of the Dead in a Chinese Village.* Stanford: Stanford University Press.

Aird, John S. (1981): Fertility Decline in China, in Eberstadt, Nick (ed.), *Fertility Decline in The Less Developed Countries,* New York:Praeger Publishers.

Akin, John S., Richard E. Bilsborrow, David K. Guilkey and barry M. Popkin (1986): Breastfeeding patterns and determinants in the Near East: An analysis for four countries. *Population Studies* 40:247-262.

Allison, Paul D. (1984): *Event History Analysis,* Sage Publication: Beverly Hills. p.5

Amin, Ruhul and A.G. Marian (1987): Son preference in Bangladesh:an emerging barrier to fertility regulation. *Journal of Biosocial Science* (19):229-243.

Anderton, Douglas L. (1989): Comment on Knodel's "Starting, Stopping, and Spacing During the Early Stages of Fertility Transition". *Demography* 26 (3).

Arnold, Fred, and Liu, Zhaoxiang (1985): Sex Preference for Children in China, paper presented at the Annual Meeting of the Association for Asian Studies, Chicago, March 21-23.

Arnold, Fred, and Liu, Zhaoxiang (1986): Sex preference, fertility, and family planning in China. *Population and Development Review.* 12 (2):221-246.

Arnold, Fred (1985): Measuring the effect of sex preference on fertility: The case of Korea. *Demography,* Vol.22, no.2.

Arnold, Fred (1986): The Effect of Sex Preference on Fertility and Family Planning:

Empirical Evidence, paper presented at PAA meeting, San Francisco, April 3-5, Pp.11-12.

Arnold, Fred (1988): The effect of sex preference on fertility and family planning: empirical evidence. *Population Bulletin of United Nations.* Nos.23/24-1987. New York: United Nations.

Balakrishnan, T.R., K.V. Rao, E. Lapierre-Adamcyk and K. Krotki (1987): A hazard model analysis of the covariates of marriage dissolution in Canada. *Demography* 24 (3):395-406.

Balakrishnan, T.R., K.V. Rao, K. Krotki and E. Lapierre-Adamcyk (1988): Age at first birth and life time fertility. *Journal of Biosocial Sciences* 20:167-174.

Banister, J., *China's Changing Population*, Stanford: Stanford University Press,1987.

Beaujot, Roderie (1980): Book review. *Canadian Studies in Population.* Vol.7.

Ben-Porath, Y. and F. Wielch (1976): Do sex preferences really matter? *Quaterly Journal of Economics* 90:285-307.

Benedetti, Jacqueline, Karen Yuen and Larry Young (1990): Life Tables and Survivor Functions. In Dixon, W.J., M.B. Brown, L. Engelman and R.I. Jennrich (eds.) *BMDP Statistical Software Manual: Volume 2*. Berkeley: University of California Press.

Beijing Review (1983): "New Achievements in rural economy", September 5.

Beijing Review (1985): "Success crowns population policy", 28 (4):18-19.

Birdsall, N., and D. T. Jamison (1983): Income and Other Factors Influencing Fertility in China, *Population and Development Review* 9 (4):651-675.

Birg, H., E.-J. Flothmann, and I. Reiter (1989): Biographic Analysis of the Demographic Characteristics of the Life Histories of Men And Women in Regional Labour-Market-Cohorts as Clusters of Birth Cohorts. Paper presented at the Symposium "life Histories

and Generations" at the Netherlands Institute for Advanced Studies in the Humanities and Social Sciences (NIAS), Wassenaar.

Blau, P.M. 1967. *Exchange and Power in Social Life. 2d ed.* New York: John Wiley and Sons.

Blechen, Marc (1988): The reorganization of the countryside. in Benewick, Robert and Paul Wingrove (eds.) *Reforming the Revolution: China in Transition.* China: Macmillan Education Ltd.

Blossfeld, Hans-Peter, Alfred Hamerle and Karl Ulrich Mayer (1989): *Event History Analysis: Statistical Theory and Application in the Social Sciences.* Hillsdale:Lawrence Erlbaum Associates, Inc.

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

Bongaarts, John (1982): The fertility-inhibiting effects of the intermediate fertility variables. *Studies in Family Planning* 13(6-7):178-189.

Bongaarts, John and R.G. Potter (1983): *Fertility, Biology, and Behaviour.* New York: Academic Press.

Bongaarts, John and S. Greenhalgh (1985): An Alternative to the One-Child Policy in China, *Population and Development Review* 11 (4):585-613.

Bumpass, Larry L., Ronald R. Rindfuss, and Richard B. Janosik (1978): Age and marital status at first birth and the pace of subsequent fertility. *Demography* 15, no 1.

Bumpass, Larry L., Ronald R. Rinfuss, and James A. Palmore (1986): Determinants of Korean Birth Intervals: The Confrontation of Theory and Data. *Population Studies* 40:403-423.

Burch, T.K. 1988. Babel Revisited: The Role of Ideas in Explanations of Human

Behaviour. Discussion Paper no. 87-1. Population Studies Centre, U.W.O.

Cain, Mead (1983): Women's status and fertility in developing countries: Son preference and economic security. Working paper:110. New York: The Population Council.

Caho, Paul (1983): *Chinese Kinship*. London: Kegan Paul International.

Carlsson, G. (1966): The Decline of Demographic Action, *Population Studies*, 20:149-174.

Carroll, Theodora Foster (1983): *Women, Religion, and Development in The Third World* New York: Praeger Publishers

Chai, Ch'u, and Winberg Chai (1962): *The Changing Society of China*. New York: New American Liberary.

Chan, Anita, Richard Madsen, and Jonathan Unger (1984): *Chen Village: The Recent History of a Peasant Community in Mao's China*, Berkeley: U. of California Press.

Chao, Paul (1983): *Chinese Kinship*. London: Kegan Paul International.

Chen, Jiajian (1986): M.A. thesis: *Fertility Transition in Mexico and Peru: A Test and Application of Easterlin's Model*. U.W.O.

Chen, Jiajian, and T.R. Balakrishnan (1990): Do gender preferences affect fertility and family dissolution in Canada? Paper presented at Canadian Population Society, Victoria, Canada.

Chen, Pi-chao and Adrienne Kols (1982): Population and Birth Planning in the People's Republic of China, *Population Reports*, Series J. No. 25: J577-618.

Chen, S. (1982): Fertility of Women during the 42 Year Period from 1940 to 1981, Pp. 32-58, in China Population Information Centre, *Analysis on China's National One-Per-Thousand Population Sampling Survey*. Beijing: China Population Information Centre.

Cheng Du (1981): China's population policy, some problems and the prospects for their solution, *Wuhan University Journal*, social science edition, no.3, (28 May):4.

Ching, Julia (1989): The Religion of Antiquity: Chinese Perspectives. In Hans Kung, and Julia Ching *Christianity and Chinese Religions*. New York: Doubleday.

Cho, Lee-Jay, and Kazumasa Kobayashi (eds.) (1979): *Fertility Transition of the East Asian Population*. Honolulu: University Press of Hawaii.

Cleland, John, Jane Verraland Martin Vaessen (1983): Preferences for the sex of children and their influence on reproductive behaviour. *WFS Comparative Studies*. N0.27.

Cleland, John (1985): Marital Fertility Decline in Developing Countries: Theories and The Evidence. In Cleland, John and John Hobcraft (ed.) *Reproductive Change in Developing Countries: Insights from the World Fertility Survey. Oxford: Oxford University Press.*

Cleland, John and John Hobcraft (ed.) (1985): *Reproductive Change in Developing Countries: Insights from the World Fertility Survey. Oxford: Oxford University Press.*

Coale, Ansley J. (1975): The Demographic Transition. *Population Debate: Dimensions and Perspectives* 1:347-355. New York: United Nations.

Coale, Ansley J. (1983): *Population Trends in China and India (A Review)*. Processing of the National Academy of Sciences, USA 80: 1757-1763.

Coale, Ansley J. (1984): *Rapid Population Change in China, 1952-1982*. National Academy Press: Washington, D.C.

Coale, Ansley J. and Watkins, S.C. (eds) (1986): *The Decline of Fertility in Europe*. Princeton: Princeton University Press.

Coale, Ansley J., Shaomin Li, and Jing-Qing Han (1988): The Distribution of Intervals in Rural China, 1940s to 1970s. Papers of the East-West Population Institute, No. 109. Honolulu: East-West Population Institute.

Coale, Ansley J. and Shengli Chen (1989): Basic Data on Fertility in the Provinces of China, 1940-82. Papers of the East-West Population Institute, No. 104. Honolulu: East-West Centre.

Coombs, Lolagene C. (1977): preferences for sex of children among U.S. couples. *Family Planning Perspectives* 9 (6):259-265.

Coombs, Lolagene C., and Te-hsiung Sun (1978): Family Composition Preferences in a Developing Culture: The Case of Taiwan, 1973. *Population Studies*, Vol.32, no.1.

Cox, D.R. (1972): Regression models and life tables. *Journal of the Royal Statistical Society*. Series B (34):187-202.

Cox, D.R. and D. Oakes (1984): *Analysis of Survival Data* London:Chapman and Hall.

Croll, Elizabeth (1984): *Chinese Women Since Mao,* N.Y.: M. E. Sharpe.

Croll, Elizabeth (1985): Introduction: Fertility Norms and Family Size in China, in Croll, E. *el al.*(eds), *China's One-Child Family Policy*, The Macmillan Press Ltd, Hong kong: 1-36.

Croll, Elizabeth (1987): Some Implications of the Rural Economic Reforms for the Chinese Peasant Household, in Saith, Ashwani (ed), *The Re-emergence of the Chinese Peasantry*. p.106.

Das, Narayan (1987): Sex preference and fertility behaviour: A study of recent Indian data. *Demography*, Vol.24, no.4.

David, Paul A., T.A. Mroz, W.C. Sanderson, K.W. Wachter and D.R. Weir (1988): Cohort parity analysis: statistical estimates of the extent of fertility control. *Demography* 25(2):163-188.

Davin, Delia (1985): The Single-Child Family in The Countryside, in Croll, E. *et al.*,(eds) *op. cit,* Pp.37-82

Davis, Kingsley and Judith Blake (1956): Social structure and fertility. *Economic Development and Cultural Change* 4 (April):211-235.

Department of Population statistics of State Statistical Bureau (1986): *China In-Depth Fertility Survey (phase I): Principal Report Vol 1:129-137.* Beijing: State Statistics Bureau.

Department of Population statistics of State Statistical Bureau (1989): ZhongGuo Di-e-qi Sheng Ru de Sheng Yu Li Diao Cha Guo Jia Bao Gao (China In-Depth Fertility Survey National Report (Phase II): Volume 1.

Department of Population statistics of State Statistical Bureau (1989): *China Population Statistics Yearbook.* Beijing: Kexucjisuwenxian.

Easterlin, R. A. (1975): An Economic Framework for Fertility Analysis. *Studies in Family Planning 6 (3), Pp.54-63.*

Easterlin, R. A. (1978a): The Economic and Sociology of Fertility: A Synthesis. in Tilly, C. (ed) *Historical Studies of Changing Fertility.* Princeton: Princeton University Press.

Easterlin, R. A. (1978b): New Directions for the Economics of Fertility, in J. Milton Yinger and Stephen J. Cutler (eds.) *Major Social Issues: A Multidisciplinary View.* New York: The Free Press. p.315.

Easterlin, R. A. (1981): Analysis of WFS Data in A Socio-economic "Synthesis" Framework. in International Population Conference. Manila, (5), Pp.423-443. Liege, Belgium:IUSSP.

Easterlin, R. A. (1982): An Exploratory Study of the "Synthesis Framework" of Fertility Determination with World Fertility Survey Data. *Scientific Reports* 40 (November). Voorburg, Netherlands: International Statistical Institute.

Easterlin, R. A. (1983): Modernization and Fertility, in Bulatao, *et al.* (eds), *Determinants of Fertility in Developing Countries* Vol. 2, Academic Press, London, Pp.562-86.

Eliot, J.W. (1968): Urban-rural and Berber-Arab differentials in desired numbers of male children and related factors in Algeria. Paper presented at the Population Association of America Meeting. Boston, MA.

Fairbank, John K., Edwin O. Reischauer and albert M. Craig (1973): *East Asia Tradition and Transformation.* Boston: Houghton Mifflin Company.

Fawcett, James T., and Siew-Ean Khoo. (1980): Singapore: Rapid fertility transition in a compact society. *Population and Development Review* 6, No. 4: 549-579.

Feeney, Griffith, and Jingyuan Yu (1987): The Effect of Son Preference on Fertility in China, paper presented at PAA meeting, San Francisco, April 3-5.

Feeney, Griffith, and Jingyuan Yu (1986): Period parity progression measures of fertility in China. *Population Studies* 41:77-102.

Feeney, Griffith, Feng Wang, Mingkun Zhou, and Baoyo Xiao (1989): Recent fertility Dynamic in China: Results from 1987 one percent population survey. *Population and Development Review*, Vol.15, no. 2.

Fei, Hsiao_tung (1938): *Peasant Life in China,* London.

Freedman, Ronald, Siew-Ean Khoo and B. Supraptilah (1981): Use of modern contraceptives in Indonesia: a challenge to conventional wisdom. *International Family Planning Perspectives.* 7 (1):3-15.

Freedman, Ronald and J. Casterline (1982): Nuptiality and Fertility in Taiwan. In L.T. Ruzicka (ed.) *Nuptiality and Fertility.* Ordina Editions for IUSSP, Liege.

Freedman, Ronald (1987): The contribution of social science research to population policy and family planning program effectiveness. *Studies in Family Planning*, vol.18 no.2.

Freedman, Ronald and Shenyang Guo (1988): Response of a Traditional Fishing Community To China's Family Program: A Case Study, *International Family Planning*

Perspective, 14 (4):131-136.

Ghose, Ajit Kumar (1987): The People's Commune, Responsibility System and Rural Development in China, 1965-1984, in Saith, Ashwani (ed), *The Reemergence of the Chinese Peasantry*. p.66.

Gilks, Walter R. (1986) The Relationship between Birth History and Current Fertility in Developing Countries. *Population Studies* 40:437-455.

Greenhalgh, Susan (1985): Sexual Stratification: The Other Side of "Growth with Equity" in East Asia. *Population and Development Review*. Vol.11, no.2.

Greenhalgh, Susan (1986): Shifts in China's Population Policy, 1984-86: Views from the Central, Provincial, and Local Levels, *Population and Development Review* 12 (3): 491-515.

Greenhalgh, Susan and John Bongaarts (1986): Fertility policy in China:future options. Working paper, 127, New york: Population Council.

Greenhalgh, Susan (1988): Fertility As Mobility: Sinic Transitions, *Population and Development Review*, 14(3):667.

Greenhalgh, Susan (1989a): New Directions in Fertility Research: Anthropological Perspectives, International Population Conference, New Delhi, p.445.

Greenhalgh, Susan (1989b): *The Evolution of the One-Child Policy in Shaanxi Province, 1979-88*. Working Papers. The population Council, No.5.

Greenhalgh, Susan (1989c): Fertility Trends in China: Approaching the 1990s. The Population Council, New York, Working Paper No. 8.

Greenhalgh, Susan (1990): Toward a political economy of fertility: anthropological contributions. *Population and Development Review* 16(1):85-106.

Guilkey, David, Ronald R. Rindfuss, Barry M. Pokin, John S. Akin and Vicente Paqueo (1988): Child Spacing in The Philippines: The Effect of Current Characteristics and Rural Development. *Population Studies* 42:259-273.

Hajnal, John (1982): Two kinds of preindustrial household formation system. *Population and Development Review* 16(1):85-106.

Handwerker, W.P. 1986. Culture and Reproduction: Exploring Micro/Macro Linkages. In Handwerker, W.Penn. (ed) *Culture and Reproduction: An Anthropological Critique of Demographic Transition Theory*. Boulder:Westview Press.

Harrell, Stevan (1985): Why the Chinese Work So Hard. In *Modern China*. Vol. 11, No.2.

Hartmann, Heidi (1976): Capitalism, patriarchy, and job segregation by sex, in Martha Blaxall and Barbara Reagan (eds.) *Women and Workplace: The Implications of Occupational Segregation*. Chicago: University of Chicago Press.

Heckman, James J. V. Joseph Hotz, and James Walker (1985): New Evidence on the Timing and Spacing of Births. *American Economic Review* 2: 179-184.

Henry, Louis (1961): Some Data on Natural Fertility. *Eugenics Quarterly* 8(2):81-91.

Henry, Louis (1976): *Population Analysis and Models*. Great Britain: Edward Arnold Ltd.

Hermalin, Albert I. and Xian Liu (1990): Gauging the Validity of Responses to Questions on Family Size Preferences in China. *Population and Development Review* 16(2):337-354.

Hobcraft, John, Jame Menken, and Samuel Preston (1982): Age, period, and cohort effects in demography: A review. *Population Index* 48:4-43.

Hobcraft, John and J.B. Casterline (1983): Speed of Reproduction. *WFS Comparative Studies*. no.25.

Hobcraft, John and J. McDonald (1984): Birth Intervals. *WFS Comparative* Studies no.28.

Hobcraft, John (1985): Family building patterns. in J. Cleland and J. Hobcraft (eds.)

Reproductive Change in Developing Countries. London: Oxford University Press.

Hollander, Paul (1982): Research on Marxist Societies. *Annual Review of Sociology* 8:319-351.

Hongqi (Red Flag) (1984): "Rural economic reforms", November, 23.

Hsu, Immanuel C.Y. (1990): *The Rise of Modern China*. New York: Oxford University Press.

Huang, Shu-min (1989): *The Sporal Road: Change in a Chinese Village Through the Eyes of a Communist Party Leader*. Boulder: Westview Press.

Jochim, Christian (1986): *Chinese Religions: A Cultural Perspective*. New Jersey: Prentice-Hall, Inc, Englewood.

John, A. Meredith, Jane A. Menken, and James Trussell (1988): Estimating the Distribution of Interval Length: Current Status and Retrospective History Data. *Population Studies*, 42: 115-127.

Jowett, A.J. (1986): China: Population Change and Population Control, in *GeoJournal*,12.4:361.

Kalbfleisch, John D. and Ross L. Prentice (1980): *The Statistical Analysis of Failure Time Data*. New York: John Willey & Sons, Inc.

Kaufman, Joan, Zhirong Zhang, Xinjian Qiao, and Yang Zhang (1989): Family Planning Policy and Practice in China: A Study of Four Rural Counties. *Population And Development Review* (New York)15(4):707-729.

Kendall, U.G. (1979): The World Fertility Survey: Current Status and Findings. *Population Reports*, Series M. N0.3.

Kent, M.M and A. Larson (1982): Family size preferences: Evidence from the World

Fertility Survey. Reports on the World Fertility Survey. N0.4. Population Reference Bureau. Washington D.C.

Karki, Yagya (1988): Sex Preference and the Value of Sons and Daughters in Nepal. *Studies in Family Planning*, Vol.19, no.3.

Knodel, John and V. Prachuabnoh (1975): Preferences for sex of children in Thailand: a comparison of husbands' and wives' attitudes. *Studies in Family Planning*. 7 (5):137-143.

Knodel, John (1977): Family limitation and the fertility transition: Evidence from the age patterns of fertility in Europe and Asia. *Population Studies* 31(2):219-249.

Knodel, John and van de Walle, Etienne (1979): Lessons from the past: Policy implications of historical fertility studies. *Population and Development Review*, 5, no.2:217-245.

Knodel, John and Napaporn Chayovan (1990): Contraceptive Initiation Patterns in Thailand. *Population Studies* 44:257-271.

Krishnan, V. (1987): Preferences for sex of children: a multivariate analysis. *Journal of Biosocial Sciences* 19:367-376.

Kung, Hans (1989): A Christian Response. In Hans Kung, and Julia Ching *Christianity and Chinese Religions*. New York: Doubleday.

Lang, O. (1946): *Chinese Family and Society*. Archon Books.

Laukaran, Virginia H. and Beverly Winikoff (1985): Contraceptive use, amenorrhea, and breastfeeding in postpartum women. *Studies in Family Planning* 16(6):293-301.

Lavely, W. R. (1984): "The Rural Chinese Fertility Transition: A Report from Shifang Xian, Sichuan", *Population Studies* 38:365-384.

Lawless, J.F. (1982): *Statistical Models and Methods for Lifetime Data*. New York: John

Willey and sons.

Leibenstein, Harvey (1981): Economic Decision Theory and Human Fertility Behaviour: A Speculative Essay. *Population and Development Review* 7(3):381-400.

Lee, R. D. and Bulatao, R. A. (1983): "The Demand for Children: A Critical Essay", in Bulatao, R. A. and Lee, R.D. *The Determinants of Fertility in Developing Countries*, v1:270.

Lee, Ronald (1980): Aiming at a Moving Target: Period Fertility and Changing Reproductive Goals. *Population Studies* (London) 34(2):205-226.

Lesthaeghe, Ron (1980): "On the social control of human reproduction". *Population and Development Review*, Vol.6(4):527-548.

Lesthaeghe, Ron and H.J. Page (1980): The postpartum non-susceptible period: Development and application of model schedules. *Population Studies* 34:(1).

Lesthaeghe, Ron, P.O. Ohadike, J. Kocher and H.J. Page (1981): Child-spacing and fertility in sub-Saharan Africa: An overview of issues. in Page H.J. and R.Lesthaeghe (eds.) *Child-spacing in Tropical Africa: Traditions and Change*. London: Academic Press.

Lesthaeghe, Ron and Johan Surkyn. 1989. Cultural Dynamics and Economic Theories of Fertility Change. *Population and Development Review.*

Levy, Marion J., Jr. (1952): *The Structure of Societies*. Princeton University Press.

Li, Shaomin (1989): China's population policy: A model of a constant stream of births. *Population Research and Policy Review.*

Lightbourne, R.E. (1985): Individual preferences and fertility behaviour, in J. Cleland and J. Hobcraft (eds.) *Reproductive Change in Developing Countries*. London: Oxford University Press.

Little, Daniel (1989): *Understanding Peasant China: Case Studies in the Philosophy of Social Science*. New Haven: Yale University Press.

Lorimer, Frank (1954): *Culture and Fertility*. France: Unesco.

Manegold, C.S., Dorrinda Elliott and Frank Gilney Jr. (1990): A bleak legacy of Suppression -- A year later: One leadership, two Chinas. *Newsweek*. May, 28th, N.Y.

McDonald, P.F., L.T. Ruzicka and J.C. Caldwell (1981): Interrelations between Nuptiality and fertility:Evidence from the World Fertility Survey. *World Fertility Survey Conference 1980: Reviewed of Proceedings* 2:77-137. Voorburg, Netherlands: International Statistical Institute.

Marini, Margaret Mooney, and Peter J. Hodsdon (1981): Effects of the timing of marriage and first birth of the spacing of subsequent births. *Demography* 18, no.4.

Mauldin, W. P. (1982): The determinants of fertility decline in developing countries: An overview of the available empirical evidence", *International Family Planning Perspectives* 8 (3):119-121.

May, David A. and David M. Heer (1968): Son Survivorship Motivation and Family Size in India: A Computer Simulation. *Population Studies* 22, no.21.

McClelland, Gary, H. (1983): Family-size derives as measures of demand. In Bulatao, R. A. and Lee, R.D. (eds) *The Determinants of Fertility in Developing Countries*, v1:294.

McDonald, Peter (1984): Nuptiality and Completed Fertility: A Study of Starting, Stopping and Spacing Behaviour. *WFS Comparative Studies* no.35.

McNicoll, Geoffrey (1978): Population and Development: Outlines for a Structuralist Approach. In Hawthorn, Geoffrey (ed.) *Population and Development*. Guildford: Billing & Sons Ltd.

McNicoll, Geoffrey (1980): Institutional Determinants of Fertility Change, *Population and Development Review* 6(3):450.

McNicoll, Geoffrey (1989): Concepts and Frameworks Needed for A Better Understanding of Socio-demographic Processes. *International Population Conference*, New Delhi, vol.3.

McNicoll, Geoffrey and Mead Cain (1990): Institutional Effects on Rural Economic and Demographic Change. Research Division, The Population Council, New York, Working Paper No. 14.

Mode, C. J. (1985): *Stochastic Processes in Demography and Their Computer Implementation.* Springer-Verlag: N.Y. p.112.

Montgomery, Mark R. (1987): A new look at the Easterlin "synthesis" framework. *Demography* 24(4):481-496.

Moreno-Navarro, Lorenzo (1987): Fertility change in five Latin American countries: A covariance analysis of birth intervals. *Demography* 24.

Namboodiri, N. K. (1972): "Some Observations on the Economic Framework for Fertility Analysis. *Population Studies,* 26:185-206.

Namboodiri, N. K. (1980): "A look at fertility model-building from different perspectives. In T.K. Burch (ed) *Demographic Behaviour*, Westview Press, Pp. 83-89.

Namboodiri, N. K. (1983): "Sequential Fertility Decision Making and Life Course", in Bulatao, R. A. and Lee, R.D. *The Determinants of Fertility in Developing Countries*, v1:444.

Namboodiri, N. K. and C.M. Suchindran (1987): *Life Table Techniques and Their Applications. London: Academic Press. Inc.*

Nee, Victor (1985): Peasant Household Individualism. In William Parish (ed.) *Chinese*

Rural Development: The Great Transformation. Armonk, N.Y.: M.E. Sharpe.

Ogden, Suzanne (1989): *China's Unresolved Issues: Politics, Development, and Culture.* New Jersey:Prentice-Hall.

Page, J. Hilary (1977): Patterns underlying fertility schedules: a decomposition by both age and marriage duration. *Population Studies* 31(1):85-106.

Page, J. Hilary and Ron Lesthaeghe (eds.) (1981): *Child Spacing in Tropical Africa: Traditions and Change.* London: Academic Press.

Palloni, Alberto (1984): Assessing the effects of intermediate variables on birth interval-specific measures of fertility. *Population Index* (Princeton) 50(4):623-657.

Palmore, J.A., R.E. Klein, and Ariffin bin Marzuki (1970): Class and family in a modernizing society. *American Journal of Sociology* 76:375-398.

Parish, William L. and Martin K. Whyte (1978): *Village and Fertility in Contemporary China,* Chicago: University of Chicago Press.

Park, Ahai Bin (1986): How Many Birth Are Attributable to Preference for Sex of Children? A Simulation Analysis. Paper presented at the annual meeting of the population Association of America, April 3-5. San Francisco, California.

Pebley, A. and C. Westoff (1982): Women's sex preference in the United States:1970-1975. *Demography* 19:177-190.

Plmore, J.A., R.E. Klein, and Ariffin bin Marzuki (1970): Class and family structure in a modernizing society, *American Journal of Sociology*, 76:375-398.

Peng, Xizhe (1988): Demographic consequences of the Great Leap Forward in China's provinces. *Population and Development Review.*

Pittenger, D.B. (1973): An exponential model of female sterility. *Demography* 10:113-

121.

Poston, D. L. Jr, and B. Gu (1987): "Socioeconomic Development, Family Planning, and Fertility in China", *Demography* 24 (4):531-551.

Rajulton, Fernando, T.R. Balakrishanan and Jiajian Chen (1990): Changes in Timing of fertility -- a Canadian experience. *Journal of Biosocial Science* 22:33-42.

Renmin Ribao (1983): Results of 1983 survey, August 1.

Rindfuss, Ronald R. and L.L. Bumpass (1978): Age and sociology of fertility: how old is too old? In K.E. Taeuber, L.L. Bumpass, and J.A. Sweet (eds.) *Social Demography*, New York/London: Academic Press.

Rindfuss, Ronald R. and S.Philip Morgan. (1983): Marriage, sex, and the first birth interval: The quite revolution in Asia, *Population and Development Review* 9, no. 2: 259-278.

Rindfuss, Ronald R., Larry L. Bumpass, James A. Palmore, Mercedes B. Concepcion, Datin N.L.B.D. Bakar, Sirisena Gamage, Chanpen Saengtienchai, and Nam Il Kim (1984): Childspacing in Asia: Similarities and Differences. *WFS Comparative Studies* no.29.

Rindfuss, Ronald R. and Charles Hirschman (1984): The timing of family formation: Structural and societal factors in the Asia context, *Journal of marriage and the Family* 46, no.1: 205-214.

Rindfuss, Ronald R., James A. Palmore and Larry L. Bumpass (1987): Analyzing Birth Intervals: Implications for Demographic Theory and Data Collection. *Sociological Forum* 2, no.4.

Rodriguez, German, and John N. Hobcraft (1980): Illustrative analysis: Life table analysis of birth intervals in Colombia. *WFS Scientific Reports*, no.16.

Rodriguez, German, John Hobcraft, John McDonald, Jane Menken, and James Trussell

(1984): A comparative analysis of determinants of birth intervals. *Comparative Studies* no.30.

Ryder, Norman B. (1983): fertility and family structure, *Population Bulletin of the United Nations, No. 15:24.*

Saith, Ashwani (1987): China's new population policies: Rationale and some implications. In Saith, Ashwani (ed), *The Reemergence of the Chinese Peasantry.* London: Croom Helm.

Santow, Gigi (1987): Reassessing the contraceptive effect of breastfeeding. *Population Studies* 41:147-160.

Simon, Herbert A. (1957): *Administrative Behaviour.* 2nd edition. New York: Macmillan:240-241.

Simpson-Hebert, Mayling and Sandra L. Huffman (1981): The contraceptive effect of breastfeeding. *Studies in Family Planning* 12(4)126-133.

Singer, Milton. 1968. The concept of culture. In David L.Sills (ed) *International Encyclopedia of the Social Sciences.*Vol. 3. New York: Macmillan and Free Press.

Sloane, D. and C.F. Lee (1983); Sex of previous children and intentions for further births in the United States, 1965-1976. *Demography* 20:353-367.

Smith, David P. (1985): Breastfeeding, contraception, and birth intervals in developing countries. *Studies in Family Planning* 16(3):154-163).

Song, Jian (1981): Population Development - Goals and Plans. By Liu Zheng, Song Jian and Others: *China's Population: Problems & Prospects.* Beijing: New World Press.

Stacey, Judith (1983): *Patriarchy and Socialist Revolution in China*, Berkeley: University of California Press.

State Stistical Bureau (1985): *1982 Population Census of China.* Beijing: Statistical Publishing House.

State Statistical Bureau (1987): *Statistical Yearbook of China, 1987.* Hong Kong: Longman Group (Far East) Ltd.

State Stistical Bureau (1987): *China In-depth Fertility Survey (Phase II): Individual Questionnaire.* State Stistical Bureau.

Teachman, J.D. (1982); Methodological issues in the analysis of family formation and dissolution. *Journal of Marriage and the Family* 44(3):1037-1050.

Teachman, J.D. and P.T. Schollaert (1989): Gender of children and birth timing. *Demography* 26 (3):411-423.

Tien, H. Yuan (1983): *China: Demographic Billionaire.* Population Bulletin. washington, D.C.: Population Reference Bureau, Inc.

Tien, H. Yuan (1984): "Induced Fertility Transition: Impact of Population Planning and Socio-economic Change in the People's Republic of China", *Population Studies* 38:385-400.

Trussell, James, Linda G. Martin, Robert Feldman, James A. Palmore, Mercedes Concepcion, and Datin Noor Laily Bt. Dato' Abu bakar (1985): Determinants of birth-interval length in the Philippines, Malaysia, and Indonesia: A Hazard-model Analysis. *Demography* 22, no.2.

Trussell, James, Etienne van de Walle, and Francine van de Walle (1989): Norms and Behaviour in Burkinable Fertility. *Population Studies* (London) 43 (2):429-454).

Tsui, A.O. (1985): The rise of modern contraception, in J. Cleland and J. Hobcraft (eds.) *Reproductive Change in Developing Countries.* London: Oxford University Press.

Tsuya, Noriko O. and Minja Kim Choe. (1988): "Achievement of One-Child Fertility in

Rural Areas of Jilin Province, China", *International family Planning Perspectives* 14 (4):123-136.

Tu, Ping (1989): The effects of breastfeeding and birth spacing on child survival in China. *Studies in Family Planning* 20(6):332-342).

Udry, J. Richard (1983): "Do Couples Make Fertility Plan One Birth at A Time?", *Demography*, 20 (2):118.

van de Walle, E. and Knodel, J. (1980): Europe's Fertility Transition: New Evidence and Lessons for Today's Developing World. *Population Bulletin.* Vol. 34 (34)

Vaughan, B. and Chen, R. and Qian, Z. (1988): "Recent Trends in Contraceptive Use and Current Practice of Contraception in China", paper presented at the PAA meeting, New Orleans, April 21-23.

Vermeer, Eduard (1987): Collectivisation and decollectivisation in Guangzhong, Central Shaanxi, 1934-1984. In Ashwani Saith (ed.) *The Re-emergence of the Chinese Peasantry.* London:Croom Helm.

Vlassoff, Carol (1990): The value of sons in an Indian Village: How widows see it. *Population Studies*, 44.

Wang, Jichuan (1990): Studies on Preference for Number and Sex of Children among Women in Shifang County, Sichuan, China. Paper presented at the annual meeting of the Population Association of America, May 3-5, Toronto, Canada.

Wasserstrom, Jeffrey (1987): Resistance to the One-Child Family, in Menard, Scott W. and Elizabeth W. Moen, *Perspectives on Population*, N. Y.: Oxford University Press, Pp.269-276.

Weber, Max, [1920](1984): *Confucianism and Taoism.* Abridged by Morishima, M, London School of Economics: London.

Weinstein, Maxine, Te-Hsiung Sun, Ming-Cheng Chang and Ronald Freedman (1990): Household Composition, Extended Kinship and Reproduction in Taiwan:1965-1985. *Population Studies*, 44:217-239.

Westoff, Charles F. and R.R. Rindfuss (1974): Sex preselection in the United States: some implications. *Science* 184:633-636.

Westoff, Charles F. and Norman B. Ryder (1977): The predictive validity of reproductive intentions. *Demography* 14(4):431-453.

Whyte, Martin King and William L. Parish (1984): *Urban Life in Contemporary China*, Chicago:University of Chicago Press, p.148.

Wickeri, Philip L. (1988): *Seeking the Common Ground: Protestant Christianity, the Three-Self Movement, and China's United Front.* New York: Orbis Books, Marynoll.

Willimason, Nancy E. (1976): *Sons or Daughters: a Cross-Cultural Survey of Parental Preferences.* Beverly Hills, Calif:Sage.

Willimason, Nancy E. (1978): Boys or Girls? Parents' preferences and sex control. *Population Bulletin* 33:1-35.

Willimason, Nancy E. (1983): Parental sex preferences and sex selection, in Bennett, N.G. (ed.) *Sex Selection of Children.* New York: Academic Press.

Wolf, Arthur P. (1980): *Marriage and Adoption in China, 1845-1945.* Standford: Standford University Press.

Wolf, Arthur P. (1986): The Preeminent Role of Government Intervention in China's Family Revolution, *Population and Development Review* 12 (1): 101-116.

Wolf, Margery (1985): *Revolution Postponed: Women in Contemporary China*. Standford, Calif.: Standford University Press.

Wu, C. (1985): Family planning meets social progress, *Beijing Review* 28 (11):15-17.

Yang, M.C. (1945): *A Chinese Village.*

Y. E. (1979): Overseas Remittances to Southeastern China, *China Quarterly* 78:339.

Zeng, Yi (1989): Is the Chinese Family Planning Program "Tightening Up"? *Population and Development Review.* Vol.15 No.2.2

Zhongguo Renkou Ziliao Zhongxin [Centre for Chinese Population Information] (1983): *Zhongguo Renkou Ziliao Shouce 1983* [*Handbook of Chinese Population Statistics 1983*]. Beijing: Zhongguo Renlou Ziliao Zhongxin.

Zhu Chuzhu (ed.). 1988. *Zhongguo Renkou -- Shaanxi Fence (China Population Monographs -- Shaanxi Volume).* Beijing: Zhongguo Caizheng jingji Chubanshe).

Zhu Yuncheng, Haoguang Chen and Datong Lu (ed.). 1988. *Zhongguo Renkou -- Guangdong Fence (China Population Monographs -- Guangdong Volume).* Beijing: Zhongguo Caizheng jingji Chubanshe).