differential availability of family planning services can account for differing levels of contraceptive use in rural and urban areas (DeVanzo, Ann and Othman, 1989).

11The exception is Kenya, which had two previous surveys, in 1977/78 and 1984.
12The island of Mauritius is the only exception.

REFERENCES


A DECADE OF CHANGE IN CONTRACEPTIVE BEHAVIOUR IN LATIN AMERICA: A MULTIVARIATE DECOMPOSITION ANALYSIS

Teresa Castro Martin* and Wamucii Njogu**

SUMMARY

This study relies on World Fertility Survey (WFS) and Demographic and Health Surveys (DHS) data to examine recent trends and determinants of contraceptive use in five Latin American countries: Colombia, Dominican Republic, Ecuador, Mexico and Peru. These countries experienced a substantial increase in contraceptive prevalence in the inter-survey period. Within countries, however, the increase was not equally shared by all social and demographic groups. The study found that relatively disadvantaged groups experienced greater gains in contraceptive use. Despite the prevailing tendency towards convergence, wide differentials in contraceptive behaviour among social sectors still persist. A decomposition analysis based on logistic regression revealed that certain shifts in the population composition—i.e., increased proportion of urban and better educated women and a growing proportion of mothers who want to continue child-bearing—contributed substantially to the aggregate increase in contraceptive prevalence in most countries. Structural changes, understood as changes in the relations between the explanatory variables and the likelihood of using contraception, were also found to play a significant role in contraceptive use trends, particularly in Colombia.

INTRODUCTION

Since the mid-1960s, most countries in the Latin American region have experienced significant reductions in fertility (Chackiel and Schkolnik, 1990). The downward trend of fertility persisted throughout the 1980s, despite a context of financial and economic crisis (ECLAC, 1991; World Bank, 1991; UNDP, 1992), which had adverse effects on family and individual well-being (Minujin, 1992).

*Fertility and Family Planning Section, Population Division, Department for Economic and Social Information and Policy Analysis, United Nations Secretariat.
**Independent consultant.
Increased contraceptive use is largely responsible for the observed decline in fertility (Potter, 1983; Moreno and Singh, 1990). In the late 1980s, the level of contraceptive prevalence in Latin America was estimated to be 57 per cent among married women of reproductive age, a level above that in other developing regions (e.g., 17 per cent in Africa, 40 per cent in South Asia), though still below the estimated average for the developed world (71 per cent) (Weinberger, 1993).

The transformation in women’s contraceptive practices in Latin America has resulted from a variety of social and economic forces, changes in public and private attitudes, implementation of policies and improvement in service provision (Ochoa and Tsui, 1991). Although most Governments initially endorsed a pro-natalist ideology or practised an ambivalent laissez-faire with regard to fertility regulation, since the 1970s family planning has been gradually incorporated into the institutions of public health (Mundigo, 1990). The institutionalization of family planning has reinforced the legitimation of birth control practices (Lerner and Quesnel, 1992), despite opposition from the formal Catholic church.

Although per capita income in Latin America is higher than in many other areas of the developing world, the region is noted for the persistent inequity in income distribution (Psacharopoulos and others, 1992). The gap between groups positioned at the upper and lower end of the social spectrum has traditionally been large and is likely to remain so in the near future. The debt crisis and, more recently, structural adjustment policies, have led in many countries to the deterioration of social services, an important mechanism of economic redistribution (ECLAC, 1989; Samaniego, 1993), reducing the prospects for narrowing the social gap. This highly polarized social structure, in which the high living standards of a relatively small elite are in sharp contrast to those of a sizeable majority that lives in poverty, must necessarily shape demographic patterns (Schoemaker, 1991). Inequality in living conditions generates inequality in choices and opportunities, which ultimately underlies differentials in reproductive and contraceptive behaviour (Bronfman and others, 1990). It is, hence, not surprising that Latin America stands out in the literature as the region displaying the largest within-country disparities in fertility and contraceptive use (United Nations, 1987).

Although the prevailing view is that the upward trend in contraceptive use in Latin America has been mainly demand-led—i.e., built on an increasingly strong motivation for smaller families—there is widespread recognition that it has been facilitated and accelerated by an expanded provision of family planning services, through a mix of commercial, private not-for-profit and public programmes, with substantial international funding (Towsend and others, 1992). The interplay of deliberate policies and spontaneous social diffusion processes has contributed to an expansion of changes in reproductive behaviour, initially restricted to the urban middle class, to the whole social spectrum (Bravo, 1990). This study assesses whether the contraceptive behaviour of different social sectors has followed a tendency towards convergence.

Data limitations have generally shaped a static view of contraceptive use. Cross-sectional fertility surveys can provide relevant information on the determinants of contraceptive behaviour at one point in time but are not well suited to reveal how key relationships evolve over time. Change in the structure of the relation between contraceptive use and its determinants is sometimes inferred from differences observed across societies at consecutive stages of development. However, inferences of this nature might not be valid. A more sound test is provided by comparing two (or more) surveys for the same society (Hermalin, 1985). The study focuses on five Latin American countries that participated in both the WFS and DHS programmes: Colombia, Dominican Republic, Ecuador, Mexico and Peru. The availability of two fertility surveys with analogous information, conducted approximately one decade apart, provides an unusual opportunity to incorporate a time trend dimension to the study of contraceptive-use patterns.

The five countries under consideration have experienced a substantial increase in contraceptive prevalence over the past decade (Weinberger, 1990, 1991). In analytical terms, there are two main mechanisms through which the aggregate level of contraceptive use can increase. One potential source of change is the expanded proportion of women belonging to social groups which typically have high rates of contraceptive use (e.g., better educated women, urban women). Aggregate change may also result from an increase in the likelihood of using contraception among all subgroups (presumably reflecting greater demand and improved access to services throughout the whole social spectrum) or among those subgroups which had lower rates of contraceptive use at an earlier time (reflecting diffusion processes, convergence of reproductive behaviour among social strata and conceivably deliberate programme targeting of less favoured groups). This study aggregates overall change into these two underlying forces: compositional change and rate change, an analytical exercise which should provide relevant insights into the causal mechanisms that underlie observed trends. The decomposition approach makes it possible to address one dimension of the micro/macro complex: the interplay of individual-level processes and structural change in building up aggregate trends (Collins, 1981; Alexander and others, 1987; Firebaugh, 1992).

The article is organized into several sections. First, recent trends in contraceptive use are examined at the national level. A trend analysis is also carried out at the subgroup level in order to assess whether the increase in contraceptive use has been equally shared by all social groups, and whether socio-demographic differentials in contraceptive behaviour have narrowed in the inter-survey period. Secondly, the role of various social and demographic factors on the likelihood of using contraception is assessed in a multivariate framework for the two survey points, in order to ascertain whether the structural linkages between the explanatory variables and contraceptive use were static or dynamic throughout the period. Lastly, a regression decomposition technique is employed to assess whether shifts in population composition, many of them linked to socio-economic development and/or changes in contraceptive behaviour within specific subgroups, can account for the overall increase in contraceptive prevalence during the inter-survey period. The decomposition procedure allows us to quantify to what extent societal compo-
sional changes have promoted the observed upward trend in fertility regulation. Special attention is paid to the role of female education.

**DATA**

The study focuses on five Latin American countries for which both WFS and DHS data are available: Colombia, Dominican Republic, Ecuador, Mexico and Peru. Although these countries cannot be considered representative of the Latin American region, they display considerable variation on several dimensions relevant to contraceptive prevalence, such as socio-economic development and family planning programme effort. Table 1 presents various economic, social and demographic indicators for those countries as measured in the mid-1970s and mid-1980s, the time periods roughly corresponding to the two survey dates. According to those indices, the record of economic growth is mixed: per capita gross national product (GNP) increased considerably in Colombia, Ecuador and Mexico but was practically stagnant in the Dominican Republic and even declined in Peru (ECLAC, 1991). Despite the economic setbacks of the 1980s, school enrolment has continued to increase and female educational attainment improved in all the countries surveyed. Support given to family planning programmes is not uniform within the region: programme strength is rated as weak in Ecuador and Peru, moderate in the Dominican Republic, and strong in Colombia and Mexico. Apparently associated with the intensity of institutional commitment to family planning, fertility decline has been sharpest in Mexico (the total fertility rate went from 6.2 to 4.1 children in merely one decade) and in the Dominican Republic (from 5.7 to 3.8 children per woman).¹

WFS and DHS data sets are sufficiently similar to allow the construction of analogous variables which can be used in a comparative framework. Both surveys obtained detailed data on contraceptive use and extensive background information for large, nationally representative samples of women of reproductive age. Table 1 presents sample sizes and fieldwork dates.

The analysis focuses on non-pregnant, fecund² women currently in union. The proportion of contraceptors among women exposed to the risk of pregnancy should provide a more accurate measure of contraceptive coverage, by excluding women with no reason to use contraception.³ In principle, all sexually active women, regardless of marital status, should be considered as "exposed". However, the large majority of single women in Latin America report no contraceptive use, presumably reflecting the prevailing normative context which censures female sexuality outside marriage. Because of the large amount of underreporting suspected in that group, this study focuses on women currently in union, whether legal or consensual.⁴ Also included in the "exposed" subpopulation are women who have been sterilized, under the rationale that those women are using 100 per cent effective contraception.³

The discussion focuses entirely on current contraceptive use. By concentrating on current experience, the analysis of differentials does not make heavy demands on the quality of the data, since different types of women may vary in their ability to recall past contraceptive episodes.
EXPLANATORY FACTORS CONSIDERED IN THE ANALYSIS

Studies based on WFS (Vaessen, 1980) and DHS data (Rutenberg and others, 1991) show that awareness of contraceptive methods is almost universal in Latin America. However, a considerable amount of demand for family planning remains unmet (Westoff, 1988; Westoff and Ochoa, 1991). Although knowledge is a precondition for fertility control, the decision to use contraception is determined by need, willingness and access to contraceptive methods, factors which in turn are conditioned by women’s position in the life cycle (age, parity), family context (union type, age at union), socioeconomic background (women’s education, husband’s education, rural/urban residence) and motivation to avoid pregnancies (child-bearing intentions) (Johnson-Ascani and Weinberger, 1980).

A woman’s age is expected to increase her motivation for fertility regulation, though not necessarily in a linear fashion. WFS studies have shown that age is curvilinearly related to contraceptive use, presumably because of its association with biological fecundity and frequency of sexual relations, two factors that influence a woman’s perceived risk of pregnancy (Nortman, 1982). Age also measures a ‘‘cohort effect’’, with older women belonging to a generation that was not socialized in the idea of fertility control but exposed to it once their family formation was well under way.

Parity positions a woman in the family life cycle and is assumed to condition her motivation to prevent additional pregnancies. However, since there is a selection process implied by the fact that women with low propensity to use contraception are more likely to reach high parities, this effect might be partly masked. Though closely associated with age, parity captures a different dimension of the reproductive process and may not necessarily follow an identical pattern.

A distinctive feature of the marriage system in Latin America and the Caribbean is the relatively high proportion of consensual unions (Quilodràn, 1985). Since informal unions differ from legal unions in terms of actual and perceived stability, union status might affect the motivation to prevent pregnancy.

Although changing marriage patterns are not considered to have played a major role in the Latin American fertility transition (Rosero-Bixby, 1990), early age at marriage can be regarded as a proxy for family-oriented norms and traditional lifestyles, which might influence attitudes and behaviour towards fertility regulation.

Female education has been consistently shown to be positively associated with contraceptive use (Cochrane, 1979; Weinberger, Lloyd and Blanc, 1989). Education increases awareness, acceptability and access to family planning services. Accordingly, better educated women are more likely to implement successfully their family size preferences. Education is also a relevant indicator of social class, especially in the developing countries, where an advanced education is generally attainable only by the more affluent strata of the society (Schoemakers, 1991).

Since data on household income are not available, and given women’s marginal position in the salaried economy, husband’s education is used as a proxy for the socio-economic status and standard of living of the family.

The large gap in contraceptive prevalence between rural and urban areas is a constant theme in the literature (Lightbourne, 1980), and it has been explained both in demand terms (distinct economic systems favour different ‘‘optimal’’ family sizes) and supply terms (urban areas provide better access and higher quality family planning services). In Latin America, however, during the 1980s, poverty and lack of services became as much an urban as a rural problem, as a consequence of the rapid growth of urban slums (Psacharopoulos and others, 1992). Unfortunately, the data available do not draw a distinction between urban-core and urban-marginal areas.

Since the attainment of reproductive goals typically underlies the decision of contraceptive adoption (Cochrane and Guikley, 1991), child-bearing intentions are incorporated into the explanatory models of contraceptive use. It is expected that women who have completed their family formation process have higher rates of contraceptive use. The inclusion of fertility intentions in the modelling of contraceptive behaviour is not devoid of problems. The validity and reliability of survey responses on fertility preferences have been often questioned. However, recent research suggests that most information on preferences is useful and not seriously flawed, especially when it is about the desire for an additional child rather than about a hypothetical ideal family size (Bongaarts, 1991). Furthermore, the reported intentions of the protagonists of the reproductive process cannot be disregarded in the analysis of contraceptive behaviour, since it is the implementation of those intentions that provides the rationale for contraceptive adoption (Westoff, 1990). Another type of criticism is based on the belief that desired family size is endogenous to the decision-making process of contraceptive use, in the sense that desired fertility is affected by access to family planning services (Kosenszweig and Schulz, 1985). Given the difficulties involved in correcting for the endogeneity of fertility intentions, models with and without desire for additional children will be compared in order to assess whether the inclusion of this variable significantly modifies the rest of the estimates.

All above-mentioned covariates are coded as categorical in order to capture non-linear and non-monotonic relationships. Obviously, this set of variables cannot claim to capture all potential determinants of contraceptive behaviour. Among the missing explanatory factors are hard-to-measure normative variables which influence the perceived legitimacy of fertility regulation. The formal Catholic church, for example, has traditionally proscribed the use of contraception other than abstinence-based rhythm methods. Despite weakening adherence to these proscriptions, religiosity may still exert some influence on matters of reproductive behaviour. At the macrolevel, contextual variables such as accessibility of family planning services are also relevant explanatory factors of individual behaviour, since they constrain the range of options actually available to women. At the psychological level, the perceived risk of pregnancy, the strength of motivation to avoid pregnancy, personality
traits related to planning disposition, or the degree of dissatisfaction with available contraceptive methods, are also factors which play a role in the decision-making process of contraceptive adoption but could not be considered in this analysis.

**METHODS**

The determinants of contraceptive use are examined in a multivariate framework using logistic regression (Aldrich and Nelson, 1984). The logit model is most appropriate because the dependent variable is dichotomous with two possible outcomes, use or non-use of contraception. The model can be written as follows:

\[
\ln \left( \frac{p}{1-p} \right) = \beta'X
\]

where \( p \) denotes the probability of using contraception, \( \left[ \frac{p}{1-p} \right] \) represents the odds of using contraception as opposed to not using, \( X \) is a vector of covariates, and \( \beta \) is a vector of regression coefficients which, depending on their sign, represent increments or reductions in the log odds of contracepting. These coefficients are to be interpreted relative to the omitted category.

The comparison of WFS and DHS logit coefficients enables us to assess the change in strength, and occasionally in direction, of the effect of the various explanatory variables on contraceptive use and hence infer how underlying causal linkages have evolved over time.

In order to explore the processes which have contributed to the upward trend in contraceptive prevalence, a regression decomposition analysis is performed. The disaggregation of overall change into shift in composition and shift in rates is a well-established demographic technique, built upon Kitawaga’s (1955) classical work on rate standardization. The conventional procedure is often limited by the difficulty of handling multiple confounding factors. A decomposition analysis based on logistic regression follows the same rationale but incorporates the advantages of a multivariate framework (Iams and Thornton, 1975; Clogg and Eliason, 1986; Liao, 1989; Ngou, 1991).

The decomposition procedure applied in this study is based on the logit models estimated for the two surveys. The difference \( \ln \left( \frac{p}{1-p} \right)_{\text{DHS}} - \ln \left( \frac{p}{1-p} \right)_{\text{WFS}} \) is decomposed using the following equation (which considers WFS as the base period):

\[
\text{Logit}_{\text{DHS}} - \text{Logit}_{\text{WFS}} = \left( \beta_{(\text{DHS})} - \beta_{(\text{WFS})} \right) + \sum P_{(\text{DHS})}(\beta_{(\text{DHS})} - \beta_{(\text{WFS})}) + \sum \beta_{(\text{WFS})}(P_{(\text{DHS})} - P_{(\text{WFS})}) + \sum (P_{(\text{DHS})} - P_{(\text{WFS})})(\beta_{(\text{DHS})} - \beta_{(\text{WFS})})
\]

where

- \( P_{(\text{DHS})} \) = proportion of the \( j \)th category of the \( k \)th covariate in DHS
- \( P_{(\text{WFS})} \) = proportion of the \( j \)th category of the \( k \)th covariate in WFS
- \( \beta_{(\text{DHS})} \) = regression constant in DHS
- \( \beta_{(\text{WFS})} \) = coefficient for the \( j \)th category of the \( k \)th covariate in WFS
- \( \beta_{(\text{WFS})} \) = coefficient for the \( j \)th category of the \( k \)th covariate in WFS

This procedure yields three components: the rates component, which reflects the differences in slopes (regression coefficients and intercept); the composition component, which indicates the portion of the overall change attributable to the variation in the means of the covariates; and the interaction component, which alludes to the covariation between the means and the coefficients in the two time periods.

**RECENT TRANSFORMATION IN CONTRACEPTIVE BEHAVIOUR: AGGREGATE AND SUBGROUP TRENDS**

Latin America has experienced a substantial increase in contraceptive use over the past decades. It is estimated that the level of contraceptive prevalence in the region rose from 14 per cent in 1960-1965 to 43 per cent in 1980-1981 and to 57 per cent in 1987 (United Nations, 1989; Weinberger, 1993).

The figure displays national trends in contraceptive use during the inter-survey period. It is evident that all countries examined have experienced significant increases in their contraceptive prevalence levels. The magnitude of the increase, however, has not been uniform: slight in Ecuador (7 percentage points), moderate in Peru and the Dominican Republic (13 and 15 points, respectively), and quite substantial in Mexico and Colombia (22 and 20 points, respectively). The latter country has reached a level of contraceptive prevalence analogous to the levels prevailing in the developed world (over 70 per cent). In all countries, the increase in contraceptive use has been entirely confined to modern methods. The proportion of women relying on traditional methods of birth control has either declined or remained unaltered.

An important feature that emerges from these data is that the largest increase in contraceptive prevalence has occurred in countries which rank higher in the development continuum and have active family planning programmes: Mexico (Juarez, Pullum and Casterline, 1985; Llera, 1991) and Colombia (Ochoa and Tsui, 1991). Conversely, countries with weak economies and weak family planning programmes, Ecuador and Peru, have experienced the smallest gains in contraceptive use (Leyton, 1993). The Dominican Republic, despite having the lowest GNP per capita, ranks third with regard to the increase in contraceptive prevalence, presumably because of its moderately strong family planning programme (Tactuk and others, 1990).

There is no obvious relationship between the initial level of contraceptive prevalence and the pace of increase. The Dominican Republic, Ecuador, Mexico and Peru all displayed similar levels of contraceptive use in the mid-1970s, but each country experienced a different rate of increase.

National averages usually conceal broad differentials within countries. Table 2 presents levels of contraceptive use for different social and demographic groups. As expected, women with higher education, women whose partners are highly educated and those who reside in urban areas exhibit sub-
substantially higher contraceptive use rates than their counterparts. With regard to demographic characteristics, high-parity women and women who want to cease child-bearing also show higher reliance on contraception, a pattern congruent with the family formation cycle. Contraceptive rates are also higher for women who have entered marriage at a later age and who are currently in a formal union. The curvilinear pattern found for consecutive age groups may be attributed to the interplay of life cycle and cohort factors.

Comparison of contraceptive use rates in the WFS and the DHS programmes makes it possible to trace the evolution of contraceptive behaviour for various subgroups and to assess whether differentials have narrowed or widened over the recent period. According to the data in Table 2, most socio-demographic groups have experienced notable increases in contraceptive use during the inter-survey period, but not universally so. Highly educated women and women with highly educated partners have experienced only slight gains in contraceptive use and, in some cases, even a reduction (e.g., Dominican Republic and Ecuador).

Among the subgroups that shared the increase, the change in contraceptive behaviour has not been uniform either. It is noteworthy that the largest increases in contraceptive use occurred among disadvantaged social groups, such as poorly educated women, women with poorly educated partners and rural women. This pattern becomes particularly salient when the increase is measured in relative terms. For instance, while change in contraceptive prevalence among women with 10 or more years of schooling ranges from -5 to 11 per cent across the countries examined, the increase for women with no formal education ranges from 38 to 117 per cent. Similarly, while the relative change in contraceptive use ranges from -1 to 26 per cent among urban women, it ranges from 35 to 109 per cent among rural women.

With regard to demographically defined groups, the pattern of change tends to be country-specific and therefore difficult to summarize. In absolute terms, the increase in contraceptive prevalence appears to be larger among women aged 35-44, women with 3-4 children, and women who desire no more children (except in Peru), reflecting life-cycle changes in the need for contraceptive protection. In relative terms, the largest gains are frequently observed, though not universally, among subgroups that initially had the lowest rates of contraceptive use, such as young women (in Mexico), childless women (in Mexico, Peru and Ecuador), women who married early (in all countries, but particularly in Mexico), women in consensual unions (in all countries, but especially in Colombia and Mexico) and women who want more children (in all countries, except Colombia).

As a result of these patterns of change, subgroup differentials in contraceptive use have narrowed considerably over the study period. The picture portrayed by WFS data was one of huge disparities in contraceptive behaviour among social strata (Weinberger, Lloyd and Blanc, 1989). In a comparative perspective, Latin America stood out in the world as the region having, on average, the largest differentials in fertility and contraceptive use by women's education (United Nations, 1987): highly educated women had a level of contraceptive use three or four times that of uneducated women. Although dispari-
<table>
<thead>
<tr>
<th>Table 2. Percentage of Women Using Contraception by Social and Demographic Characteristics: Comparison of WFS and DHS Data</th>
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<tbody>
<tr>
<td><strong>Colombia</strong></td>
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<tr>
<td>Education</td>
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<td>0</td>
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<td>1-3</td>
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<td>4-6</td>
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<td>7-9</td>
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<tr>
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<td>Husband's education</td>
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<tr>
<td>Residence</td>
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<td>Rural</td>
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<td>Urban</td>
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<td>25-34</td>
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<tr>
<td>18+</td>
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<td>Union type</td>
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<tr>
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<tr>
<td>Desire for children</td>
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<tr>
<td>More</td>
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<tr>
<td>Undecided</td>
</tr>
<tr>
<td>No more</td>
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<tr>
<td>TOTAL</td>
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</tbody>
</table>

Sources: WFS: Fertility Survey and Demographic and Health Surveys standard recode files.

Notes: Based on fecund, non-pregnant women aged 15-49, currently in union.

Ties in contraceptive behaviour according to women’s social background remain sizeable in the DHS programme, the gap has narrowed substantially. The reduction of social distances, however, has not occurred to the same extent across countries. The contrast between the upper and lower educational groups, for example, narrowed by 31 points in Colombia and 23 points in the Dominican Republic but by merely 10 points in Ecuador and less than 5 points in Peru and Mexico. Despite the recent tendency towards convergence in contraceptive behaviour, large inequalities remain: uneducated women still have levels of contraceptive use far below those observed for highly educated women: differentials are modest in Colombia and Dominican Republic (about 20 percentage points) and large in Ecuador, Mexico and Peru (about 50 percentage points).
In sum, WFS studies documented very large socio-economic differentials in contraceptive use for most Latin American countries in the mid-1970s; accordingly, fertility decline was mainly confined to the upper social strata. Since then, contraceptive prevalence has increased steadily and, in some countries, at an accelerated pace. Given this trend, it is of considerable interest and policy relevance to assess whether the global increase has led to a convergence in contraceptive behaviour among social strata or whether unmeasurable inequalities persist. Comparison of WFS and DHS data revealed that social differentials in contraceptive behaviour have lessened (though only slightly in Mexico and Peru). This pattern suggests both a "ceiling" reached by early adopters of contraception and a diffusion process of attitudes and behaviours related to fertility regulation which gradually permeate the whole social structure. Educated, urban and middle-class women are typically regarded as forerunners in the process of contraceptive adoption, but they are also the first to reach a saturation point, after which contraceptive use cannot increase very rapidly or very much. At the time of WFS, the upper social strata had already reached high levels of contraceptive use: contraceptive prevalence among women with 10 or more years of schooling was already in the range of 70-79 per cent, the typical coverage in developed countries, leaving little room for improvement. Consequently, the countries that have experienced a substantial growth in contraceptive prevalence over the recent period did so to a considerable extent due to the rapid adoption of contraception by the less educated and rural sectors of their populations.

**NET SOCIAL AND DEMOGRAPHIC DIFFERENTIALS:**

**CONVERGENCE OR POLARIZATION?**

This section examines the linkages between women's background characteristics and contraceptive behaviour in a multivariate framework. A logistic regression model is estimated for each country and for each survey point for this purpose. The comparison of the models run for WFS and DHS data can provide relevant insights into how key relationships have evolved over time, incorporating a dynamic dimension to the study of contraceptive determinants. By contrasting the logit coefficients from the two surveys, we can infer whether the impact of a particular variable has changed in any important fashion. If the effect increases over time, it implies a tendency towards polarization, while weakened effects suggest convergence among initially distant groups.

Table 3 presents the results of the analysis. According to those estimates, all covariates included in the models, with the exception of age at marriage, are significant predictors of contraceptive use. As expected, female education exerts a powerful influence on contraceptive behaviour. The effect is quasi-linear: the likelihood of using contraception rises monotonically with increasing education. Congruent with previous studies (United Nations, 1987), the gap between women in the upper and lower educational strata is remarkably large in WFS: the odds of using contraception among women with 10 or more years of education are from three to seven times greater than for women who have not attended school, even after other factors are held constant. Differentials among educational groups have declined in the inter-survey period, except in Mexico, where they have actually increased. The narrowing of the gap has been sharpest in Colombia, where practically all the increase in contraceptive use has been concentrated among less educated women.

*Husband's education* also has a positive influence on the rate of contraceptive use, but its net effect is weaker than that of female education in all countries. Analogous to the pattern of change observed for women's education, husband's education becomes a weaker predictor of contraceptive use in DHS, except in Peru, where differentials by husband's educational status have remained practically unaltered.

*Place of residence* conditions the access to family planning services; accordingly, rural/urban differentials in rates of contraceptive use are usually very pronounced. At the time of WFS, women residing in urban areas had from two to three times higher odds of contraceptive use than rural women. The urban/rural gap narrowed considerably in DHS for all countries but Peru. The magnitude of residential differentials decreased more dramatically in Colombia and in the Dominican Republic.

*Parity* appears as one of the variables with the strongest effect on the probability of using contraception in WFS. The odds of contraceptive among women with five or more children are from four to 10 times greater than among women with no children, though the main contrast is between mothers and childless women, not between high-parity and low-parity women. At the time of DHS, women with a large number of children remain more likely to use contraception, but differentials based on family size have narrowed considerably in Colombia (suggesting the massive adoption of contraception by low-parity women), moderately in Ecuador and Peru and only slightly in Mexico. The pattern of change has been the opposite in the Dominican Republic, where net differentials by parity have actually increased.

The effect of *age*, once parity is controlled, is presumed to capture the increasing willingness to regulate fertility, regardless of family size, among younger cohorts. Since age and parity have been grouped in broad categories, cohort and life cycle effects cannot be accurately disentangled. However, there is some indication that women belonging to earlier cohorts are less likely to use contraception, once their achieved family size is held constant. Differentials by age have diminished in DHS for some countries (Colombia and Ecuador), but have increased in others (Dominican Republic, Mexico and Peru).

*Age of entry into marriage* has no statistically significant effect on current contraceptive behaviour. *Type of union*, however, exerts a visible influence on contraceptive use: women in legally established unions are more likely to control their fertility, except in Ecuador. Differentials have increased over time, except in Colombia.

*Desire for additional children* also emerges as an important predictor of contraceptive use. As expected, women who want no more children are considerably more likely to be using a contraceptive method to avoid pregnancy than those who want more children. Women who are undecided about future
<table>
<thead>
<tr>
<th></th>
<th>Colombia</th>
<th>Dominican Republic</th>
<th>Ecuador</th>
<th>Mexico</th>
<th>Peru</th>
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<tr>
<td></td>
<td>WFS</td>
<td>DHS</td>
<td>WFS</td>
<td>DHS</td>
<td>WFS</td>
</tr>
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<td>0.408*</td>
<td>0.95</td>
<td>0.539*</td>
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Age at 1st union (<18) | -0.009 | 0.024 | 0.199 | 0.092 | -0.130 | -0.159 | 0.090 | 0.076 | 0.018 | -0.061 |
18+                   |        |       |       |       |        |        |       |       |       |        |

Union type (Consensual) | 0.339* | 0.054* | 0.372* | 0.460* | -0.115 | -0.061 | 0.141 | 0.369* | 0.138 | 0.232* |

Desire for children | Omitted categories are in parentheses. *p<.05 (two-tailed t-test).

Sources: World Fertility Survey and Demographic and Health Surveys standard recode files.
Notes: Based on fecund, non-pregnant women aged 15-49, currently in union.
child-bearing do not differ significantly in their contraceptive behaviour from
genomen who want additional children. The evolution of the effect of fertility
intentions on contraceptive behaviour has not been uniform: the impact of
desiring no more children has weakened in Colombia, Peru and Ecuador, sug-
gesting the expansion of contraceptive use for birth-spacing purposes, but has
grown larger in the Dominican Republic and Mexico.

In sum, most socio-demographic factors measured in DHS influence con-
traceptive behaviour basically in the same fashion as they did in WFS. How-
ever, a precise comparison of the WFS and DHS logit coefficients reveals that
the effect of most covariates has in general weakened, reflecting a tendency
towards diminishing differentials in contraceptive behaviour among social
strata and demographic groups. The degree of convergence differs across soci-
eties, making it difficult to talk about a general pattern of evolution: conver-
gence was highest in Colombia and lowest in Mexico and Peru. The
comparison of the two logit models also revealed a large intercept increase,
indicating that even when all explanatory variables are set equal to their omitted
categories, the probability of using contraception was significantly higher
in DHS than in WFS.

DECOMPOSITION OF CHANGE IN CONTRACEPTIVE BEHAVIOUR: WORLD
FERTILITY SURVEY AND DEMOGRAPHIC AND HEALTH SURVEYS

The preceding sections have documented that all countries examined
have experienced substantial increases in contraceptive use during the inter-
survey period. In an abstract sense, there are two major mechanisms through
which the level of contraceptive prevalence can rise in a population. Overall
change may result from an increase in the proportion of women belonging to
subgroups which typically have high rates of contraceptive use. For instance,
an increase in the proportion of educated and urban women should have a
positive impact on overall contraceptive prevalence, even if contraceptive
behaviour within those subgroups remains unaltered (Weinberger, Lloyd and
Blanc, 1989).

As can be seen in table 4, the composition of the population in all coun-
tries examined has changed in a direction that could plausibly promote aggregate
increase in contraceptive use. For example, women’s education, husband’s education and urban residence have increased in all countries during
the inter-survey period. The proportion of women who want to discontinue
child-bearing has also grown in all societies, reflecting a decline in the demand
for children. With regard to other demographic variables, the age composition
of currently married, fecund, non-pregnant women has shifted upward, the
proportion of women with large families has decreased, the incidence of early
marriages has declined, and the prevalence of consensual unions has risen.
Many of these compositional shifts are likely to have contributed to the overall
increase in contraceptive prevalence.

A second component of aggregate change may result from an increase in
the propensity to use contraception among all subgroups or among those seg-
ments of the population whose rates of contraceptive use were low at an earlier
time. For example, if contraceptive-use rates among rural women increase
over time, overall contraceptive prevalence would rise even if there is no trend
towards urbanization and rural residents remain a large proportion of the popu-
lation. The former analysis of trends in contraceptive use revealed that the
largest increases were observed among those subgroups less likely to use con-
traception in WFS. The multivariate analysis of the determinants of contracep-
tive use also documented that differentials in contraceptive behaviour by
education and residence were narrower in DHS than in WFS, as a result of the
disproportionate increase in contraceptive use among poorly educated and
rural women. This type of structural change in the relationship between back-
ground factors and contraceptive use should translate into an aggregate
increase in contraceptive prevalence.

In this section, a multivariate decomposition procedure is employed to
evaluate the relative contribution of changes in the socio-demographic config-
uration of the population versus structural change (understood as changes in
the relations between the explanatory variables and the likelihood of using
contraception) to the overall increase in contraceptive prevalence between
WFS and DHS. The results of this analysis, based on the logit coefficients in
table 3 and the proportional distribution of the population in table 4, are pre-
sented in table 5. The contribution of each of the covariates previously exam-
ined cross-sectionally at the individual level is now evaluated longitudinally at
the aggregate level (though still based on micro-level data) and partitioned into
three components: composition, rates and interaction.

The relative contribution of compositional and rate factors varies widely
among countries. According to the estimates in table 5, compositional change
explains nearly all the increase in contraceptive use in Peru and Ecuador and a
large amount of the increase in the Dominican Republic. Conversely, most of
the inter-survey change in contraceptive behaviour in Colombia and Mexico,
the two countries that experienced the largest expansion in contraceptive prev-
ance, is attributable to changes in the propensity to use contraception.

With regard to the specific dimensions of the social and demographic
configuration of the population that may have favoured the upward trend in
contraceptive use, the results in table 5 point to female education as the most
influential factor, particularly in Ecuador and Peru. The improvement in
women’s education alone explains roughly one third of the overall increase in
contraceptive prevalence in most countries, regardless of change in contracep-
tive behaviour within educational groups. By comparison, the contribution of
husband’s education is, though relevant, more modest. The trend towards
urbanization has also favoured the rise in contraceptive prevalence, particu-
larly in Peru and Ecuador. The growing proportion of women who desire no
more children also appears to account for an important share of the increase in
contraceptive use in the Dominican Republic, Ecuador and Peru. In general,
the shift in demographic composition (age, parity, age at marriage and union
type) has not made a significant contribution to overall change.

The results in table 5 also show that the signs of the propensity factors are
mostly negative, indicating that the direction of the change in rates has been
towards declining differentials among subgroups with respect to the omitted
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| Age at 1st union     |          |                    |         |        |      |      |        |      |      |      |
| <18                  | 38       | 35                 | 55      | 52     | 42   | 39   | 46     | 42   | 38   | 35   |
| 18-24                | 62       | 66                 | 45      | 48     | 58   | 61   | 54     | 58   | 62   | 65   |
| **Union type**       |          |                    |         |        |      |      |        |      |      |      |
| Consensual           | 24       | 34                 | 61      | 61     | 28   | 32   | 13     | 15   | 24   | 30   |
| Formal               | 76       | 66                 | 39      | 39     | 72   | 68   | 88     | 85   | 76   | 70   |
| **Desire for children** |        |                    |         |        |      |      |        |      |      |      |
| More                 | 37       | 29                 | 43      | 34     | 39   | 33   | 43     | 29   | 33   | 25   |
| Undecided            | 2        | 1                  | 5       | 2      | 6    | 3    | 1      | 4    | 6    | 2    |
| No more              | 61       | 71                 | 52      | 64     | 55   | 64   | 56     | 67   | 61   | 74   |
| N                    | 2 323    | 2 563              | 1 381   | 3 810  | 2 050 | 2 599 | 4 107  | 4 602 | 3 851 | 2 448 |

**Sources:** World Fertility Survey and Demographic and Health Surveys  
**Note:** Based on fecund, non-pregnant women aged 15-49, currently in standard recode tapes.
category. The narrowing of socio-demographic differentials in contraceptive use rates has been largest in Colombia, particularly with regard to parity, female education and type of residence. These results also reveal that the propensity change contributing most to the overall increase in contraceptive use was the intercept. The change in the intercept was particularly large in Colombia and Ecuador. This feature suggests that the increase in contraceptive prevalence was largely influenced by factors not explicitly considered in the model.

Among the obvious candidates are the improved availability and quality of family planning services (Mauldin and Ross, 1991), which can attenuate social differentials by expanding service access to less privileged groups (Tsui, 1985)

In sum, the changing socio-demographic composition of the population in the Latin American countries examined has had an important impact on the aggregate increase in contraceptive use. Educated mothers tended to be a smaller and more heavily selected minority in the 1970s than a decade later. The growth in size of the educated and urban strata, together with the social diffusion of new values and habits, has had the expected effect of diluting some of the originally large disparities in contraceptive behaviour. An analogous process has occurred with regard to women’s position in the family life cycle: contraception was initially adopted by high-parity women in order to discontinue child-bearing, whereas at a later phase, contraceptive use tends to spread out to all women regardless of their stage in the family-building process.

**SUMMARY AND DISCUSSION**

During the past decade, most Latin American countries have experienced a substantial increase in contraceptive prevalence, confined entirely to modern methods. Despite the economic setbacks faced by those countries in the 1980s, linked to the increasing burden of international debt, and despite major financial cuts in expenditures for social development, the secular trend in fertility decline has not stagnated (Guzmán, 1992). Also, despite the persistence of a large economic gap among social classes, the tendency in contraceptive behaviour has been towards convergence.

The availability of repeated survey data with analogous information has made it possible to examine aggregate trends as well as different subgroup trajectories. The results showed that the recent increase in contraceptive prevalence was not equally shared by all social and demographic groups. In fact, the most advantaged groups, such as highly educated women, have experienced virtually no gain, since they had already reached high levels of contraceptive use in the past. Gains have been disproportionately larger among the least favoured social groups, such as poorly educated women, low socio-economic strata and rural dwellers, sectors of the population that have traditionally displayed low reliance on contraceptive methods. The increase in fertility regulation has also been relatively larger among women in the midst of their family formation process, suggesting an expansion of the role of contraception from birth limitation to birth planning.
Socio-demographic differentials regarding contraceptive use in the mid-1970s were compared to those observed in the mid-1980s. Despite disproportionate gains by the least advantaged groups, the social gap in contraceptive behaviour remains quite large. Multivariate analysis confirmed the strong association between education, social class, urban residence and contraceptive use. Women with higher education, with educated partners, and living in an urban environment were much more likely to use contraception than their counterparts in both time periods, once their cohort affiliation and position in the life cycle were taken into account.

With the exception of Mexico, where the gap between educated and uneducated women regarding contraceptive use has actually increased, educational differentials have narrowed significantly in the rest of the countries, particularly in Colombia. Most of the social covariates, including urban residence, have seen their effect on contraceptive use weakened over time. This pattern suggests that when education ceases to be a scarce commodity to which only a few have access and when health services are available to all women regardless of social origin and place of residence, personal characteristics of families and mothers may start losing their primacy as determinants of contraceptive use.

The observed evolution suggests that contraception is initially adopted by educated, urban couples, creating a wide gap in contraceptive behaviour. At a later period, partly as a result of the institutionalization of family planning, contraception becomes an increasingly common behaviour and the practice filters down to lower social strata. Besides this diffusion process, other mechanisms underlie the observed tendency towards convergence. For instance, the upper strata had already reached a ceiling in contraceptive use which left little room for improvement. Educated sectors of the society had levels of contraceptive use in the past analogous to the levels prevailing in the developed world. Hence, it has been mainly the behavioural change within the lower strata that has marked the evolution at the national level of contraceptive prevalence. Also, given an environment of economic stagnation and rising educational aspirations, the perceived costs of child-bearing may be rising faster among lower social classes (Guzmán, 1990).

The decomposition exercise revealed that shifts in the social and demographic configuration of the population were relevant sources of aggregate change in contraceptive prevalence between the mid-1970s and the mid-1980s. Today’s mothers are more likely to be educated, to be living in an urban setting and to have an educated partner than mothers in previous generations. It is also well known, from extensive analyses of WFS and DHS data, that the likelihood of using contraception increases with socio-economic status, mother’s educational attainment being a particularly strong predictor. Accordingly, a shift in the composition of the population towards a growing proportion of educated women should lead to an increase in overall contraceptive prevalence, even if contraceptive use rates within each educational group remain unchanged over time. The improvement in maternal education was estimated to account for one tenth to one third of the national trend in contraceptive use. The study also documented a sizeable increase in the proportion of women desiring no more children, reflecting a normative change in family size preferences, and this compositional shift was shown to influence the aggregate increase in contraceptive prevalence.

Structural changes, understood as changes in the relations between the explanatory variables and the likelihood of using contraception, were also found to be important, particularly in Colombia. The weakening of the effect of education or parity in determining contraceptive behaviour is a relevant structural change, since it implies increasing homogenization of contraceptive practices among women from different social strata and at different life cycle stages. However, it was also noted that the explanation for a large amount of the propensity change lay in the intercept—i.e., in the influence of factors not explicitly considered in the analysis.

In sum, in all countries examined, trends associated with social and economic development, such as enhanced female education, urbanization and preferences towards smaller families, have contributed to an increase in the overall level of contraceptive prevalence, simply by enlarging the proportion of women belonging to social and demographic groups which typically have higher rates of birth planning. Concomitantly, the increased propensity to use contraception among socially disadvantaged groups and among women in the midst of their family-building process was also shown to contribute to a rising prevalence rate. Though the predominant tendency has been towards convergence in contraceptive behaviour, exceptions to this pattern should not be downplayed. In Mexico, for example, in spite of considerable increase in overall contraceptive prevalence, educational disparities in contraceptive behaviour did not lessen. And, contrary to the general trend, the gap in contraceptive behaviour between rural and urban areas widened in Peru. It can be speculated that, as fertility regulation becomes an increasingly normative behaviour, contraceptive use could eventually transcend those traditional geographical, economic and social class divisions. However, further increase and social homogenization in contraceptive behaviour will largely depend on achievements in the reduction of poverty (Torres Adrian, 1993), on the promotion of women’s education (Jeejeebhoy, 1992), and on the extent to which family planning programmes are able to show a genuine commitment to expanding women’s reproductive choices, emphasizing quality in the delivery of contraceptive and sexual health services (Hartmann, 1987; Dixon-Mueller, 1993).

NOTES

1 Although Colombia also had a strong family planning programme, fertility decline was not so spectacular within this time-frame, mainly because fertility had already reached a moderate level in the mid-1970s.

2 In WFS, fecundity status was based on women’s self-assessment of their own reproductive capability. DHS used a more behavioural approach to determine infecundity: non-pregnant women in union for at least five years who have not used contraception and have not given birth are classified as infecund, as are non-pregnant women who have not had their menstrual period in the past 12 weeks.
Women seeking to become pregnant could also be excluded from the population potentially in "need" of contraceptive protection. Instead, we have opted to include child-bearing intentions as a covariate.

Another pragmatic reason for restricting the analysis to women currently in union is that information on contraceptive use was collected only for that subgroup in WFS.

Although sterilized women are not, strictly speaking, "exposed" to the risk of pregnancy, their exclusion would lead to a serious underestimation of the level of contraceptive prevalence. In the Dominican Republic, for instance, one third of all women in union and two thirds of all contraceptive users are sterilized.

Contraceptive _calendar_ data, collected for Peru and Dominican Republic in DHS I and for every country in the second round of DHS, will make it possible to address more detailed research questions on the individual-level dynamics of contraceptive use, including method switching and method discontinuation (Kost, 1991).

For the sake of brevity, the term "parity" is used interchangeably with the term "number of living children".

No distinction is made between traditional and modern methods of contraception.

The relevant test statistic for difference of coefficients is $z = \beta_{	ext{BMI}} - \beta_{	ext{WH}}(\text{BMI}) + s^2(\text{BMI})/s^2(\text{WH})$. The results of this test suggest that the differences between parameter estimates at the two time periods are statistically significant in all countries for only a few variables, such as urban residence and marital status. Because of the difference in sample size between the two surveys, the results may not necessarily be generalized to other countries with different demographic and social characteristics. However, we have opted to discuss them in equal terms, since they hint at the direction of societal change and hence could be meaningful in substantive terms, if not statistically significant.

The relative odds are calculated by exponentiating the coefficient—i.e., $e^\beta$.

In the Dominican Republic, childless women have not shared in the overall increase in contraceptive use. Plausibly, the excessive emphasis on sterilization might have detrimental effects in the promotion of temporary contraceptive methods (Baez, 1993).

Besides cohort effects linked to socialization, age is also associated with self-perception of fecundity.

It was previously mentioned that the inclusion in the model of "desire for additional children", part of an endogenous variable, might bias the relationship between contraceptive use and other explanatory variables. A model excluding this variable was also estimated. The results revealed that, although the size of the coefficients of the variables remaining in the model increased, neither the sign nor the significance level changed.

Because of small sample sizes, the estimates for the "undecided" category are not reliable.

This assertion must be tempered by the fact that research in other settings has revealed that, although family planning clinics play a key role in the increase of contraceptive use, a large portion of the increase still remains unexplained after family planning programmes are taken into account (DaVanzo, 1988).

REFERENCES


