My Choice: Female Contraceptive Use Autonomy in Bangladesh[†]

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Abstract:
Using a recent household survey for two cohorts of married women, this paper examines female contraceptive use autonomy incidence and determinants in Bangladesh focusing at the role of education. Female contraceptive use autonomy is found to differ substantially across cohorts, with females from the younger cohort being far more likely to have complete autonomy over contraceptive use than females from the older cohort. Additionally, females from Non-Muslim households are found to be far more likely to have complete autonomy over contraceptive use than females from Muslim households. Examining the correlates of female contraceptive use autonomy, the woman's own education is found to be a strong correlate of female contraceptive use autonomy, both in substantive and statistical terms. This finding differs widely across subsamples, however, with education having an effect among younger females but not among older females (where it becomes statistically insignificant). Similarly, the education effect is stronger among non-Muslims than among Muslims, both in substantive and statistical terms. Decomposing the generational contraceptive use autonomy gap, only about 15 percent can be explained by the changes in endowments, including education, while almost the entire gap related to religious affiliation can be explained by the changes in endowments. Pursuing a detailed decomposition, the explained part of the contraceptive use autonomy gap is found to be driven almost exclusively by the decrease in the "no education" group from the older to the younger cohort. In sum, more than anything else, it is the lack of education for the older cohort relative to the younger cohort that appears to have been driving the generational contraceptive use autonomy gap in Bangladesh in recent years.

[†] The findings and interpretations are those of the authors and should not be attributed to the World Bank or any of its member countries or affiliated institutions.

1. Introduction

The factors associated with decreased fertility, a main driver of the demographic transition (the other being decreased mortality) has received widespread attention in the research community. Contraception being one of the main factors underlying decreased fertility, the determinants of contraceptive use has received particular attention (Bollen, Guilkey and Mroz, 1995; Guilkey and Jayne, 1997; Magadi and Curtis, 2003).

Relatively little is known about what drives the norms and attitudes underlying actual contraceptive use, however. For example, what underlies the extent to which women's contraceptive use preferences are adhered to? This is related to the notion of empowerment and Sen's "capabilities," as well. In other words, what determines the contraceptive use autonomy of women? In addition to understanding the determinants of actual contraceptive use mentioned earlier, increased understanding of the norms and attitudes, including female contraceptive use autonomy seems crucial for several reasons. First, from an academic viewpoint, norms and perceptions regarding contraceptive use are latent factors relative to actual contraceptive use. Hence, in the examination of actual (manifest) contraceptive use they comprise a "black box" or "missing link" that must be opened if we are to fully understand the processes underlying contraceptive use. Second, for policy regarding family planning to be as effective as possible, it would seem prudent to incorporate potential effects on norms and attitudes related to family planning, including contraceptive use, as well.

Examining the first comprehensive nationally representative household survey of gender norms and practices in Bangladesh, this paper is an attempt at understanding better what underlies female contraceptive use autonomy for the case of Bangladesh. In so doing we focus at the importance of own and spousal education for a sample of two cohorts of married women.

In addition to linear probability models of the determinants of female contraceptive use autonomy, we also ask what explains the contraceptive use autonomy gap across subgroups: women from the older cohort and from a Muslim background are found to have relatively less contraceptive use autonomy than women from the younger cohort and from a non-Muslin background, respectively. This part of the analysis decomposes the established subgroup gaps using several specifications for Oaxaca (1973) – Blinder (1973) type decompositions, taking into account recent methodological improvements allowing the individual components to be stochastic by applying an alternative calculation of standard errors and addressing the issue of the results for categorical variables in detailed decompositions depending on the choice of the reference category (Jann, 2008; Yun 2003).

The remainder of this paper is structured as follows. We first provide the analytical framework for studying contraceptive use autonomy for the specific case of Bangladesh. Next, we present the data and methods underlying the empirical analysis of this paper. We then present the results, where after a final section concludes.

2. Analytical Framework

The analytical framework for this analysis is that of norms and attitudes and their transformation, according to which norms and attitudes develop in response to a wide range of factors, including education (Brewster and Padavic, 2000; Kane and Kyyro, 2001; Mason et al, 1976; Mason and Lu, 1988; Montgomery, 1999). This leads to the following simple model:

$$CUA_i = CUA(E_i, O_i), \qquad (1)$$

where *CUA* is the degree of contraceptive use autonomy for female *i*, *E* denotes education of a female and her spouse, and *O* is other individual characteristics, for example age, religion and residence of female *i*. The main variable of interest in the analyses here is education. There are several pathways through which education interacts with female contraceptive use autonomy. First, education (the woman's own and or that of her spouse) can lead to an increase in health knowledge and therefore increase the awareness of the usefulness of engaging in family planning in general. Second, education can affect the bargaining power of the woman whereby she will be better able to ensure that her preferences towards contraception are adhered to. Some research from the US has found that this relationship between higher education and liberal attitudes is not necessarily a clear-cut one and is contingent upon a number of other factors and has different effects for different categories of individuals (Kane and Kyyro, 2001). Other than the individual's own education, the household level "educatedness" may also have a bearing on the attitude of individuals to gender equality. The literature on "social influence" and "social learning" in changing perceptions of mortality and fertility points to a lag between actual and perceived changes (Montgomery and Casterline, 1996). Koenig et al (2003) found in Bangladesh that when women's autonomy is an accepted part of the community culture, violence against women decreases, so we would expect that higher levels of aggregate education and individuals from more educated families, especially, where female education is higher, would be more liberal in their attitudes to gender equality in education. We therefore also include spousal education as an explanatory variable since a woman's own views on educational equality may well be guided by her husband's in a society that is overwhelmingly patriarchal.

Additional potentially important factors affecting female contraceptive autonomy include age, religion, household wealth quintiles, and media exposure (radio listening). Finally, region

of residence is an indicator of cultural norms, which have been found to be an important correlate of norms and attitudes (e.g., Mason et al, 1976). In India, it is common to use region as a proxy for conservatism and the literature on regional differences is strong (e.g., Dyson and Moore, 1989). Bangladesh, however, is all too often viewed as a homogenous entity in the development literature. One reason for this is that national data sets have limited questions that can allow for the links between norms and outcomes. Surveys that do include this information are small in scale and do not allow for national generalizations to be made. That cultural norms are regionally determined and there are more or less conservative areas is well-known. For instance, Sylhet is a region fraught with poor indicators of women's status and universally regarded as conservative. Yet, it is also the major sending area for migrants to, for example, the UK and the Middle East. Combined with the possibility of some migrants in Dhaka ending up in key leadership positions, its collective view may be to exercise stronger influence on policy with regard to women's status.

3. Data and Methods

The WBGNS 2006 is the first comprehensive nationally representative survey of gender norms and practices in Bangladesh. It is based on a sample of adults that include married women in the 15-25 and 45-59 year age range, married male heads of households in the 25-50 year age range, and 500 community leaders (such as Union Parishad (UP) members, Imams/Moulvis (religious leaders), primary school teachers and Madrasah teachers). The samples were drawn in two stages. 91 clusters[1] were selected at the first stage as a subsample of the 361 clusters included in

[1] A cluster is a census defined village that corresponds roughly to a mouza village in rural areas and a census block (part of a mohollah) in an urban area.

the Bangladesh Demographic and Health Survey (BDHS) of 2004. The second sampling stage selected one adult from each household. Opinion leaders were selected from among those who were resident in and around the cluster, having knowledge of and influences on the people of the cluster. On average 49 adults and 5-6 opinion leaders were interviewed in each cluster. Out of the 49 adults interviewed in a cluster, roughly 16 were married women age 15-25, 16 married women age 45-59 and 17 married men age 25-50. Interviews were conducted in April-May 2006. Of the total sample of 2,974 women, 99 answered "not applicable" to the question on contraceptive use autonomy and are therefore excluded, bringing the effective initial estimation sample down to 2,875 women. Explanatory variables are missing for some observations, which cause a drop in sample sizes for the final/effective analyses samples of 16 observations (or less than 0.6 percent. Our final sample thus consists of 2,859 women. Sample drops of these magnitudes do not seem to be cause for concern regarding the representativeness of the estimation samples. The means for the analyses samples are reported in Table 1.

Our dependent variable is based on the responses to the question "To what extent would you say your preferences/opinions are taken into consideration in making the following types of decision within your household – Whether to use contraception?" Again, we first exclude females who responded "not applicable" (causing the initial sample of 2,875 women to drop by 99 observations). From the five other possible responses ("Always," "Most of the time," "Some of the time," "Rarely,", and "Never") we create a binary variable for whether or not the woman's preferences were always taken into account, which we interpret as perfect female contraceptive autonomy.

Based on the theoretical literature on the pathways to change in attitudes about gender equality discussed previously, we use a rich set of explanatory variables. Our focal explanatory

variables are own and spousal education, which are created as a set of educational attainment dummy variables (coded as two dummies for some primary or primary completed and some secondary and above, respectively, with no education being the reference category). Additional explanatory variables include age and age squared, whether the woman listens to the radio regularly, religion of the household head (indicator variable for Muslim household head), a set of five dummies for which wealth quintile the household belongs to, an urban dummy, and a set of regional dummy variables.

Turning to the descriptive analysis, contraceptive use autonomy is seen to be much higher for the younger (37.7 percent) than the older (18.9) cohort (Table 1). Similarly, contraceptive use autonomy is substantially larger for women with "other" religious background (36.4 percent) than for women with a Muslim background.

What might be the reason for these overwhelming differences in contraceptive use autonomy across the two generations and religious affiliation? Table 1 hint at some possible answers. Most obviously, the younger cohort is far better educated, with only 23.7 percent belonging to the "No education" category, as compared with 64.6 percent for the older cohort. The same goes for spousal education, where the younger cohort also is consistently better off. These patterns hold for the Muslims versus other religions, as well, though less strongly than what was the case when examining the differences in education across cohorts. Do these correlations hold up when other potentially factors, such as geographical location, are controlled for? That is the focus of the multivariate analysis, the discussion of which we now turn.

[Table 1 about here]

The conceptual framework discussed in the previous section suggests that own and

spousal education can directly affect contraceptive use autonomy through a mixture of empowerment / bargaining power and increased knowledge of the usefulness of using family planning methods more generally and also suggest additional factors that are potentially important for contraceptive use autonomy. The first part of the multivariate analysis will examine these relationships, using linear approximations of female contraceptive use autonomy as given by equation (1). One potentially important econometric issue here is that wives' and/or husbands' education may be endogenous. The main concern here is possible omitted variables bias. Preferences and ability, for example, are unobserved and at the same time also, at least to some extent, determine both educational attainment and of female contraceptive use autonomy. However, as we do not have available in this dataset any variables that may potentially act as instruments, it does not appear feasible to try to address this problem using instrumental variables methods. The effect of any omitted variables will therefore be captured by the error term, possibly causing omitting variables bias. As a result, we must interpret any subsequent results with caution and hence not give them a causal interpretation but rather as merely reflecting associations with contraceptive use autonomy.

Turning next to the estimation method, the linear probability model (LPM) yields a more robust alternative to the also widely used probit and logit models both of which are founded on rather strong functional form assumptions and also appears appropriate here for several other reasons, despite its potential shortcomings.[2] Hence, the LPM is our preferred estimation method – but we also compare the results for the LPM with those obtained using the probit model to

[2] While there may be some concern about using the LPM due to the possibility of the predicted probabilities falling outside the (0,1)-range and heteroskedasticity being present by default, it can be argued that the LPM still approximates the response probability well. This is particularly the case if (1) the main purpose is to estimate the partial effect of a given regressor on the response probability, averaged across the distribution of the other regressors, (2) most of the regressors are discrete and take on only a few values and/or (3) heteroskedasticity-robust standard errors are used in place of regular standard errors (Wooldridge, 2002). All three factors seem to work in favor of the LPM for the purposes of the application here.

check the robustness of results. Further, so as to allow for arbitrary heteroskedasticity, the estimations will be carried out using Huber-White standard errors (Huber, 1967; White, 1980). Additionally, so as to allow for the possibility that observations are correlated within communities the standard errors are also adjusted for within-cluster correlation (Froot, 1989; Williams, 2000).

Again, our focus is on differences in contraceptive use autonomy incidence and determinants across the two cohorts of married women surveyed for WBGNS 2006. There are several reasons why it might be useful to apply the previously discussed empirical methodology to both of the two cohorts separately. One might conjecture, for example, that if norms overall have generally become more responsive in recent years, then increases in education would also be more likely to be associated with a higher degree of female autonomy in contraception use for the younger cohort relative to the older cohort. Additionally, one might conjecture that education is more likely to be associated with a higher degree of female autonomy in contraceptive use in less traditional (in terms of norms more generally) households, as proxied by religious affiliation. Here, one might expect female autonomy in contraceptive use to be higher for females from non-Muslim households.

In addition to examining the determinants of contraceptive use autonomy, it would seem useful to push the analysis further, still, by examining the composition of the established contraceptive use autonomy gaps across subgroups (younger vs. older cohort and Muslim vs. non-Muslim) in more detail. Specifically, this amounts to examining to which extent the observed gaps in contraceptive use autonomy across subgroups are attributable to changes in the observable characteristics, to changes in the responses to those characteristics, and to other

factors (three-fold division)[3] and, relatedly, to which extent the observed contraceptive use autonomy gaps are due to observable and unobservable characteristics (two-fold division).[4] This analysis will comprise the second part of the multivariate empirical analysis and will be pursued as an Oaxaca (1973)-Blinder (1973) type decomposition, using several different specifications for the baseline (i.e., "absence of discrimination") model.[5] The standard errors of the individual components are computed according to the method detailed in Jann (2008), which extends the earlier method developed in Oaxaca and Ransom (1998) to deal with stochastic regressors. In addition to examining the overall composition of the established intergenerational and interreligious contraceptive use autonomy gaps, it would seem instructive to perform detailed decompositions, as well, whereby it would be possible to see which explanatory variables contribute the most to the three- and/or two-fold overall decompositions. An issue here is that while the overall decompositions are always identified, the results for categorical variables in detailed decompositions depend on the choice of the reference category (Oaxaca and Ransom 1999). A possible solution to this problem is to apply the deviation contrast transformation to the estimates before conducting the decomposition (Yun 2003); this is also the approach pursued here.

4. Results

This section reviews the results from the multivariate models of contraceptive use autonomy as discussed in the previous section. We will first review the main overall results and then

[3] See Winsborough and Dickinson (1971).
[4] See Oaxaca (1973), Blinder (1973), Cotton (1988), Reimers (1983), and Neumark (1988) for different approaches.

[5] We will exclude the age variables from this analysis, since this method requires "overlap" of the explanatory variables.

highlight any special results pertaining specifically to any of the two different sample cuts.

The results from linear probability models of contraceptive use autonomy indicate that, perhaps surprisingly, own (as well as spousal) education confers contraceptive use autonomy only to a limited extent when considering the older and the younger cohorts (Table 2). When conditioning on religious background, however, the association between education and contraceptive use autonomy is much more pronounced, both in magnitude and statistically. Indeed, the estimated association of some primary or primary completed is now almost 20 percentage-points for women from a non-Muslim religious household, and only about 5 percentage-points for women from a Muslim household. Both are statistically significant. At higher levels of education (some secondary and above), only the estimated association for non-Muslims is statistically significant, with a coefficient estimate of an impressive 17.7 percent. The estimates associations for most other variables are mostly quite imprecisely measured and therefore not statistically significant.

[Table 2 about here]

Again, while the linear probability model appears appropriate and, as we argued earlier, perhaps even preferable for this application – since it imposes only relatively modest restrictions on the estimated relationship in terms of functional form, relative to the probit or logit model – it would still seem useful to verify that the previous results are robust to the estimation method. Since the probit model is widely used and roughly comparable to the results for the logit model (subject to a scaling factor), we pursue this alternative estimation method as well as a sensitivity analysis. The results (not shown, available upon request) reveal some differences in magnitude but are qualitatively very similar. Hence, the previous results are essentially robust to estimating

instead by the probit model – including the direction and statistical significance of the estimated associations.

Summing up, after establishing the existence of an intergenerational gap in contraceptive use autonomy as well as a gap related to religious affiliation, the previous analysis examined the determinants of that gap across the two cohorts and religious affiliation of women. Again, it would seem potentially useful to also examine the extent to which the observed gaps in contraceptive use autonomy are attributable to changes in the observable characteristics, to changes in the responses to those characteristics, and to other factors and, relatedly, to which extent the observed knowledge gap is due to observable and unobservable characteristics. We therefore next turn to an Oaxaca (1973)-Blinder (1973) type decomposition, using several different specifications for the baseline (i.e., "absence of discrimination") model.

The decomposition analysis are two-fold – first, examining overall decompositions and, second, examining detailed decompositions, whereby the contraceptive use autonomy differential may be decomposed into the contributions from specific explanatory variables. The results from the overall decompositions are shown in Table 7. The top panel gives the results across cohorts, while the bottom panel gives the results across religious affiliation. The first column then gives the three-fold decomposition result, while the five next columns give the two-fold decomposition results for different alternative specifications of the "absence of discrimination" group.

Starting with the three-fold decomposition of the contraceptive use autonomy, the first thing to note is that the raw gaps, at 18.8 percentage-points across cohorts and 7.8 percentage-points across religious affiliation, are both substantively large and statistically significant. Also,

the generational contraceptive use autonomy gap is mainly attributable to the coefficients[6], whereas the contraceptive use autonomy gap pertaining to religious affiliation is mainly attributable to endowments, including education.

Moving to the two-fold decompositions of the contraceptive use autonomy gap, the unexplained[7] part of the gap therefore is greater than the explained part for the generation gap, though a substantial fraction still can be explained by endowments (ranging between 11.4 percent and 36.2 percent of the total gap, depending on the specification of the "absence of discrimination" model). The opposite is true for the contraceptive use autonomy related to religious affiliation, where the major part can be explained by differences in endowments. Hence, a substantial part of the difference in contraceptive use autonomy across the two cohorts can be explained by the change in observable characteristics, while an even larger part cannot be explained. One might interpret the latter as changes in contraceptive use autonomy in the society over time more generally.

[Table 3 about here]

While the overall decompositions helped illuminate a bit more how contraceptive use autonomy differs across the two cohorts of Bangladeshi women examined here, as well as across their religious affiliation, detailed decompositions may yield additional insights. Specifically, this analysis will allow us to pinpoint exactly which explanatory variables contribute most to the estimated gaps in contraceptive use autonomy. Also, while the explained part of the intergenerational contraceptive use autonomy gap was mostly statistically insignificant overall, the contributions from individual explanatory variables may still be statistically significant. The

[6] This is the part that is frequently interpreted as "discrimination" in decompositions of gender wage differentials.
[7] Again, this part is frequently interpreted as "discrimination" in decompositions of gender wage differentials.

results from the detailed decompositions are shown in Tables 4 and 5. Again, in interpreting the signs of a given coefficient here, a positive sign implies that the explanatory variable in question hurts the disadvantaged group (that is, the older cohort and/or women from Muslim households, which have the relatively less favorable degree of contraceptive use autonomy) – keeping in mind that we are now estimating the models with the full set of dummies ("effects coding") to address the identification issues pertaining to detailed decompositions raised in Oaxaca and Ransom (1999).[8]

The results from Tables 4 and 5 reveal that the effects from specific individual explanatory variables do in fact "drown" in the aggregated explained part reported earlier, which, again, was mostly not statistical significant overall when considering the generational gap. Considering own education, it is not the difference in educational attainment for the higher levels of education that matters in explaining the difference in the knowledge gaps across cohorts (these are frequently insignificant, in magnitude as well as statistically) but rather the fact that the older cohort has a greater share who has not completed any education: having a larger share of the no education completed group is what really hurts the older cohort, in terms of their less favorable degree of contraceptive use autonomy. Most other variables are either statistically or substantively significant – or both.

[Table 4 about here]

[Table 5 about here]

[8] Specifically, we apply the deviation contrast transformation to the estimates before conducting the decomposition (Yun 2003).

5. Conclusion

Using a recent household survey for two cohorts of married women, this paper examines female contraceptive use autonomy incidence and determinants in Bangladesh focusing at the role of education. Female contraceptive use autonomy is found to differ substantially across cohorts, with females from the younger cohort being far more likely to have complete autonomy over contraceptive use than females from the older cohort. Additionally, females from Non-Muslim households are found to be far more likely to have complete autonomy over contraceptive use than females from Muslim households. Examining the correlates of female contraceptive use autonomy, the woman's own education is found to be a strong correlate of female contraceptive use autonomy, both in substantive and statistical terms. This finding differs widely across subsamples, however, with education having an effect among younger females but not among older females (where it becomes statistically insignificant). Similarly, the education effect is stronger among non-Muslims than among Muslims, both in substantive and statistical terms. Decomposing the generational contraceptive use autonomy gap, only about 15 percent can be explained by the changes in endowments, including education, while almost the entire gap related to religious affiliation can be explained by the changes in endowments. Pursuing a detailed decomposition, the explained part of the contraceptive use autonomy gap is found to be driven almost exclusively by the decrease in the "no education" group from the older to the younger cohort. In sum, more than anything else, it is the lack of education for the older cohort relative to the younger cohort that appears to have been driving the generational contraceptive use autonomy gap in Bangladesh in recent years.

These results have important policy implications. First, it appears that female contraceptive autonomy use is only weakly linked to observable characteristics for the case of

Bangladesh. Second, however, among the observable factors that do seem to promote female contraceptive autonomy in Bangladesh, education seems to be the most important one. Further, as revealed by the decomposition analyses, it is not so much having a lot of education that matters for female contraceptive autonomy. Rather, it is having completed at least some education. This improved contraceptive use autonomy, then, may come about through increased bargaining power or simply increased knowledge about the usefulness of family planning. From a policy point of view, then, since fertility remains high on the agenda of developing nations, including Bangladesh, improving education – especially for women – should remain high on the agenda, as well.

References:

Blinder, A.S. 1973. "Wage Discrimination: Reduced Form and Structural Estimates." *The Journal of Human Resources* 8: 436-455.

Bollen, Kenneth A, David K. Guilkey and Thomas A. Mroz. 1995. "Binary Outcomes and Endogenous Explanatory Variables: Tests and Solutions with an Application to the Demand for Contraceptive Use in Tunisia." *Demography* 32(1): 111-131.

Brewster, Karin and Irene Padavic. 2000. "Change in Gender Ideology, 1977-1996: The Contributions of Intracohort Change and Population Turnover." *Journal of Marriage and the Family* 62:477-487.

Cotton, J. 1988. "On the Decomposition of Wage Differentials." *The Review of Economics and Statistics* 70: 236-243.

Dyson, Tim and M Moore. 1983. "On kinship structure, female autonomy and demographic behavior in India." *Population and Development Review* 9(1): 35-60.

Froot, K. A. 1989. "Consistent Covariance Matrix Estimation with Cross-sectional Dependence and Heteroskedasticity in Financial Data." *Journal of Financial and Quantitative Analysis* 24:333–355.

Guilkey, David K. and Susan Jayne. 1997. "Fertility transition in Zimbabwe: Determinants of contraceptive use and method choice." *Population Studies* 51: 173-189.

Huber, P. J. 1967. "The Behavior of Maximum Likelihood Estimates under Nonstandard Conditions." In: *Proceedings of the Fifth Berkeley Symposium on Mathematical Statistics and Probability* Vol. 1, Berkeley, CA: University of California Press.

Jann, B. (2008). The Blinder-Oaxaca Decomposition. ETH Zurich Sociology Working Paper No.

5. Available from: http://ideas.repec.org/p/ets/wpaper/5.html.

Kane, Emily W. and Else K. Kyyro. 2001. "For Whom Does Education Enlighten?: Race, Gender, Education and Beliefs about Social Inequality." *Gender & Society* 15:710-733.

Koenig, Michael. A., S. Ahmed, et al. 2003. "Women's Status and Domestic Violence in Rural Bangladesh: Individual- and Community-Level Effects." *Demography* 40(2):269-288.

Magadi, Monica A. and Siân L. Curtis. 2003. "Trends and Determinants of Contraceptive Method Choice in Kenya." *Studies in Family Planning* 34(3): 149-159.

Mason, Karen Oppenheim and Yu-Hsia Lu. 1988. "Attitudes toward Women's Familial Roles: Changes in the United States, 1977-1985." *Gender and Society* 2:39-57.

Mason, Karen Oppenheim, John L. Czajka and Sara Arber. 1976. "Change in U.S. Women's Sex-Role Attitudes, 1964-1974." *American Sociological Review* 41(4):573-596.

Montgomery, Mark R and John B. Casterline. 1996. "Social Learning, Social Influence, and New Models of Fertility." *Population and Development Review* 22, Supplement: Fertility in the United States: New Patterns, New Theories (1996): 151-175.

Montgomery, Mark R. 1999. "Mortality Decline and the Demographic Response: Toward a New Agenda." PRD Working Paper #122. New York: The Population Council.

Neumark, D. 1988. "Employers' Discriminatory Behavior and the Estimation of Wage Discrimination." *The Journal of Human Resources* 23: 279-295.

Oaxaca, R. 1973. "Male-Female Wage Differentials in Urban Labor Markets. *International EconomicReview* 14: 693-709.

Oaxaca, R.L., Ransom, M.R. 1998. "Calculation of approximate variances for wage

Decomposition differentials." *Journal of Economic and Social Measurement* 24: 55-61.

Oaxaca, R.L. and M.R. Ransom. 1999. "Identification in Detailed Wage Decompositions." *The Review of Economics and Statistics* 81: 154-157.

Reimers, C.W. 1983. Labor Market Discrimination Against Hispanic and Black Men. *The Review of Economics and Statistics* 65: 570-579.

White, H. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica* 48(4):817–830.

Williams, R. L. 2000. "A Note on Robust Variance Estimation for Cluster-correlated Data." *Biometrics* 56:645–646.

Yun, M.-S. 2003. "A Simple Solution to the Identification Problem in Detailed Wage Decompositions." IZA Discussion Paper No. 836.

Table 1. Descriptive Statistics

	Older cohort:		*Younger cohort:*		*Muslims:*		*Other religion:*	
	Mean	*Std Dev*	*Mean*	*Std Dev*	*Mean*	*Std Dev*	*Mean*	*Std Dev*
Dependent variable:								
Contraceptive use	0.189	0.392	0.377	0.485	0.286	0.452	0.364	0.482
Explanatory variables:								
Age	49.655	4.150	21.523	2.899	33.966	14.431	37.138	14.216
No education	0.646	0.478	0.237	0.425	0.420	0.494	0.438	0.497
Primary	0.214	0.411	0.333	0.471	0.284	0.451	0.229	0.421
Secondary plus	0.139	0.347	0.431	0.495	0.296	0.457	0.333	0.472
No education (Spouse)	0.488	0.500	0.330	0.470	0.406	0.491	0.355	0.480
Primary (Spouse)	0.205	0.404	0.267	0.443	0.240	0.427	0.227	0.420
Secondary plus (Spouse)	0.307	0.461	0.402	0.491	0.354	0.478	0.418	0.494
Listens to radio	0.212	0.409	0.300	0.458	0.252	0.434	0.353	0.479
Islam	0.906	0.291	0.932	0.251	1.000	0.000	0.000	0.000
Urban	0.484	0.500	0.493	0.500	0.487	0.500	0.511	0.501
Barisal	0.071	0.256	0.062	0.241	0.071	0.256	0.011	0.104
Chittagong	0.174	0.379	0.157	0.364	0.155	0.362	0.270	0.445
Dhaka	0.316	0.465	0.308	0.462	0.312	0.463	0.308	0.463
Khulna	0.119	0.324	0.133	0.340	0.112	0.316	0.295	0.457
Rajshahi	0.246	0.431	0.280	0.449	0.283	0.451	0.053	0.225
Sylhet	0.074	0.262	0.060	0.237	0.066	0.249	0.063	0.244
	1327		1532		2617		242	

Notes: Calculations incorporate sampling weights and also adjust for within-community correlation/clustering (Froot, 1989; Williams, 2000).

Source: World Bank Survey on Gender Norms in Bangladesh (2006).

Table 2. Linear Probability Model Results for Female Contraceptive Use Autonomy Regressions

	Older cohort:	*Younger cohort:*	*Muslims:*	*Other religion:*
Age:				
Age	0.13	0.04	0.001	0.038**
	[0.079]	[0.074]	[0.007]	[0.016]
Age squared	-0.001*	-0.001	0.0001	-0.001***
	[0.001]	[0.002]	[0.0001]	[0.0001]
Own education:				
Primary	0.038	0.074*	0.053*	0.196***
	[0.032]	[0.040]	[0.031]	[0.067]
Secondary plus	0.091	0.054	0.054	0.177*
	[0.060]	[0.040]	[0.036]	[0.093]
Spousal education:				
Primary	0.033	-0.048	-0.023	0.074
	[0.034]	[0.034]	[0.024]	[0.073]
Secondary plus	0.003	0.043	0.037	-0.075
	[0.036]	[0.052]	[0.030]	[0.076]
Information access/processing:				
Listens to radio	0.023	0.038	0.035	0.002
	[0.039]	[0.039]	[0.030]	[0.088]
Religion of household head:				
Islam	-0.04	-0.025	0.0001	0.0001
	[0.044]	[0.069]	[0.0001]	[0.0001]
Poverty / Wealth:				
Second-to-lowest asset score decile	-0.006	0.037	0.02	-0.067
	[0.036]	[0.043]	[0.034]	[0.094]
Median asset score decile	-0.011	0.008	-0.003	-0.104
	[0.041]	[0.050]	[0.036]	[0.161]
Second-to-highest asset score decile	0.059	0.001	0.005	0.177**
	[0.048]	[0.046]	[0.036]	[0.072]

Highest asset score decile	0.06	0.002	0.021	0.093
	[0.045]	[0.052]	[0.038]	[0.135]
Geography:				
Urban	0.0001	-0.044	-0.008	-0.170*
	[0.031]	[0.048]	[0.036]	[0.094]
Barisal	-0.079***	-0.173*	-0.119**	-0.421***
	[0.030]	[0.087]	[0.049]	[0.079]
Chittagong	-0.001	0.15	0.093	-0.028
	[0.054]	[0.093]	[0.073]	[0.087]
Khulna	0.036	0.180***	0.138***	0.078
	[0.053]	[0.057]	[0.045]	[0.107]
Rajshahi	-0.079*	-0.110*	-0.101**	-0.005
	[0.041]	[0.061]	[0.046]	[0.155]
Sylhet	0.305***	0.282***	0.290***	0.346**
	[0.034]	[0.054]	[0.037]	[0.162]
Constant	-2.961	-0.117	0.307**	-0.161
	[2.030]	[0.756]	[0.129]	[0.310]
R^2	0.1	0.09	0.12	0.21
N	1327	1532	2617	242

Notes: Dependent variable: One if wife's preference whether to use contraception was always followed, zero otherwise. Terms in brackets are robust Huber-White (Huber, 1967; White, 1980) standard errors. Estimations also incorporate sampling weights and adjust for within-community correlation/clustering (Froot, 1989; Williams, 2000). Reference groups are "None" (education), "Lowest asset score decile" (poverty/wealth), "Dhaka" (region). *: statistically significant at 10 percent; **: statistically significant at 5 percent; ***: statistically significant at 1 percent.

Source: World Bank Survey on Gender Norms in Bangladesh (2006).

Table 3. Overall Decompositions of Contraceptive Use Autonomy across Two Cohorts of Women and Religious Affiliation

	Tree-fold Decomposition:	*Two-fold Decomposition: Weights/"Absence-of-discrimination" model:*				
		0	*1*	*0.5*	*Rel grp size*	*Pooled*
Older vs. Younger Cohort:						
Mean prediction high (H):	0.377***					
Mean prediction low (L):	0.189***					
Raw differential (R) {H-L}:	0.188***					
- due to endowments (E):	0.028					
- due to coefficients (C):	0.167***					
- due to interaction (CE):	-0.006					
Unexplained (U){C+(1-D)CE}:		0.161***	0.167***	0.164***	0.164***	0.12***
Explained (V) {E+D*CE}:		0.028	0.021	0.025	0.024	0.068***
% unexplained {U/R}:		85.3	88.6	86.9	87.1	63.8
% explained (V/R):		14.7	11.4	13.1	12.9	36.2
Muslims vs. Other Religion:						
Mean prediction high (H):	0.364***					
Mean prediction low (L):	0.286***					
Raw differential (R) {H-L}:	0.078*					
- due to endowments (E):	0.07**					
- due to coefficients (C):	0.048					
- due to interaction (CE):	-0.04					
Unexplained (U){C+(1-D)CE}:		0.008	0.048	0.028	0.012	0.013
Explained (V) {E+D*CE}:		0.07**	0.03	0.05	0.066	0.065**
% unexplained {U/R}:		10.8	61.5	36.1	14.8	16.7
% explained (V/R):		89.2	38.5	63.9	85.2	83.3

Notes: The references for the different specifications of weights are: 0 (Oaxaca, 1973), 1 (Oaxaca 1973; Blinder, 1973), 0.5 (Reimers, 1983), relative group size (Cotton, 1988), Pooled (Neumark (1988). Standard errors for calculating statistical significance are computed according to Jann (2008). *: statistically significant at 10 percent; **: statistically significant at 5 percent; ***: statistically significant at 1 percent.

Source: World Bank Survey on Gender Norms in Bangladesh (2006).

Table 4. Detailed Decompositions: Across Two Cohorts of Women

	W = 0		*W = 1*		*W = 0.5*		*Relative group size*		*Pooled*	
	Expl.	*Unexpl.*	*Expl.*	*Unexpl.*	*Expl.*	*Unexpl.*	*Expl.*	*Unexpl.*	*Expl.*	*Unexpl.*
Own education:										
None	0.019*	0.001	0.016	0.004	0.017**	0.003	0.019*	0.002	0.040***	-0.020
	[0.011]	[0.008]	[0.010]	[0.021]	[0.008]	[0.015]	[0.010]	[0.009]	[0.007]	[0.017]
Primary	-0.001	0.012	0.004	0.008	0.002	0.010	0.0001	0.011	0.004*	0.008
	[0.003]	[0.010]	[0.003]	[0.007]	[0.002]	[0.008]	[0.002]	[0.010]	[0.002]	[0.008]
Secondary plus	0.015	-0.018	0.003	-0.006	0.009	-0.012	0.014	-0.017	0.020***	-0.023
	[0.011]	[0.018]	[0.006]	[0.006]	[0.006]	[0.012]	[0.010]	[0.017]	[0.005]	[0.009]
Spousal education:										
None	0.002	0.005	0.0001	0.007	0.001	0.006	0.002	0.005	0.001	0.006
	[0.003]	[0.011]	[0.004]	[0.017]	[0.002]	[0.014]	[0.003]	[0.012]	[0.002]	[0.014]
Primary	0.001	-0.018**	-0.003**	-0.013**	-0.001	-0.015**	0.001	-0.017**	-0.001	-0.015
	[0.001]	[0.008]	[0.001]	[0.006]	[0.001]	[0.007]	[0.001]	[0.008]	[0.001]	[0.007]
Secondary plus	0.0001	0.020	0.004	0.016	0.002	0.018	0.0001	0.020	0.002	0.018
	[0.002]	[0.016]	[0.003]	[0.013]	[0.002]	[0.014]	[0.002]	[0.016]	[0.002]	[0.014]
Information access/processing:										
Listens to radio	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.002*	0.0001
	[0.002]	[0.007]	[0.002]	[0.005]	[0.001]	[0.006]	[0.002]	[0.007]	[0.001]	[0.006]
Does not listen to radio	0.001	-0.002	0.002	-0.002	0.002	-0.002	0.001	-0.002	0.002*	-0.003
	[0.002]	[0.017]	[0.002]	[0.020]	[0.001]	[0.019]	[0.002]	[0.018]	[0.001]	[0.019]
Religion of household head:										
Islam	0.0001	0.003	0.0001	0.003	0.0001	0.003	0.0001	0.003	0.0001	0.003
	[0.001]	[0.026]	[0.001]	[0.025]	[0.001]	[0.026]	[0.001]	[0.026]	[0.001]	[0.026]
Other	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	[0.001]	[0.002]	[0.001]	[0.003]	[0.001]	[0.002]	[0.001]	[0.002]	[0.001]	[0.002]
Poverty / Wealth:										
Lowest asset score decile	0.0001	0.002	0.0001	0.002	0.0001	0.002	0.0001	0.002	0.0001	0.002

	[0.001]	[0.008]	[0.001]	[0.007]	[0.0001]	[0.007]	[0.001]	[0.008]	[0.0001]	[0.007]
Second-to-lowest asset score decile	-0.001	0.012	0.002	0.008	0.0001	0.010	-0.001	0.011	0.002	0.008
	[0.002]	[0.008]	[0.002]	[0.006]	[0.001]	[0.007]	[0.002]	[0.008]	[0.001]	[0.007]
Median asset score decile	0.0001	0.005	0.0001	0.006	0.0001	0.006	0.0001	0.005	0.0001	0.006
	[0.001]	[0.007]	[0.0001]	[0.007]	[0.0001]	[0.007]	[0.0001]	[0.007]	[0.0001]	[0.007]
Second-to-highest asset score decile	0.0001	-0.010	0.0001	-0.010	0.0001	-0.010	0.0001	-0.010	0.0001	-0.010
	[0.001]	[0.010]	[0.0001]	[0.010]	[0.0001]	[0.010]	[0.001]	[0.010]	[0.0001]	[0.010]
Highest asset score decile	-0.002	-0.006	0.0001	-0.009	-0.001	-0.008	-0.002	-0.006	0.002	-0.010
	[0.002]	[0.006]	[0.002]	[0.008]	[0.001]	[0.007]	[0.002]	[0.006]	[0.001]	[0.007]
Geography:										
Urban	0.0001	-0.012	0.0001	-0.012	0.0001	-0.012	0.0001	-0.012	0.0001	-0.012
	[0.0001]	[0.010]	[0.001]	[0.010]	[0.0001]	[0.010]	[0.0001]	[0.010]	[0.0001]	[0.010]
Rural	0.0001	0.013	0.0001	0.013	0.0001	0.013	0.0001	0.013	0.0001	0.013
	[0.0001]	[0.010]	[0.001]	[0.010]	[0.0001]	[0.010]	[0.0001]	[0.010]	[0.0001]	[0.010]
Dhaka	0.0001	-0.007	0.0001	-0.008	0.0001	-0.008	0.0001	-0.008	0.0001	-0.008
	[0.001]	[0.011]	[0.001]	[0.011]	[0.001]	[0.011]	[0.001]	[0.011]	[0.001]	[0.011]
Barisal	0.001	-0.007	0.002	-0.008	0.002	-0.008	0.001	-0.007	0.002	-0.008
	[0.001]	[0.006]	[0.002]	[0.006]	[0.001]	[0.006]	[0.001]	[0.006]	[0.001]	[0.006]
Chittagong	0.0001	0.020**	-0.002	0.022**	-0.001	0.021**	0.0001	0.020**	-0.001	0.021**
	[0.001]	[0.009]	[0.002]	[0.010]	[0.001]	[0.009]	[0.001]	[0.009]	[0.001]	[0.009]
Khulna	0.0001	0.016**	0.002	0.014**	0.001	0.015**	0.0001	0.016**	0.001	0.015**
	[0.001]	[0.007]	[0.002]	[0.007]	[0.001]	[0.007]	[0.001]	[0.007]	[0.001]	[0.007]
Rajshahi	-0.004	-0.016	-0.006	-0.014	-0.005	-0.015	-0.004	-0.015	-0.005	-0.015
	[0.004]	[0.012]	[0.005]	[0.010]	[0.004]	[0.011]	[0.004]	[0.012]	[0.004]	[0.011]
Sylhet	-0.004**	-0.003	-0.003**	-0.004	-0.004**	-0.003	-0.004**	-0.003	-0.004**	-0.003
	[0.002]	[0.003]	[0.002]	[0.004]	[0.002]	[0.004]	[0.002]	[0.003]	[0.002]	[0.004]
Constant		0.150***		0.150***		0.150***		0.150***		0.150***
		[0.034]		[0.034]		[0.034]		[0.034]		[0.034]
Total	0.028	0.161***	0.021	0.167***	0.025*	0.164***	0.027	0.161***	0.068***	0.120***
	[0.020]	[0.030]	[0.015]	[0.024]	[0.014]	[0.026]	[0.019]	[0.030]	[0.012]	[0.019]

Notes: The calculations take into account the issue of the effect of indicator variables not being individually identified in detailed decompositions (Oaxaca and Ransom, 1999) by applying the deviation contrast transformation to the estimates before conducting the decomposition (Yun 2003) – effectively transforming the coefficients of such variables so that they reflect deviations from the "grand mean" rather than deviations from the reference category as in standard analyses (hence, the transformed coefficients are equivalent to those obtained by using the socalled "effects coding" for the dummy variables). Standard errors are computed according to Jann (2008). *: statistically significant at 10 percent; **: statistically significant at 5 percent; ***: statistically significant at 1 percent.

Source: World Bank Survey on Gender Norms in Bangladesh (2006).

Table 5. Detailed Decompositions: Across Religious Affiliation

	W = 0		*W = 1*		*W = 0.5*		*Relative group size*		*Pooled*	
	Expl.	*Unexpl.*	*Expl.*	*Unexpl.*	*Expl.*	*Unexpl.*	*Expl.*	*Unexpl.*	*Expl.*	*Unexpl.*
Own education:										
None	-0.002	-0.034*	-0.003	-0.032**	-0.002	-0.033*	-0.002	-0.033*	-0.002	-0.033*
	[0.004]	[0.018]	[0.008]	[0.017]	[0.006]	[0.017]	[0.006]	[0.017]	[0.004]	[0.018]
Primary	-0.001	0.008	-0.003	0.010	-0.002	0.009	-0.002	0.009	-0.002	0.008
	[0.001]	[0.009]	[0.003]	[0.011]	[0.002]	[0.010]	[0.002]	[0.010]	[0.001]	[0.009]
Secondary plus	0.002	0.014	0.004	0.012	0.003	0.013	0.003	0.013	0.002	0.014
	[0.004]	[0.018]	[0.006]	[0.016]	[0.005]	[0.016]	[0.005]	[0.016]	[0.004]	[0.017]
Spousal education:										
None	0.0001	0.003	0.0001	0.004	0.0001	0.004	0.0001	0.004	0.0001	0.003
	[0.001]	[0.015]	[0.002]	[0.017]	[0.001]	[0.016]	[0.001]	[0.016]	[0.001]	[0.015]
Primary	0.0001	0.021*	-0.001	0.022*	0.0001	0.021*	0.0001	0.021*	0.0001	0.021*
	[0.001]	[0.012]	[0.003]	[0.012]	[0.001]	[0.012]	[0.001]	[0.012]	[0.001]	[0.012]
Secondary plus	0.002	-0.042**	-0.005	-0.036**	-0.001	-0.039**	-0.002	-0.039**	0.001	-0.042**
	[0.002]	[0.020]	[0.005]	[0.016]	[0.002]	[0.018]	[0.002]	[0.018]	[0.002]	[0.020]
Information access/processing:										
Listens to radio	0.003	-0.003	0.002	-0.002	0.002	-0.002	0.002	-0.002	0.003	-0.003
	[0.002]	[0.016]	[0.005]	[0.011]	[0.003]	[0.014]	[0.003]	[0.013]	[0.002]	[0.015]
Does not listen to radio	0.003	0.005	0.002	0.006	0.002	0.005	0.002	0.005	0.003	0.005
	[0.002]	[0.029]	[0.005]	[0.034]	[0.003]	[0.031]	[0.003]	[0.032]	[0.002]	[0.029]
Poverty / Wealth:										
Lowest asset score decile	0.0001	0.001	0.0001	0.001	0.0001	0.001	0.0001	0.001	0.0001	0.001
	[0.001]	[0.015]	[0.001]	[0.015]	[0.001]	[0.015]	[0.001]	[0.015]	[0.001]	[0.015]
Second-to-lowest asset score decile	-0.001	-0.022***	0.002	-0.025***	0.001	-0.023***	0.001	-0.024***	-0.001	-0.022***
	[0.002]	[0.007]	[0.003]	[0.007]	[0.001]	[0.007]	[0.001]	[0.007]	[0.001]	[0.007]
Median asset score decile	0.0001	-0.017	0.002	-0.019	0.001	-0.018	0.001	-0.018	0.0001	-0.017
	[0.0001	[0.017]	[0.003]	[0.019]	[0.001]	[0.018]	[0.002]	[0.018]	[0.001]	[0.017]

Second-to-highest asset score decile	0.0001	0.026**	-0.005	0.031**	-0.002	0.028**	-0.002	0.029**	0.0001	0.026**
	[0.001]	[0.013]	[0.005]	[0.015]	[0.002]	[0.014]	[0.003]	[0.014]	[0.001]	[0.013]
Highest asset score decile	-0.003	0.017	0.003	0.011	0.0001	0.014	0.0001	0.014	-0.002	0.016
	[0.002]	[0.016]	[0.005]	[0.011]	[0.003]	[0.013]	[0.003]	[0.013]	[0.002]	[0.015]
Geography:										
Urban	0.0001	-0.042	-0.002	-0.040*	-0.001	-0.041	-0.001	-0.040	0.0001	-0.041
	[0.001]	[0.028]	[0.013]	[0.024]	[0.007]	[0.025]	[0.007]	[0.025]	[0.001]	[0.027]
Rural	0.0001	0.040	-0.002	0.042*	-0.001	0.041	-0.001	0.041	0.0001	0.040
	[0.001]	[0.027]	[0.013]	[0.025]	[0.007]	[0.025]	[0.007]	[0.025]	[0.001]	[0.027]
Dhaka	0.0001	0.018	0.0001	0.019	0.0001	0.019	0.0001	0.019	0.0001	0.018
	[0.008]	[0.022]	[0.002]	[0.020]	[0.003]	[0.020]	[0.002]	[0.020]	[0.007]	[0.021]
Barisal	0.011*	-0.003	0.029**	-0.020**	0.020**	-0.012**	0.021**	-0.013**	0.011*	-0.003
	[0.006]	[0.003]	[0.014]	[0.010]	[0.010]	[0.006]	[0.010]	[0.006]	[0.006]	[0.003]
Chittagong	0.005	-0.018	-0.003	-0.010	0.001	-0.014	0.001	-0.014	0.004	-0.017
	[0.008]	[0.023]	[0.008]	[0.013]	[0.005]	[0.018]	[0.005]	[0.017]	[0.008]	[0.022]
Khulna	0.017	0.001	0.018	0.0001	0.017	0.001	0.017	0.001	0.015	0.003
	[0.015]	[0.024]	[0.021]	[0.009]	[0.017]	[0.016]	[0.017]	[0.016]	[0.014]	[0.023]
Rajshahi	0.033***	0.009	-0.007	0.049	0.013	0.029	0.011	0.031	0.032***	0.010
	[0.012]	[0.008]	[0.027]	[0.034]	[0.015]	[0.020]	[0.016]	[0.022]	[0.012]	[0.009]
Sylhet	-0.001	0.008	-0.001	0.008	-0.001	0.008	-0.001	0.008	-0.001	0.008
	[0.011]	[0.010]	[0.017]	[0.009]	[0.014]	[0.009]	[0.015]	[0.009]	[0.012]	[0.010]
Constant		0.017		0.017		0.017		0.017		0.017
		[0.049]		[0.049]		[0.049]		[0.049]		[0.049]
Total	0.070**	0.008	0.030	0.048	0.050	0.028	0.048	0.030	0.065**	0.013
	[0.031]	[0.050]	[0.048]	[0.054]	[0.031]	[0.045]	[0.032]	[0.045]	[0.028]	[0.045]

Notes: The calculations take into account the issue of the effect of indicator variables not being individually identified in detailed decompositions (Oaxaca and Ransom, 1999) by applying the deviation contrast transformation to the estimates before conducting the decomposition (Yun 2003) – effectively transforming the coefficients of such variables so that they reflect deviations from the "grand mean" rather than deviations from the reference category as in standard analyses (hence, the transformed coefficients are equivalent to those obtained by using the socalled "effects coding" for the dummy variables). Standard errors are computed according to Jann (2008). *: statistically significant at 10 percent; **: statistically significant at 5 percent; ***: statistically significant at 1 percent.

Source: World Bank Survey on Gender Norms in Bangladesh (2006).