HACETTEPE UNIVERSITY INSTITUTE OF POPULATION STUDIES
ECONOMIC AND SOCIAL DEMOGRAPHY PROGRAM

SAMPLING ERROR ESTIMATION BY USING DIFFERENT METHODS AND SOFTWARE IN COMPLEX SAMPLES

Dilek YILDIZ

M.A. thesis submitted for the partial fulfillment
of the requirements for the M.A. degree
in Economic and Social Demography Program at Hacettepe University
Institute of Population Studies

Ankara

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Ankara
August, 2011

This is to certify that we have read and examined this thesis and in our opinion it fulfils the requirements in scope and quality of a thesis for the degree of Master of Arts in Economic and Social Demography.

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.... /…./2011

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ACKNOWLEDGEMENT

I owe my deepest gratitude to my supervisor Ahmet Sinan Türkyılmaz, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject and complete the thesis.

I am grateful to Tuğba Adalı, for her patience, guidance and answering my questions even from abroad. This thesis would not have been possible without her priceless contributions. I also want to thank Fulya Hande Tunçkanat, Ayşe Özgören, Pelin Seçkiner and Berna Şafak Zülfikar for their friendship and support. I would like to express my sincere gratitude to Serhat Ulaş for his endless support and patience.

Lastly, I would like to give my special thanks to my dear mother Hatice Yıldız and my beloved grandmother Fatma Baş for trusting in me and for their love.

SUMMARY

The aim of this thesis is to estimate the sampling errors of selected variables of Turkey Demographic and Health Survey-2008 (TDHS-2008) data by using different methods and software. TDHS-2008 sample was selected by using a weighted, multistage, stratified cluster sampling. Sampling designs that differentiate from simple random sampling are called complex sampling designs and require specific treatments. Therefore, sampling errors as well as other statistics from the TDHS-2008 data should be computed by taking its sample design into account. Taylor series linearization, balanced repeated replication and jackknife repeated replication techniques are used to estimate variances of selected variables of TDHS-2008 in the thesis.

Not all statistical software are capable of dealing with complex sample survey data. The variances of selected variables given in TDHS-2008 main report are estimated by using ISSA Sampling Error Module (SAMPERR). Additionally, five statistical software were selected to compute sampling error estimates of selected variables in the thesis. These software are; PASW Statistics 18 (formerly known as SPSS), Stata 11, WesVar 5.1, SAS/STAT and IVEware. By using the available variance estimation methods in these software, sampling errors of variables are calculated with eleven different approaches. The estimations of proportion, standard error, design effect, coefficient of variation, lower and upper bounds are tabulated for eight domains; Turkey, urban, rural, West, South, Central, North and East regions. The design effect values computed with different software and methods within software are differ from each other and from ISSA-SAMPERR. Considering all approaches, jackknife n repeated replication technique is found the most eligible technique for sampling error estimations of TDHS-2008 variables.

Keywords: complex samples, variance estimation, Taylor series linearization, balanced repeated replication, jackknife repeated replication

ÖZET

Bu tezin amacı Türkiye Nüfus ve Sağlık Araştırması, 2008 (TNSA-2008) verisinden seçilen değişkenler için örnekleme hatalarını farklı yöntemler ve yazılımlar kullanarak tahmin etmektir. TNSA–2008 örneklemi ağırlıklı, çok aşamalı, tabakalı küme örneklemesi yaklaşımı kullanılarak seçilmiştir. Basit rasgele örnekleme yöntemi dışında bir örnekleme yöntemi kullanılarak seçilen örneklem tasarımları karmaşık örneklem tasarımı olarak adlandırılır ve özel işlem gerektirir. Bu nedenle, TNSA-2008 verisinin örnekleme hataları, bu veriden hesaplanacak diğer istatistikler gibi örneklem tasarımını dikkate alarak hesaplanmalıdır. TNSA–2008 verisinden seçilen değişkenlerin varyanslarını tahmin etmek için Taylor lineerizasyon metodu, dengelenmiş tekrarlı yöntem ve jackknife tekrarlı yöntem kullanılmıştır.

Sadece bazı istatistik yazılımları karmaşık tasarımlı alan örneklemesi araştırmaları analizi yapabilirler. TNSA–2008 veri setinden seçilen değişkenlerin örnekleme hataları ISSA programının "Örneklem hataları hesaplama modülü" (SAMPERR) kullanılarak hesaplanmıştır. Buna ek olarak, bu tezde örnekleme hatalarını hesaplamak için beş tane istatistik yazılımı seçilmiştir. Bu yazılımlar, PASW Statistics 18 (daha önceki adı SPSS), Stata 11, WesVar 5.1, SAS/STAT ve IVEware'dir. Farklı yöntemler ve yazılımlar kullanılarak örnekleme hataları toplam onbir yaklaşım ile hesaplanmıştır. Orantı, standart hata, desen etkisi, göreceli hata ve güven aralıkları Türkiye, kent, kır, Batı, Güney, Orta, Kuzey ve Doğu bölgeleri olmak üzere sekiz nüfus alanı için hesaplanmıştır. Farklı programlarla ve aynı program içinde farklı yöntemlerle hesaplanan desen etkileri birbirleriyle ve ISSA-SAMPERR ile aynı sonuçları vermemektedir. Tüm yaklaşımlar dikkate alındığında jackknife n tekrarlı yöntemi TNSA-2008'den elde edilen değişkenlerin örnekleme hatalarını hesaplamak için en uygun yöntem olarak bulunmuştur.

Anahtar kelimeler: karmaşık örneklem, varyans, Taylor lineerizasyon metodu, dengelenmiş tekrarlı yöntem, Jackknife tekrarlı yöntem

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ABBREVIATIONS

BRR:	Balanced Repeated Replication
Deff:	Design Effect
Deft:	Design Factor
EPSEM:	Equal Probabilty of Selection Method
Fpc:	Finite population correction
IPNS:	Interpenetrating Network of Subsampling
JK:	Jackknife Repeated Replicaton
TDHS-2008:	Turkey Demographic and Health Survey, 2008
TSL:	Taylor Series Linearization
p:	Proportion
PSU:	Primary Sampling Unit
se:	Standard Error
SECU:	Sampling Error Computation Unit
SRS:	Simple Random Sampling
SSU:	Scondary Sampling Unit

1. INTRODUCTION

There is a continuous need for social, economic, demographic and health data for policy development, sustainable management all over the world. Especially in developing countries, data gathering is critical for monitoring the progress made by these countries and to position them within the stages of the demographic transition.

The planning of schooling investments, essential number of contraceptives, vaccinations, retirement homes etc. require the sizes and characteristics of subpopulations. Data about these subpopulations should be accurate and up to date to get correct information. Every country uses one or more main sources of data for this need which are; censuses, registration systems and surveys. They are used in different areas and situations according to their advantages, disadvantages and the type of data needed. They are examined in the following paragraphs in terms of providing the three important criteria of developing statistics, which are; randomness, representativeness and reality. It is difficult for one data source to satisfy all criteria at the same time. Evaluation of all possible data sources should be made and the best fitted one must be selected.

Censuses are used to gather data from the whole population. They are strong with the reality criterion, according to date the census is conducted on. However, conducting censuses for vast populations is not always feasible due to the need of high budgets, long durations of time and trained interviewers. Besides censuses usually have high measurement errors than other data gathering techniques. Furthermore, even if budget, time and measurement error burden are ignored reaching the whole population of interest may be physically impossible (Kish 1979). Nevertheless, censuses are conducted all over the world mainly by governments and they form an excessive part of collected data. Brunt (2001) summarizes the difficulties about censuses as follows:

> "The problem with a census was that it was very costly to undertake. Only Governments had the sources, authority and the organization to undertake a large scale enumeration and even most Governments tackled the task reluctantly with considerable difficulty" (Brunt 2001).

An important disadvantage of censuses is that, especially, in less developed countries, all population of interest cannot be reached and data becomes deficient. Apart from difficulties, the numbers of questions asked in a census are limited due to time limitations.

Another data gathering technique is registration systems. All governments collect data by registers. Every citizen's information at least individual level such as name, age and place of residence are registered in some institutions, for instance statistical offices and health facilities. Like censuses, registration systems may not cover all the population. Especially information about disadvantaged groups can be easily missed out. Unfortunately, it cannot be said that the registration systems in Turkey is exactly complete and reliable. According to the Turkey Demographic and Health Survey 2008 (TDHS-2008), 6.3% of children under five years are not registered with the civil authorizes. The same percentage is calculated as 11%, for the East region, where the population of disadvantaged groups is relatively larger than other regions. When registration systems cannot reach every individual or unit of the population, necessary data can be collected by survey samples. In least developed and developing countries, demographic and health surveys have been conducted for decades to fulfil the deficiency of data especially in health issues.

A sample survey[1] is, as mentioned before, an important source of statistical information, especially in developing countries where registers are not always reliable and censuses are incomplete or collect limited information. Sample surveys

[1] For detailed information about sample surveys, Kish, *Survey Sampling*, 1965 can be studied.

are specially designed surveys that are conducted to produce statistical information to represent the whole population. They are also convenient in collecting detailed information on a specific topic or about a specific part of the population such as women, children under five or elderly people. Subpopulations are selected as a substitute of the whole population and the estimated statistics produced are proxies of the real/actual ones. "Sample surveys are flexible in terms of coverage, size, content, and other aspects of design and methodology" (Verma 2002). Therefore, they can be compared with complete censuses. The statistics calculated from sample surveys are reliable, because they are within known confidence intervals produced from known standard errors. Among other research techniques, sample surveys are the ones that are strong on all realization, randomization and representation.

The data source of the thesis is Turkey Demographic and Health Survey 2008 (TDHS-2008). TDHS-2008 is associated with worldwide Demographic and Health Surveys (MEASURE/DHS+) project which includes more than 200 surveys conducted in 85 countries. The DHS program aims to collect information about fertility, family planning, maternal and child health, gender, HIV/AIDS, malaria and nutrition (MEASURE DHS webpage). TDHS-2008 is fully comparable with the other surveys conducted all over the world. Surveys are formed according to countries' needs and conditions, information about HIV/AIDS and malaria were not collected in TDHS-2008.

Surveys have always been compared with censuses and registers according to their use and reliability. For instance, Kish (1979) in his article "Samples and Censuses" explains the shortcomings of registers as:

> "Data from registers, like censuses, are detailed and precise. However, their accuracy varies greatly: electric bills and reported wages may be more accurate then interviews; but birth and death registers are known to be woefully inaccurate in many countries. The data are often timely and up-to-date".

In the same article he also compares samples, census and administrative registers for eight criteria (Kish 1979). In his comparison, samples are found advantageous in being; *rich, complex, diverse, flexible; accurate, relevant, pertinent; inexpensive; timely, opportune, seasonal and population content.* And, censuses are advantageous in being; *precise, detailed and inclusive, credible.* However, it has also been claimed that they have something in common. Thompson (1944) associates a census and a survey by noting that a census can be considered as a survey which the selected sample is the whole population.

Sample surveys meet all three criteria (randomness, representativeness and reality) of producing statistics. The reason behind this is its complex design. The *selection procedure* and *estimation procedure* form the aspects of the sample design. Sample selection procedure of a survey must be done carefully, since selection affects the whole survey procedure. Furthermore, estimates should be calculated in accordance with the selection method. If the selected sample is not a *probability sample*, in which every element in the population has a non-zero and known selection probability, the survey would not be representative and acceptable statistically. Verma (2002) expresses this estimation aspect as;

> "The estimation procedure involves the statistical and mathematical forms in terms of sample values and possibly also of information from other sources external to the sample; it provides estimations which are used to produce sample estimates of population parameters of interest. The procedure also includes the estimation of measures of uncertainty ("sampling error", "confidence interval" etc.) to which the sample results are subject" (Verma 2002).

Other important criteria of sample design are determined as: (1) good orientation, (2) measurability, (3) practicality and (4) being economical.

Analyzing survey data requires good knowledge about the type of data and survey design. Selection of appropriate estimation method and software should be done according to the design employed in sample selection. If a complex design[2] is employed, not all statistical software packages would be convenient to use. Some packages which are capable of complex sample analyses are; SAS (Statistical Analysis System), PASW (formerly SPSS, Statistical Package for the Social Sciences), Stata, S-plus, R, MATLAB (Matrix Laboratory), SUDAAN, WesWar, Epi Info, CENVAR, CLUSTERS, PC CARP, VPLX (Lepkowski, and Bowles, 1996; Karim, 2003). In the thesis five of these software are used; PASW, Stata, WesVar, SAS and IVEware. Accesible five softwares were chosen to use in the thesis according to their frequent use in sampling error estimation.

Nevertheless, like all sample surveys, TDHS-2008 which is the data source of this thesis is not free of errors and analysis from this survey data should be made by considering its errors. Generally, all statistics should be evaluated with their errors. Types of survey errors can be organized into two parts, in three different ways as follows.

1) a) Measurement errors,
   b) Estimation errors.
2) a) Variance,
   b) Bias.
3) a) Non-sampling errors,
   b) Sampling errors.

Types and content of errors will be explained in detail in the methodology part. Since the aim of this thesis is to recalculate and compare the sampling errors of selected variables in TDHS-2008, a brief explanation of sampling error is needed.

[2] Every design involving one of stratification, clustering, unequal probability sampling (other than simple random sampling (SRS)) is called complex design.

Sampling error is a measure of the variability that occurrs by selecting a sample from the whole population. The precision of sample surveys can be measured by sampling errors. They are also useful for indicating the accuracy of the estimates. The sampling errors for selected variables in TDHS-2008 are given in Appendix B of the report (TDHS-2009). In complex designed sample surveys, not only the estimation of point estimates, but also sampling error calculation is difficult and complex. Moreover, not all software packages are capable of calculating it. TDHS-2008 sampling errors for selected variables were calculated by ISSA (Integrated System for Survey Analysis) Sampling Error Module (SAMPERR) (Türkyılmaz et al. 2009).

This thesis aims to (1) calculate sampling errors of selected variables of TDHS-2008 survey by using different techniques and software; (2) compare PASW, STATA, WesWar, SAS/STAT and IVEware according to their capability of dealing survey data, available techniques and precision of their sampling error outcomes with each other and with ISSA-SAMPERR; (3) present the syntaxes used. In addition to these, Taylor series linearization, balanced repeated replication and jackknife repeated replication techniques will be investigated.

The second part of thesis is an “Overview of Survey Sampling and Literature Review” in order to present the historical background of sample surveys and sampling errors. Additionally, comparative studies for variance estimation in complex samples are mentioned. Then in the third part; methodologies of sampling errors, software and data source are explained. This part includes brief explaination for the Taylor Series Linearization method, balanced repeated replication method and Jackknife replication method. In addition to these methods, different software will be discussed according to their capabilities of sampling error calculation in complex designed sample surveys. The main emphasis will be on PASW, STATA, WesWar, SAS/STAT and IVEware. In the fourth part, comparisons of results are given in tables. Finally, the thesis will end with the conclusion section. Syntaxes of different

calculations and sampling error tables of eight domains are included in Appendix A and Appendix B respectively.

2. OVERVIEW OF THE SURVEY SAMPLING AND LITERATURE REVIEW

2.1 SAMPLE SURVEYS

Sample surveys are conducted to collect information from a subset of a population, which is called a sample, and then make inferences for the whole population based on the collected sample information. Surely, not any subset will result on correct inferences. A careful formation of the survey design and appropriate analyses of survey data regarding its design must be performed to estimate population parameters correctly.

Sampling is basically selecting a part of a population to represent the whole population. Sampling is used in everyday life for different types of populations. In daily life, it is used without knowing in many different areas such as tasting cheese before buying it. However, the method for statistical sampling is "… a scientific and objective procedure of selecting units from a population and provides a sample that is expected to be representative of the population as a whole" (Sukhatme 1954).

John Graunt, who is generally regarded as the founder of formal demography, is also mentioned as being the first to make statements about a population by using information only from a part of it (Bethlehem 2009).

Brunt's (2001) article provides detailed information about the early years of sample surveys. The first surveys were conducted by Arthur Young in 1768 and 1770 to gather information about rural economy and farming practices from the north and east of England. Young's survey consisted of 413 farms throughout England. His study became the major source of information on rural economy in 18^{th} century. In 1795, David Davies conducted a postal survey to determine poverty. He tried to gather information from fellow ministers of the Church of England. Information

about 34 parishes was sent to him. However, his work was judged for being unrepresentative, since returned information was self selected. To discard the problems in representativeness, Eden (1797) sent a researcher to collect data. He collected data from fewer households, but his data was subjected to less sample selection bias. Although sample surveys are still very common in agricultural sciences, they were forgotten about for a while and rediscovered, in the second half of the 19th century. There are two reasons for this situation. First of all, information from whole population became accessible with censuses in the early 19th century. Secondly, population statistics was developed rapidly by the studies of Poisson, Gauss, Quetelet and others'. In 1835, a normal distribution around a true value was assumed by Quetelet (Brunt 2001).

Anders Kiaer, the founder of Statistics Norway, with his 1895 paper, started the process that ended in the development of modern survey sampling theory and methods. Kiaer conducted a sample survey to examine proposed retirement and sickness throughout Norway. He used a stratified purposive selection in the survey, which was called "representative method". Kiaer (1897) recommended the International Statistical Institute (ISI) to use sampling methods including stratification, clustering and multistage sampling. In 1903, ISI decided to use the "representative method". Detailed information about Kiaer's survey and methods can be found in his papers dated 1895, 1897, and 1901. Arthur Bowley (1926) who was interested in Kiaer's method developed random selection method with equal probabilities. He also played role in ISI's resolution adopting Kiaer's representative method in 1901 (Hansen 1987; Bethlehem 2009).

Rothamsted Experimental Station, the oldest agricultural research station in the world, is the birthplace of modern statistical theory and practice in 1920s. Fisher (1925) contributed to experimental designs in terms of randomization, replication and local control, Yates and Zacapony (1935) in terms of replication and randomization. In addition to these, stratification and multistage sampling and

variance estimates are developed in Rothamsted (Hansen 1987; Rothamsted website).

In the early and mid 1930s, sample surveys had became widespread. In 1934, Neyman introduced the concept of "probability sampling", optimal allocation and the theory of estimation based on confidence intervals in his famous paper. He also compared probability sampling and purposive sampling and claimed that probability sampling was superior to Kiaer's purposive sampling method (Bethlehem 2009).

From the mid 1930s and on, methods of survey sampling improved rapidly with the contributions of Cochran in 1939 on the use of analyses of variance and in 1942 on the use of regression estimation, Hansen (1939) by conducting one of the earliest modern probability samples for the Monthly Survey of Unemployment, Hansen and Hurwitz (1943) in the multistage samples approach, W.G. Madow and L.H. Madow (1944) in systematic sampling theory, Mahalanobis (1946) with the philosophy of "statistical engineering", Sukhatme (1946) in the control of nonsampling errors and Kish (1949) with the selection table, now known as the Kish selection table (Hansen 1987; Kalton 2001; Groves et al. 2004; Bethlehem 2009).

Modern sampling method use was supported, recommended and explained to national statistical institutes with the foundation of the Sub-commission on Statistical Sampling of the United Nations Statistical Commission in 1947. The importance and success of this commission lies in its precious members; Darmois, Deming, Mahalanobis, Yates and Fisher (Bethlehem 2009).

As a result, contributions of all statisticians who studied probability and sampling starting from the end of the 19th century, survey sampling theory was developed in mid the 20th century. Bethlehem (2009) summarizes this progress as follows:

> "The classical theory of survey sampling was more or less completed in 1952. Horvitz and Thompson (1952) developed a general theory for constructing unbiased estimates. Whatever the selection probabilities are, as long as they are known and positive, it is always possible to construct a useful estimate. Horvitz and Thompson completed the classical theory, and the random sampling approach was almost unanimously accepted. Most of the classical books about sampling were also published by then (Cochran 1953; Deming 1950, Hansen, Hurwitz and Madow 1953, Yates 1949)" (Bethlehem 2009).

One of the major contributors to the field of survey sampling is Leslie Kish. He is also one of the founders of the Survey Research Center at the University of Michigan, where he worked for 53 years until his death in 2000. Kish's studies brought survey sampling to an advanced level. He resolved three important problems on sampling methods; (1) by generating Kish's selection table (Kish 1949), (2) including nonresponse in surveys and (3) developing the multiple stratification method (Goodman and Kish 1950). Kish's work has an essential position in this thesis with his important impacts on variance estimation and the concept of design effect. Kish (1957) promoted the computation of sampling errors according to the sampling design instead of depending on the corresponding simple random sample formulas. He developed a relatively simple method for designs with two primary sampling units (PSUs) in each stratum (Kish and Hess 1959; Kish 1968). Design effects, which are important tools to compare variances for parameters from differently designed surveys, are used as the key computation in this thesis. Kish and his colleagues took advantage of computers in sampling error estimation by developing "Sampling Error Estimation Package" (Kalton 2001).

Kalton (2001) explains Kish's contribution to variance estimation complex sample parameters as:

> "With his doctoral student Martin Frankel, he also extended the range of statistics for which sampling errors from complex sample designs could be computed (Kish and Frankel 1970, 1974). This highly influential research developed, applied, and evaluated balanced repeated replication (BRR) and jackknife repeated replication (JRR) methods of variance estimation" (Kalton 2001).

Kish contributed to survey sampling in many other aspects such as his work regarding multipurpose surveys, small area estimation, nonsampling errors, observational studies and other problematic areas. The coverage of all his work is beyond the scope of this thesis. Kalton's (2001) paper "Leslie Kish's Impact on Survey Statistics" provides further information.

Sample surveys are among important types of data gathering techniques and are used frequently all over the world. Sample surveys provide data on health issues, demography, commodity stocks and flows, earnings and expenditures, market researches and various other topics. Especially, developments in health issues are tracked with sample surveys in developing countries (Heeringa, et al. 2010).

2.1.1 Sample Surveys in Demography

Sample surveys are conducted for gathering information about a wide range of areas and topics. The main emphasis in this thesis is on demographic and health surveys, since Turkey Demographic and Health Survey-2008 data is used to understand the different approaches in sampling error calculations. Sample surveys dealing with demographic and health issues all over the world, especially in less developed and developing countries have been conducted for many years. Some examples of these surveys are given below.

Two major surveys conducted to provide information about population health are World Fertility Surveys (WFS) and Contraceptive Prevalence Survey (CPS). While the former was conducted in 1970s, it was replaced by the latter in the early 1980s. Some other examples for sample surveys are; Demographic and Health Surveys (DHS), the National Comorbidity Survey Replication (NCS-R) (2002), the Health and Retirement Survey (HRS) (2006), the National Health and Nutrition Examination Survey (NHANES) (2005-2006) and Multiple Indicator Cluster Surveys (MICS) (Heeringa, et al. 2010).

Demographic and Health Surveys (DHS) have been conducted by MEASURE DHS, since its foundation in 1984 in over 85 countries. The project aims to collect detailed information on population and health issues. The very first DHS Survey was conducted in El-Salvador in 1985. The first Turkey Demographic and Health Survey (TDHS) was conducted in 1993 and the fourth and most recent one was conducted in 2008 (MEASURE DHS webpage; HUIPS webpage).

Nationwide sample surveys have been conducted in Turkey for more than forty years. Since the foundation of the Hacettepe University, Institute of Population Studies, sample surveys have been carried out every five years, starting with the 1968 Survey on Family Structure and Population Problems in Turkey (in collaboration with the Ford Foundation). A total of eight nationwide surveys have been held up to 2011 (HUIPS webpage).

Ever married women and birth history datasets of TDHS-2008 were analysed in this thesis. Like all surveys, TDHS-2008 data is subject to both sampling and nonsampling errors. In the next chapter, survey errors are explained in detail to develop a better understanding of the thesis and analysis.

2.2 SURVEY ERRORS AND SAMPLING ERRORS

It is inevitable for any type of statistic to be subject to errors. Therefore, it is necessary to know the types and magnitudes of such errors clearly when statistical data (from censuses, surveys etc.) are used. Limitations and quality of data should be well known before making any inferences and drawing conclusions. Data quality evaluation is also important for improvement of statistical sources and methods (Verma 2002). Data qualities of sample surveys are measured by survey errors. Types of survey errors are explained in this section.

Survey errors in a sample survey may arise from different reasons including measurement errors and estimation errors. The overall error from all sources in a sample is called total survey error. Briefly, it is also referred to as survey error.

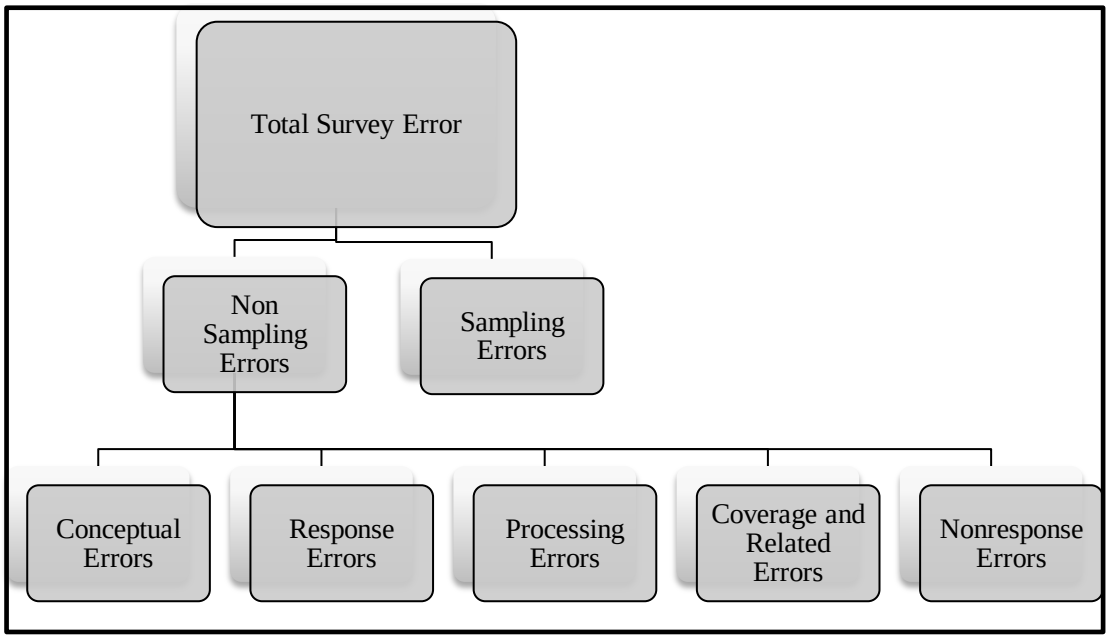
> "A typical survey objective is to estimate a descriptive population quantity using the values of the appropriate varieties for units in the sample. The total survey error in the estimate is the amount by which the estimate differs from the true value of the quantity for the target population" (Thompson 1944).

Survey errors can be categorised in different ways. Some of these categorizations are; measurement errors vs. estimation errors, nonsampling errors vs. sampling errors and variance vs. bias. Sampling errors, especially sampling variances are the main issues in the thesis.

Box 1 shows the categorization of types of errors as two categories; sampling errors and nonsampling errors. This categorization can also be done as measurement errors and estimation errors, as given in Box 2. In the latter, errors numbered 1 to 5 are called nonsampling errors. Conceptual errors include errors in basic concepts, definitions or classifications and errors in putting them into practise (questionnaire

design, interviewers training and instructions). Response errors include response bias, simple response variance and correlated response variance. Processing errors are editing errors, coding errors, data entry errors, programming errors, etc. Coverage and related errors arise from omissions, incorrect boundaries, outdated lists or sample selection errors. Non-response errors are refusals, inaccessible, not-at-homes, etc. Finally, sampling errors include; sampling variance and estimation bias (Verma 2002).

Box 1 Types of total survey error

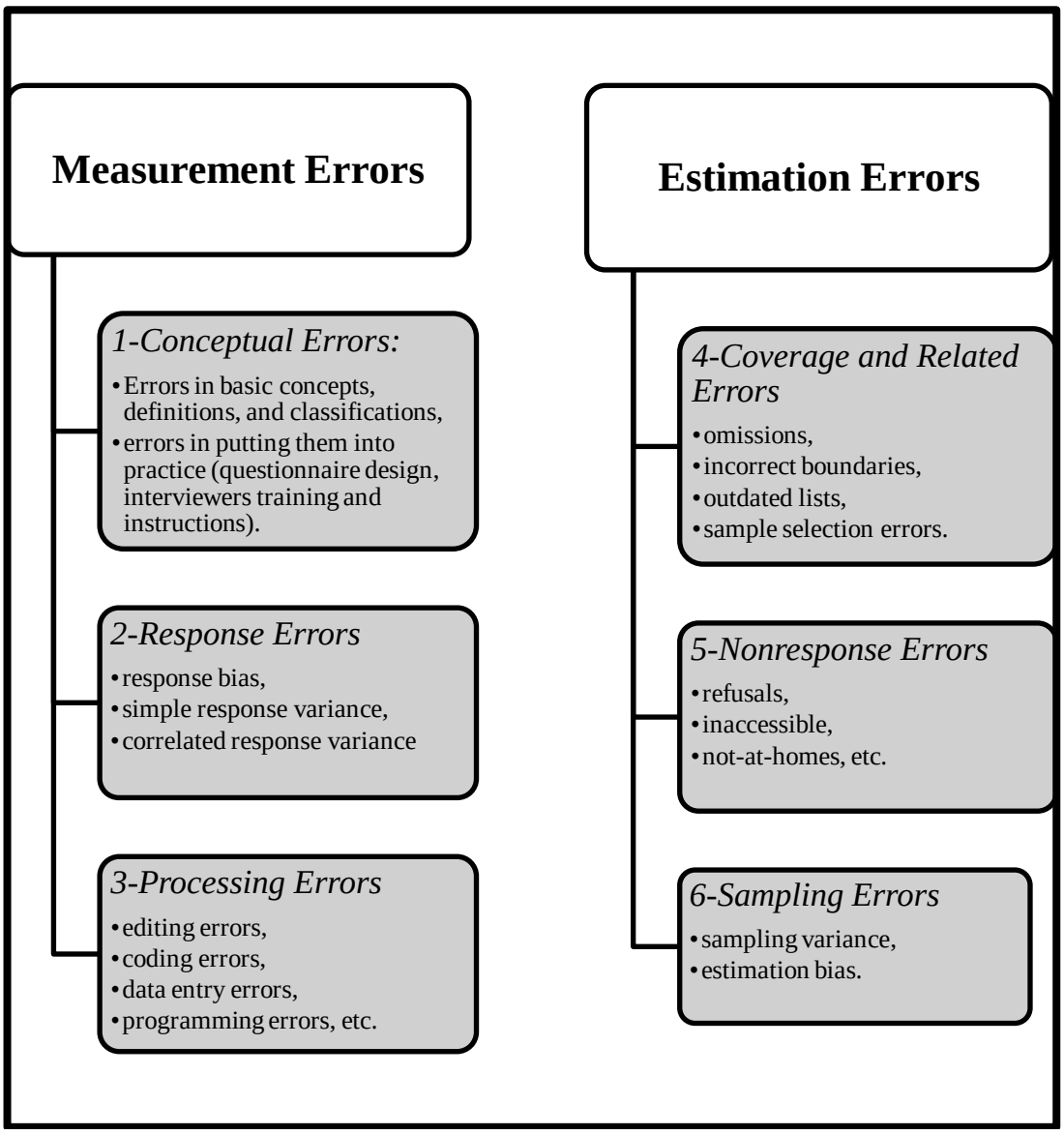


Measurement error is basically the difference between true value and measured value. It can originate from the questionnaire design, field work as well as from further office work (editing, coding etc.). Estimation errors originate from making inferences for the whole population by using sample information, by errors in sample frame and by the non response from some of the selected units.

As mentioned before calculating sampling errors is the main focus of the thesis. Verma et al. (2010) describe term as:

"Sampling error is a measure of the variability between estimates from different samples, disregarding any variable errors and biases resulting from the process of measurement and sample implementation."

Box 2 Types of survey errors and their contents



Source: Verma,2002.

Sampling errors are evaluated in two parts; sampling variance and estimation bias. Bias is the measure of validity. It is the difference between expected value and

true value of an estimator. Bias cannot be calculated in sample surveys since true value of the estimated statistic is not known. Explaining and understanding what "variance" means is not easy. The basic idea is that different samples from the same population provide different inferences regarding population parameters. Verma (2002) emphasises the presence of sampling variance in all possible samples of a population and explains the sampling variance as the uncertainity of factors that affected the selection even if all information is obtained without error (Verma 2002).

Variance formula for a population is;

$$\sigma^2 = \frac{\sum_{i=1}^{N}(Y_i - \bar{Y})^2}{N}$$

Element variance is calculated with the formula:

$$s_y{}^2 = \frac{\sum_{i=1}^{n}(y_1 - \bar{y})^2}{n} = \frac{\sum_{i=1}^{n} y^2{}_i - (\frac{y^2}{n})}{n-1}.$$

And the sampling variance is calculated with the following formula:

$$\text{var}\,(\bar{y}) = (1 - f)\,\frac{s_y{}^2}{n}.$$

An important measure of survey precision is design effect (deff). Leslie Kish (1965) was the first to use design effect to compare the statistical efficiency of a survey design with what would have been obtained in a simple random sample of the same size. Another measure derived from design effect is design factor (deft), which is the ratio of standard errors under actual design to under simple random sample (Le and Verma 1997; Kalton 2001). In other words, the design factor is the square root of the design effect. DHS prefers the design factor for its tabulations. The design effects are

calculated for selected variables in TDHS-2008 data in this thesis, the tabulated design factors from TDHS-2008 main report are transformed into design effects (by taking squares of design factors) and presented in the Appendix B.

Formulas for design effect and design factor are, respectively;

$$deff = \frac{\mathrm{var_D}\,(\bar{y})}{\mathrm{var_{SRS}}\,(\bar{y})},$$

$$deft = \frac{\mathrm{se_D}\,(\bar{y})}{\mathrm{se_{SRS}}\,(\bar{y})}.$$

2.3 SAMPLING METHODS

Sampling methods are used to determine the way a sample will be drawn from a population to make inferences about it. Different methods are used for different types of data. The main focus in survey sampling is on probability samples. In probability samples, sampling error can be measured objectively. Probability samples allow researchers to obtain population estimates from sample information. Additionally, the precisions of different designs and modifications of the same designs can be compared and precision of estimations can be evaluated. Sampling methods can be classified as; "epsem" sampling/simple random sampling, cluster sampling, stratified sampling, systematic sampling, multistage sampling and complex sampling. Epsem sampling is the basis of all sampling methods. It is acronym of "equal probability of selection method". It is the special form of probability selection, in which all elements in the population has equal selection probability. It is also known as "simple random sampling" (Hansen et al. 1953; Kish 1965). Other sampling methods are described in the following sections.

2.3.1 Simple Random Sampling

Simple random sampling is the underlying method of sampling theory. Despite its important role in understanding sampling theory and other sampling methods, simple random sampling is not a practical approach for sample surveys. If a sample of n elements is selected from a population including N elements, T samples can be selected by using permutations and combinations where;

$$T = \binom{N}{n} = \frac{N!}{n!\,(N-n)!}.$$

and N! = n x (n-1) x (n-2) x … (1) and 0! =1. Thus, every sample has the same selection probability of $\frac{1}{\binom{N}{n}}$. This sampling is without replacement, where every element can be selected only once. In sample surveys, sampling without replacement is used. If sampling with replacement is employed, one element can appear more than once in the sample. This approach is usually used for theoretical reasons. In simple random sampling every element has an equal chance $(\frac{n}{N})$ of being selected (Hansen et al. 1953; Levy and Lemeshow 2008).

Simple random sample is not really appropriate for sample surveys, especially household surveys like the Turkey Demographic and Health Surveys. The reason is that selected sample elements can be spread over a large area, causing high costs regarding time and field work (accommodation, travel, etc.). Another reason is the chance of a “bad sample” selection. Bad samples are still random samples, however, their elements are accumulated according to a variable, such as geographical unit. For example, it is probable for a random sample of the population to representing mostly a small or local area. Besides, if estimations for subgroups are needed, simple random sampling would not serve the purpose. A sample drawn by simple random sampling may results in very few elements with a certain characteristic that defines a

subgroup. Thus there may not be enough cases to make estimations for that particular subgroup. Variance estimation formula under a simple random sampling design is given in methodology chapter (Hansen et al. 1953; Levy and Lemeshow 2008).

2.3.2 Cluster Sampling

It is usually not feasible in sample surveys to visit units selected with simple random sampling. It requires a long time interval, large and well trained field staff, sufficient number of trainers to train the field staff, and a budget to cover all these as well as other field costs such as travel and accommodation of field staff. In cluster sampling, elements in the population are grouped according to specific characteristic, which are usually geographic or spatial in order to reduce costs. Each element of the population is included in one cluster. Clusters may be blocks, dwellings, classes or time periods (e.g. for estimating traffic in a specific road). Clusters maybe equal or unequal sized, with different numbers of elements. Considering the TDHS-2008, 13,510 households were selected to the sample. If simple random sampling was used, 13,510 different places for each household would have been visited (Levy and Lemeshow 2008; Türkyılmaz et al. 2009).

Cluster sampling is usually used within multistage sampling. For example, cluster selection may be done with simple random sampling or clusters may be selected from strata. After the selection of clusters, elements are selected within these clusters. Ideally, units in clusters should be heterogeneous, because homogeneity within clusters causes high standard errors. However, heterogeneity within clusters cannot always be provided in household surveys. Since, socio-economic standards of households within small areas (in this case, clusters) are usually alike; people may tend to answers some questions similarly. For instance, the majority of a neighbourhood may shop from at the local market. In a market research, if the brand of shampoo which household members use is asked, the majority will indicate the ones sold in their local market. The source of drinking water is also a good example

for this situation. Within the same neighbourhood, it is not likely for some households to have pipe water and others to have well water. (Kish 1965; Levy and Lemeshow 2008).

2.3.3 Stratified Sampling

Stratified sampling was introduced by Kiaer's 1895 paper, "Observations and experiences with representative surveys", and developed at the Rothamsted Experimental Station (England) in 1920s and 1930s. In 1924, Jansen, a Danish statistician was assigned to investigate Kiaer's representative method. Jansen emphasized the importance of the method. There were only few theoretical papers in the issue until Bowley's 1926 paper. Bowley was influenced by Kiaer's studies and developed random selection method with equal probabilities.

In stratified sampling, the population is divided into exhaustive and mutually exclusive subgroups. In other words, population is divided into strata, in a manner that, each element in the population is assigned to one stratum and strata are not overlapping. Sample units within strata are selected independently. This, independency lets researchers to make estimates for each stratum separately as well as the whole population. Stratified sampling is advantageous in providing flexible sample design, allocation in subgroups and relatively high statistical efficiency (Verma 2002). Stratification is made according to a stratification variable, which should have a known value for each unit in the population. The stratification variable cannot be a survey variable at the same time. A population can be stratified according to various variables; it could both be geographical (urban/rural residence, regions, etc.) and non-geographical (socio-economic statuses, ages, etc.). In these situations, the value of the stratification variable (type of place of residence, socio-economic status, age, etc.) should be known for each sampling unit (household, individual or other) at the stage of survey design, before sample selection. Stratification requires homogeneity within strata and heterogeneity between strata.

When the strata are united they form the whole population. The use of mutually-exclusive strata strengthens representativeness of the sample. Additionally, stratification decreases the total variance.

If the population is divided into L strata, then the number of possible stratified samples is equal to

$$\binom{N_1}{n_1} \text{ x } \binom{N_2}{n_2} \text{ x ... x } \binom{N_L}{n_L}.$$

This number is less than or equal to the number of possible simple random samples ($\binom{N}{n}$), which can be selected from the same population (Levy and Lemeshow, 2008).

Once stratification is decided to be employed as sampling method, researcher should decide which allocation technique to use. In equal allocation, sample sizes are equal in each stratum. Number of elements in each stratum is equal to

$$n_h = \frac{n}{L}.$$

Where, n_h is the size of *h*th sample, n is the total sample size and L is the number of strata. In proportional allocation, self weighting samples are constructed, meaning, the sizes of each sample (n_h) is associated with the sizes of stratum (Nh) and its ratio to whole population size N. Sample size for stratum h is calculated with the following formula;

$$n_h = N_h \text{ x } \frac{n}{N}.$$

Another type of sample is allocation is Neyman allocation, which is used to maximize the survey precision. This method provides the smallest sampling variance for the statistic of interest. Neyman allocation requires known standard deviations for each stratum. Standard deviations may be borrowed from previous studies. The stratum sample size for Neyman allocation is calculated as;

$$n_h = k\, W_h\, S_h$$

where

$$W_h = \frac{N_h}{N},$$

$$k = \frac{n}{\sum_{h=1}^{H} W_h S_h}.$$

Neyman allocation can be extended to the "optimum allocation" by adding costs to the strata sample size calculations. If the fixed cost is equal to $J = \sum_{h=1}^{H} n_h\, J_h$, then the sample size of stratum h is equal to;

$$n_h = \frac{k\, W_h S_h}{\sqrt{J_h}}.$$

2.3.4 Systematic Sampling

Systematic sampling was introduced by L.H. Madow and W.G. Madow in 1944 and developed further by L.H. Madow, Cochran, Yates and W.G. Madow (1949, 1953). Madow and Madow (1944) developed the theory of systematic sampling treating single elements as sampling units. Lillian Madow (1946) examined the relation between systematic sampling and other sampling designs. Cochran (1946) stated that: "…, the systematic sampling is on the average more accurate than the stratified sample for any size of sample". A similar conclusion was drawn by Yates (1948). In 1949, W.G. Madow extended the theory by using equal and unequal sized clusters as sampling units. Systematic sampling is briefly explained in the following paragraph and corresponding formulas for variance estimation are given in the methodology chapter.

Systematic sampling is widely used as an alternative to simple random sampling. Its procedure is simple and it is easy to use by researchers with little knowledge of sampling. In systematic sampling, sample is divided into intervals with lengths (I) and one or two elements from each interval are selected. The procedure

starts with a selection of random start r, from the first interval, between 1 and I, where I=N/n. The random start also determines the first selection. The next selection is determined by adding I to the former selection. The following figure will be helpful to explain the procedure more clearly. Suppose a sample of 10 will be selected from a population including 50 elements with systematic sampling; I is calculated as I=N/n=50/10=5. If the random start is selected as 3. The sample consisted of the 3rd, 8th, 13th, …, 43rd, 48th observations.

Box 3 Systematic selection

1st selection=random start=3

2nd selection= r+I= 3+5=8,

3rd selection=r+2I=3+2x5=13,

9th selection=r+ (n-2) I= 3+8x5=43,

10th selection=r+ (n-1) I= 3+9x5=48.

1st selection	2nd selection		(n-1)th selection	nth selection
1,2,…, r,…,I	I+1,,…, r+I,…,2I	…	(n-2)+1,…,r+(n-2)I, …,I	(n-1)I+1,…, r+(n-1)I,…,N
1,2,**3**,4,5	6,7,**8**,9,10		41,42,**43**,44,45	46,47,**48**,49,50

2.3.5 Multistage Sampling

Multistage sampling method is used in many household surveys due to practical reasons. A combination of different methods is used in multistage sampling. One of the most common applications of multistage sampling involves the population being divided into clusters or enumeration areas in the first stage, and

selecting a sample among these units. In this case, these units in the sample of clusters or enumeration areas are called primary sampling units (PSUs). In other words, primary sampling units are the units selected in the first stage. In the second stage, units are selected within the selected clusters. This selection may be done with simple random sampling or systematic sampling. Units selected in the second stage are called secondary stage units (SSUs) (Verma 2002). Dividing the population into strata and then selecting clusters from each stratum may be another example for multistage sampling. In this case, if all units from clusters are included in the sample, it is called two stage sampling. If another selection is done within clusters, then it is a three stage sample design.

Multistage sampling is advantageous in many ways. It is used to create representative samples. In addition, employing cluster sampling reduces travelling and time costs. It also reduces listing operations. A better data quality is provided since coverage, supervision and control of data are improved. However, employing multistage sampling causes higher sampling errors and complicates making inferences from sample (Verma 2002). Estimations from samples selected with multistage sampling must be calculated carefully.

2.4 COMPLEX SURVEYS

Survey designs different than simple random sampling are called complex survey designs. Social surveys, health surveys, agricultural surveys are usually designed in a complex way, instead of simple random sampling. It would be very expensive to conduct nationwide household surveys with large samples and many variables with simple random surveys or single stage surveys. Hence, stratification is employed to guarantee representation, single stage or two-stage cluster sampling is employed to reduce costs and unequal probability selection is made to get enough observations for subgroups. Complex samples are also efficient in improving statistical efficiency. Complex surveys may include all or some of stratification,

multistage, cluster sampling and unequal selection probability methods. Therefore, inferences from complex sample surveys should be made with specific methods that account for the sample design. Weights should be used to make estimations from unequal probability samples, so that units are represented as they are in total population. Stratified, cluster and unequal probability samples require different formulas for variance estimation. Usually statistics of interests from these surveys are not linear. Even for linear parameters, complex surveys estimations are not easily calculated.

Variance estimations from complex survey data are calculated with special techniques. Taylor series linearization, balanced repeated replication and jackknife repeated replication techniques are the most widely used techniques, and they are explained in the methodology section. The tables constructed by using these techniques for selected variables from THDS-2008 data are given in the Appendix B. There are also several statistical software used for complex survey data analysis. Some of these software are used and compared in the next chapters.

2.5 LITERATURE ON COMPARISON BETWEEN DIFFERENT SOFTWARE FOR SAMPLING ERROR CALCULATIONS

It is important to use appropriate statistical packages and methods to make inferences from survey data. There are many statistical software used for complex survey data, including those used in the thesis, which are SAS, PASW (formerly known as SPSS), Stata, WesVAR, IveWare. In these software, several methods for variance estimation are available. Even though many surveys such as household surveys, have similar complex survey designs including stratification, multistage cluster sampling and unequal probability selection; minor differences in survey design and different types of variables require different treatments in variance estimation. Most of the time, software are selected according to researchers' personal choice. Yet, a good knowledge about statistical software and variance estimation

methods is compulsory for statistically acceptable results. Therefore, researchers should be aware of which software and methods are appropriate for a specific survey design. For this purpose, several studies were conducted to compare statistical software and variance estimation methods. Some of these studies are mentioned briefly in the following paragraphs.

One relatively earlier study on the issue is Cohen et al.'s (1986) paper, which dealt with four statistical programs: SESUDAAN/RATIOEST, SUPERCARP, PSALMS and HESBRR. The programs were compared according to ease of use, processing time (CPU time) and capabilities. Cohen et al. (1986) concluded that SESUDAAN/RATIOEST was the most convenient package to use for complex sample survey data analysis.

A comparative study on personal computers' use in variance estimation from complex surveys is made by Carlson, Johnson and Cohen (1993). SUDAAN, PC CARP and their counterparts (SESUDAAN, SUPER CARP and PC SUDAAN) are evaluated according to their run-time, difficulty, special features and requirements. Taylor series linearization approach is used to estimate variance of selected variables from 1987 National Medical Expenditure Survey.

Jim Lepkowski and Judy Bowles' (1996) article "Sampling Error Software for Personal Computers" was published in The Survey Statistician journal. Lepkowski and Bowles prepared a catalogue for eight statistical software; CENVAR,CLUSTERS, Epi Info, PC CARP, Stata, SUDAAN, VPLX and WesVarPC. Since, the software are not up to date; detailed information of software examined in the article is not given here.

An important source about sampling errors is one of the Demographic and Health Surveys Analytical Reports. Sampling errors of 37 different variables are calculated from 48 countries in the report "An Analysis of Sample Designs and

Sampling Errors of the Demographic and Health Surveys" (Le and Verma 1997). It is not directly linked to software or method choice, but it shows the variability of sampling errors according to country and different variables.

Cohen (1997) evaluated three software packages; Stata, SUDAAN and WesVarPC. Complex sample analysis modules were available in neither SPSS nor SAS at the publication date of this paper. The evaluation was focused on user facility, computer efficiency and program capabilities. As a conclusion, the writer leaves it up to the reader to decide which statistical package to choose.

A different study on variance estimation methods is Steven Paben's (1999) "Comparison of Variance Estimation Methods for the National Compensation Survey" article in the "Proceedings of the Section on Survey Research Methods". Taylor series linearization, balanced repeated replication, Fay's Method and Jackknife repeated replication methods are compared. This article deals with panel data and interested in bias and stability calculations.

Statistical survey packages which are capable of analyzing survey data are also discussed in Karim's paper (2003) "Analyzing Survey Data with Available Statistical Software Packages". Karim compared the use and limitations of SAS, STATA, SPSS, S-Plus/R, MATLAB, SUDAAN, WesVar, Epi-Info and CENVAR. However, the paper provides only brief information about programs and it is not up to date.

Another study in the issue is presented as a poster in SAS Global Forum 2007. Bell-Edison and Kromrey from University of South Florida compared the statistical results of complex sample analysis made by three different software. SAS version 9.1.3, SUDAAN SAS9-Callable 9.0.1 and AM version 0.0.6 are compared and identical results for point estimates of parameters, standard errors, confidence intervals and hypothesis tests were obtained from all.

Alves and Silva (2007) used Taylor series linearization, balanced repeated replication and jackknife replication techniques to estimate variances for an employment survey in Sao Paulo, Brazil. Their reference population was drawn by SEADE (State Statistical Data Analysis System Foundation) and they selected three samples of 2000 with three different sample designs. They used to mean square error and confidence intervals to evaluate variance and ratio estimations.

Replication methods; balanced repeated replication, Fay's Method, Jackknife repeated replication and bootstrap methods are compared in Chen and Adler's (2010) study. They used Producer Price Index data, which differs from TDHS-2008 severely, to determine the best fitting method and recommended bootstrap method.

Oyeyemi, Adewara and Adeyemi (2010) compared three statistical packages (SAS, SPSS and STATA) in terms of multiple regression analysis under complex sample settings. They used two complex surveys; the Medical Expenditure Panel Survey (MEPS, 2002) and the Nigeria Demographic and Health Survey (NDHS, 2003). As a result, they found the same results for standard errors of regression coefficients in SAS and STATA and higher results for most of the variables in SAS. Oyeyemi et al. came to the conclusion that SPSS is easier to use than other two packages.

One of the latest studies on software comparison for sampling error estimation takes part in the Appendix A of the "Applied Survey Data Analysis" book written by Heeringa et. al. (2010). Stata, SAS, SUDAAN, SPSS, IVEware, WesVar, Mplus and R software are compared according to their survet data analysis capacity. Four of the software (Stata, SAS, SUDAAN and SPSS) are reviewed in detail. More information about the book can be found on website of the book[3] (Heeringa et. all. 2010).

[3] http://www.isr.umich.edu/src/smp/asda/

There are many other different studies conducted on this issue however those considered the most relevant have been presented in this section. These studies comparing variance estimation methods and statistical software are helpful in deciding the proper tool for estimations. However, the thesis differs from former studies in combining methods and software. Taylor series linearization and replication methods in five different software are compared in the thesis.

In Turkey, there is not any study comparing methods and/or software for sampling error estimation. However, Ulusoy (1991) calculated design effect, rate of homogeneity and standard error values for selected variables from 1988 Turkish Population and Health Survet and compared results with 1978 survey.

In addition, sampling errors of selected variables have been presented in Turkey Demographic and Health Survey reports since 1994. Ulusoy and Aliaga calculated sampling errors of TDHS-1993 variables by using CLUSTERS package for 12 domain (Ulusoy and Aliaga, 1994). Aliaga and Türkyılmaz used ISSA SAMPERR for estimating sampling errors of eight domain (Aliaga and Türkyılmaz 1999). ISSA SAMPERR was also employed to estimate standard errors of 20 domains in TDHS-2003 and TDHS-2008 (Türkyılmaz 2004; Türkyılmaz and Adalı 2009).

3. METHODOLOGY

In this chapter, methodology of the thesis is explained in terms of variance estimation with different sampling methods, methods for estimating complex survey sampling errors, software used for calculating complex survey sampling errors and data source. Simple random sampling, cluster sampling, stratified sampling and systematic sampling are presented in the first section. Variance estimation from complex survey samples includes Taylor linearization method and repeated replications methods; balanced repeated replication and jackknife repeated replication. PASW, Stata, WesVar, SAS/STAT and IVEware software which were used in the thesis are mentioned in the third section of methodology chapter. Finally, the data source, TDHS-2008, is discussed in detail.

3.1 VARIANCE ESTIMATION WITH DIFFERENT SAMPLING METHODS

3.1.1 Simple Random Sampling

Simple random sampling (SRS) is the basis of sampling methods. Hence, understanding the calculations from simple random surveys is essential for further computations from complex samples. Variances for different types of variables (means, totals, ratios or rates) are estimated with different formulas. Variance estimations for variables selected from TDHS-2008 are proportions. Formulas for population and sample are given below. Capital letters denote population and small letters denote sample variables.

Population mean: $\overline{Y} = \sum_i^N \frac{Y_i}{N}$,

Population variance: $\sigma^2 = Var\,(Y_i) = \sum_i^N (Y_i - \bar{Y})/N$,
Standard deviation for population mean $\bar{Y}$: $\sigma = \sqrt{Var\,(Y_i)}$.

Sample mean: $\bar{y} = \sum_i^n \frac{y_i}{n}$,

Sample variance: $Var\,(\bar{y}) = (1-f)\frac{s^2}{n}$, where $s^2 = \sum_i^n \frac{(y_i - \bar{y})^2}{n-1}$

Standard deviation of the mean: se($\bar{y}$) $= \sqrt{Var\,(\bar{y})}$.

(1-f) is finite population correction (fpc) term. f=n/N. In large scaled surveys, such as nationwide sample surveys, (1-f) approaches 1. Hence, it has almost no effect on computations and omitted.

Variance estimation for a proportion variable is calculated differently. A proportion variable Y is either equal to 1 or 0. For example, if personal computer ownership is asked, the answers will be yes (1) or no (0). Then, proportion, sample mean is equal to;

Sample mean: $\bar{y} = \sum_i^n y_i$,

Element variance: $s^2 = p.q$,

Sample variance: $Var\,(p) = (1-f)\frac{p\,(1-p)}{n-1}$.

3.1.2 Cluster Sampling

Clusters from a population can be selected with different methods such as equal probability selection method (epsem), systematic, stratified or further clustered (Kish 1965). Below formulas are for samples from which clusters are selected with

simple random sampling. If a population is divided into "*A*" clusters and "*a*" of them are selected with simple random sampling, each of "*a*" clusters have exactly *B* elements and all of *B* elements are included in the sample, then the sample consists of n=*a.B* elements. Table 1 shows a population of N elements, with *A* clusters. In this case, sample mean and its variance, var ($\bar{y}$) are equal to;

$$\bar{y} = \frac{y}{n} = \frac{1}{n}\sum_{i}^{n} y_i = \frac{1}{aB}\sum_{\alpha}^{a}\sum_{\beta}^{B} y_{\alpha\beta} = \frac{1}{a}\sum_{\alpha}^{a} \bar{y}_\alpha,$$

$$var\,(\bar{y}) = (1-f)\frac{s_a^2}{a}, \text{where } s_a^2 = \frac{1}{a-1}\sum_{\alpha}^{a}(\bar{y}_\alpha - \bar{y})^2.$$

s_a^2 is the indicator of variance between cluster means, $\bar{y}_\alpha$.

Table 1 A population of N elements divided into *A* clusters of *B* elements each so that N=*A.B*

Clusters		1	2	α	A
Elements	1	Y_{11}	Y_{21}	$Y_{\alpha 1}$	Y_{A1}
	2	Y_{12}	Y_{22}	$Y_{\alpha 2}$	Y_{A2}
	β	$Y_{1\beta}$	$Y_{2\beta}$	$Y_{\alpha\beta}$	$Y_{A\beta}$
	B	Y_{1B}	Y_{2B}	$Y_{\alpha B}$	Y_{AB}
Cluster Totals		Y_1	Y_2	Y_α	Y_A
Cluster Means		$\overline{Y}_1$	$\overline{Y}_2$	$\overline{Y}_\alpha$	$\overline{Y}_A$

Source: Kish, 1965

3.1.3 Stratified Simple Random Sampling

Variances from stratified samples are usually smaller than variances estimated from samples which are selected by different methods. Variance estimation from a stratified sample differs from simple random sample estimations. Stratum weights are used in stratified samples to obtain a proper estimation. W_h is the weight of stratum h. Weights are directly related to the proportion of stratum h. The sum of weights is equal to 1. Following formulas are from Kish's (1965) book: "Survey Sampling".

$$W_h = \frac{N_h}{N} \; and$$

$$\sum_{h=1}^{H} W_h = 1.$$

Weighted population mean for stratified sample is calculated as follows:

$$\bar{Y}_w = \sum_{h=1}^{H} W_h \bar{Y}_h = W_1 \bar{Y}_1 + W_2 \bar{Y}_2 + \cdots + W_H \bar{Y}_H.$$

Sample mean of each stratum are calculated independently. Sample mean formula for a stratified sample is similar to population formula:

$$\bar{y}_w = \sum_{h=1}^{H} W_h \bar{y}_h = W_1 \bar{y}_1 + W_2 \bar{y}_2 + \cdots + W_H \bar{y}_H \text{ and}$$

variance of this mean is calculated with the following formula:

$$var(\bar{y}) = \sum_{h=1}^{H} W_h^2 \; var(\bar{y}_h).$$

The following mean and variance formulas for stratified element sampling are used when simple random sampling is used to select units from each stratum, 0 denotes simple random sampling:

Mean of stratum h: $\bar{y}_{h0} = \frac{1}{n_h}\sum_i^{n_h} y_{hi}$ and mean of any stratified random sample of elements: $y_{w0} = \sum_h^H W_h y_{h0}$.

The variance of the simple random sample of n_h elements in the *h*th stratum:

$$var(\bar{y}_{h0}) = (1 - f_h)\frac{s_h^2}{n_h}, \qquad where\ s_h^2 = \frac{1}{n_h - 1}(\sum_i^{n_h} y_{hi}^2 - \frac{y_h^2}{n_h}).$$

The variance of sample mean $\bar{y}_{w0}$:

$$var(\bar{y}_{w0}) = \sum W_h^2\ (1 - f)\frac{s_h^2}{n_h}.$$

If y_{w0} denotes a proportion $p_{w0} = \sum W_h p_h$, its variance is equal to:

$$var(p_{w0}) = \sum W_h^2\ \ (1 - f)\frac{p_h\,(1 - p_h)}{n_h - 1}.$$

In proportionate stratified sampling samples are "miniatures of the population" (Kish, 1965). Hence, the sampling fraction (f_h) has the same value for each stratum and overall fraction. So, $f_1 = f_2 = f_h = f = \frac{n_h}{N_h} = \frac{n}{N}$. For example, if a population of 1000 is divided into three strata having 200, 500 and 300 elements respectively and a sample of 200 is drawn with proportionate allocation, the sample sizes of each stratum will be;

$$f = \frac{n}{N} = \frac{200}{1000} = 0.2,$$

$$n_1 = n \text{ x } f = 200 \text{ x}0.2 = 40,$$
$$n_2 = n \text{ x } f = 500 \text{ x}0.2 = 100,$$

$$n_3 = n \text{ x } f = 300 \text{ x} 0.2 = 60.$$

Mean and variance for proportionate samples (also known as self-weighting sample) are calculated with the following formula, respectively;

$$\bar{y}_{prop} = \frac{y}{n} = \frac{1}{n}\sum_{j=1}^{n} y_j.$$

Variance for sample total for proportionate sample is equal to:

$$var\,(y) = (1-f)\sum^{H}\frac{n_h}{n_h-1}\left[\sum_{i}^{n_h} y_{hi}^2 - \frac{y_h^2}{n_h}\right] \text{ and}$$

variance of proportions is equal to:

$$var\left(p_{prop}\right) = \frac{1-f}{n^2}\sum^{H}\frac{y_h(1-y_h)}{n_h-1}.$$

3.1.4 Systematic Sampling

Systematic sampling can be a simple random model, stratified random model, paired selections model or successive differences model. In the simple random model, the units in the population are randomly enumerated and simple random sampling formulas are used for estimations. This model of systematic sampling is explained in part 2.2.4. However, the units are usually in some kind of order such as alphabetical, geographical or other. In this case, the variance estimate is usually smaller than when simple random sampling formulas are used and appropriate formulas for stratification should be used.

In a paired selections model, one pair per implicit stratum or zone is selected. In other words, a pair is selected from every I elements. The first pair from 1 to I, the second from I+1 to 2I and so on. If n elements are selected, then the number of zone is equal to the half of n, H= $\frac{n}{2}$, where H=1, 2, ..., $\frac{n}{2}$. The first element is contrasted with second, the third with the fourth and n-1th with the nth element. The elements are denoted as y_{ha} and y_{hb}. The variance of the mean is equal to;

$$var(\bar{y}) = \frac{1-f}{n^2} \sum_{h}^{n/2} (y_{ha} - y_{hb})^2.$$

A successive differences model is developed by modifying the paired selections model. In this model, n-1 differences are used. The differences are formed as $(y_g - y_{g+1})$. The variance of the mean is calculated with the following formula:

$$var(\bar{y}) = \frac{1-f}{2n(n-1)} \sum_{g}^{n-1} (y_g - y_{g+1})^2.$$

3.1.5 Multistage Sampling

Multistage sampling is frequently used in sample surveys. Mostly, two or three stage samples are used. Multistage samples consist of both cluster sampling and stratification. Additionally, weighting is needed for sample size correction. Computations also get more complex when more stages to the survey design are included. Different sampling techniques can be used in different stages. Different stages also have different sampling frames. Many different designs can be employed in multistage sampling; such as stratified multistage sample, two stage cluster samples or combination of both is possible. Therefore, estimation formulas change according to sample designs. Estimation process must be made carefully in multistage sampling designs due to its complex structure. Besides, researchers use variance estimation techniques like replication techniques to avoid complicated

formulas and get more accurate results. A typical household survey design structure is given in Table 2.

Table 2 Typical household survey design structure

Features	**Possible Definitions**	**Implications**
Strata	-Regions, -Community type (urban versus rural).	-May reduce standard errors of estimates, -Control distribution of sample may lead to disproportionate sampling.
First stage sampling units	-Census enumeration areas or similar geographical areas, -Villages in rural strata.	-Facilitate clustering of the sample to control costs, -Facilitate development of complete frames of housing unit addresses only in sampled areas, -Selected with probability proportional to size.
Second stage sampling units	-Housing unit addresses.	-May contain none, one or more than one household or unrelated person, -Selected with equal probability within first stage sampling units.
Third stage sampling units	-Household members.	-Sample selected from roster of household members obtained from a responsible adult household member. May lead to unequal weighting in order to account for household size.
Observational units	-Households, -Household members, -Agricultural or business enterprises operated by the household members, -Special files for subgroups, for example, adults in the workforce, -Events or episodes pertaining to household members, -Repeated measures over time (panel surveys).	-May require more than one analytic file for special-purpose analyses.

Source: Chromy and Abeyasekera, 2005

3.2 METHODS FOR ESTIMATING COMPLEX SURVEY SAMPLING ERRORS

Sampling error estimations for different sampling methods have been discussed in the previous chapters. However, many sample surveys have complex sampling designs including weighting, multistage designs and nonlinear estimations. Therefore, sampling error estimations from complex surveys require special methods. Two major methods for variance estimation in complex sample surveys are: Taylor series linearization which is based on Taylor series approximation and replication methods. Replication methods include jackknife repeated replication method and balanced repeated replication method.

The application of Taylor series linearization, balanced repeated replication and jackknife repeated replication methods are explained in following sections. Surely, it is impossible to give detailed theoretical and application information about methods in the thesis. Those who are interested in detailed discussion may read Shao (1996) and Wolter (1985) for replication, Taylor series approximation, and analytic methods and Rust and Rao (1996) for replication and practical applications (Westat 2007).

3.2.1 Taylor Series Linearization

Statistics from household surveys are mostly not linear functions of survey data due to surveys' complex designs such as unequal size clusters, weights and strata. In that case, variance estimation of nonlinear statistics cannot be estimated with simple random sampling variance formula and alternative methods are required. Even if simple random sampling is employed variance estimations of nonlinear functions cannot be calculated with a direct simple random sampling variance formula and needs approximations (Brogan 2005).

Taylor series linearization for variance estimation of nonlinear statistics has been used to estimate complex sample variances since 1950's by Hansen, Hurwitz and Madow (1953), Kish and Hess (1959) (Heeringa et al. 2009). This method is also referred as Delta method in literature. In addition to this, linearization method has been included in Kish's (1965) and Cochran's (1977) textbooks (Flyer, Rust and Morganstein 1989).

Binder (1983) has developed a general method for obtaining an appropriate linearization estimator for a high proportion of the cases likely to be met in practice. It is important to keep in mind that the linearization approach does not actually yield an estimate of variance. Instead, the linearization approach provides a linear approximation to the quantity for which variance is to be estimated, after which the usual textbook formulas for the variance of a linear statistic are applied (Flyer, Rust, and Morganstein 1989).

Means, proportions, and regression coefficients can be estimated by using Taylor series linearization. The statistic of interest should be able to express as a mathematical function. Linearization cannot be used in nonfunctional statistics, such as medians or percentiles (Forthofer, Lee and Hernandez 2007). The main purpose of using this method is to transfer the nonlinear statistic (estimator of interest) into a linear combination of weighted sample totals with the help of Taylor series expansion and then use standard linear estimations to calculate variance.

In Taylor series linearization, the statistic, percentage or average, is accepted as ratio like r= x/y to estimate the population parameter R=X/Y. The nonlinear expression is approximated by a linear expression, so that variance could be estimated with linear estimator methods rather than nonlinear. The variance is calculated more easily with the standard variance estimation methods for linear estimators, and standard error is obtained as the square root of the variance.

Heeringa et al. (2010)'s five steps would be helpful to understand Taylor series linearization approach more clearly.

1. Weighted sample totals are used to rewrite the function of the estimator (Kish 1965). For instance, where r=x/y, x and y can be weighted totals.
2. Variance of a ratio is not equal to the ratio of two variances.

$$Var\left(\frac{x}{y}\right) \neq \frac{Var\ (x)}{Var\ (y)}.$$

   Therefore, Taylor series approach is used to rewrite the function in a linear form. Only the first order term of Taylor series expansion is calculated, second or higher order terms of expansion are ignored.
3. Variance estimator of linearized form is approximated by using simple algebraic function.
4. Strata and clusters' weighted totals are calculated separately.
5. Confidence intervals for statistics of interest are calculated (Heeringa et al. 2010).

Yet, different types of parameters require different formulas (Johnson and Elliot, 1998). Use of linearization method for different types of statistics and designs are available in number of textbooks.

Variance estimation of a ratio variable with Taylor series linearization is as follows.

Where

$$g(u_1, u_2) = \frac{y}{x},$$

the linearized form is

$$g_1(u_1, u_2) = \frac{\partial g}{\partial X}\, x + \frac{\partial g}{\partial Y}\, y.$$

For function $g_1(u_1, u_2)$

$$var\ [g_1(u_1, u_2)] = \left(\frac{\partial g}{\partial u_1}\right)^2 var(u_1) + \left(\frac{\partial g}{\partial u_2}\right)^2 var(u_2) + 2\ \frac{\partial^2 g}{\partial u_1 u_2}\ cov(u_1, u_2)$$

For example, for $g = {}^{y}/_{x}$

$$var\left(\frac{y}{x}\right) \approx \frac{1}{x^2}\left[var(y) + r^2\, var(x) - 2r\, cov(y,x)\right]$$

Rust (1985) mentions two main difficulties with the method. The first difficulty is the assumption that second or higher elements of Taylor series expansion do not make an important contribution to the variance and they can be neglected. The second one is the difficulty or impossibility of deriving and calculating the partial differentiation for more complex estimators.

SPSS, SAS, IVEware, Stata and some other programs use this method as default estimation technique. These programs require the specification of design variables for Taylor series linearization (Brogan 2005).

3.2.2 Replication Methods

The basic idea of replication methods is to select independent replicates from a full sample that have the same sample design and complexity. These methods are based on measures of variability among replications. Replication methods are easier than Taylor series linearization since the same procedure is used for whole sample, replicates and all statistics. The only difficulty in replication techniques may be constructing replicate weights, which are required for analysis. Anyhow, replicate weights can be calculated by many software easily. Furthermore, replication methods are also advantageous in not requiring as much information of survey design as Taylor series linearization method. If replication weights are included in dataset, variance estimations with replication methods can even be calculated without design information.

Replication techniques were first introduced in the sampling field with Mahalanobis (1946) as the technique of interpenetrating network of subsampling

(IPNS). The aims of the technique were firstly to improve the accuracy of data and to find out the first measures of error in estimation while the fieldwork is still in progress. The full sample is divided into two or more subsamples and an estimate of statistic of interest from each sample is calculated in IPNS method. In the end the diversity of estimates between different subgroups is compared and a measure of error can be calculated. Deming (1956) used the same technique with a different name, replicated sampling, to calculate a variance estimator. Replicated sampling provides an easier and simpler estimate of variance for every sample design, even for complicated ones (Chaudhuri and Stenger 2005).

> "In this approach, random subsamples are repeatedly drawn from the sample in a manner that takes into account the sampling design. Standard errors then are estimated from the variability in the estimates among the random replicates. The methods can provide standard errors for any parameter estimate because the estimates are derived in the same way for all statistical procedures" (Johnson and Elliot 1998).

A number of independent subsamples or replications are composed with the same design, which reflects the complexity of the full sample, by using the same procedures but selected and implemented independently. The only difference between a replication and the full sample should be the size, in terms of design. In fact, the replicate is sometimes reffered as the miniature of the full sample. The size of the replicates should also be large enough to reflect the structure of the full sample. Additionally, any estimate from any replication should have a close value to the full sample estimate. Furthermore, the number of replicates is important; in order to develop a stable estimate of the sampling variability, an adequate number of replications should be generated (Verma 2002, Heeringa et al. 2010).

These techniques provide variance estimation for the average of the replications instead of the variance of the full sample estimate. If the statistic of interest is a linear function, then these two estimates are the same. If the number of

replication is large enough and the replication design is the same as the full sample design, then their estimates would have close values. (Verma 2002).

The use of replication techniques provides simple variance estimation. But it is not always possible to achieve full independence between replicates. This difficulty, leads us to a similar method called; repeated re-sampling, which does not require independence between replications. Repeated re-sampling methods also require the same design as the full sample for each replication. Repeated re-sampling methods are more complex technically and computationally than replicated sampling methods; since independency between replications are not provided. This, results in the need of controlling bias between variance estimates (Verma 2002).

There are three different methods of repeated re-sampling techniques; balanced repeated replication (BRR), jackknife repeated replication (JRR) and Bootstrap methods. These methods differ in methods of creating replications. But still, they follow the same path described in five steps.

1. Replicates (r=1,...,R) are generated with appropriate rules of selected method;
2. Full sample weights are recalculated to create R replicate weights for each replicate;
3. Weighted estimates of the population statistic for the full sample and for each replicate calculated by using replicate weights, separately;
4. Standard errors are calculated by using appropriate variance estimation formula for the selected method;
5. Confidence intervals or hypothesis tests are constructed with the estimated statistics, standard errors and correct degrees of freedom (Heeringa et al. 2010)

Advantages and disadvantages of replication techniques are discussed in WesVar 4.3 User Guide. Replication methods are advantageous due to the use of the

same procedures for both the full sample and the replicates when estimating means, proportions, ratios and other statistics (Efron 1982). In addition, one does not need to know how the sample was designed when the replicate weights are included on the data set. Furthermore, replicate weights can be adjusted for nonresponse and post stratification (Westat 2007).

There are also some disadvantages of using replication methods. First of all, using replication methods require the use of computers. Estimates for the full sample and its replicates are calculated separately. Calculating and storing replicate weights for each replicate in large datasets can be challenging for personal computers. Even with today's computer systems can handle large datasets and numerous computations, it may still take long. Calculating replicate weights requires a good knowledge of replication theory. As previously mentioned, replicates should have exactly the same design as full sample. Otherwise, estimations from that replicates would be subject to bias. Not all types of statistics are easy to calculate with replication techniques. Medians, quartiles and other quantiles are not calculated as easy as means and ratios. Calculating such types of statistics is still a developing research area (Westat 2007).

Balanced repeated replication and jackknife repeated replication methods were used in the thesis, and they will be explained in detail in next sections.

3.2.2.1 Jackknife Repeated Replication

Quenouille (1956) introduced the jackknife repeated replication method for reducing the bias of parameter estimates. Tukey (1958) adapted the technique to produce variance estimates for a large class of estimators with including finite population samples. The range of jackknife procedure use extended with Miller (1964, 1974). Additionally, Chakrabarty and Rao (1967) included the ratio estimator into possible use of jackknife methods (Rust 1985).

The jackknife repeated replication technique consists of deleting one primary sampling unit (PSU) to form a replicate and re-computing the full sample weights to form new replication weights. This procedure results in generating L equal sized subsamples. The technique differs according to the use of stratification and the number of PSUs per stratum.

The procedure for calculating is as follows;

1. One PSU from single primary stage stratum is deleted to construct a JRR replicate. Another PSU is deleted to construct the second and so on. But, PSUs are not literally deleting while using statistical programs. Programs only change PSUs' weight by 0, when they need to be deleted.
2. For each of the JRR replicates new replicate weights are computed. For PSUs, other than deleted PSU, new replication weights are computed in such manner that their total weight will sum up to full sample weight. It is achieved by multiplying full sample weights of each PSU by a (h)/ (a (h)-1).
3. Weighted estimates of statistic of interest are computed by using replicate weights for each replicate.
4. Sampling variance is estimated by using replicate and full sample estimates.
5. Confidence interval for the statistic of interest is computed (Heeringa et al. 2010).

Sample designs with 2 PSUs per stratum (a (h) =2) are very common. In this case, within a stratum; the weight for the deleted PSU's becomes 0, while the weight of other one is duplicated. This technique is called jackknife 2. If each stratum/subset consists of one PSU, then it is called delete-one jackknife (Wolter 2007). If every deleted subset is a randomly formed group of units, then the jackknife 1 method becomes non-overlapping random group method. If strata have more than two PSUs each and one PSU is deleted every time to generate replicates, then the method is called jackknife n (Westat 2007).

The jackknife repeated replication method is available in various statistical programs. Some of these programs do not calculate replicate weights thus only data sets including replicate weights can be used. Stata, SAS and WesVar are appropriate programs to estimate variances with the jackknife repeated replication method.

If $x_{h1}^{'}, x_{h2}^{'}, y_{h1}^{'} \; and \; y_{h2}^{'}$ are estimates from each PSUs of the stratum parameters $X_h and \; Y_h$ in each of L strata having n_h PSUs within h=L stratum. The ratio estimator, the replicate and standard error of the ratio estimator r are given below (Levy and Lemeshow 2008).

$$r = \frac{\sum_{h=1}^{L} \sum_{i=1}^{n_h} x_{hi}^{'}}{\sum_{h=1}^{L} \sum_{i=1}^{n_h} y_{hi}^{'}}$$

$$r_{(hi)} = \frac{\sum_{h\prime \neq h} \sum_{i=1}^{n_h} x_{h\prime i}^{'} + \sum_{i'} \frac{n_h}{n_h - 1} \; x_{hi'}^{'}}{\sum_{h\prime \neq h}^{L} \sum_{i=1}^{n_h} y_{h\prime i}^{'} + \sum_{i'} \frac{n_h}{n_h - 1} \; y_{hi'}^{'}} \; , where \; r_{(hi)} \; is \; an \; estimate$$

$$\widehat{SE}(r) = \sqrt{\sum_{h=1}^{L} \sum_{i=1}^{n_h} \frac{n_h}{n_h - 1} \left(r_{(hi)} - r\right)^2}.$$

3.2.2.2 Balanced Repeated Replication

Balanced repeated replication (BRR) was developed for special designed samples with exactly 2 PSUs per stratum. This sample may be selected with unequal probability and with or without replacement. Nowadays, it can be used for very general designs, namely, stratified multistage sampling (Brogan 2005). Balanced repeated replication method is also known as “half sample” method. Nevertheless,

the method has been improved, since its first use in 1957 and it can now be used with strata containing any random number of observations.

The balanced repeated method was first used by Keyfitz (1957) with a different name, for estimating variances with two PSUs in strata. McCarthy (1966, 1969) developed the method into "balanced repeated replication" method with the use of Hadamard matrices and lessened the computation. In 1975, Gurney and Jewett (1975) extended the method that it could also be used even strata have more than two PSUs. Their development was still requiring an exact positive integer. "Gupta and Nigam (1987) extended it to cover the case of any arbitrary number of observations per stratum" (Chaudhuri and Stenger 2005). The method was continued to develop by Wu (1991) and Sitter (1992)'s contribution.

Hadamard matrices show statistical programs which PSU to choose for the replicate. Hadamard matrices are named after the French mathematician Jacques Hadamard. A Hadamard matrix is a square matrix whose entries are either +1 or −1 and whose rows are mutually orthogonal. Statistical programs make it easier to choose replicates, by using Hadamard matrices. Rows of Hadamard matrices denote BRR replicates and columns denote strata. If the first column of the first row is +1, ((1,1)=+1), it means that, the first PSU of stratum one is chosen for replicate one. If (1,1)=-1, it means that, the second PSU of stratum one is chosen for replicate one. The size of a Hadamard matrix can only be four or multiples of four. The smallest Hadamard matrix is a 4x4 dimensional one. An HxH Hadamard matrix is used for a sample with H stratum. Then the variance estimation is called "fully balanced". If H is not a multiple of four, the first number which is greater than H and can be divided by four should be used. For instance, if H= 25, a 28x28 Hadamard matrix will be used. Then, the variance estimate would be a partially balanced one. An example of a Hadamard matrix for H=4 strata is given in the table.

Table 3 Hadamard matrix for H=4

γ	H			
	1	2	3	4
1	+	+	+	-
2	+	-	-	-
3	-	-	+	-
4	-	+	-	-

Source: Heeringa et. al., 2010.

"The evolution of the BRR method began with the concept of forming replicates by choosing one-half of the samples" (Heeringa et al. 2010: 78). A new variable "SECU" (Sampling Error Computation Unit) is constructed for balanced repeated replication method. Two PSUs form a SECU and two SECUs form one stratum. The table below shows stratum, SECU and the choice of PSUs in a replicate.

Table 4 Replicate and compliment selection for balanced repeated replication

Stratum	SECU	Replicate	Complement
1	1	✓	
	2		✓
2	1		✓
	2	✓	
3	1	✓	
	2		✓
4	1		✓
	2	✓	

Source: Heeringa et al., 2009.

Half-sample replications are constructed by denoting one PSU in one SECU, and the other PSU in the second SECU for every stratum. Assuming we have a sample with 4 strata with 2 PSUs each: if we choose PSU 1 from strata 1 and 3 and

PSU 2 from strata 2 and 4 from a 4 strata sample, this will form a half-sample. There will also be a half sample complement for this half sample replicate we generated as shown in the above table. Half sample complement will include PSU 2 from strata 2 and 4, and PSU 1 from strata 1 and 3. If there are L strata, G= 2^L replicates can be constructed. In our case, where L=4, we can construct G= 16 replicates. However, if L=10 G will be equal to 1024 and, if L=20, G will be equal to 1 048 576. In this situation, using exactly G replicates will result in a very long computational process, for which McCarthy (1969) proposed a solution. This solution was using balanced number of replicates instead of G replicates by using Hadamard matrices.

The variance estimation procedure for balanced repeated replication method is given below.

1. A half sample is selected by using appropriate Hadamard matrix.
2. After creating half sample replicates, new replicate weights are calculated for each replicate. The complement half sample PSUs' weights will be changed to 0 or missing. As well, PSUs' sample weights will be doubled to generate replicate weights for the half sample replicates.
3. Weighted replicate estimates for the statistics of interest will be calculated by using the replicate weights.
4. Sampling variance is estimated by using replicate and full sample estimates. There are several formulas for variance estimation by using balanced repeated replication technique.
5. Confidence interval for the statistic of interest is computed with a degrees of freedom value of H (Heeringa et al. 2010).

The variance estimation procedure for a ratio estimate with balanced repeated replication is given below (Levy and Lemeshow 2008).

Let $x_{h1}^{'}, x_{h2}^{'}, y_{h1}^{'} \; and \; y_{h2}^{'}$ be estimates from each PSUs of the stratum parameters $X_h and \; Y_h$ in each of L strata. Equal weight between strata is assumed.

The ratio estimate r of the population ratio R based on all 2L estimates would be given by

$$r = \frac{x'}{y'},$$

where

$$x' = \sum_{h=1}^{L}\sum_{i=1}^{2}\left(x'_{hi}/_2\right)$$

and

$$y' = \sum_{h=1}^{L}\sum_{i=1}^{2}\left(y'_{hi}/_2\right).$$

Half sample estimate of ratio R is

$$r_{(k)} = \frac{\sum_{h=1}^{L}\left[\delta_{kh}x'_{h1} + (1-\delta_{kh})x'_{h2}\right]}{\sum_{h=1}^{L}[\delta_{kh}y'_{h1} + (1-\delta_{kh})y'_{h2}]},$$

where $(\delta_{k1}, \dots, \delta_{kl})$ is a L dimensional vector whose elements are equal to unity or zero. Variance estimate of r computed from the 2^Lpossible half samples is calculated with;

$$\widehat{var}(r) = \left(\frac{1}{2^L}\right)\sum_{k=1}^{2^L}(r_{(k)} - r)^2.$$

3.2.3 SOFTWARE FOR COMPLEX SAMPLING ERRORS

Five different software were used in the thesis; (1) PASW, (2) Stata, (3) WesVar, (4) SAS and (5) IVEware. The software were chosen according to their frequent use in sample survey analysis and being accessible easily.

3.2.4 PASW (SPSS)

PASW, formerly known as SPSS, is developed by SPSS Inc. PASW Complex Samples 18.0 is used in the thesis. The software SPSS is capable of analysing complex sample designs, since SPSS version 12.0 is released with the Complex Samples module in 2003. PASW Complex Samples module is used with PASW software. PASW Complex Samples 18.0 User's Guide explains how to specify a sample design and analyse complex samples according to that design step by step.

Firstly, survey design of data should be specified in Analysis Preparation Wizard. Strata cluster and weight variables are identified in design variables step of the wizard. In the second step, one of estimation method is selected from three choices: sampling with replacement, equal probability sampling without replacement and unequal probability sampling without replacement.

For TDHS-2008 dataset, "pairpsu" variable is specified as strata, "v001" variable as clusters and "sweight" variable as sample weight. The pairpsu variable is formed by grouping clusters into pairs, the table below is an example of the first six clusters. Sweight variable is a simple recode of survey weight, which is denoted as v005 in TDHS-2008. The survey weight variable in TDHS-2008 was not divided into 1,000,000. Therefore, analyses result in 1,000,000 times higher sample sizes. Sweight variable is generated by dividing the survey weight by 1,000,000. Sampling with replacement is chosen as sample design. Finite population correction ignored.

Table 5 Cluster and pairpsu variables

Cluster (v001)	PAIRPSU
0101	1
0102	1
0103	2
0104	2
0105	3
0106	3

An important problem in subpopulation analysis arises when there is only one PSU in a given stratum. This situation is often referred to as a "lonely PSU" problem. If there is a lonely PSU in a stratum, the variability between PSUs cannot be estimated within that particular stratum. There are several ways to address this issue; one has to decide how to treat such strata. Some software present options for lonely PSU strata and some of them inform the researcher about how this problem was handled, such as Stata SE and SAS/STAT. However, there is no explanation in PASW documentations about how this software handles this problem. In the TDHS-2008 dataset, five clusters do not have 15-49 ever married women which results in five lonely PSUs, where there will be information on ever-married women from one cluster only. Since ever-married women aged 15-49 are a subpopulation of the whole household members population, their analysis should be unconditional. Unconditional analysis treats the number of women as a random variable, in contrast to a filtered out group of women in which case the number of women would be fixed. For detailed information on conditional and unconditional analysis for subpopulations West et al.'s (2008) paper would be helpful. As a simple trick to correct unconditional subpopulation analysis in PASW, five cases including only strata, cluster and weight information are included into the strata with lonely PSUs.

PASW 18.0 estimates complex sample variances with Taylor series linearization approach. Variances of selected variables were estimated with complex sample frequencies. In addition, estimates of table percentages, standard errors,

confidence intervals, coefficients of variation, design effects, square roots of design effects were gathered. This procedure also, provides weighted and unweighted size of population.

The PASW 18.0 syntax used for variance estimation of selected variables from TDHS-2008 data set is given in Appendix A.

3.2.5 Stata

Stata is the Data Analysis and Statistical Software was developed by StataCorp. The last version of Stata, Stata 11, was used to estimate variances for TDHS-2008 data. Some of statistical areas that Stata 11 is capable of are data management, panel data/longitudinal data, time series, survival analysis. In addition, Stata 11 is one of statistical packages "survey methods" are included. The software is capable of making inferences from survey data. Complex surveys, including surveys with multistage designs, stratification, clustering, and sampling weights can be analysed by Stata 11. Variance and standard error estimates of complex survey data can be made calculated by Taylor series linearization, balanced repeated replication, jackknife replication, Bootstrap and successive difference replication methods.

In the thesis, Taylor series linearization, balanced repeated replication and jackknife repeated replication approaches were used. Estimations of means, totals and ratio are provided. Stata software package is supported by books, manuals, Stata Journal and other documentation. There is also an email group called Statalist where, Stata users share their knowledge, problems and solutions about statistics and mainly about Stata. There are no requirements to join email list. More information about StataCorp and Stata 11 can be found on www.stata.com. Stata Survey Data Reference Manual, Release 11 was used to understand and use Stata properly. This manual includes detailed information about Stata 11's survey analysis features.

In Stata 11, “svy” prefix is used to make inferences from survey datasets. Survey design is specified with “svyset” command. Survey design variables and weight variable are set before analysis. The following is the svyset command used for Taylor series linearization approach for TDHS-2008 data. Once svyset command is run, program uses it until a new svyset is run or a new dataset is used.

svyset v001 [pweight=sweight], strata(pairpsu) vce(linearized) singleunit(centered)

- “v001” variable denotes primary sampling units (PSUs).
- “sweight” variable denotes sampling weights.
- “PAIRPSU” variable denotes strata.
- “vce (linearized)” denotes Taylor series linearization approach will be used in variance estimation. Instead of Taylor series linearization approach, balanced repeated replication method and jackknife repeated replication method can be used. In that case, vce(brr) and vce(jackknife) should be used, respectively.
- “singleunit(centered)” shows program how to treat stratum with one sampling unit.

Stata 11 provides for different methods for single unit situations. When singleunit(missing) option is used standard errors become missing values. If singleunit(certainty) option is chosen single units do not contribute to the standard error. In singleunit(scaled) option, the variance of the strata with one sampling unit is equalized to the average of the variances from strata with multiple single units. The last option is singleunit(centered), which strata with single unit is specified at the grand mean instead of stratum mean. The problem aroused from the five lonely PSU cases in data set is solved with using singleunit(centered) option since it gives closer variance estimates to ISSA SAMPERR.

In addition to these options, when balanced repeated replication and jackknife repeated replication methods are used replicate weights for them should be specified in svyset command. Default variance estimation method in Stata is Taylor series linearization.

Subpopulation analysis can be done with subpop() command. The syntaxes used for each method are given in Appendix A.

3.2.5.1 Taylor Series Linearization

Taylor series linearization is also known as the Delta method and Huber/White/robust/sandwich estimator method in Stata Survey Data Reference Manual, Release 11. A first order Taylor series linear approximation is used with the vce (linearized) command.

In the Taylor series linearization approach, "tab" command with svy prefix is used. With this command, estimations of percent, standard error, design factor and confidence intervals are gathered by tab options. Following is an example of syntax for percent and variance estimation of "type of place of residence" variable for TDHS-2008.

svy: tab v025, se percent deft ci

3.2.5.2 Balanced Repeated Replication

Balanced repeated replication approach can be used to estimate variance in Stata 11. Svy brr command generates replicate weights. However, a Hadamard matrix should be specified. Otherwise, replicate weights calculated for balanced repeated replication should be added to dataset and specified in svyset command.

Since balanced repeated replication is used for two PSUs-per stratum designs. A “secu” variable is used instead of v001 variable (which was used for Taylor repeated replication method). Briefly, secu variable is generated by combining two sequential PSUs.

For variance estimations with Stata using balanced repeated replication method, replicate weights calculated with WesVar were included in TDHS-2008 dataset. Svyset command used in thesis for balanced repeated replication is given below for developing a better understanding of including replicate weights.

Svyset secu [pweight=sweight], strata (pairpsu) brrweight (rpl001 rpl002 rpl003 rpl004 … rpl317 rpl318 rpl319 rpl320) vce (brr) dof (631) singleunit (centered).

Default variance formula for balanced repeated replication is as follows:

$$\hat{V}(\hat{\theta}) = \frac{1}{r} \sum_{i=1}^{r} (\{\hat{\theta}_{(i)} - \bar{\theta}_{(.)}\}\{\hat{\theta}_{(i)} - \bar{\theta}_{(.)}\}')$$

Where,

$\hat{\theta}$ = point estimates,

$\hat{\theta}_{(i)}$=*i*th replicate of the point estimates

$\bar{\theta}_{(.)}\}$=average of the replicates.

3.2.5.3 Jackknife Repeated Replication

Jaccknife repeated replication method can also be used for variance estimation for complex designed surveys in Stata 11. Stata 11 does not requires a specific design for jackknife repeated replication use.

In order to proceed with the estimation procedure in Stata, the replicate weights generated with WesVar for jackknife repeated replication method were also included in the dataset, and they were specified with the svyset command. Below formula is used for TDHS-2008 dataset.

Svyset secu [pweight=sweight], strata (pairpsu) jkrweight (rpl001 rpl002 rpl003 rpl004 … rpl304 rpl305 rpl306 rpl307 rpl308 rpl309 rpl310 rpl311 rpl312) vce (jackknife) dof (631) singleunit (centered).

Stata 11 uses below formula as default variance formula for jackknife repeated replication.

$$\hat{V}(\hat{\theta}) = \sum_{h=1}^{L} (1 - f_h)\, m_h \sum_{i=1}^{r} \left(\{\hat{\theta}_{(h,i)-}\bar{\theta}_h\}\{\hat{\theta}_{(h,i)-}\bar{\theta}_h\}'\right)$$

Where,

$\hat{\theta}_{(h,i)}$=replicate of the point estimates from stratum *h*, PSU *i*,

$\bar{\theta}_h$=average of the replicates from stratum *h*

m_h=$((n_h - 1)/n_h$ delete 1 multiplier for stratum *h*

3.2.6 WesVar

WesVar is developed by Westat, a research and statistical survey organization in USA. WesVar can be used in analyzing complex samples and estimating variances for statistics based on complex samples. Estimates and variance estimates from multistage, stratified, unequal probability samples and complex samples, which is simply a combination of sampling methods, can be calculated by WesVar. WesVar employs jackknife repeated replication and balanced repeated replication methods. Three types of jackknife repeated replication methods and two types of balanced

repeated replication methods are available in this software. Bootstrap method can also be used to estimate variances for complex sample parameters, but replicate weights and factors should be input. Post stratification and raking can also be included in analysis. WesVar is capable of calculating estimates for different types of parameters; medians, ratios, complex functions of estimates and some other types of parameters can be estimated by WesVar. WesVar can also be used for hypotheses testing, linear and logistic regression and tests for the overall fit of regression model and for the significance of linear combinations of variables included in the model.

The newest version of software is WesVar 5.1. This software can be downloaded from Westat website[4]. An important advantage of WesVar is that it is a freeware and all documentations are available on the Westat webpage.

Balanced repeated replication, Fay's method, jackknife 1, jackknife 2, jackknife n replication methods are clearly explained in WesVar User Guide Appendix A (Westat 2007).

Balanced repeated replication, jackknife 2 and jackknife n replication methods are used in this thesis. Fay's method is excluded since it is a variant of balanced repeated replications, and it is generally used in estimates from small domains and ratio estimates with small denominators. Thus, analysis has been limited to the use of balanced repeated replication methods. The jackknife 1 method was also not used; since it is suitable for samples that are selected without explicit stratification.

A summary of WesVar's approach on the used replication techniques are given below.

[4] Westat website:
http://www.westat.com/Westat/expertise/information_systems/WesVar/wesvar_downloads.cfm

Stratification and primary sampling unit (PSU) variables are required for every case in the replicate generation by WesVar. Strata variable is defined as VarStrat and PSU is defined as VarUnit in WesVar. Strata variable should be selected for VarStrat box and PSU variable for VarUnit box on the Creating Weights window. The choice of replication method should also be specified on the same window. Replicates are generated with the same design as the full sample. Replicate weights for each replicate are calculated separately. Replicate weights are saved in dataset. Estimates from replicates are calculated with the same formula as the full sample. Finally, full sample variance is estimated by using both replicate estimates and the full sample estimate.

Hadamard matrices are included in the WesVar files. However, the number of replicates is limited to 512 for Hadamard matrices. If more replicates are required; the adequate Hadamard matrix should be included. In this case, 9,984 replicates can be created for BRR and Fay's method. In the case of a jackknife replication method, the number of replicates is limited to 9,999.

3.2.6.1 Balanced Repeated Replication

Balanced repeated replication is developed for special cases, where two PSUs per each stratum are sampled. It is usually used for the analysis of multistage stratified designed samples. In WesVar primary sampling units are denoted as VarUnits and strata are denoted as VarStrat.

The dataset is assumed to have two VarUnits for each of L many VarStrat variables. In other words, number of VarStrat is equal to L and number of VarUnit is equal to two times L.

Balanced repeated replication replicates are called "half-sample" replicates. Half-sample replicates are generated by using a Hadamard matrix. One VarUnit from

each VarStrat is chosen and the set of selected VarUnits form a replicate. Replicate weights are calculated by doubling sample weights of selected VarUnits. Same Hadamard matrix is used for samples having same number of VarStrat.

In our dataset “PAIRPSU” variable is used as VarStrat and “pair” variable is used as VarUnit. The pair variable is the same as the “SECU” variable mentioned before in section 3.2.2.2. There are 316 VarStrats. For our dataset $2^L = 2^{316}$ replicates can be formed. Creating 2^{316} replicates is not practical. Creating G=316 replicates results in “balanced” replicates and G=316+4=320 replicates form “full-orthogonal” balance. For the TDHS-2008 data set 320 replicates were created to perform balanced repeated replication.

WesVar is able to create replicate weights for only two-VarUnit-per stratum designs for the balanced repeated replication technique. If a sample design is not a two-VarUnit-per stratum design, replicate weights should be included in dataset.

3.2.6.2 Jackknife 2 (JK 2)

Basically, the jackknife 2 replication method is similar to the balanced repeated replication method. Both methods assume that the sample design is consisted of L strata (VarStrat) with two PSUs (VarUnits) each. Another assumption for jackknife 2 is that VarUnits are sampled with replacement. These methods differ in creating replicate weights.

The actual application of the jackknife repeated replication method involves dropping one VarUnit and create one replicate, then other unit to create the second this procedure is repeated for all VarStrats until all VarUnits are used. This is called jackknife n in WesVar.

Jackknife 2 is a simpler variant of jackknife n repeated replication method. For linear estimators, the jackknife n method (deleting VarUnits in each stratum one by one) gives algebraically same result as the jackknife 2 method (randomly deleting only one VarUnit in each stratum). However, it is not valid for nonlinear estimators. Yet, if there is a sufficient number of VarStrats, jackknife 2 results for nonlinear statistics are accepted as reliable.

Replication weights for jackknife 2 method are calculated as follows;

- Replicate weight of the deleted VarUnit is calculated by multiplying its sample weight with 0. In other words, VarUnits are not deleted but weighted by 0 and not included in estimation progress of that replicate.
- Sample weights of selected VarUnits are multiplied by 2, to create replicate weights.
- Sample weights for other VarUnits in VarStrat are not changed.

VarUnits to delete or select are chosen in their sorted order. However, if systematic sampling is used, than the order of VarUnits should be randomized. The number of replicates created is equal to the number of VarStrat. In the TDHS-2008 dataset, there are 316 pairs. Namely, there are L=316 VarStrats and 316 replicates. WesVar can create maximum 9,999 replicates for jackknife 2 method.

3.2.6.3 Jackknife n (JK n)

Balanced repeated replication or jackknife 2 repeated replication methods cannot be used if there more than two PSUs per stratum. In this case, the jackknife n repeated replication method is used. Since jackknife n method can also be used for samples with two PSUs per stratum, it is a more common method than both the balanced repeated replication and the jackknife 2 method. Jackknife 1 method is also a variant of jackknife n method where N=1. Namely, there is only one stratum in jackknife 1.

If there are L VarStrats and each VarStrat has n_h VarUnits, then the number of replicates is equal to $G = \sum_{h=1}^{L}(n_h)$.

Calculation of replicate weights for the jackknife n method is similar to the jackknife 2 method. The calculation differs in generating replicate weights for selected VarUnits. Instead of multiplying by 2, the sample weights for VarUnits in the same VarStrat which are included in the replicate are multiplied by $\frac{n_h}{n_h-1}$.

The jackknife 2 method and jackknife n method are similar but not identical. If there are two PSUs for each stratum jackknife 2 method can be used for linear estimators instead of jackknife n method. Jackknife 2 method can also be used for nonlinear statistics if there are a sufficiently large number of strata. In this case, the jackknife 2 method will provide similar results to jackknife n method. However, jackknife n and balanced repeated replication methods should be employed when the number of strata is not large enough.

The "tabakaici" variable which was generated by numbering clusters within a stratum from 0 to n_h and strata variable which denotes the real strata variable of TDHS-2008 are selected as VarStrat and VarUnit respectively.

3.2.7 SAS/STAT

SAS/STAT software was developed by SAS. The last version of SAS/STAT 9.2 was used to estimate variances from TDHS-2008 data. SAS/STAT can be used to analyse survey data, regardless of its design. Analyses from multistage or single stage designs, stratified or not and equal or unequal weighted designs can be done with SAS/STAT. Surveymeans, surveyfreq, surveyreg and surveylogistic procedures can be used to analyse survey data.

Three different types of variance estimation methods can be selected to analyse complex survey data; Taylor series linearization, balanced repeated replication and jackknife repeated replication. Surveyfreq procedure was used to estimate variances from TDHS-2008.

SAS/STAT software is used commonly throughout the world. Therefore, finding useful documentation both online and print is relatively easier than other software. In addition, SAS website (www.sas.com) also provides support.

3.2.7.1 Taylor Series Linearization

Taylor series linearization in SAS/STAT software is specified by "varmethod=taylor" command. In addition, stratum, cluster and weight information should also be specified.

Variance estimation formula for a proportion estimate is as follows;

$$\widehat{\mathrm{Var}}_h\left(\hat{P}_{rc}\right) = \frac{n_h(1-f_h)}{n_h-1} \sum_{i=1}^{n_h}\left(\mathrm{e}_{\mathrm{rc}}^{\mathrm{hi}} - \bar{\mathrm{e}}_{\mathrm{rc}}^{\mathrm{h}}\right)^2$$

$$\mathrm{e}_{\mathrm{rc}}^{\mathrm{hi}} = \left(\sum_{j=1}^{m_{hi}}\left(\delta_{ij}(\mathrm{r},\mathrm{c}) - \hat{P}_{rc}\right)\mathrm{w}_{hij}\right)/\hat{\mathrm{N}}$$

$$\mathrm{e}_{\mathrm{rc}}^{-\mathrm{h}} = \sum_{i=1}^{n_h}\left(\mathrm{e}_{\mathrm{rc}}^{\mathrm{hi}} \middle| n_h\right).$$

Where,

h=	1, 2, …, H	is the stratum number, with a total of H strata
i=	1, 2, …, n_h	is the cluster number within stratum h, with a total of n_h sample clusters in stratum h
j=	1, 2, …, m_{hi}	is the unit number within cluster i of stratum h, with a total of m_{hi} sample units from cluster i

	of stratum h
n= $\sum_{h=1}^{H} \sum_{i=1}^{n_h} m_{hi}$	is the total number of observations in the sample
f_h =	first stage sampling rate for stratum h
w_{hij} =	sampling weight of unit j in cluster i stratum h
r= 1, 2, …, R	is the row number, with a total of R rows
c= 1, 2, …, C	is the column number, with total of C columns
N_{rc}=	is the population total in row r and column c
N_r= $\sum_{c=1}^{C} N_{rc}$	is the total in row c
N_c= $\sum_{r=1}^{R} N_{rc}$	is the total in column c
N= $\sum_{r=1}^{R} \sum_{c=1}^{C} N_{rc}$	is the overall total
P_{rc}= N_{rc}/N	is the population proportion in row r and column c
	c
$P_{r.=}$ $N_{r.}$/N	is the proportion in row r
$P_{.c=}$ $N_{.c}$/N	is the proportion in column c
P_{rc}^{r}= $N_{rc}/N_{r.}$	is the row proportion for table cell (r,c)
P_{rc}^{c}= $N_{rc}/N_{.c}$	is the column proportion for table cell (r,c)
$\delta_{ij}(r,c) = \begin{cases} 1 \\ 0 \end{cases}$	if observation (hij) is in cell (r,c)
	otherwise

3.2.7.2 Balanced Repeated Replication

Balanced repeated replication technique is specified by “varmethod=brr” command. SAS/STAT requires two-PSUs-per stratum stratified design to employ balanced repeated replication technique. Replicate weights for balanced repeated replication can either be provided by “repweights” statement or by “proc surveyfreq” statement. “Proc surveyfreq” statement generates replicates by deleting one PSU per stratum by using Hadamard matrix.

Variance estimation formula for a proportion, total, odds ratio or other statistics is given below.

$$\hat{V}(\hat{\theta}) = \frac{1}{R'} \sum_{r=1}^{R'} (\hat{\theta}_r - \hat{\theta})^2.$$

Where,

θ is the population parameter to be estimated

$\hat{\theta}$ is the estimate of θ from full sample

$\hat{\theta}_r$ is the estimate from the *r*th BRR replicate

3.2.7.3 Jackknife Repeated Replication

SAS/STAT employs a delete-one jackknife repeated replication method both for not stratified designs and for stratified designs with at least two PSUs in each stratum. Varmethod=jackknife option should be specified. Replicate weights can be constructed by using repweights command or proc surveyfreq statement. Proc surveyfreq constructs R replicates, which is equal to number of PSUs.

For stratified design, as TDHS-2008 data, replicate weights are calculated as:

$$W_{hij}^{r} = \begin{cases} W_{hij} & \text{if } h \neq \tilde{h}_r \\ \dfrac{W_{hij}}{\propto_r} & \text{if } h = \tilde{h}_r \text{ and PSU (hi)is included in replicate r} \\ 0 & \text{if } h = \tilde{h}_r \text{ and PSU (hi)is not included in replicate r} \end{cases}.$$

Where,

$\check{h}_r$ is the stratum from which a PSU is deleted to form the *r*th replicate (donor stratum)

$\propto_r = \frac{n_{\tilde{h}_r} - 1}{n_{\tilde{h}_r}}$ for r=1, 2, …, R is the jackknife coefficients

The jackknife variance estimation formula for a proportion, total, odds ratio or other statistics is given below.

$$\hat{V}(\hat{\theta}) = \sum_{r=1}^{R} \propto_{\mathrm{r}} (\hat{\theta}_r - \hat{\theta})^2.$$

Where,

θ is the population parameter to be estimated

$\hat{\theta}$ is the estimate of θ from full sample

$\hat{\theta}_r$ is the estimate from the *r*th BRR replicate

3.2.8 IVEware: Imputation and Variance Estimation Software

IVEware: Imputation and Variance Estimation Software differs from other programs used in the thesis in that it can be launched from SAS. The software was developed by the researchers at the Survey Methodology Program, Survey Research Center, Institute for Social Research, University of Michigan. It requires SAS version 6.2 or higher. IVEware is capable of single or multiple imputations, complex sample analyses and using sequential regression approach to create partial or full synthetic datasets. The software can be downloaded from Institute for Social Research's website (http://www.isr.umich.edu/src/smp/ive/). Software, documentation and support are free of charge.

IVEware has four different modules; Impute, describe, regress and sasmod. The describe module was used in variance estimation of selected variables from TDHS-2008 dataset. IVEware employs Taylor series linearization to estimate variances from population means, proportions, subgroup differences, contrasts and linear combinations of means and proportions.

Stratum, cluster, weight variables should be specified for complex sample analyses in IVEware. Type of variance estimation method can be changed as number

of PSUs per stratum changes. Default “mult” method is used when there are multiple PSUs per stratum. “Pair” method is suitable for two PSUs per stratum designs. Finally, the “diff” method is used for successive differences. In one command different methods for variance estimation can be specified. Tables, cross tabulations for weighted proportions and standard errors can be estimated by “table” option. “Mean” option estimates means, standard errors and design effects. In addition, “by” statement can be used with both table and mean options and creates estimates for each level of the variable specified in by statement.

For “received method from public source” variable an error was occurred during IVEware analyses. Although, the necessary correspondences with the software developer have been made, the estimates for this particular variable could not be calculated. Additionally, conditional analysis instead of unconditional one is made only for this software due to single PSU problems.

3.3 DATA SOURCE:TURKEY DEMOGRAPHIC AND HEALTH SURVEY-2008

The data source used in the thesis is, as mentioned before, Turkey Demographic and Health Survey 2008. The TDHS-2008 is designed as a weighted, multistage, stratified cluster sample survey. Therefore, complex sample survey methods are needed to analyse the data from TDHS-2008.

The reason for employing a complicated sample design is for providing estimates for different subsamples (domains). These domains are;

- Turkey,
- Urban and rural areas as separate domains,
- The major five regions of the country; West, South, Central, North and East regions,
- The 12 NUTS 1 regions,

- The seven metropolitan cities which have population more than one million; İstanbul, Ankara, İzmir, Bursa, Adana, Konya, Gaziantep (Türkyılmaz, et. al. 2009).

The distinction between urban and rural areas is population size. The settlements which have populations larger than 10,000 people are included in the urban frame. The remaining settlements which are not included in urban frame are included in the rural frame. Turkey Statistical Institute (TURKSTAT) provided the information of all settlements in Turkey from 2007 Address-Based Population Registration System (ABPRS-2007).

15 divisions are created to form both conventional five regions and 12 NUTS 1. Turkey was divided into 36 mutually exclusive strata including urban and rural strata from these 15 divisions and metropolitan cities.

A total of 634 clusters are selected from 36 strata. Urban clusters are consisted of 25 households and rural clusters are consisted of 15 households.

The first stage of sample selection of TDHS-2008 was to draw settlements from 36 strata with systematic random sampling with probability proportionate to size. These settlements are divided into segments of approximately 100 households. 634 clusters from these segments are selected. Detailed information about survey design of TDHS-2008 is available in TDHS-2008 Main Report, Appendix B (2009).

The Household Questionnaire and the Individual Questionnaire for ever-married women aged 15-49 are used to gather data. Basic information about household members and visitors, background information for never married women aged 15-49, welfare information of elderly people aged 60+ and information about housing characteristics were collected with the Household Questionnaire.

The Individual Questionnaire was used to collect information on; background characteristics, migration, marriage, birth and work history, pregnancy, fertility preferences, knowledge and use of contraceptive methods, health issues for both mother and children and anthropometric measures.

Based on the collected data from both the Household Questionnaire and the Individual Questionnaire, 46 selected variables were presented for sampling error calculations in the Appendix C of TDHS-2008 Main Report (2009).

Separate sample weights for each stratum were calculated because of sample design. The formulas for sample weight calculation are as follows.

$$Wh = \frac{1}{f_h},$$

where Wh is the major component of the sample weight, h=stratum indicator and f_h is the sample fraction of h^{th}stratum. f_h is calculated as:

$$f_{h=}\ P_{1h}\ P_{2h}\ P_{3h}$$

where P_{1h} is the probability of the sample unit in the i th sample stage for the h th strata. Additionally, adjustments for household nonresponse, individual nonresponse and half sample nonresponse are taken into account in sample weight calculation (Türkyılmaz et. al., 2009).

Sampling errors of selected forty six variables from TDHS-2008 were calculated by ISSA Sampling Error Module (SAMPERR). These variables are proportions, means or rates based on different populations. Taylor series linearization method is employed for variance estimations of means and proportions, and jackknife repeated replication method is used for rates. Sampling error tables for selected variables for each domain (Turkey, urban, rural, five regions, and NUTS 1 regions) mentioned before are given in Appendix C of the Main Report of TDHS-2008 (Türkyılmaz and Adalı 2009).

Variables whose variances are calculated in the thesis are chosen from the variables whose sampling errors were calculated and presented in THDS-2008 Main Report. These variables were selected to be able to compare calculations with TDHS-2008's computations. Not all sampling errors of variables given in TDHS-2008 Appendix were calculated in the thesis. The values, standard errors, design effects, coefficient of variations and confidence intervals of thirty variables were calculated from TDHS-2008's selected variables. All proportion type variables were selected from the variables calculated from TDHS-2008. Estimations of mean type variables were not included in the thesis, since all women factor is included in these kinds of estimations, variance estimation needs special treatment. Sampling errors of rate type variables given in the Appendix C of TDHS-2008 Main Report such as "total fertility rate" were calculated by ISSA-SAMPERR. Variance estimation of rates requires advanced statistical and programming knowledge. Therefore, rate type variables were not included in the thesis.

The estimates for urban residence, no education, with secondary education or higher and currently married (in union) variables are calculated for the subsample of ever married women aged 15-49. These variables are used to determine background characteristics of women.

The estimates from the knowing any contraceptive method, knowing any modern contraceptive method, ever used contraceptive method, currently using any contraceptive method, currently using a modern method, currently using pill, currently using IUD, currently using condom, currently using injectables, currently using female sterilization, currently using periodic abstinence, currently using withdrawal, obtained method from public source, want no more children, want to delay birth at least 2 years variables are calculated for currently married women. These variables provide important information about women's family planning behaviours.

The mothers received medical care at delivery variable is based on the subpopulation births in the last 5 years. This is an important variable for evaluating reproductive health.

For children aged 15-26 months estimations of the child having health card, seen, child received BCG vaccination, child received DPT vaccination (3 doses), child received polio vaccination (3 doses), child received measles vaccination, child fully immunized variables are calculated. These variables are used in child health chapter of the TDHS-2008 main report.

The height-for age (-2SD), weight-for-height (-2SD) and weight-for-age (-2SD) variables are based on the subpopulation children aged 0-59 months. These variables are called anthropometric indices and they are recommended by the World Health Organization (WHO) to evaluate children's nutritional statuses (Kurtuluş Yiğit et al. 2009).

The BMI<18.5 (body mass index) variable is based the subpopulation of women who gave birth in the last 5 years. This variable is used to evaluate women's nutritional statuses. The index is calculated by dividing the weight by the squared heighta and evaluated by WHO standards (Kurtuluş Yiğit et al. 2009).

The variables used in the thesis and which subpopulations they are based on are given in the Table 6.

Table 6 Variables and their base populations

Variable	Base population
Urban residence	Ever married women 15-49
No education	Ever married women 15-49
With secondary education or higher	Ever married women 15-49
Currently married (in union)	Ever married women 15-49
Knowing any contraceptive method	Currently married women 15-49
Knowing any modern contraceptive method	Currently married women 15-49
Ever used any contraceptive method	Currently married women 15-49
Currently using any contraceptive method	Currently married women 15-49
Currently using a modern method	Currently married women 15-49
Currently using pill	Currently married women 15-49
Currently using IUD	Currently married women 15-49
Currently using condom	Currently married women 15-49
Currently using injectables	Currently married women 15-49
Currently using female sterilization	Currently married women 15-49
Currently using periodic abstinence	Currently married women 15-49
Currently using withdrawal	Currently married women 15-49
Obtained method from public sector source	Currently married women 15-49
Want no more children	Currently married women 15-49
Want to delay birth at least 2 years	Currently married women 15-49
Mothers received medical care at delivery	Births in last 5 years
Child having health card, seen	Children 15-26 months
Child received BCG vaccination	Children 15-26 months
Child received DPT vaccination (3 doses)	Children 15-26 months
Child received polio vaccination (3 doses)	Children 15-26 months
Child received measles vaccination	Children 15-26 months
Child fully immunized	Children 15-26 months
Height-for-age (-2SD)	Children 0-59 months
Weight-for-height (-2SD)	Children 0-59 months
Weight-for-age (-2SD)	Children 0-59 months
BMI < 18.5	Women15-49 who gave birth in 5 years

4. RESULTS

The proportions, standard errors, design effects, coefficient of variations (relative error) and 95% confidence intervals for each variable are calculated for eleven different approaches. These approaches are; Taylor series linearization of PASW (PASW-Taylor), Taylor series linearization, balanced repeared replication and jackknife repeated replication of Stata (Stata-Taylor, Stata-BRR, Stata-JK2 respectively), balanced repeated replication, jackknife 2 and jackknife n repeated replications of WesVar (WesVar-BRR, WesVar-JK2 and WesVar-JKn respectively), Taylor series linearization, balanced repeated replication and jackknife 2 repeated replication of SAS/STAT (SAS/STAT-Taylor, SAS/STAT-BRR and SAS/STAT-JK2 respectively) and Taylor series linearization of IVEware (IVEware-Taylor).

Eighty eight tables are formed for eleven approaches in eight domains which are Turkey, urban, rural, West, South, Central, North and East regions. These tabulations are presented in the Appendix B.

4.1 COMPARISON OF RESULTS

The results of proportions, standard errors and design effects for Turkey, urban and the West region domains are compared in this chapter. The estimates are compared according to their closeness to ISSA-SAMPERR results and also according to the relation between estimates calculated from different approaches. Ten comparison tables including three variables each are constructed. The inferences from tables are given immediately after each table.

In addition, three tables presenting deviation of design effect values of different approaches for Turkey, urban and West domain are constructed and interpreted in this chapter.

Table 7 Comparison of results of different software and standard error calculation approaches: urban residence, no education, with secondary education or higher

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Urban residence									
ISSA-Samperr	0.758	0.006	1.706	-	-	-	0.859	0.008	1.036
PASW -Taylor	0.758	0.006	1.706	-	-	-	0.859	0.008	1.010
Stata- Taylor	0.758	0.006	1.706	-	-	-	0.859	0.008	1.036
Stata-BRR	0.758	0.007	1.966	-	-	-	0.859	0.009	1.208
Stata- JK2	0.758	0.007	1.960	-	-	-	0.859	0.009	1.179
WesVar-BRR	0.758	0.007	1.975	-	-	-	0.859	0.009	1.105
WesVar-JK2	0.758	0.007	1.966	-	-	-	0.859	0.009	1.090
WesVar-JKn	0.758	0.007	1.994	-	-	-	0.859	0.009	1.188
SAS-Taylor	0.758	0.007	1.751	-	-	-	0.859	0.008	1.090
SAS-BRR	0.758	0.007	1.971	-	-	-	0.858	0.008	1.014
SAS JK2	0.758	0.007	1.963	-	-	-	0.858	0.008	1.011
IVEware Taylor	0.758	0.007	1.751	-	-	-	0.858	0.008	1.086
No education									
ISSA-Samperr	0.183	0.008	3.226	0.152	0.010	4.109	0.119	0.015	3.877
PASW -Taylor	0.183	0.008	3.226	0.152	0.010	4.102	0.119	0.015	3.872
Stata- Taylor	0.183	0.008	3.226	0.152	0.010	4.109	0.119	0.015	3.877
Stata-BRR	0.183	0.008	3.073	0.152	0.010	3.795	0.119	0.014	3.512
Stata- JK2	0.183	0.008	3.049	0.152	0.009	3.779	0.119	0.014	3.489
WesVar-BRR	0.183	0.008	3.077	0.152	0.010	3.800	0.119	0.014	3.471
WesVar-JK2	0.183	0.008	3.071	0.152	0.010	3.802	0.119	0.015	3.782
WesVar-JKn	0.183	0.008	3.197	0.152	0.010	3.919	0.119	0.015	3.782
SAS-Taylor	0.183	0.008	3.024	0.152	0.009	3.788	0.119	0.014	3.517
SAS-BRR	0.183	0.008	3.070	0.152	0.010	3.808	0.119	0.015	3.950
SAS JK2	0.183	0.008	3.072	0.152	0.010	3.805	0.119	0.015	3.869
IVEware Taylor	0.183	0.008	3.024	0.152	0.009	3.788	0.119	0.014	3.509
With secondary education or higher									
ISSA-Samperr	0.298	0.011	4.423	0.348	0.015	5.139	0.338	0.023	4.414
PASW -Taylor	0.298	0.011	4.421	0.348	0.015	5.070	0.338	0.023	4.339
Stata- Taylor	0.298	0.011	4.423	0.348	0.015	5.139	0.338	0.023	4.414
Stata-BRR	0.298	0.011	4.558	0.348	0.015	5.490	0.338	0.024	4.722
Stata- JK2	0.298	0.011	4.541	0.348	0.015	5.462	0.338	0.024	4.726
WesVar-BRR	0.298	0.011	4.564	0.348	0.015	5.499	0.338	0.024	4.798
WesVar-JK2	0.298	0.011	4.574	0.348	0.015	5.494	0.338	0.021	3.827
WesVar-JKn	0.298	0.011	3.980	0.348	0.014	4.576	0.338	0.021	3.827
SAS-Taylor	0.298	0.011	4.422	0.348	0.015	5.190	0.338	0.023	4.455
SAS-BRR	0.298	0.011	4.566	0.348	0.015	5.460	0.338	0.023	4.378
SAS JK2	0.298	0.011	4.561	0.348	0.015	5.468	0.338	0.023	4.410
IVEware Taylor	0.298	0.011	4.445	0.348	0.015	5.192	0.338	0.023	4.452

When the proportions, standard errors and design effects of “urban residence” variable are compared among different software and different variance estimation approaches’ results, the estimates seem to be close to the ISSA-SAMPERR results.

All software and approaches give the same proportion estimate (p) for Turkey. Standard errors estimated by using Taylor series linearization method (TSL) in PASW and Stata software are equal to ISSA-SAMPERR estimates. The standard error estimates (se) by other software and approaches are equal to each other and slightly differ from ISSA-SAMPERR estimates. Design effects calculated by PASW and Stata with Taylor series linearization method are equal to ISSA-SAMPERR results. Design effects calculated with Taylor series linearization method by SAS/STAT and IVEware are equal and slightly higher than ISSA-SAMPERR results. The other software and methods provide higher design effect (deff) values for Turkey.

Since the proportion of urban residence is 0 in urban domain, standard error estimates of the variable is equal to 0 and design effects can not be computed by software and methods.

For the West region, all proportion estimates except those calculated with the balanced repeated replication (BRR) and jackknife 2 repeated replication (JK2) methods of SAS/STAT and TLM of IVEware are equal to each other and are smaller than ISSA-SAMPERR estimates. Repeated replication methods except the SAS/STAT–BRR estimate provide standard errors equal to each other but higher than other software and approaches. Only TSL of Stata gives exactly the same design effect with ISSA-SAMPERR.

All proportion and standard error estimates of the “no education” variable for Turkey are equal. Deff values for Stata-Taylor and PASW-Taylor are equal to ISSA-

SAMPERR values. SAS/STAT- Taylor and IVEware-Taylor approaches gives same results.

All proportion estimates for the urban domain are also equal and only Stata-JK2, SAS/STAT-Taylor and IVEware-Taylor se estimates differ from the ISSA-SAMPERR se estimate. Only the Stata-Taylor deff result is similar to that of ISSA-SAMPERR. Other approaches are different from each other and are lower than the ISSA-SAMPERR value. In the West region, proportions of all estimates are the same as ISSA-SAMPERR. Se estimations of PASW-Taylor, Stata-Taylor, WesVar JK2, WesVar JKN, SAS/STAT BRR and SAS/STAT JK2 are equal to ISSA-SAMPERR. The other se estimations are equal to each other and are slightly lower than this value. Only Stata-Taylor gives exactly the same design effect with ISSA-SAMPERR. WesVar-JK2 and JKn results are equal to each other and lower than ISSA-SAMPERR result.

All proportion estimates of "with secondary education or higher" variable are equal to ISSA-SAMPERR for all three domains; Turkey, urban and West. All standard error estimates for Turkey are also equal. Stata-Taylor deff value is similar to ISSA-SAMPERR's. PASW-Taylor and SAS/STAT-Taylor are slightly lower than ISSA-SAMPERR result.

Only WesVar-JKn gives slightly lower standard errors estimation for urban, the others are equal to each other. Once again, Stata-Taylor and ISSA-SAMPERR results for deff are equal. WesVar-JKn's deff value is significantly lower than other values. Se estimations of ISSA-SAMPERR, PASW-Taylor, Stata-Taylor, all methods of SAS/STAT and IVEware-Taylor are equal for the West region. Stata-Taylor deff computation is equal to ISSA-SAMPERR and WesVar-JK2 is equal to WesVar-JKn.

Table 8 Comparison of results of different software and standard error calculation approaches: Currently married (in union), knowing any contraceptive method, knowing any modern contraceptive method

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Currently married (in union)									
ISSA-Samperr	0.945	0.004	2.140	0.941	0.005	2.347	0.938	0.007	1.777
PASW- Taylor	0.945	0.004	2.141	0.941	0.005	2.345	0.938	0.007	1.775
Stata- Taylor	0.945	0.004	2.140	0.941	0.005	2.347	0.938	0.007	1.777
Stata-BRR	0.945	0.004	2.094	0.941	0.005	2.271	0.938	0.007	1.716
Stata- JK2	0.945	0.004	2.062	0.941	0.005	2.226	0.938	0.007	1.605
WesVar-BRR	0.945	0.004	2.093	0.941	0.005	2.283	0.938	0.007	1.698
WesVar-JK2	0.945	0.004	2.101	0.941	0.005	2.288	0.938	0.007	1.590
WesVar-JKn	0.945	0.004	1.952	0.941	0.005	2.031	0.938	0.007	1.590
SAS-Taylor	0.945	0.004	2.103	0.941	0.005	2.291	0.938	0.007	1.723
SAS-BRR	0.945	0.004	2.092	0.941	0.005	2.294	0.938	0.007	1.767
SAS JK2	0.945	0.004	2.100	0.941	0.005	2.286	0.938	0.007	1.779
IVEware Taylor	0.945	0.004	2.103	0.941	0.005	2.291	0.938	0.007	1.724
Knowing any contraceptive method									
ISSA-Samperr	0.998	0.000	0.774	0.999	0.000	0.867	0.999	0.001	0.806
PASW -Taylor	0.998	0.000	0.769	0.999	0.000	0.867	0.999	0.001	0.551
Stata- Taylor	0.998	0.000	0.769	0.999	0.000	0.861	0.999	0.001	0.804
Stata-BRR	0.998	0.000	0.774	0.999	0.000	0.865	0.999	0.001	0.805
Stata- JK2	0.998	0.000	0.767	0.999	0.005	0.859	0.999	0.001	0.782
WesVar-BRR	0.998	0.000	0.775	0.999	0.000	0.870	0.999	0.001	0.806
WesVar-JK2	0.998	0.000	0.775	0.999	0.000	0.868	0.999	0.001	0.806
WesVar-JKn	0.998	0.001	0.849	0.999	0.000	0.839	0.999	0.001	0.806
SAS-Taylor	0.998	0.000	0.775	0.999	0.000	0.868	0.999	0.001	0.550
SAS-BRR	0.998	0.000	0.775	0.999	0.000	0.865	0.999	0.001	0.808
SAS JK2	0.998	0.000	0.772	0.999	0.000	0.868	0.999	0.001	0.808
IVEware Taylor	0.998	0.001	0.882	0.999	0.000	0.857	0.999	0.001	0.806
Knowing any modern contraceptive method									
ISSA-Samperr	0.996	0.001	1.049	0.998	0.001	1.266	0.998	0.001	1.212
PASW -Taylor	0.996	0.001	1.042	0.998	0.001	1.266	0.998	0.001	1.122
Stata- Taylor	0.996	0.001	1.042	0.998	0.001	1.259	0.998	0.001	1.208
Stata-BRR	0.996	0.001	1.044	0.998	0.001	1.270	0.998	0.001	1.210
Stata- JK2	0.996	0.001	1.036	0.998	0.001	1.250	0.998	0.001	1.192
WesVar-BRR	0.996	0.001	1.050	0.998	0.001	1.276	0.998	0.001	1.229
WesVar-JK2	0.996	0.001	1.050	0.998	0.001	1.263	0.998	0.001	1.229
WesVar-JKn	0.996	0.001	1.107	0.998	0.001	1.246	0.998	0.001	1.229
SAS-Taylor	0.996	0.001	1.050	0.998	0.001	1.268	0.998	0.001	1.124
SAS-BRR	0.996	0.001	1.053	0.998	0.001	1.268	0.998	0.001	1.197
SAS JK2	0.996	0.001	1.050	0.998	0.001	1.268	0.998	0.001	1.214
IVEware Taylor	0.996	0.001	1.146	0.998	0.001	1.256	0.998	0.001	1.214

Proportion and standard error estimates for “currently married” variable calculated by all software and methods for three domains are equal to ISSA-SAMPERR results.

For Turkey, the design effect calculated by Stata-Taylor is equal to the ISSA-SAMPERR value and PASW-Taylor deff value is almost equal to them. Design effects calculated by balanced repeated replication method are close to each other. Deff values calculated by using the TSL method of SAS/STAT and IVEware are also equal to each other.

For urban domain, designs effects calculated by ISSA-SAMPERR and Stata-Taylor are equal to each other. Additionally, deff values of SAS/STAT-Taylor and IVEware-Taylor are also equal to each other.

West region design effect values, ISSA-SAMPERR and Stata-Taylor values are equal. Design effects calculated by WesVar using JK2 and JKn procedures are equal to each other.

Proportion estimates of “knowing any contraceptive method” are equal in all domains and all approaches.

Turkey se estimations for all approaches are also equal to each other except WesVar-JKn and IVEware-Taylor. Only design effect value calculated by Stata-BRR approach is equal to ISSA-SAMPERR’s result. PASW-Taylor and Stata-Taylor values for deff calculations are equal to each other. Interestingly, WesVar-BRR, WesVar-JK2, SAS/STAT-Taylor and SAS/STAT-BRR calculations resulted in the same deff value, which is close to ISSA-SAMPERR value.

For urban domain, se estimation by Stata-JK2 differs from other se estimations. Deff value calculated by PASW-Taylor is the only value equal to ISSA-SAMPERR’s

deff value. Stata-BRR and SAS/STAT-BRR results of deff are same. WesVar-JK2, SAS/STAT-Taylor and SAS/STAT-JK2 deff values are equal to each other.

Deff values for West region, calculated by all methods of WesVar and IVEware-Taylor are equal to ISSA-SAMPERR's value. SAS/STAT-BRR and JK2 gives the same deff value.

All proportion and standard error estimates for "knowing any modern contraceptive method" variable are equal to each other.

For Turkey, deff values calculated by PASW-Taylor and Stata-Taylor are equal to each other. WesVar-JK2, WesVar-BRR, SAS/STAT-Taylor and SAS-JK2 deff values are equal to each other.

Deff values for the urban domain calculated by ISSA-SAMPERR and PASW-Taylor are equal. All methods of SAS/STAT resulted in the same deff values.

For the West region all methods of WesVar resulted in the same deff values. Additionally, SAS/STAT-JK2 and IVEware-Taylor deff values are equal to each other.

Table 9 Comparison of results of different software and standard error calculation approaches: Ever used any contraceptive method, currently using any contraceptive method, currently using modern method

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Ever used any contraceptive method									
ISSA-Samperr	0.913	0.004	1.430	0.926	0.004	1.442	0.940	0.006	1.199
PASW -Taylor	0.913	0.004	1.417	0.926	0.004	1.438	0.940	0.006	1.195
Stata- Taylor	0.913	0.004	1.421	0.926	0.004	1.433	0.940	0.006	1.197
Stata-BRR	0.913	0.004	1.316	0.926	0.004	1.348	0.940	0.006	1.105
Stata- JK2	0.913	0.004	1.325	0.926	0.004	1.355	0.940	0.006	1.026
WesVar-BRR	0.913	0.004	1.335	0.926	0.004	1.368	0.940	0.006	1.285
WesVar-JK2	0.913	0.004	1.341	0.926	0.004	1.370	0.940	0.006	1.285
WesVar-JKn	0.913	0.004	1.471	0.926	0.005	1.573	0.940	0.006	1.285
SAS-Taylor	0.913	0.004	1.350	0.926	0.004	1.401	0.940	0.006	1.151
SAS-BRR	0.913	0.004	1.342	0.926	0.004	1.366	0.940	0.006	1.217
SAS JK2	0.913	0.004	1.436	0.926	0.004	1.374	0.940	0.006	1.203
IVEware Taylor	0.913	0.005	1.800	0.926	0.005	1.650	0.940	0.006	1.253
Currently using any contraceptive method									
ISSA-Samperr	0.730	0.007	1.667	0.743	0.008	1.772	0.763	0.012	1.430
PASW -Taylor	0.730	0.007	1.641	0.743	0.008	1.758	0.763	0.012	1.419
Stata- Taylor	0.730	0.007	1.656	0.743	0.008	1.761	0.763	0.012	1.428
Stata-BRR	0.730	0.007	1.729	0.743	0.008	1.860	0.763	0.013	1.548
Stata- JK2	0.730	0.007	1.756	0.743	0.008	1.888	0.763	0.013	1.518
WesVar-BRR	0.730	0.007	1.781	0.743	0.008	1.913	0.763	0.013	1.541
WesVar-JK2	0.730	0.007	1.774	0.743	0.008	1.906	0.763	0.013	1.541
WesVar-JKn	0.730	0.007	1.832	0.743	0.008	1.944	0.763	0.013	1.541
SAS-Taylor	0.730	0.007	1.656	0.743	0.008	1.789	0.763	0.012	1.459
SAS-BRR	0.730	0.007	1.779	0.743	0.008	1.906	0.763	0.012	1.475
SAS JK2	0.730	0.007	1.685	0.743	0.008	1.906	0.763	0.012	1.434
IVEware Taylor	0.730	0.007	1.994	0.743	0.009	1.956	0.763	0.012	1.500
Currently using modern method									
ISSA-Samperr	0.460	0.007	1.583	0.478	0.009	1.503	0.482	0.012	0.998
PASW -Taylor	0.460	0.007	1.566	0.478	0.009	1.500	0.482	0.012	0.995
Stata- Taylor	0.460	0.007	1.573	0.478	0.009	1.493	0.482	0.012	0.996
Stata-BRR	0.460	0.007	1.523	0.478	0.008	1.416	0.482	0.012	0.938
Stata- JK2	0.460	0.007	1.525	0.478	0.008	1.435	0.482	0.011	0.928
WesVar-BRR	0.460	0.007	1.553	0.478	0.008	1.462	0.482	0.013	1.222
WesVar-JK2	0.460	0.007	1.541	0.478	0.008	1.450	0.482	0.013	1.222
WesVar-JKn	0.460	0.008	1.705	0.478	0.009	1.740	0.482	0.013	1.222
SAS-Taylor	0.460	0.007	1.541	0.478	0.008	1.459	0.482	0.012	0.951
SAS-BRR	0.460	0.007	1.550	0.478	0.008	1.445	0.482	0.012	1.002
SAS JK2	0.460	0.007	1.584	0.478	0.008	1.450	0.482	0.012	0.996
IVEware Taylor	0.460	0.008	1.866	0.478	0.009	1.837	0.482	0.014	1.316

All proportion estimates of all domains are equal to ISSA-SAMPERR's estimates.For Turkey, all se estimates except IVEware-Taylor estimate are equal to each other. None of the deff values is equal to ISSA-SAMPERR's deff result.

For the urban domain, only WesVar-JKn and IVEware Taylor se estimations differ from ISSA-SAMPERR's estimation. None of the deff values is equal to ISSA-SAMPERR's deff result.

All se estimates are equal to each other in the West region. WesVar deff calculations with three different methods are equal to each other.

All proportion and standard error estimates of "currently using any contraceptive method" variable for Turkey are equal. Only Stata-Taylor and SAS/STAT-Taylor deff values are equal to each other.

All proportion estimates for the urban domain are same as ISSA-SAMPERR's estimate. Only, the se estimate of IVEware-Taylor differs from ISSA-SAMPERR's se estimate. Also, only, the WesVar-JK2, SAS/STAT-BRR and SAS-JK2 deff values are equal to each other.

All proportion estimates for the West region are equal to the ISSA-SAMPERR's estimation. The se estimated by Stata-BRR and JK2, and all methods of WesVar are equal to each other. The remaining approaches have the same estimate as ISSA-SAMPERR. WesVar deff values are equal to each other.

All proportion estimates of "currently using modern method" variable are equal to ISSA-SAMPERR's estimation in all domains. For Turkey, se estimates of WesVar-JKn and IVEware-Taylor are equal to each other and they are also the only estimates differing from ISSA-SAMPERR' estimates. All deff values calculated for Turkey differ from each other except WesVar-JK2 and SAS/STAT-Taylor.

ISSA-SAMPERR, PASW-Taylor, Stata-Taylor, WesVar JKN and IVEware-Taylor se estimates for the urban domain are equal to each other. Additionally, the remaining approaches are also equal between each other. All deff values differ from each other.

ISSA-SAMPERR, PASW-Taylor, Stata-Taylor and BRR, and all methods of SAS/STAT have the same se estimate for West region. Deff values calculated by WesVar are equal to each other. Stata-Taylor and SAS/STAT-JK2 deff valueas are equal to each other.

Table 10 Comparison of results of different software and standard error calculation approaches: Currently using pill, currently using IUD, currently using condom

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Currently using pill									
ISSA-Samperr	0.053	0.003	1.621	0.056	0.004	1.700	0.058	0.006	1.353
PASW -Taylor	0.053	0.003	1.608	0.056	0.004	1.697	0.058	0.006	1.349
Stata- Taylor	0.053	0.003	1.610	0.056	0.004	1.690	0.058	0.006	1.348
Stata-BRR	0.053	0.003	1.621	0.056	0.004	1.716	0.058	0.007	1.364
Stata- JK2	0.053	0.003	1.610	0.056	0.004	1.698	0.058	0.006	1.350
WesVar-BRR	0.053	0.003	1.632	0.056	0.004	1.719	0.058	0.007	1.482
WesVar-JK2	0.053	0.003	1.632	0.056	0.004	1.717	0.058	0.007	1.482
WesVar-JKn	0.053	0.003	1.666	0.056	0.004	1.783	0.058	0.007	1.482
SAS-Taylor	0.053	0.003	1.647	0.056	0.004	1.743	0.058	0.007	1.397
SAS-BRR	0.053	0.003	1.631	0.056	0.004	1.717	0.058	0.006	1.347
SAS JK2	0.053	0.003	1.627	0.056	0.004	1.714	0.058	0.006	1.353
IVEware Taylor	0.053	0.003	1.645	0.056	0.004	1.750	0.058	0.007	1.463
Currently using IUD									
ISSA-Samperr	0.169	0.006	1.672	0.175	0.007	1.593	0.174	0.011	1.435
PASW -Taylor	0.169	0.006	1.646	0.175	0.007	1.579	0.174	0.011	1.420
Stata- Taylor	0.169	0.006	1.662	0.175	0.007	1.583	0.174	0.011	1.430
Stata-BRR	0.169	0.006	1.613	0.175	0.007	1.530	0.174	0.011	1.399
Stata- JK2	0.169	0.006	1.623	0.175	0.007	1.548	0.174	0.011	1.397
WesVar-BRR	0.169	0.006	1.635	0.175	0.007	1.565	0.174	0.011	1.435
WesVar-JK2	0.169	0.006	1.641	0.175	0.007	1.564	0.174	0.011	1.435
WesVar-JKn	0.169	0.006	1.733	0.175	0.007	1.721	0.174	0.011	1.435
SAS-Taylor	0.169	0.006	1.601	0.175	0.007	1.516	0.174	0.011	1.355
SAS-BRR	0.169	0.006	1.637	0.175	0.007	1.554	0.174	0.011	1.440
SAS JK2	0.169	0.006	1.677	0.175	0.007	1.563	0.174	0.011	1.437
IVEware Taylor	0.169	0.006	1.817	0.175	0.007	1.803	0.174	0.011	1.465
Currently using condom									
ISSA-Samperr	0.143	0.006	2.129	0.154	0.007	2.179	0.155	0.011	1.618
PASW -Taylor	0.143	0.006	2.108	0.154	0.007	2.173	0.155	0.011	1.609
Stata- Taylor	0.143	0.006	2.117	0.154	0.007	2.167	0.156	0.011	1.613
Stata-BRR	0.143	0.006	1.974	0.154	0.007	1.968	0.156	0.010	1.438
Stata- JK2	0.143	0.006	1.968	0.154	0.007	1.957	0.156	0.010	1.421
WesVar-BRR	0.143	0.006	2.002	0.154	0.007	1.998	0.156	0.011	1.591
WesVar-JK2	0.143	0.006	1.998	0.154	0.007	2.005	0.156	0.011	1.591
WesVar-JKn	0.143	0.006	2.083	0.154	0.007	2.111	0.156	0.011	1.591
SAS-Taylor	0.143	0.006	2.082	0.154	0.007	2.113	0.155	0.011	1.547
SAS-BRR	0.143	0.006	1.992	0.154	0.007	2.013	0.155	0.011	1.632
SAS JK2	0.143	0.006	2.123	0.154	0.007	2.009	0.155	0.011	1.617
IVEware Taylor	0.143	0.007	2.466	0.154	0.008	2.470	0.155	0.012	1.916

All proportion estimates of all domains for “currently using pill” variable are equal to ISSA-SAMPERR estimates. For Turkey and urban domains, se estimates are also equal to ISSA-SAMPERR’s estimates. Only Stata-BRR deff value for Turkey is equal to ISSA-SAMPERR’s value. Stata-Taylor and JK2 deff values are equal to each other. WesVar-BRR and JK2 deff values are equal to each other. For the urban domain, only WesVar-JK2 and SAS/STAT-BRR deff values are equal to each other.

For the West region, Stata-BRR, all methods of WesVar, SAS/STAT-Taylor and IVEware-Taylor se estimates are equal to each other. The other approaches have the same se estimate as ISSA-SAMPERR which differs only slightly from the former packages. Deff values of WesVar methods are equal to each other.

All proportion and se estimates of “currently using IUD” variable are equal to ISSA-SAMPERR’s estimates in all of the three domains.

The deff values of Turkey and urban domains differ from ISSA-SAMPERR’s deff values. For the West region, only the WesVar methods calculated the same deff value as ISSA-SAMPERR. All proportion estimates for Turkey and urban domains of “currently using condom” variable are equal to ISSA-SAMPERR estimates. For Turkey, only IVEware-Taylor’s se estimate slightly differs from others. All deff values for Turkey are different from both each other and ISSA-SAMPERR.

For the urban domain only IVEware-Taylor’s se estimate slightly differs from others. All deff values differ from ISSA-SAMPERR’s result. For the West region, the proportion estimates calculated by Stata and WesVar methods are equal to each other and almost equal to the other approaches. All se estimations are close to each other. Those calculated by Stata-BRR and JK2 are equal to each other. Deff values calculated by WesVar are equal to each other. Only, the SAS/STAT-JK2 deff value is close to ISSA-SAMPERR’s deff value.

Table 11 Comparison of results of different software and standard error calculation approaches: Currently using injectables, currently using female sterilization, currently using periodic abstinence

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Currently using injectables									
ISSA-Samperr	0.009	0.001	1.508	0.008	0.002	1.656	0.008	0.003	1.426
PASW -Taylor	0.009	0.001	1.498	0.008	0.002	1.657	0.008	0.003	1.426
Stata- Taylor	0.009	0.001	1.498	0.008	0.002	1.646	0.008	0.003	1.423
Stata-BRR	0.009	0.001	1.488	0.008	0.002	1.610	0.008	0.002	1.378
Stata- JK2	0.009	0.001	1.469	0.008	0.002	1.593	0.008	0.002	1.334
WesVar-BRR	0.009	0.001	1.494	0.008	0.002	1.618	0.008	0.002	1.258
WesVar-JK2	0.009	0.001	1.496	0.008	0.002	1.617	0.008	0.002	1.258
WesVar-JKn	0.009	0.001	1.415	0.008	0.002	1.543	0.008	0.002	1.258
SAS-Taylor	0.009	0.001	1.503	0.008	0.002	1.644	0.008	0.003	1.413
SAS-BRR	0.009	0.001	1.494	0.008	0.002	1.608	0.008	0.003	1.431
SAS JK2	0.009	0.001	1.510	0.008	0.002	1.615	0.008	0.003	1.427
IVEware Taylor	0.009	0.001	1.420	0.008	0.002	1.556	0.008	0.002	1.286
Currently using female sterilization									
ISSA-Samperr	0.083	0.004	1.535	0.083	0.005	1.553	0.084	0.008	1.334
PASW -Taylor	0.083	0.004	1.511	0.083	0.005	1.545	0.084	0.008	1.327
Stata- Taylor	0.083	0.004	1.525	0.083	0.005	1.543	0.084	0.008	1.332
Stata-BRR	0.083	0.004	1.785	0.083	0.005	1.902	0.084	0.009	1.700
Stata- JK2	0.083	0.004	1.774	0.083	0.005	1.902	0.084	0.009	1.708
WesVar-BRR	0.083	0.004	1.794	0.083	0.005	1.918	0.084	0.008	1.445
WesVar-JK2	0.083	0.004	1.796	0.083	0.005	1.929	0.084	0.008	1.445
WesVar-JKn	0.083	0.004	1.619	0.083	0.005	1.712	0.084	0.008	1.445
SAS-Taylor	0.083	0.004	1.561	0.083	0.005	1.610	0.084	0.008	1.394
SAS-BRR	0.083	0.004	1.797	0.083	0.005	1.920	0.084	0.008	1.326
SAS JK2	0.083	0.004	1.528	0.083	0.005	1.918	0.084	0.008	1.332
IVEware Taylor	0.083	0.004	1.662	0.083	0.005	1.736	0.084	0.008	1.416
Currently using periodic abstinence									
ISSA-Samperr	0.006	0.001	1.698	0.007	0.001	1.662	0.005	0.002	1.107
PASW -Taylor	0.006	0.001	1.687	0.007	0.001	1.661	0.005	0.002	1.107
Stata- Taylor	0.006	0.001	1.687	0.007	0.001	1.651	0.005	0.002	1.105
Stata-BRR	0.006	0.001	1.682	0.007	0.001	1.641	0.005	0.002	1.111
Stata- JK2	0.006	0.001	1.685	0.007	0.001	1.649	0.005	0.002	1.100
WesVar-BRR	0.006	0.001	1.692	0.007	0.001	1.652	0.006	0.002	1.108
WesVar-JK2	0.006	0.001	1.700	0.007	0.001	1.665	0.006	0.002	1.108
WesVar-JKn	0.006	0.001	1.665	0.007	0.001	1.629	0.006	0.002	1.108
SAS-Taylor	0.006	0.001	1.700	0.007	0.001	1.664	0.005	0.002	1.110
SAS-BRR	0.006	0.001	1.709	0.007	0.001	1.664	0.005	0.002	1.120
SAS JK2	0.006	0.001	1.697	0.007	0.001	1.666	0.005	0.002	1.109
IVEware Taylor	0.006	0.001	1.622	0.007	0.001	1.582	0.005	0.002	1.093

All proportion estimates of “currently using injectables” variable are equal to ISSA-SAMPERR’s estimates. The se estimates for Turkey and urban domains are also equal to ISSA-SAMPERR’s estimates. Deff values calculated by PASW and Stata-Taylor are equal to each other.

For the urban domain, only the PASW-Taylor deff value is close to ISSA-SAMPERR’s value. WesVar-BRR and JK2 methods resulted in close deff values.

All se estimates for the West region are close to each other. Stata-BRR and JK2, WesVar and IVEware se estimates are equal to each other and are almost equal to the estimates by other approaches. PASW deff value is equal to ISSA-SAMPERR and SAS/STAT-JK2 deff value is close to these values. WesVar deff values are equal to each other.

All proportion estimates for “currently using female sterilization” variable are equal to ISSA-SAMPERR’s estimates. Additionally, the se estimates for Turkey and urban domains are also equal to ISSA-SAMPERR’s estimates. WesVar-BRR, JK2 and SAS/STAT-BRR deff values are close to each other.

Stata-BRR and JK2 deff values are equal to each other and WesVar-BRR and SAS/STAT-JK2 deff values are equal to each other in urban domain.

Stata-BRR and JK2 se estimations are equal to each other and close to other se estimations in the West region. Stata-Taylor and SAS/STAT-JK2 deff values are equal to each other and they are also close to ISSA-SAMPERR’s value. Additionally, the WesVar deff results are equal to each other.

All proportion and se estimates of “currently using periodic abstinence” variable for all three domains are equal to ISSA-SAMPERR’s estimates. For Turkey,

PASW-Taylor and Stata-Taylor deff results are equal and SAS/STAT-JK2 deff value is close to ISSA-SAMPERR's value.

For the urban domain, PASW-Taylor deff value is almost equal to ISSA-SAMPERR's deff value. SAS/STAT BRR and Taylor deff calculations are equal to each other.

For, the West region, PASW-Taylor deff value is equal to ISSA-SAMPERR's deff value and WesVar deff calculations are equal to each other.

Table 12 Comparison of results of different software and standard error calculation approaches: Currently using withdrawal, obtained method from public source, want no more children

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Currently using withdrawal									
ISSA-Samperr	0.262	0.007	1.980	0.256	0.008	1.882	0.271	0.013	1.510
PASW -Taylor	0.262	0.007	1.965	0.256	0.008	1.878	0.271	0.013	1.506
Stata- Taylor	0.262	0.007	1.968	0.256	0.008	1.869	0.272	0.013	1.508
Stata-BRR	0.262	0.007	1.982	0.256	0.008	1.915	0.272	0.013	1.555
Stata- JK2	0.262	0.007	1.985	0.256	0.008	1.904	0.272	0.013	1.530
WesVar-BRR	0.262	0.007	2.020	0.256	0.008	1.935	0.272	0.012	1.301
WesVar-JK2	0.262	0.007	2.004	0.256	0.008	1.923	0.272	0.012	1.301
WesVar-JKn	0.262	0.007	1.798	0.256	0.008	1.749	0.272	0.012	1.301
SAS-Taylor	0.262	0.007	1.982	0.256	0.008	1.880	0.271	0.013	1.518
SAS-BRR	0.262	0.007	2.030	0.256	0.008	1.923	0.272	0.013	1.514
SAS JK2	0.262	0.007	1.991	0.256	0.008	1.929	0.272	0.013	1.507
IVEware Taylor	0.262	0.007	1.878	0.256	0.008	1.846	0.272	0.012	1.359
Obtained method from public sector source									
ISSA-Samperr	0.600	0.012	1.745	0.580	0.013	1.631	0.536	0.021	1.462
PASW -Taylor	0.600	0.012	1.789	0.579	0.013	1.684	0.536	0.021	1.457
Stata- Taylor	0.600	0.012	1.790	0.580	0.013	1.644	0.536	0.021	1.457
Stata-BRR	0.600	0.011	1.756	0.580	0.013	1.615	0.536	0.020	1.430
Stata- JK2	0.600	0.012	1.785	0.580	0.013	1.621	0.536	0.020	1.416
WesVar-BRR	0.600	0.012	1.751	0.580	0.014	1.970	0.536	0.022	1.621
WesVar-JK2	0.600	0.012	1.754	0.580	0.014	1.970	0.536	0.022	1.621
WesVar-JKn	0.600	0.012	1.986	0.580	0.014	1.970	0.536	0.022	1.621
SAS-Taylor	0.600	0.011	1.702	0.580	0.013	1.618	0.536	0.020	1.407
SAS-BRR	0.600	0.012	1.762	0.580	0.013	1.646	0.536	0.021	1.459
SAS JK2	0.600	0.012	1.746	0.580	0.013	1.638	0.536	0.021	1.461
IVEware Taylor	0.600	0.013	2.137	0.580	0.015	2.128	0.536	0.022	1.629
Want no more children									
ISSA-Samperr	0.588	0.007	1.523	0.583	0.008	1.464	0.587	0.012	1.113
PASW -Taylor	0.588	0.007	1.509	0.583	0.008	1.455	0.587	0.012	1.102
Stata- Taylor	0.588	0.007	1.513	0.583	0.008	1.454	0.587	0.012	1.109
Stata-BRR	0.588	0.007	1.496	0.583	0.008	1.428	0.587	0.013	1.145
Stata- JK2	0.588	0.007	1.510	0.583	0.008	1.469	0.587	0.012	1.111
WesVar-BRR	0.588	0.007	1.534	0.583	0.008	1.326	0.587	0.012	1.025
WesVar-JK2	0.588	0.007	1.538	0.583	0.008	1.326	0.587	0.012	1.025
WesVar-JKn	0.588	0.007	1.352	0.583	0.008	1.326	0.587	0.012	1.025
SAS-Taylor	0.588	0.007	1.522	0.583	0.008	1.476	0.587	0.012	1.124
SAS-BRR	0.588	0.007	1.536	0.583	0.008	1.504	0.587	0.013	1.146
SAS JK2	0.588	0.007	1.523	0.583	0.008	1.494	0.587	0.012	1.111
IVEware Taylor	0.588	0.007	1.393	0.583	0.008	1.324	0.587	0.012	1.036

All proportion and se estimates of “currently using withdrawal” variable for Turkey and urban domains are equal to ISSA-SAMPERR’s estimates. For Turkey, Stata-BRR and SAS/STAT-Taylor deff values are equal to each other.

For the urban domain, WesVar-JK2 and SAS/STAT-BRR deff values are equal to each other.

For the West region, PASW-Taylor and SAS/STAT-Taylor proportion estimates are equal to ISSA-SAMPERR estimate. The proportion estimates for the other approaches are equal to each other and are almost equal to ISSA-SAMPERR’s estimate. The se estimates of WesVar and IVEware-Taylor are equal to each other. The remaining se estimates are also equal to each other and close to the WesVar and IVEware estimates. Deff values calculated by WesVar are equal to each other.

All proportion estimates of “obtained method from public source” variable for Turkey are equal to each other. All se estimates are close to each to each other and only Stata-BRR, SAS/STAT-Taylor and IVEware-Taylor estimations differ from ISSA-SAMPERR’ estimation. Only, the deff value calculated by SAS/STAT-JK2 is close to ISSA-SAMPERR’s value.

For the urban domain, only PASW-Taylor’s proportion estimate differs from others. Se estimates of all approaches are close to each other. WesVar estimates are equal to each other and slightly differ from other approaches. The deff values of WesVar are equal to each other.

For the West region, all proportion estimates are equal to each other. All se estimates are close to each other. WesVar and IVEware estimates are equal. Besides, Stata-BRR, JK2 and SAS/STAT-Taylor estimates are equal to each other. The remaining estimates are equal to ISSA-SAMPERR estimate. Only the SAS/STAT-JK2 deff value is close to ISSA-SAMPERR’s deff value. Deff values calculated by

Taylor series linearization method of PASW and Stata are equal to each other. Additionally, WesVar deff values are equal to each other.

All proportion estimates of “want no more children” variable are equal to ISSA-SAMPERR’s estimates. Additionally, all se estimates for Turkey and urban are also equal to ISSA-SAMPERR’s estimates. For Turkey, only SAS/STAT-JK2 deff value is equal to ISSA-SAMPERR’s deff value.

For the urban domain, WesVar deff values are equal to each other and PASW-Taylor and Stata-Taylor deff values are close each other.

For the West region, only Stata-BRR and SAS/STAT-BRR se estimates, which are equal to each other, differ from other se estimates. Stata-JK2 and SAS/STAT JK2 deff values are equal to each other, and WesVar deff calculations are equal to each other. WesVar values are also close to ISSA-SAMPERR values.

Table 13 Comparison of results of different software and standard error calculation approaches: Want to delay birth at least 2 years, mothers received medical care at delivery, childe having health card, seen

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Want to delay birth at least 2 years									
ISSA-Samperr	0.143	0.006	1.869	0.146	0.007	2.079	0.138	0.011	1.708
PASW -Taylor	0.143	0.006	1.860	0.146	0.007	2.072	0.138	0.011	1.702
Stata- Taylor	0.143	0.006	1.855	0.146	0.007	2.065	0.138	0.011	1.706
Stata-BRR	0.143	0.006	1.742	0.146	0.007	1.921	0.138	0.010	1.595
Stata- JK2	0.143	0.006	1.748	0.146	0.007	1.949	0.138	0.010	1.565
WesVar-BRR	0.143	0.006	1.772	0.146	0.007	1.783	0.138	0.010	1.398
WesVar-JK2	0.143	0.006	1.772	0.146	0.007	1.783	0.138	0.010	1.398
WesVar-JKn	0.143	0.005	1.656	0.146	0.007	1.783	0.138	0.010	1.398
SAS-Taylor	0.143	0.006	1.791	0.146	0.007	1.986	0.138	0.010	1.610
SAS-BRR	0.143	0.006	1.779	0.146	0.007	1.971	0.138	0.011	1.734
SAS JK2	0.143	0.006	1.867	0.146	0.007	1.971	0.138	0.011	1.710
IVEware Taylor	0.143	0.005	1.632	0.146	0.007	1.754	0.138	0.010	1.386
Mothers recieved medical care at delivery									
ISSA-Samperr	0.913	0.008	2.816	0.957	0.006	1.626	0.980	0.007	1.788
PASW -Taylor	0.913	0.008	2.933	0.957	0.006	2.273	0.980	0.007	1.684
Stata- Taylor	0.913	0.008	2.934	0.957	0.006	2.235	0.980	0.007	1.695
Stata-BRR	0.913	0.008	3.375	0.957	0.006	2.199	0.980	0.007	1.664
Stata- JK2	0.913	0.008	3.356	0.957	0.006	2.173	0.980	0.007	1.626
WesVar-BRR	0.913	0.009	3.498	0.957	0.006	2.248	0.980	0.007	1.665
WesVar-JK2	0.913	0.008	3.489	0.957	0.006	2.232	0.980	0.007	1.633
WesVar-JKn	0.913	0.008	3.407	0.957	0.006	2.161	0.980	0.007	1.692
SAS-Taylor	0.913	0.008	3.026	0.957	0.006	2.284	0.980	0.007	1.689
SAS-BRR	0.913	0.009	3.522	0.957	0.006	2.208	0.980	0.007	1.768
SAS JK2	0.911	0.008	2.816	0.957	0.006	2.284	0.980	0.007	1.691
IVEware Taylor									
Child having health card, seen									
ISSA-Samperr	0.726	0.021	1.952	0.758	0.026	1.793	0.797	0.041	1.440
PASW -Taylor	0.727	0.021	1.747	0.758	0.022	1.358	0.797	0.034	0.996
Stata- Taylor	0.726	0.021	1.756	0.758	0.026	2.031	0.797	0.041	1.506
Stata-BRR	0.726	0.021	1.742	0.758	0.026	1.980	0.797	0.041	1.430
Stata- JK2	0.726	0.021	1.742	0.758	0.026	1.985	0.797	0.040	1.418
WesVar-BRR	0.727	0.021	1.708	0.758	0.026	1.935	0.797	0.041	1.415
WesVar-JK2	0.727	0.021	1.715	0.758	0.026	1.936	0.797	0.041	1.411
WesVar-JKn	0.727	0.022	1.873	0.758	0.028	2.170	0.797	0.047	1.900
SAS-Taylor	0.726	0.020	1.572	0.758	0.026	1.878	0.797	0.041	1.421
SAS-BRR	0.726	0.021	1.720	0.758	0.026	1.934	0.797	0.042	1.487
SAS JK2	0.726	0.021	1.723	0.758	0.026	1.961	0.797	0.041	1.468
IVEware Taylor	0.726	0.022	1.887	0.758	0.027	2.131	0.797	0.046	1.818

All proportion estimates of “want to delay birth at least 2 years” variable are equal to ISSA-SAMPERR estimates in all three domains. For Turkey, se estimations of all approaches are equal to ISSA-SAMPERR except estimations from WesVar-JKn and IVEware-Taylor, which are equal to each other and they differ from other estimates slightly. Only SAS/STAT-JK2 deff value is closer to ISSA-SAMPERR’s value. WesVar-BRR and JK2 methods give same deff value.

For the urban domain, se estimations as well as proportion estimates are equal to ISSA-SAMPERR results. Deff values calculated by WesVar are equal to each other and SAS/STAT- BRR and JK2 results are equal to each other. The closest deff value to ISSA-SAMPERR is calculated by PASW-Taylor.

For the West region, PASW-Taylor, Stata-Taylor, SAS/STAT-BRR and JK2 all provide the same se estimates as ISSA-SAMPERR. Other estimates are equal to each other and close to ISSA-SAMPERR value. WesVar deff calculations are equal to each other. SAS-JK2 and Stata-Taylor deff values are the closest values to the ISSA-SAMPERR.

Only the IVEware proportion estimate of “mothers received medical care at delivery” variable differs from ISSA-SAMPERR estimates in Turkey. All se estimations are equal to each other. Only the se estimates of WesVar-BRR and SAS/STAT-BRR, which are the same, differ from them. Only the IVEware-Taylor deff value is equal to ISSA-SAMPERR’s value. PASW and Stata-Taylor have close values.

All proportion and se estimations of the West region are equal to ISSA-SAMPERR estimations. WesVar-BRR and Stata-BRR have close deff values.

Proportion estimates of “child having health card, seen” variable are close to each other for the Turkey domain. PASW and WesVar estimations are equal to each

other and differ from others. Se estimates also have close values. WesVar-JKn and IVEware-Taylor have the same se estimates. SAS/STAT-Taylor se estimate differs from others. None but, Stata-BRR and JK2 provides equal deff values.

For the urban domain, all proportion estimates are equal to the ISSA-SAMPERR estimate. PASW-Taylor, WesVar-JKn and IVEware-Taylor se estimations differ from ISSA-SAMPERR estimate. WesVar-BRR and JK2, and SAS/STAT-BRR have close deff values.

All proportion estimates are equal to ISSA-SAMPERR estimate in the West region. Stata-JK2 and SAS/STAT-BRR have closer se estimations to ISSA-SAMPER. PASW-Taylor and IVEware-Taylor estimates differ from other estimates. All of the other approaches have the same se estimate as ISSA-SAMPERR. All deff values differ from each other.

Table 14 Comparison of results of different software and standard error calculation approaches: Child received BCG vaccination, child received DPT vaccination (3 doses), child received polio vaccination (3 doses)

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Child received BCG vaccination									
ISSA-Samperr	0.959	0.006	1.447	0.965	0.006	0.537	0.973	0.005	0.135
PASW -Taylor	0.959	0.006	0.688	0.965	0.005	0.394	0.973	0.001	0.011
Stata- Taylor	0.959	0.006	0.691	0.966	0.006	0.586	0.973	0.005	0.130
Stata-BRR	0.959	0.009	1.698	0.966	0.012	2.211	0.973	0.022	2.500
Stata- JK2	0.959	0.009	1.737	0.966	0.012	2.310	0.973	0.023	2.802
WesVar-BRR	0.959	0.009	1.669	0.966	0.012	2.153	0.973	0.022	2.483
WesVar-JK2	0.959	0.009	1.715	0.966	0.012	2.257	0.973	0.023	2.783
WesVar-JKn	0.959	0.008	1.147	0.966	0.009	1.374	0.973	0.016	1.334
SAS-Taylor	0.959	0.005	0.557	0.965	0.006	0.557	0.973	0.003	0.033
SAS-BRR	0.959	0.009	1.677	0.965	0.012	2.159	0.973	0.005	0.139
SAS JK2	0.959	0.006	0.677	0.965	0.006	0.565	0.973	0.005	0.127
IVEware Taylor	0.959	0.008	1.154	0.965	0.009	1.340	0.973	0.015	1.250
Child received DPT vaccination (3 doses)									
ISSA-Samperr	0.893	0.012	0.976	0.921	0.013	1.162	0.937	0.022	1.169
PASW -Taylor	0.893	0.012	1.102	0.921	0.011	0.828	0.937	0.017	0.702
Stata- Taylor	0.893	0.012	1.141	0.921	0.013	1.268	0.937	0.022	1.124
Stata-BRR	0.893	0.011	1.018	0.921	0.012	1.038	0.937	0.019	0.897
Stata- JK2	0.893	0.011	1.026	0.921	0.012	1.057	0.937	0.020	0.914
WesVar-BRR	0.893	0.011	1.003	0.921	0.012	1.007	0.937	0.019	0.889
WesVar-JK2	0.893	0.011	1.011	0.921	0.012	1.031	0.937	0.020	0.907
WesVar-JKn	0.893	0.012	1.115	0.921	0.013	1.133	0.937	0.021	1.036
SAS-Taylor	0.893	0.012	1.114	0.921	0.013	1.225	0.937	0.022	1.096
SAS-BRR	0.893	0.011	1.007	0.921	0.012	1.037	0.937	0.022	1.114
SAS JK2	0.893	0.012	1.116	0.921	0.013	1.225	0.937	0.022	1.097
IVEware Taylor	0.893	0.012	1.203	0.921	0.013	1.161	0.937	0.020	0.968
Child received polio vaccination (3 doses)									
ISSA-Samperr	0.888	0.013	1.158	0.917	0.016	1.583	0.917	0.029	1.595
PASW -Taylor	0.888	0.013	1.286	0.917	0.014	1.344	0.917	0.025	1.137
Stata- Taylor	0.888	0.013	1.332	0.917	0.016	1.729	0.917	0.029	1.535
Stata-BRR	0.888	0.012	1.186	0.917	0.014	1.464	0.917	0.026	1.288
Stata- JK2	0.888	0.012	1.208	0.917	0.015	1.501	0.917	0.027	1.334
WesVar-BRR	0.888	0.012	1.169	0.917	0.014	1.426	0.917	0.026	1.271
WesVar-JK2	0.888	0.012	1.191	0.917	0.015	1.466	0.917	0.027	1.325
WesVar-JKn	0.888	0.013	1.328	0.917	0.015	1.577	0.917	0.028	1.466
SAS-Taylor	0.888	0.013	1.300	0.917	0.016	1.668	0.917	0.029	1.496
SAS-BRR	0.888	0.012	1.173	0.917	0.015	1.456	0.917	0.029	1.490
SAS JK2	0.888	0.013	1.303	0.917	0.016	1.669	0.917	0.029	1.499
IVEware Taylor	0.888	0.013	1.379	0.917	0.015	1.572	0.917	0.027	1.361

All proportion estimates of “child received BCG vaccination” variable for Turkey are equal to ISSA-SAMPERR estimate. ISSA-SAMPERR, PASW-Taylor, Stata-Taylor and SAS/STAT-JK2 have the same se estimate. SAS/STAT-Taylor has a close estimate to them. SAS/STAT-BRR and JK2, and WesVar-BRR and JK2 approaches resulted in the same se estimate. WesVar-JKn and IVEware-Taylor have equal estimates.

Stata and WesVar proportion estimates for urban domain are equal to each other in urban domain. The remaining proportion estimates are equal to ISSA-SAMPERR estimate. Stata-Taylor, SAS/STAT-Taylor and JK2 have the same se estimate as ISSA-SAMPERR. PASW-Taylor estimate is closer to them. WesVar-JKn and IVEware-Taylor has equal estimates. Additionally, Stata-BRR, JK2, WesVar-BRR and JK2 have equal se estimates.

All proportion estimates are equal in the West region. Stata-Taylor, SAS/STAT-BRR and JK2 have the same se estimates as ISSA-SAMPERR.

All proportion estimates of “child received DPT vaccination (3 doses)” variable are equal to each other in Turkey domain. ISSA-SAMPERR, PASW-Taylor, Stata-Taylor, WesVar-JKn, SAS/STAT-Taylor, JK2 and IVEware-Taylor se estimates are equal. Other approaches also have equal estimates and their estimates are almost equal to ISSA-SAMPERR. WesVar-JKn, SAS/STAT-Taylor and JK2 have closer deff values.

All proportion estimates for the urban domain are equal. All Stata-BRR, JK2, WesVar-BRR and JK2 have equal se estimates but they differ from ISSA-SAMPERR. Other approaches provide the same se estimations as ISSA-SAMPERR except PASW-Taylor. ISSA-SAMPERR and IVEware-Taylor have almost equal deff values. In addition to these, Stata-BRR and SAS/STAT-BRR have close deff values.

All proportion estimates for the West region are equal. All se estimates have close values. Stata-Taylor and all three methods of SAS/STAT results are equal to ISSA-SAMPERR. SAS/STAT-Taylor and JK2 deft values are close to each other.

All proportion estimates of “child received polio vaccination (3 doses)” have equal estimates to ISSA-SAMPERR estimates in all three domains. For Turkey, all se estimates except Stata-BRR, JK2, WesVar-BRR, JK2 and SAS/STAT-BRR (which have the same estimate) are equal to ISSA-SAMPERR. All approaches have different deff values.

All se estimates are close to each other in urban domain. Stata-Taylor, SAS/STAT-Taylor and JK2 have the same se estimate as ISSA-SAMPERR. SAS/STAT-Taylor and JK2 have close deff values.

All se estimates have close values in the West region. Stata-Taylor and SAS/STAT have the same se estimate as ISSA-SAMPERR. SAS/STAT-Taylor and JK2 have close deff values.

Table 15 Comparison of results of different software and standard error calculation approaches: Child received measles vaccination, child fully immunized, height-for-age (-2 SD)

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Child received measles vaccination									
ISSA-Samperr	0.893	0.015	1.745	0.903	0.020	2.347	0.904	0.037	2.359
PASW -Taylor	0.893	0.015	1.898	0.903	0.019	2.159	0.904	0.036	2.009
Stata- Taylor	0.893	0.015	1.966	0.903	0.020	2.563	0.904	0.037	2.271
Stata-BRR	0.893	0.014	1.565	0.903	0.018	2.008	0.904	0.032	1.654
Stata- JK2	0.893	0.014	1.578	0.903	0.018	2.048	0.904	0.033	1.780
WesVar-BRR	0.893	0.014	1.537	0.903	0.018	1.958	0.904	0.032	1.641
WesVar-JK2	0.893	0.014	1.569	0.903	0.018	2.010	0.904	0.033	1.798
WesVar-JKn	0.893	0.015	1.719	0.903	0.019	2.073	0.904	0.035	1.922
SAS-Taylor	0.893	0.015	1.911	0.903	0.020	2.475	0.904	0.037	2.214
SAS-BRR	0.893	0.014	1.562	0.903	0.018	2.019	0.904	0.037	2.182
SAS JK2	0.893	0.015	1.919	0.903	0.020	2.475	0.904	0.037	2.216
IVEware Taylor	0.893	0.015	1.766	0.903	0.019	2.084	0.904	0.034	1.840
Child fully immunized									
ISSA-Samperr	0.805	0.018	1.421	0.842	0.023	1.915	0.846	0.041	1.888
PASW -Taylor	0.805	0.018	1.582	0.842	0.021	1.672	0.846	0.038	1.504
Stata- Taylor	0.805	0.018	1.638	0.842	0.023	2.097	0.846	0.041	1.820
Stata-BRR	0.805	0.018	1.669	0.842	0.024	2.280	0.846	0.043	2.042
Stata- JK2	0.805	0.018	1.700	0.842	0.024	2.344	0.846	0.045	2.196
WesVar-BRR	0.805	0.018	1.647	0.842	0.024	2.222	0.846	0.044	2.022
WesVar-JK2	0.805	0.018	1.686	0.842	0.024	2.298	0.846	0.045	2.199
WesVar-JKn	0.805	0.018	1.618	0.842	0.023	2.013	0.846	0.042	1.873
SAS-Taylor	0.805	0.018	1.597	0.842	0.023	2.024	0.846	0.041	1.775
SAS-BRR	0.805	0.018	1.674	0.842	0.024	2.296	0.846	0.040	1.733
SAS JK2	0.805	0.018	1.605	0.842	0.023	2.025	0.846	0.041	1.778
IVEware Taylor	0.805	0.019	1.709	0.842	0.023	2.014	0.846	0.041	1.755
Height-for-age (-2SD)									
ISSA-Samperr	0.103	0.007	1.252	0.076	0.007	1.230	0.076	0.012	0.970
PASW -Taylor	0.103	0.007	1.571	0.076	0.007	1.391	0.076	0.012	0.965
Stata- Taylor	0.103	0.007	1.590	0.076	0.007	1.426	0.076	0.012	1.010
Stata-BRR	0.103	0.007	1.484	0.076	0.007	1.397	0.076	0.012	0.985
Stata- JK2	0.103	0.007	1.457	0.076	0.007	1.371	0.076	0.012	0.960
WesVar-BRR	0.103	0.007	1.502	0.076	0.007	1.406	0.076	0.012	0.996
WesVar-JK2	0.103	0.007	1.491	0.076	0.007	1.392	0.076	0.012	0.979
WesVar-JKn	0.103	0.008	1.662	0.076	0.008	1.535	0.076	0.013	1.159
SAS-Taylor	0.103	0.007	1.602	0.076	0.007	1.438	0.076	0.012	1.024
SAS-BRR	0.103	0.007	1.504	0.076	0.007	1.384	0.076	0.012	1.046
SAS JK2	0.103	0.007	1.594	0.076	0.007	1.438	0.076	0.012	1.025
IVEware Taylor	0.103	0.008	1.997	0.076	0.008	1.625	0.076	0.013	1.128

All proportion estimates of “child received measles vaccination” have equal estimates to ISSA-SAMPERR estimates in all three domains. There are two different se estimates in Turkey domain. PASW-Taylor, Stata-Taylor, WesVar-JKn, SAS/STAT-Taylor, JKN, IVEware-Taylor have the same se estimate as ISSA-SAMPERR and others have almost equal estimates to them. All deff values are different from each other. For the urban domain, ISSA-SAMPERR, Stata-Taylor, SAS/STAT-Taylor and JK2 have equal se estimates and other estimates are close to them. All deff values are different from each other.

For the West region, ISSA-SAMPERR, Stata-Taylor, SAS/STAT-Taylor, BRR and JK2 have equal se estimates and other estimates are close to them. SAS/STAT-Taylor and JK2 have close deff values. All proportion estimates of “child fully immunized” have equal estimates to ISSA-SAMPERR estimates in all three domains. All se estimates for Turkey except IVEware-Taylor are equal to each other. All deff values are different from each other.

For the urban domain, ISSA-SAMPERR, Stata-Taylor, WesVar-JKn, SAS/STAT-Taylor, JK2 and IVEware-Taylor have equal se estimates and other estimates are close to them. All deff values are different from each other. For the West region, ISSA-SAMPERR, Stata-Taylor, SAS/STAT-Taylor, JK2 and IVEware-Taylor have equal se estimates and the other estimates are close to them. SAS/STAT-Taylor and JK2 have close deff values.

All proportion estimates of “height-for-age (2-SD)” are equal to ISSA-SAMPERR estimates in all three domains. All se estimates for Turkey except WesVar-JKn and IVEware-Taylor are equal to each other. All deff values are different from each other.All se estimates for the urban domain except WesVar-JKn and IVEware-Taylor are equal to each other. None of the deff values are equal or closer to ISSA-SAMPERR value. All se estimates for the West region except WesVar-JKn and IVEware-Taylor are equal to each other. Only, PASW-Taylor deff value is closer to ISSA-SAMPERR value.

Table 16 Comparison of results of different software and standard error calculation approaches: Weight-for-height (-2SD), weight-for-age (-2SD), height-for-age (-2 SD)

	Turkey			Urban			West		
	p	se	deff	p	se	deff	p	se	deff
Weight-for-height (-2SD)									
ISSA-Samperr	0.009	0.002	1.343	0.008	0.003	1.654	0.009	0.005	1.496
PASW -Taylor	0.009	0.002	1.436	0.008	0.003	1.770	0.009	0.005	1.469
Stata- Taylor	0.009	0.002	1.452	0.008	0.003	1.756	0.009	0.005	1.452
Stata-BRR	0.009	0.002	1.447	0.008	0.003	1.766	0.009	0.005	1.535
Stata- JK2	0.009	0.002	1.409	0.008	0.003	1.724	0.009	0.005	1.423
WesVar-BRR	0.009	0.002	1.478	0.008	0.003	1.784	0.009	0.005	1.562
WesVar-JK2	0.009	0.002	1.459	0.008	0.003	1.765	0.009	0.005	1.457
WesVar-JKn	0.009	0.002	1.502	0.008	0.003	1.713	0.009	0.005	1.418
SAS-Taylor	0.009	0.002	1.479	0.008	0.003	1.771	0.009	0.005	1.470
SAS-BRR	0.009	0.002	1.466	0.008	0.003	1.786	0.009	0.005	1.516
SAS JK2	0.009	0.002	1.462	0.008	0.003	1.771	0.009	0.005	1.471
IVEware Taylor	0.009	0.002	1.499	0.008	0.003	1.705	0.009	0.005	1.419
Weight-for-age (-2SD)									
ISSA-Samperr	0.028	0.004	1.130	0.021	0.004	1.311	0.010	0.005	1.304
PASW -Taylor	0.028	0.004	1.257	0.021	0.004	1.386	0.010	0.005	1.272
Stata- Taylor	0.028	0.004	1.270	0.021	0.004	1.376	0.010	0.005	1.257
Stata-BRR	0.028	0.004	1.245	0.021	0.004	1.381	0.010	0.005	1.257
Stata- JK2	0.028	0.004	1.228	0.021	0.004	1.364	0.010	0.005	1.254
WesVar-BRR	0.028	0.004	1.272	0.021	0.004	1.394	0.011	0.005	1.291
WesVar-JK2	0.028	0.004	1.256	0.021	0.004	1.387	0.011	0.005	1.279
WesVar-JKn	0.028	0.004	1.340	0.021	0.004	1.346	0.011	0.005	1.242
SAS-Taylor	0.028	0.004	1.282	0.021	0.004	1.389	0.010	0.005	1.274
SAS-BRR	0.028	0.004	1.268	0.021	0.004	1.395	0.010	0.005	1.313
SAS JK2	0.028	0.004	1.300	0.021	0.004	1.389	0.010	0.005	1.274
IVEware Taylor	0.028	0.004	1.411	0.021	0.004	1.368	0.010	0.005	1.197
BMI < 18.5									
ISSA-Samperr	0.016	0.003	1.248	0.013	0.003	1.302	0.015	0.006	1.117
PASW -Taylor	0.016	0.003	1.270	0.013	0.003	1.387	0.015	0.006	1.120
Stata- Taylor	0.016	0.003	1.243	0.013	0.003	1.284	0.015	0.006	1.121
Stata-BRR	0.016	0.003	1.304	0.013	0.003	1.367	0.015	0.006	1.234
Stata- JK2	0.016	0.003	1.286	0.013	0.003	1.353	0.015	0.006	1.188
WesVar-BRR	0.016	0.003	1.394	0.013	0.003	1.333	0.015	0.006	1.040
WesVar-JK2	0.016	0.003	1.380	0.013	0.003	1.333	0.015	0.006	1.040
WesVar-JKn	0.016	0.003	1.272	0.013	0.003	1.333	0.015	0.006	1.040
SAS-Taylor	0.016	0.003	1.346	0.013	0.003	1.382	0.015	0.006	1.117
SAS-BRR	0.016	0.003	1.394	0.013	0.003	1.436	0.015	0.006	1.107
SAS JK2	0.016	0.003	1.328	0.013	0.003	1.435	0.015	0.006	1.102
IVEware Taylor	0.016	0.003	1.251	0.013	0.003	1.310	0.015	0.006	1.011

All proportion and se estimates of “weight-for-height (-2SD)” variable have equal estimates to ISSA-SAMPERR in all three domains. WesVar-BRR and SAS/STAT-Taylor have close deff values for Turkey. Additionally, WesVar-JK2 and SAS/STAT-JK2 have close deff values. SAS/STAT-Taylor and JK2 have equal deff values for urban domain. PASW-Taylor, SAS/STAT-Taylor and JK2 have close deff values for the West region.

Proportion estimates for Turkey and urban domains and all se estimates for all the three domains of “weight-for-age (-2SD)” variable have equal estimates to ISSA-SAMPERR. PASW-Taylor and WesVar-JK2 have close deff values for Turkey. Additionally, Stata-Taylor and WesVar-BRR have close deff values.

For the urban domain, SAS/STAT-Taylor and JK2 have equal deff values. Deff values of PASW-Taylor and WesVar-JK2 are also close to each other.

WesVar proportion estimates, which are equal to each other, are the only proportion estimates differing from the ISSA-SAMPERR in the West region. In addition to Stata-Taylor and BRR, SAS/STAT-Taylor and JK2 have equal deff values separately.

All proportion and se estimates of the “BMI < 18.5” variable have equal estimates to ISSA-SAMPERR in all three domains. WesVar-BRR and SAS/STAT-BRR have equal deff values for Turkey. Deff values calculated by WesVar are equal to each other in the urban domain. SAS/STAT-BRR and JK2 have almost the same deff value. The only equal deff value to the ISSA-SAMPERR value is calculated by SAS/STAT-Taylor for the West region. Moreover, WesVar deff values are equal to each other.

4.2 SUMMARY OF COMPARISON OF RESULTS

To determine the deviation of design effect values of one approach from other approaches an indicator was generated by dividing the deff value calculated by one approach (i.e. ISSA-SAMPERR) by deff values calculated by other approaches and subtracted from 1. The results are grouped into 0.00 to 0.05, 0.06 to 0.10, 0.10 to 0.50 and 0.51+. If the deff value of an approach is equal to the compared approach's (i.e. ISSA-SAMPERR) value, its division to deff value is 1 and the indicator is equal to 1-1=0. The first group has the closest results to compared approach's deff values.

Three different tables were constructed for Turkey, urban and West domain. Table 17 shows the deviation of design effect values of different approaches for Turkey. According to the Table 17 the highest number of variables which have the closest (0.00-0.05 deviation) design effect values to ISSA-SAMPERR values are computed by PASW-Taylor and Stata-Taylor. 21 variables out of 30 variables calculated by both approaches deviate at most 0.005 points from design effect values calculated by ISSA-SAMPERR. Design effect values calculated by Stata-Taylor approach deviate from PASW-Taylor at most 0.05 points. The closest design effect values to Stata-Taylor are calculated by using SAS-JK2 approach and the closest values to Stata-BRR by Stata-JK2 and WesVar-JK2. 29 variables calculated by WesVar-BRR, WesVar-JK2 and SAS-BRR are either equal to Stata-JK2 design effect values or deviate from them up to 0.05 points. All of the WesVar-JK2 and SAS-BRR design effect values lie between 0.00-0.005 points deviation from WesVar-BRR values. All of the SAS-BRR design effect values are either equal to or close to (0.00-0.005) WesVar-JK2 design effect values. Design effect values of 18 variables calculated by IVEware-Taylor deviate from WesVar-JKn between 0.00 to 0.05 points. The most of the variables (25) which have the closest design effect values to SAS-Taylor are calculated by SAS-JK2 approach. 20 variables out of 30 variables whose design effect values are calculated by SAS-JK2 have either equal or close design effect values to those calculated by SAS-BRR. SAS-JK2 and IVEware-

Taylor approaches have only six variables whose design effect values are equal or close to each other.

Deviation of design effect values for urban domain are given in the Table 18. The highest number of variables (23) which have the closest design effect values to ISSA-SAMPERR are those calculated by SAS-Taylor. Similarly, the closest design effect values to PASW-Taylor for 22 variables each are calculated by Stata-Taylor and SAS-Taylor. 26 variables' design effect values calculated by SAS-Taylor deviate from those calculated by Stata-Taylor only between 0.00 to 0.00 points. 29 of the variables which were calculated by Stata-JK2 and SAS-BRR have equal or close design effect values to those calculated by Stata-BRR. 27 variables whose design effect values are calculated by SAS-BRR have either equal or close design effect values to those calculated by Stata-JK2. For 29 variables WesVar-JK2 and WesVar-BRR have design effect values deviate from each other at most 0.05 points. 25 variables whose design effect values calculated by WesVar-JK2 and SAS-BRR have either equal or close design effect values. The highest number of variables whose design effects deviate from those calculated by WesVar-JKn up to 0.05 points are those calculated by using IVEware-Taylor approach. 27 variables whose designs effects are calculated by SAS-JK2 have design effects either equal or close to those calculated by SAS-Taylor. SAS-BRR and SAS-JK' approaches resulted in close design effect values for 24 variables. IVEware-Taylor and SAS-JK2 have 15 variables whose design effect values are either equal or close to each other.

According to Table 19, all design effect values calculated by ISSA-SAMPERR and Stata-Taylor are either equal or close to each other. SAS-BRR and SAS-JK2 approaches resulted in close design effect values to PASW-Taylor for 21 variables. All variables calculated by SAS-JK2 and Stata-Taylor have either equal or close design effect values. The highest number of variables (24) having close design effects calculations to Stata-BRR approach is Stata-JK2. Design effects calculated by WesVar-JK2 and Stata-JK2 are close to each other for 16 variables. 23 variables' design effects calculated by WesVar-JK2 and WesVar-BRR are deviate from each

other by 0.00 to 0.05 points. 22 variables for WesVar-JK2 and WesVar-JKn, 19 variables for IVEware-Taylor and WesVar-JKn, 23 variables for SAS-BRR and SAS-JK2 to SAS-Taylor, 29 variables for SAS-JK2 and SAS-BRR, 10 variables for IVEware-Taylor and SAS-JK2 have either equal or close design effect values.

Table 17 Summary Table for Comparison of Results for Turkey

TURKEY	ISSA-SAMPERR				PASW-Taylor				Stata-Taylor				Stata-BRR				Stata JK2				WesVar-BRR				WesVar-JK2				WesVar-JKn				SAS-Taylor				SAS-BRR				SAS JK2			
PASW Taylor	21	5	3	1																																								
Stata Taylor	21	1	7	1	30	0	0	0																																				
Stata-BRR	17	5	8	0	19	6	4	1	19	4	6	1																																
Stata-JK2	17	5	8	0	16	9	4	1	17	7	5	1	30	0	0	0																												
WesVar-BRR	16	5	9	0	20	5	4	1	18	4	7	1	29	1	0	0	29	1	0	0																								
WesVar-JK2	16	6	8	0	18	7	4	1	18	5	6	1	30	0	0	0	29	1	0	0	30	0	0	0																		
WesVar-JKn	10	6	14	0	12	12	6	0	13	10	7	0	11	11	8	0	9	16	4	1	11	11	8	0	11	13	6	0														
SAS-Taylor	17	6	6	1	26	2	2	0	27	1	2	0	21	3	5	1	19	5	5	1	20	5	4	1	19	6	4	1	12	10	7	1										
SAS-BRR	16	5	9	0	19	6	4	1	18	4	7	1	29	1	0	0	29	1	0	0	30	0	0	0	30	0	0	0	11	11	8	0	20	3	6	1						
SAS-JK2	19	3	7	1	29	0	1	0	28	1	1	0	20	6	3	1	18	8	3	1	21	5	3	1	21	5	3	1	11	11	8	0	25	3	2	0	20	6	3	1		
IVEware-Taylor	9	7	13	0	9	11	8	1	11	8	10	0	9	6	14	0	8	7	13	1	8	8	13	0	8	8	13	0	18	7	4	0	7	12	9	1	8	8	13	0	6	13	10	0

Deviation of design effects among approaches

- 0.00-0.005
- 0.006-0.10
- 0.11-0.50
- 0.50+

Table 18 Summary Table for Comparison of Results for urban

URBAN	ISSA-SAMPERR				PASW-Taylor				Stata-Taylor				Stata-BRR				Stata JK2				WesVar-BRR				WesVar-JK2				WesVar-JKn				SAS-Taylor				SAS-BRR				SAS JK2			
PASW Taylor	19	3	7	0																																								
Stata Taylor	20	6	3	0	22	1	6	0																																				
Stata-BRR	13	8	7	1	16	8	4	1	17	7	4	1																																
Stata-JK2	15	8	5	1	17	6	5	1	17	5	6	1	29	0	0	0																												
WesVar-BRR	11	8	9	1	15	7	6	1	16	6	6	1	26	2	1	0	25	2	2	0																								
WesVar-JK2	12	8	8	1	15	7	6	1	16	6	6	1	26	2	1	0	26	1	2	0	29	0	0	0																				
WesVar-JKn	12	7	9	1	11	8	9	1	11	10	7	1	12	8	8	1	13	7	8	1	15	5	8	1	16	5	7	1																
SAS-Taylor	23	4	2	0	22	1	6	0	26	3	0	0	21	2	5	1	20	4	4	1	18	5	5	1	18	4	6	1	12	8	8	1												
SAS-BRR	12	10	6	1	18	6	4	1	18	5	5	1	29	0	0	0	27	2	0	0	25	2	2	0	25	2	2	0	12	5	12	0	22	1	5	1								
SAS-JK2	17	9	3	0	18	4	7	0	23	4	2	0	24	0	4	1	23	2	3	1	20	3	5	1	20	2	6	1	12	7	9	1	27	1	1	0	24	0	4	1				
IVEware-Taylor	13	3	11	1	10	5	12	1	12	6	9	1	14	6	8	1	15	3	9	1	14	7	6	1	15	4	8	1	23	2	3	0	12	5	10	1	13	3	11	1	15	3	9	1

Deviation of design effects among approaches

- 0.00-0.005
- 0.006-0.10
- 0.11-0.50
- 0.50+

Table 19 Summary Table for Comparison of Results for West

WEST	ISSA-SAMPERR				PASW-Taylor				Stata-Taylor				Stata-BRR				Stata JK2				WesVar-BRR				WesVar-JK2				WesVar-JKn				SAS-Taylor				SAS-BRR				SAS JK2			
PASW Taylor	21	2	5	2																																								
Stata Taylor	30	0	0	0	22	1	6	1																																				
Stata-BRR	14	9	6	1	12	8	9	1	15	7	7	1																																
Stata-JK2	12	7	10	1	10	7	12	1	12	7	10	1	24	5	1	0																												
WesVar-BRR	10	11	8	1	7	11	11	1	9	12	8	1	18	4	8	0	14	7	9	0																								
WesVar-JK2	11	8	10	1	8	9	12	1	11	8	10	1	12	8	10	0	16	5	9	0	23	5	2	0																				
WesVar-JKn	9	9	11	1	8	8	13	1	11	8	10	1	8	7	14	1	10	6	13	1	18	5	6	1	22	3	4	1																
SAS-Taylor	19	9	1	1	20	5	4	1	23	5	1	1	17	4	8	1	14	8	7	1	10	8	11	1	9	8	12	1	8	10	11	1												
SAS-BRR	26	4	0	0	21	3	5	1	29	1	0	0	14	6	9	1	11	10	8	1	11	7	11	1	10	8	11	1	10	8	11	1	23	4	2	1								
SAS-JK2	24	6	0	0	21	3	5	1	30	0	0	0	15	6	8	1	12	9	8	1	10	10	9	1	11	7	11	1	11	7	11	1	23	5	1	1	29	1	0	0				
IVEware-Taylor	10	7	11	1	7	9	12	1	12	5	11	1	9	7	12	1	11	6	11	1	17	7	4	1	18	5	5	1	19	8	2	0	10	8	10	1	9	9	10	1	10	10	8	1

Deviation of design effects among approaches

- 0.00-0.005
- 0.006-0.10
- 0.11-0.50
- 0.50+

5. CONCLUSION

The governments, companies and other organisations (the non governmental organisations) seek for the latest and the most accurate information for processing. There are three types of demographic data gathering technique. The censuses are used to collect information from the whole population. As well as being difficult, very costly and requiring too much work to conduct a census, gathering detailed information is not always possible. Another technique of data collection is registration systems. Even though the registration systems in developed countries are also well developed and may provide required information, the registration systems in developing countries usually are not capable of holding up to date and accurate data. Moreover, in developing countries information of an important amount of population may be missing or incomplete.

In these circumstances, sample surveys fulfil the deficiencies of data gathering methods. Sample surveys are specially designed surveys to collect detailed statistical information from a sample which are used to make inferences for the whole population. Sample surveys act as the substitutes of other data gathering techniques in developing countries where censuses and registration systems are not always reliable. Surely, data of sample surveys are also subject to errors like all kinds of statistical data. Survey errors are divided into two groups as mentioned in previous chapters: sampling errors and nonsampling errors. Nonsampling errors are difficult to measure however sampling errors can be measured more easily. Sampling errors are measured by different statistics such as standard error, variance, coefficient of variation and confidence intervals.

The aim of this thesis was to estimate the sampling errors of selected variables of the Turkey Demographic and Health Survey-2008 data by using different techniques and software. TDHS-2008 sample was selected by using a weighted, multistage, stratified cluster sample design. Sampling designs that differentiate from simple random sampling are called complex sampling designs and

require specific treatments for analysis. Therefore, sampling errors as well as other statistics from the TDHS-2008 data should be computed by taking its sample design into account. If simple random sampling formulas are used instead of complex sampling formulas, the estimations will not be accurate.

Standard errors, variances and confidence intervals are measures of sampling errors. Design effect is the measure of the change in variance, which arises by conducting a complex sample survey instead of simple random sampling survey. Variance estimations of statistics from complex samples cannot be computed by basic variance formulas used for statistics from simple random samples. There are two reasons for this; firstly, variance formulas for complex sample statistics are complicated and they cannot be easily computed. Secondly, the variance formulas may not be linear; in some cases the variances formulas are not even known formulas. Therefore, two variance estimation techniques are commonly used to compute complex variance formulas; the Taylor series linearization and repeated replication techniques.

Taylor series linearization method is based on first degree Taylor series expansion. This method assumes that all higher degree terms are negligible. When Taylor series linearization is used, separate formula for each type of estimates are needed (Yansaneh, 2005).

The variance estimation of repeated replication techniques depends on the variation of subsample estimates of statistics from the full sample estimate. Subsamples or replicates are generated from full sample and then estimations of selected statistic are calculated for each replicate and the full sample separately. The variance of the statistic is, in a sense, the variation of the estimates from full sample estimate. The use of replication techniques requires calculating replicate weights. Apart from that, its use is easier than Taylor series linearization since repeated replication techniques use the same basic estimation method for every type of statistics.

Repeated replication techniques are divided into two groups in terms of replicate weight calculation; balanced repeated replication and jackknife repeated replication. Jackknife repeated replication has three types of estimation methods; jackknife 1, jackknife 2 and jackknife n, used for different sample designs.

Taylor series linearization, balanced repeated replication and jackknife repeated replication techniques are used to estimate variances of selected variables in the thesis.

Not all statistical software are capable of dealing with complex sample survey data. The variances of selected variables given in TDHS-2008 main report are estimated by using Taylor series linearization method of ISSA Sampling Error Module (SAMPERR). Additionally, five statistical software were selected to compute sampling error estimates of selected variables in the thesis. These software are; PASW Statistics 18 (formerly known as SPSS), Stata 11, WesVar 5.1, SAS/STAT and IVEware.

The selected statistical software employ one or more of the three variance estimation methods. The table of variance estimation methods used for each of the software is given in Appendix C.

The TDHS-2008 main report represents sampling error estimations of 46 selected variables for Turkey. These variables are proportion, mean and rate type variables calculated for different subpopulations and the number of estimates differs according to base subpopulation. In the thesis, 30 proportion type estimates are selected and their sampling errors are estimated by different variance estimation methods available in the five different software.

The estimations of proportion, standard error, design effect, coefficient of variation, lower and upper bounds are tabulated for eight domains; Turkey, urban,

rural, West, South, Central, North and East regions. Estimations of other subpopulations are not included in order to avoid long computations and tabulations. Additionally, the estimations of proportions and standard errors differentiate from ISSA SAMPERR values for small sample sizes of subpopulations. The relation between variance estimation methods and software can be detected by using information from these eight domains. 88 tables are constructed for 11 different approaches. These tables are presented in the Appendix B.

In order to develop a good understanding of sampling error and design effect variations according to different approaches ten comparison tables are generated for three different domains, Turkey, urban and West region, for all of the selected variables. These comparison tables are presented in the fourth chapter of the thesis. According to the comparison tables the following inferences are made:

- Proportion estimates for Turkey calculated by different approaches are equal to ISSA-SAMPERR's proportion estimates. The only exceptions of this equality are; the estimate of "mothers received medical care at delivery" variable calculated by SAS/STAT jackknife 2 repeated replication method and the estimates of "child having health card, seen" variable. These proportion estimates deviate from ISSA-SAMPERR estimates at most 0.002.

- Standard error estimates for Turkey by different approaches are either equal or close to ISSA-SAMPERR estimates. For half of the variables (15 variables) se estimations of all 11 approaches are equal. For the remaining fourteen variables, se estimations change by 0.001 values. Only for the "child received BCG vaccination" variable, se estimations change 0.005 to 0.009.

- For most of the variables none of the approaches provide the same design effect value as ISSA-SAMPERR. Only, for eight variables one or more approaches calculated design effects equal to ISSA-SAMPERR. PASW-Taylor series linearization provides the same deff value as ISSA-SAMPERR value for two variables, Stata-Taylor for four variables, Stata-BRR for two variables and SAS/STAT-JK2 for two variables.

- For almost all variables (28 variables), all the eleven approaches provide the exact estimate of proportions as ISSA-SAMPERR's estimates for urban domain. For "obtained method from public source" variable PASW-Taylor proportion estimate differs from others for 0.001 point. Stata and WesVar estimates of "child received BCG vaccination" variable also differ from others only 0.001 point.

- Standard error estimates for Turkey by different approaches are either equal to or close to ISSA-SAMPERR estimates. For 15 variables se estimations of all 11 approaches are equal. For 12 cases the difference between approaches' estimates and ISSA-SAMPERR is 0.001 or 0.002. Only, for three cases the difference increases up to 0.006. The 0.006 point difference is in "child received BCG vaccination" variable.

- For most of the variables none of the approaches provide the same design effect value as ISSA-SAMPERR. For two variables design effect estimate of PASW-Taylor approach and for three variables design effect estimate of Stata-Taylor approach is equal to ISSA-SAMPERR's estimate.

- Almost all proportion estimations for West region are equal to ISSA-SAMPERR estimate. For five variables proportions, mostly estimated by Stata or WesVar, differ from others by 0.001 point.

- Standard error estimates for Turkey by different approaches are either equal or close to ISSA-SAMPERR estimates. For 22 variables se estimations of all eleven approaches are equal or 0.001 point differ from ISSA-SAMPERR estimates. Se estimations of "child received BCG vaccination" variable differ from ISSA-SAMPERR estimate almost up to 0.020 points.

- For most of the variables none of the approaches provide the same design effect value as ISSA-SAMPERR. For nine variables, design effect estimates of one or more approaches are equal to ISSA-SAMPERR estimates. The estimates are equal to ISSA-SAMPERR's estimate for two variables design effect estimates of PASW-Taylor approach, for four variables deff estimate of Stata-Taylor approach, for two variables deff estimate of WesVar methods, for one variable deff estimate of SAS/STAT-JK2 and for one variable deff estimate of IVEware-Taylor.

Tables are constructed for three domains to show for how many variables, the approaches give the exactly same design effect value (see Appendix C).

For Turkey, the design effect calculations from SAS/STAT software's Taylor series linearization method are same as ISSA-SAMPERR's deff values for four variables. The balanced repeated replication method by WesVar provided the exact deff results as the jackknife 2 repeated replication method of the same software for four variables. The Taylor series linearization methods of PASW and Stata estimated the same deff value for three variables. Additionally, balanced repeated replication

methods of WesVar and SAS/STAT calculated the same deff values for three variables. Interestingly, WesVar JKn and IVEware Taylor series linearization approaches provided the exact deff values for three variables. This result is surprising since they are calculated neither by the same software nor by the same variance estimation method.

For the urban domain, PASW-Taylor approach resulted in two and Stata-Taylor approach resulted in three exact deff values as ISSA-SAMPERR. WesVar approaches resulted in four exact deff values between each other. WesVar JK2 and SAS/STAT BRR have exact deff values for three variables. SAS/STAT approaches also have same deff values for several variables. For three variables the same deff value is calculated by WesVar JK2 and SAS/STAT BRR.

Stata-Taylor approach resulted in equal deff values as ISSA-SAMPERR for four variables in the West region. Each one of the PASW-Taylor, WesVar-BRR, WesVar-JK2 and WesVar-JKn approaches have the same deff value as ISSA-SAMPERR for two variables. Each of the SAS/STAT-JK2 and IVEware-Taylor resulted in the same deff value as ISSA-SAMPERR for one variable. An important issue is WesVar methods resulted in exact deff values for more than half of the variables. WesVar JK2 and JKn are the approaches which have the exactly equal deff values for 17 variables. The most exact deff values between different approaches arose in the West region. This can be explained by relatively smaller sample sizes in the West region.

In conclusion, design effect values calculated by Taylor series linearization methods have closer design effect values to those calculated by ISSA-SAMPERR. Taylor series linearization methods of Stata, SAS/STAT and PASW resulted in design effect values close to ISSA-SAMPERR while design effects calculated by Taylor series linearization method by the IVEware software are not close to ISSA-SAMPERR's design effect values for more than half of variables. Taylor series linearization methods of various software were expected to be give close results as

ISSA-SAMPERR since; ISSA-SAMPERR employs Taylor series linearization method for variance estimation of proportion type variables.

Different methods used in the same software (i.e. WesVar BRR and WesVar JK2) and same methods used in different software (i.e. PASW-Taylor and Stata-Taylor) calculated relatively close design effect values.

Especially, design effect values calculated by different approaches of WesVar resulted in equal or very close values. As was seen in the former tables, WesVar-BRR, JK2 and JKn calculated the exact same design effect values for 16-17 variables for the West region.

Design effect values calculated by different methods by using the same software resulted in close calculations. SAS/STAT design effect values calculated by Taylor series linearization, balanced repeated replication and jackknife 2 repeated replication methods were close to each other. Relatively close results to ISSA-SAMPERR's deff values were obtained by SAS/STAT jackknife repeated replication method.

Design effects calculated for the West region with different approaches for more variables were either equal to or closer to ISSA-SAMPERR's design effect values. This can be explained with stratification. Stratification lowers the within variance in strata. The cases in a stratum have similar characteristics and the relatively smaller sample sizes result in a decrease in the variance and thus closer design effect values.

The design effect values computed with different software and different methods within software are different from both each other and ISSA-SAMPERR. The underlying reason is that, different software use different formulas for variance

estimation techniques. There were small differences even in proportion estimates and standard error estimates between different approaches.

The design effects and sampling errors of TDHS-2008 variables are compared with the estimates calculated by ISSA-SAMPERR. This comparison does not mean that ISSA-SAMPERR estimates all sampling errors and design effects accurately. This kind of assumption cannot be made. However, the most appropriate sampling error estimation technique for TDHS-2008 is the jackknife n technique. Jackknife n is the only technique that takes TDHS-2008's sampling design correctly into account. WesVar software is the only software among 5 software used that is capable of calculating sampling errors by using jackknife n repeated replication method. The software which estimates the most accurate sampling errors can not be known, since the true value of any statistic is never a known value. The aim is to compare selected approaches of variance estimation methods in terms of different statistical software which are commonly used to estimate variances from complex sample surveys. The relation between these approaches would provide a good understanding and comparison ability of design effect values of complex sample surveys.

The syntaxes used in the thesis are given in the Appendix A. They would be beneficial for those who want to estimate variances from Demographic and Health Survey data. These syntaxes would also be a guide for estimation of variances for different variables.

This thesis deals with the design effect estimations of proportion type variables selected from TDHS-2008. The variance estimation of mean type statistics and rate type statistics are more complicated than proportion type statistics. Estimating sampling errors of these type of statistics require advanced statistical and computational skills. The estimation of these kinds of statistics can be further studied with more detailed methodological studies of mathematical statistics. In addition, different software can be included for comparison of complex sample sampling error estimation.

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APPENDIX A: SYNTAXES OF STANDARD ERROR CALCULATION APPROACHES FOR SOFTWARE

A.1.PASW

```
DATASET ACTIVATE DataSet1.
* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008
eklenecekler\individualplan.csaplan'
/TABLES VARIABLES=V025
/CELLS POPSIZE TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT CUMULATIVE
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=seduc
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT CUMULATIVE
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

recode seduc (1 thru 3= 1) (else=copy) into seducno.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=seducno
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT CUMULATIVE
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

recode seduc (2 thru 3=2) (else=copy) into seducsec.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=seducsec
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT CUMULATIVE
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=v501
```

```
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT CUMULATIVE
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.
USE ALL.
COMPUTE filter_$=(V501 = 1).
VARIABLE LABEL filter_$ 'V501 = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

fre v301.
recode v301 (0=0) (1 thru 3=1) (else=copy) into yonbil.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=yonbil
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=v301
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.
recode v302 (0=0) (1 thru 3=1) (else=copy) into yonkul.

 Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=yonkul
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

recode v312 (1 thru 20= 1) (else=copy) into curmet.

Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=curmet
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
 /MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.
```

```
filter off.
* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=V313
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Documents and Settings\dilek\Desktop\TEZ\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=V312
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

fre v326.
recode v326 (10 thru 19= 1) (else=copy) into pubsource.
* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=pubsource
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

freq v605.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\individual '+
'plan.csaplan'
/TABLES VARIABLES=v605
/SUBPOP TABLE=V501 DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute vucut=0.

recode v445 (0 thru 1849=1) (9999=sysmis) (9998=sysmis) (1850 thru highest=0) into vucut.
fre vucut.
compute son5yil=0.
if (v208>0) son5yil=1.
recode bisi=0.
if  (son5yil=1 and v213=0 and v222>1) bisi=1.

 Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\individual '+
```

```
'plan.csaplan'
/TABLES VARIABLES=vucut
/SUBPOP TABLE=bisi DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute a=(v008-b3).
if (a<60) kucukbes=1.
recode kucukbes (sysmis=0) (else=copy).
compute filter=(kucukbes=1).
filter by filter.

fre m3n.
fre m3b.
compute e=0.
if (m3a=1 or m3b=1) e=1.
fre e.

DATASET ACTIVATE DataSet2.
* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='D:\tez-ensitu pc\laptop\dilek-5aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=e
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT CUMULATIVE
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute a=(v008-b3).
if (((a>14) and (27>a)) and b5=1) asi=1.
recode asi (sysmis=0) (else=copy).

fre asi.

recode h2 (1 thru 3=1) (else=copy) into bcg1.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=bcg1
/SUBPOP TABLE=asi DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute dbt3=0.
if ((h3=1 or h3=2 or h3=3) and (h5=1 or h5=2 or h5=3) and (h7=1 or H7=2 or h7=3)) dbt3=1.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=dbt3
/SUBPOP TABLE=asi DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT

compute pol3=0.
```

```
if ((h4=1 or h4=2 or h4=3) and (h6=1 or h6=2 or h6=3) and (h8=1 or H8=2 or h8=3)) pol3=1.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=pol3
/SUBPOP TABLE=asi DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute kiz=0.
if ((h9=1 or h9=2 or h9=3)) kiz=1.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=kiz
/SUBPOP TABLE=asi DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute asili=0.
if (bcg1=1 and dbt3=1 and  pol3=1 and kiz=1) asili=1.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=asili
/SUBPOP TABLE=asi DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

compute bya=0.
if (( a<60) and b5=1) bya=1.
fre bya.

fre hw5 hw8 hw11.

recode hw5 (lowest thru -201= 1000) (9998=sysmis) (9999=sysmis) (else=0) into ygb.
fre ygb.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=ygb
/SUBPOP TABLE=bya DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

recode hw8 (lowest thru -201= 1000) (9998=sysmis) (9999=sysmis) (else=0) into yga.
fre yga.

* Complex Samples Frequencies.
```

```
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=yga
/SUBPOP TABLE=bya DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

recode hw11 (lowest thru -201= 1000) (9998=sysmis) (9999=sysmis) (else=0) into bga.
fre bga.

* Complex Samples Frequencies.
CSTABULATE
/PLAN FILE='C:\Users\user\Desktop\dilek-2aug\TNSA-2008 eklenecekler\birth.csaplan'
/TABLES VARIABLES=bga
/SUBPOP TABLE=bya DISPLAY=LAYERED
/CELLS TABLEPCT
/STATISTICS SE CV CIN(95) COUNT DEFF DEFFSQRT
/MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.
```

A.2.Stata

A.2.1. Taylor Series Linearization

```
set memory 250m
use "F:\TEZ\stata\TRIR50FL", clear
 log using "F:\TEZ\stata.log", append
 *name of pairpsu was changed to abc
 * set design variables and weight variable before using commands for analysis of survey data
svyset v001 [pweight=sweight], strata(pairpsu) vce(linearized) singleunit(centered)

svy: tab v025, se percent deft ci

gen seducno = (seduc==0)

svy: tab seducno, se percent deft ci

gen seducsec = (seduc>=2)

svy: tab seducsec, se percent deft ci

gen mar2 = (v501 == 1)

svy: tab mar2, se percent deft ci

gen yonbill= (v301>=1)

svy: tab yonbill, se percent deft ci subpop(mar2)

gen modern= (v301==3)
```

```
svy: tab modern, se percent deft ci subpop(mar2)

gen yonkul= (v302>0)

svy: tab yonkul, se percent deft ci subpop(mar2)

svy: tab v301, se percent deft ci subpop(mar2)

gen curmet= (v312>0)

svy: tab curmet, se percent deft ci subpop(mar2)

svy: tab v313, se percent deft ci subpop(mar2)

svy: tab v312, se percent deft ci subpop(mar2)

gen pub3 =((9<v326)&(v326<20))
gen mod= (v313==3)

svy: tab pub3, se percent deft ci subpop(mod)

svy: tab v605, se percent deft ci subpop(mar2)

gen sonbesyil= ((v208>0)&(v213==0)&(v222>1))

recode v445 (0/1849=1) (1850/5740=0) (5741/9999=.), gen(body3)
tab body3

svy: tab body3, se percent deft ci subpop(sonbesyil)

use "F:\TEZ\stata\TRBR50FL", clear

svyset v001 [pweight=sweight], strata(pairpsu) vce(linearized) singleunit(centered)

gen bes=(v008-b3)
gen bes2=(bes<60)

gen mcare2=((m3a==1)|(m3b==1))
svy: tab mcare2, se percent deft ci subpop(bes2)

*asi

gen alive=(b5==1)
gen onbes=((bes>14)&(bes<27)&(b5==1))

gen card=(h1==1)

svy: tab card, se percent deft ci subpop(onbes)

*bcg asi

gen asi1=((h2==1)|(h2==2)|(h2==3))
svy: tab asi1, se percent deft ci subpop(onbes)


*dpt 3doz
```

```
gen asi2=(((h3==1)|(h3==2)|(h3==3))&((h5==1)|(h5==2)|(h5==3))&((h7==1)|(h7==2)|(h7==3)))

svy: tab asi2, se percent deft ci subpop(onbes)

gen asi3=(((h4==1)|(h4==2)|(h4==3))&((h6==1)|(h6==2)|(h6==3))&((h8==1)|(h8==2)|(h8==3)))

svy: tab asi3, se percent deft ci subpop(onbes)


gen asi4=((h9==1)|(h9==2)|(h9==3))

svy: tab asi4, se percent deft ci subpop(onbes)

gen tamasi=((asi1)&(asi2)&(asi3)&(asi4))

svy: tab tamasi, se percent deft ci subpop(onbes)

gen antro=((b5==1)&(bes<60)&(hw5<9998))
gen ygb1=(hw5<-200)
svy: tab ygb1, se percent deft ci subpop(antro)

gen bga1=(hw8<-200)
svy: tab bga1, se percent deft ci subpop(antro)

gen bga2=(hw11<-200)
svy: tab bga2, se percent deft ci subpop(antro)


log close
```

A.2.2 Balanced Repeated Replication

```
set memory 400m

 use "F:\TEZ\stata\BRR\brr TRIR50FL.dta", clear

 log using "C:\Users\user\Desktop\dilek-3aug\stata.log", append


svyset secu [pweight=sweight], strata(pairpsu) brrweight(rpl001 rpl002 rpl003 rpl004 rpl005 rpl006
rpl007 rpl008 rpl009 rpl010 rpl011 rpl012 rpl013 rpl014 rpl015 rpl016 rpl017 rpl018 rpl019 rpl020
rpl021 rpl022 rpl023 rpl024 rpl025 rpl026  rpl027 rpl028 rpl029 rpl030 rpl031 rpl032 rpl033 rpl034
rpl035 rpl036 rpl037 rpl038 rpl039 rpl040 rpl041 rpl042 rpl043 rpl044 rpl045 rpl046 rpl047 rpl048
rpl049 rpl051 rpl050 rpl052 rpl053 rpl054 rpl055 rpl056 rpl057 rpl058 rpl059 rpl060  rpl061 rpl062
rpl063 rpl064 rpl065 rpl066 rpl067 rpl068 rpl069 rpl070 rpl071 rpl072 rpl073 rpl074 rpl075 rpl076
rpl077 rpl078 rpl079 rpl080 rpl081 rpl082  rpl083 rpl084 rpl085 rpl086 rpl087 rpl088 rpl089 rpl090
rpl091 rpl092 rpl093 rpl094 rpl095 rpl096 rpl097 rpl098 rpl099  rpl100 rpl101 rpl102 rpl103 rpl104
rpl105 rpl106 rpl107 rpl108 rpl109 rpl110 rpl111 rpl112 rpl113 rpl114 rpl115  rpl116 rpl117 rpl118
rpl119 rpl120 rpl121 rpl122 rpl123 rpl124 rpl125 rpl126 rpl127 rpl128 rpl129 rpl130 rpl131 rpl32
rpl133 rpl134 rpl135 rpl136 rpl137 rpl138 rpl139 rpl140 rpl141 rpl142 rpl143 rpl144 rpl145 rpl146
rpl147 rpl148 rpl149 rpl150 rpl151 rpl152 rpl153 rpl154 rpl155 rpl156 rpl157 rpl158 rpl159 rpl160
rpl161 rpl162  rpl163 rpl164 rpl165 rpl166 rpl167 rpl168 rpl169 rpl170 rpl171 rpl172 rpl173 rpl174
rpl175 rpl176 rpl177 rpl178 rpl179 rpl180 rpl181 rpl182 rpl183 rpl184 rpl185 rpl186 rpl187 rpl188
```

```
rpl189 rpl190 rpl191 rpl192 rpl193 rpl194 rpl195 rpl196  rpl197 rpl198 rpl199 rpl200 rpl201 rpl202
rpl203 rpl204 rpl205 rpl206 rpl207 rpl208 rpl209 rpl210 rpl211 rpl212 rpl213 rpl214 rpl215 rpl216
rpl217  rpl218 rpl219 rpl220 rpl221 rpl222 rpl223 rpl224 rpl225 rpl226 rpl227 rpl228 rpl229 rpl230
rpl231 rpl232 rpl233 rpl234 rpl235 rpl236 rpl237 rpl238 rpl239 rpl240 rpl241 rpl242 rpl243 rpl244
rpl245 rpl246 rpl247 rpl248 rpl249 rpl250 rpl251 rpl252 rpl253 rpl254 rpl255 rpl256 rpl257 rpl258
rpl259 rpl260 rpl261 rpl262 rpl263 rpl264 rpl265 rpl266 rpl267 rpl268 rpl269 rpl270 rpl271 rpl272
rpl273 rpl274 rpl275 rpl276 rpl277 rpl278 rpl279 rpl280 rpl281 rpl282 rpl283 rpl284 rpl285 rpl286
rpl287 rpl288 rpl289 rpl290 rpl291 rpl292  rpl293 rpl294 rpl295 rpl296 rpl297 rpl298 rpl299 rpl300
rpl301 rpl302 rpl303 rpl304 rpl305 rpl306 rpl307 rpl308 rpl309 rpl310 rpl311 rpl312 rpl313 rpl314
rpl315 rpl316 rpl317 rpl318 rpl319 rpl320) vce(brr) dof(631) singleunit(centered)

svy: tab v025, se percent deft ci

svy: tab seducno, se percent deft ci

svy: tab seducsec, se percent deft ci

gen mar = (v501 == 1)

svy: tab mar, se percent deft ci

svy: tab knowsany, se percent deft ci subpop(mar)

svy: tab v301, se percent deft ci subpop(mar)

svy: tab everuse, se percent deft ci subpop(mar)

svy: tab curuse, se percent deft ci subpop(mar)

svy: tab v313, se percent deft ci subpop(mar)

svy: tab v312, se percent deft ci subpop(mar)

gen modern= (v313==3)

svy: tab pubsourc, se percent deft ci subpop(modern)

svy: tab v605, se percent deft ci subpop(mar)

gen sonbesyil= ((v208>0)&(v213==0)&(v222>1))

svy: tab vucut, se percent deft ci subpop(sonbesyil)

use "F:\TEZ\stata\BRR\brrTRBR50FL.dta", clear

svyset secu [pweight=sweight], strata(pairpsu) brrweight(rpl001 rpl002 rpl003 rpl004 rpl005 rpl006
rpl007 rpl008 rpl009 rpl010 rpl011 rpl012 rpl013 rpl014 rpl015 rpl016 rpl017 rpl018 rpl019 rpl020
rpl021 rpl022 rpl023 rpl024 rpl025 rpl026  rpl027 rpl028 rpl029 rpl030 rpl031 rpl032 rpl033 rpl034
rpl035 rpl036 rpl037 rpl038 rpl039 rpl040 rpl041 rpl042 rpl043 rpl044 rpl045 rpl046 rpl047 rpl048
rpl049 rpl051 rpl050 rpl052 rpl053 rpl054 rpl055 rpl056 rpl057 rpl058 rpl059 rpl060  rpl061 rpl062
rpl063 rpl064 rpl065 rpl066 rpl067 rpl068 rpl069 rpl070 rpl071 rpl072 rpl073 rpl074 rpl075 rpl076
rpl077 rpl078 rpl079 rpl080 rpl081 rpl082  rpl083 rpl084 rpl085 rpl086 rpl087 rpl088 rpl089 rpl090
rpl091 rpl092 rpl093 rpl094 rpl095 rpl096 rpl097 rpl098 rpl099  rpl100 rpl101 rpl102 rpl103 rpl104
rpl105 rpl106 rpl107 rpl108 rpl109 rpl110 rpl111 rpl112 rpl113 rpl114 rpl115  rpl116 rpl117 rpl118
rpl119 rpl120 rpl121 rpl122 rpl123 rpl124 rpl125 rpl126 rpl127 rpl128 rpl129 rpl130 rpl131 rpl32
rpl133 rpl134 rpl135 rpl136 rpl137 rpl138 rpl139 rpl140 rpl141 rpl142 rpl143 rpl144 rpl145 rpl146
rpl147 rpl148 rpl149 rpl150 rpl151 rpl152 rpl153 rpl154 rpl155 rpl156 rpl157 rpl158 rpl159 rpl160
```

```
rpl161 rpl162  rpl163 rpl164 rpl165 rpl166 rpl167 rpl168 rpl169 rpl170 rpl171 rpl172 rpl173 rpl174
rpl175 rpl176 rpl177 rpl178 rpl179 rpl180 rpl181 rpl182 rpl183 rpl184 rpl185 rpl186 rpl187 rpl188
rpl189 rpl190 rpl191 rpl192 rpl193 rpl194 rpl195 rpl196  rpl197 rpl198 rpl199 rpl200 rpl201 rpl202
rpl203 rpl204 rpl205 rpl206 rpl207 rpl208 rpl209 rpl210 rpl211 rpl212 rpl213 rpl214 rpl215 rpl216
rpl217  rpl218 rpl219 rpl220 rpl221 rpl222 rpl223 rpl224 rpl225 rpl226 rpl227 rpl228 rpl229 rpl230
rpl231 rpl232 rpl233 rpl234 rpl235 rpl236 rpl237 rpl238 rpl239 rpl240 rpl241 rpl242 rpl243 rpl244
rpl245 rpl246 rpl247 rpl248 rpl249 rpl250 rpl251 rpl252 rpl253 rpl254 rpl255 rpl256 rpl257 rpl258
rpl259 rpl260 rpl261 rpl262 rpl263 rpl264 rpl265 rpl266 rpl267 rpl268 rpl269 rpl270 rpl271 rpl272
rpl273 rpl274 rpl275 rpl276 rpl277 rpl278 rpl279 rpl280 rpl281 rpl282 rpl283 rpl284 rpl285 rpl286
rpl287 rpl288 rpl289 rpl290 rpl291 rpl292  rpl293 rpl294 rpl295 rpl296 rpl297 rpl298 rpl299 rpl300
rpl301 rpl302 rpl303 rpl304 rpl305 rpl306 rpl307 rpl308 rpl309 rpl310 rpl311 rpl312 rpl313 rpl314
rpl315 rpl316 rpl317 rpl318 rpl319 rpl320) vce(brr)  singleunit(centered)

gen bes=(v008-b3)
gen bes2=(bes<60)

svy: tab e, se percent deft ci subpop(bes2)

*asi

gen alive=(b5==1)
gen onbes=((bes>14)&(bes<27)&(b5==1))

gen card=(h1==1)

svy: tab card, se percent deft ci subpop(onbes)

svy: tab bcg1, se percent deft ci subpop(onbes)

svy: tab dbt3, se percent deft ci subpop(onbes)

svy: tab pol3, se percent deft ci subpop(onbes)

svy: tab kiz, se percent deft ci subpop(onbes)

svy: tab asili, se percent deft ci subpop(onbes)

gen antro=((b5==1)&(bes<60)&(hw5<9998))

svy: tab ygb, se percent deft ci subpop(antro)

svy: tab bga, se percent deft ci subpop(antro)

svy: tab yga, se percent deft ci subpop(antro)
```

A.2.3.Jackknife Repeated Replication

```
set memory 400m

 use "C:\Users\dyildiz\Desktop\TEZ\stata\JK2\JK2 TRIR50FL.dta", clear

log using "C:\Users\dyildiz\Desktop\TEZ\stata\jk2\stata.log", append
```

svyset secu [pweight=sweight], strata(pairpsu) jkrweight(rpl001 rpl002 rpl003 rpl004 rpl005 rpl006 rpl007 rpl008 rpl009 rpl010 rpl011 rpl012 rpl013 rpl014 rpl015 rpl016 rpl017 rpl018 rpl019 rpl020 rpl021 rpl022 rpl023 rpl024 rpl025 rpl026 rpl027 rpl028 rpl029 rpl030 rpl031 rpl032 rpl033 rpl034 rpl035 rpl036 rpl037 rpl038 rpl039 rpl040 rpl041 rpl042 rpl043 rpl044 rpl045 rpl046 rpl047 rpl048 rpl049 rpl051 rpl050 rpl052 rpl053 rpl054 rpl055 rpl056 rpl057 rpl058 rpl059 rpl060 rpl061 rpl062 rpl063 rpl064 rpl065 rpl066 rpl067 rpl068 rpl069 rpl070 rpl071 rpl072 rpl073 rpl074 rpl075 rpl076 rpl077 rpl078 rpl079 rpl080 rpl081 rpl082 rpl083 rpl084 rpl085 rpl086 rpl087 rpl088 rpl089 rpl090 rpl091 rpl092 rpl093 rpl094 rpl095 rpl096 rpl097 rpl098 rpl099 rpl100 rpl101 rpl102 rpl103 rpl104 rpl105 rpl106 rpl107 rpl108 rpl109 rpl110 rpl111 rpl112 rpl113 rpl114 rpl115 rpl116 rpl117 rpl118 rpl119 rpl120 rpl121 rpl122 rpl123 rpl124 rpl125 rpl126 rpl127 rpl128 rpl129 rpl130 rpl131 rpl132 rpl133 rpl134 rpl135 rpl136 rpl137 rpl138 rpl139 rpl140 rpl141 rpl142 rpl143 rpl144 rpl145 rpl146 rpl147 rpl148 rpl149 rpl150 rpl151 rpl152 rpl153 rpl154 rpl155 rpl156 rpl157 rpl158 rpl159 rpl160 rpl161 rpl162 rpl163 rpl164 rpl165 rpl166 rpl167 rpl168 rpl169 rpl170 rpl171 rpl172 rpl173 rpl174 rpl175 rpl176 rpl177 rpl178 rpl179 rpl180 rpl181 rpl182 rpl183 rpl184 rpl185 rpl186 rpl187 rpl188 rpl189 rpl190 rpl191 rpl192 rpl193 rpl194 rpl195 rpl196 rpl197 rpl198 rpl199 rpl200 rpl201 rpl202 rpl203 rpl204 rpl205 rpl206 rpl207 rpl208 rpl209 rpl210 rpl211 rpl212 rpl213 rpl214 rpl215 rpl216 rpl217 rpl218 rpl219 rpl220 rpl221 rpl222 rpl223 rpl224 rpl225 rpl226 rpl227 rpl228 rpl229 rpl230 rpl231 rpl232 rpl233 rpl234 rpl235 rpl236 rpl237 rpl238 rpl239 rpl240 rpl241 rpl242 rpl243 rpl244 rpl245 rpl246 rpl247 rpl248 rpl249 rpl250 rpl251 rpl252 rpl253 rpl254 rpl255 rpl256 rpl257 rpl258 rpl259 rpl260 rpl261 rpl262 rpl263 rpl264 rpl265 rpl266 rpl267 rpl268 rpl269 rpl270 rpl271 rpl272 rpl273 rpl274 rpl275 rpl276 rpl277 rpl278 rpl279 rpl280 rpl281 rpl282 rpl283 rpl284 rpl285 rpl286 rpl287 rpl288 rpl289 rpl290 rpl291 rpl292 rpl293 rpl294 rpl295 rpl296 rpl297 rpl298 rpl299 rpl300 rpl301 rpl302 rpl303 rpl304 rpl305 rpl306 rpl307 rpl308 rpl309 rpl310 rpl311 rpl312) vce(jackknife) dof(631) singleunit(centered)

svy: tab v025, se percent deft ci

svy: tab seducno, se percent deft ci

svy: tab seducsec, se percent deft ci

gen mar = (v501 == 1)

svy: tab mar, se percent deft ci

svy: tab knowsany, se percent deft ci subpop(mar)

svy: tab everuse, se percent deft ci subpop(mar)

svy: tab curuse, se percent deft ci subpop(mar)

svy: tab v301, se percent deft ci subpop(mar)

svy: tab v313, se percent deft ci subpop(mar)

svy: tab v312, se percent deft ci subpop(mar)

gen modern= (v313==3)

svy: tab pubsourc, se percent deft ci subpop(modern)

svy: tab v605, se percent deft ci subpop(mar)

gen sonbesyil= ((v208>0)&(v213==0)&(v222>1))

svy: tab vucut, se percent deft ci subpop(sonbesyil)

```
use "D:\TEZ\stata\JK2\JK2 TRBR50FL.dta", clear
svyset secu [pweight=sweight], strata(pairpsu) jkrweight(rpl001 rpl002 rpl003 rpl004 rpl005 rpl006
rpl007 rpl008 rpl009 rpl010 rpl011 rpl012 rpl013 rpl014 rpl015 rpl016 rpl017 rpl018 rpl019 rpl020
rpl021 rpl022 rpl023 rpl024 rpl025 rpl026  rpl027 rpl028 rpl029 rpl030 rpl031 rpl032 rpl033 rpl034
rpl035 rpl036 rpl037 rpl038 rpl039 rpl040 rpl041 rpl042 rpl043 rpl044 rpl045 rpl046 rpl047 rpl048
rpl049 rpl051 rpl050 rpl052 rpl053 rpl054 rpl055 rpl056 rpl057 rpl058 rpl059 rpl060  rpl061 rpl062
rpl063 rpl064 rpl065 rpl066 rpl067 rpl068 rpl069 rpl070 rpl071 rpl072 rpl073 rpl074 rpl075 rpl076
rpl077 rpl078 rpl079 rpl080 rpl081 rpl082  rpl083 rpl084 rpl085 rpl086 rpl087 rpl088 rpl089 rpl090
rpl091 rpl092 rpl093 rpl094 rpl095 rpl096 rpl097 rpl098 rpl099  rpl100 rpl101 rpl102 rpl103 rpl104
rpl105 rpl106 rpl107 rpl108 rpl109 rpl110 rpl111 rpl112 rpl113 rpl114 rpl115  rpl116 rpl117 rpl118
rpl119 rpl120 rpl121 rpl122 rpl123 rpl124 rpl125 rpl126 rpl127 rpl128 rpl129 rpl130 rpl131 rpl132
rpl133 rpl134 rpl135 rpl136 rpl137 rpl138 rpl139 rpl140 rpl141 rpl142 rpl143 rpl144 rpl145 rpl146
rpl147 rpl148 rpl149 rpl150 rpl151 rpl152 rpl153 rpl154 rpl155 rpl156 rpl157 rpl158 rpl159 rpl160
rpl161 rpl162  rpl163 rpl164 rpl165 rpl166 rpl167 rpl168 rpl169 rpl170 rpl171 rpl172 rpl173 rpl174
rpl175 rpl176 rpl177 rpl178 rpl179 rpl180 rpl181 rpl182 rpl183 rpl184 rpl185 rpl186 rpl187 rpl188
rpl189 rpl190 rpl191 rpl192 rpl193 rpl194 rpl195 rpl196  rpl197 rpl198 rpl199 rpl200 rpl201 rpl202
rpl203 rpl204 rpl205 rpl206 rpl207 rpl208 rpl209 rpl210 rpl211 rpl212 rpl213 rpl214 rpl215 rpl216
rpl217  rpl218 rpl219 rpl220 rpl221 rpl222 rpl223 rpl224 rpl225 rpl226 rpl227 rpl228 rpl229 rpl230
rpl231 rpl232 rpl233 rpl234 rpl235 rpl236 rpl237 rpl238 rpl239 rpl240 rpl241 rpl242 rpl243 rpl244
rpl245 rpl246 rpl247 rpl248 rpl249 rpl250 rpl251 rpl252 rpl253 rpl254 rpl255 rpl256 rpl257 rpl258
rpl259 rpl260 rpl261 rpl262 rpl263 rpl264 rpl265 rpl266 rpl267 rpl268 rpl269 rpl270 rpl271 rpl272
rpl273 rpl274 rpl275 rpl276 rpl277 rpl278 rpl279 rpl280 rpl281 rpl282 rpl283 rpl284 rpl285 rpl286
rpl287 rpl288 rpl289 rpl290 rpl291 rpl292  rpl293 rpl294 rpl295 rpl296 rpl297 rpl298 rpl299 rpl300
rpl301 rpl302 rpl303 rpl304 rpl305 rpl306 rpl307 rpl308 rpl309 rpl310 rpl311 rpl312) vce(jackknife)
dof(631) singleunit(centered)

gen bes=(v008-b3)
gen bes2=(bes<60)

svy: tab e, se percent deft ci subpop(bes2)

*asi

gen alive=(b5==1)
gen onbes=((bes>14)&(bes<27)&(b5==1))

gen card=(h1==1)

svy: tab card, se percent deft ci subpop(onbes)

svy: tab bcg1, se percent deft ci subpop(onbes)

svy: tab dbt3, se percent deft ci subpop(onbes)

svy: tab pol3, se percent deft ci subpop(onbes)

svy: tab kiz, se percent deft ci subpop(onbes)

svy: tab asili, se percent deft ci subpop(onbes)

gen antro=((b5==1)&(bes<60)&(hw5<9998))

svy: tab ygb, se percent deft ci subpop(antro)

svy: tab bga, se percent deft ci subpop(antro)

svy: tab yga, se percent deft ci subpop(antro)
```

A.3. SAS/STAT

A.3.1. Taylor Series Linearization

```
libname tez 'D:/TEZ/sas';
data tnsa;
set tez.TRIR50FL;
sweight=v005/1000000;
run;
proc contents data=tez.TRIR50FL;
run;
ods html file='D:\TEZ\sas\taylor/taylor kadin.xls' RS=none;

proc surveyfreq ;
tables v025 seducno seducsec v501;
stratum pairpsu;
cluster v001;
weight sweight;
run;

proc surveyfreq;
stratum pairpsu;
cluster v001;
weight sweight;
tables v501*knowsany v501*v301 v501*everuse v501*curuse v501*v313 v501*v312/row;
run;

proc surveyfreq;
stratum pairpsu;
cluster v001;
weight sweight;
tables v313*pubsource/row;
run;
proc surveyfreq;
stratum pairpsu;
cluster v001;
weight sweight;
tables v501*v605/row;
run;
data tnsa;
set tez.TRIR50FL;
if v208>0 and v213=0 and v222>1 then v=1 ; else v=0 ;
run;
proc surveyfreq;
stratum pairpsu;
cluster v001;
weight sweight;
tables v*vucut/row;
run;
ods html close;

libname tez 'D:/TEZ/sas';
```

```
ods html file='D:/TEZ/sas/taylor/birth/taylor birth.xls' RS=none;
data tnsa;
set tez.birthdene;
sweight=v005/1000000;
run;
/*proc contents data=tez.TRBR50FL;
run;*/
proc surveyfreq ;
tables yasfilter*e/row;
stratum pairpsu;
cluster v001;
weight sweight;
run;
proc surveyfreq ;
stratum pairpsu;
cluster v001;
weight sweight;
tables asifilter*h1 asifilter*bcg1 asifilter*dbt3 asifilter*pol3 asifilter*kiz asifilter*asili/row;
run;
proc surveyfreq ;
tables antrofilter*ygb antrofilter*yga antrofilter*bga/row;
stratum pairpsu;
cluster v001;
weight sweight;
run;
ods html close;
```

A.3.2. Balanced Repeated Replication

```
libname tez 'D:/TEZ/sas';
data tnsa;
set tez.TRIR50FL;
varmethod=brr;
sweight=v005/1000000;
run;
ods html file='D:/TEZ/sas/brr tr kadin xls' RS=none;

proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
weight sweight;
tables v025 seducno seducsec v501;
run;
/*row yazıp row percent ve std error kullanılacak*/
proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
weight sweight;
tables v501*knowsany v501* v301 v501*everuse v501*curuse v501*v313 v501*v312/row;
run;
proc surveyfreq varmethod=brr ;
stratum pairpsu ;
cluster secu;
weight sweight;
```

```
tables v313*pubsource /row;
run;
ods html close;
proc surveyfreq varmethod=brr ;
stratum pairpsu;
cluster secu;
weight sweight;
tables v501*v605/row;
run;
data tnsa;
set tez.TRIR50FL;
if v208>0 and v213=0 and v222>1 then v=1 ; else v=0 ;
run;
 proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
weight sweight;
tables v*vucut/row;
run;
ods html close;
libname tez 'H:\sas';
data tnsa;
set tez.TRBR50FL;
sweight=v005/1000000;
run;
proc contents data=tez.TRBR50FL;
run;
data tnsa;
set tez.TRBR50FL;
sweight=v005/1000000;
if (v008-b3)   <60  then besyas=1 ; else besyas=0 ;
run;
proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
weight sweight;
tables besyas * e /row;
run;
data tnsa;
set tez.TRBR50FL;
sweight=v005/1000000;
if (v008-b3>14)and(v008-b3<27)and(b5=1)  then asifilter=1 ; else asifilter=0 ;
run;
proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
weight sweight;
tables asifilter*h1 asifilter*bcg1 asifilter*dbt3 asifilter*pol3 asifilter*kiz asifilter*asili/row;
run;
data tnsa;
set tez.TRBR50FL;
sweight=v005/1000000;
if (b5=1)and(v008-b3<60)and(hw5<9998)  then antro=1 ; else antro=0 ;
run;
proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
```

```
weight sweight;
tables antro*ygb antro*yga antro*bga/row;
run;
ods html close;
```

A.3.3. Jackknife Repeated Replication

```
libname tez 'D:/TEZ/sas';
data tnsa;
set tez.TRIR50FL_complex3;
sweight=v005/1000000;
run;
ods html file='D:/TEZ/sas/ jk tr kadin.xls' RS=none;
proc surveyfreq varmethod=jackknife;
stratum pairpsu;
cluster secu;
weight sweight;
/*where v024=1;*/
tables v025 seducno seducsec v501;
run;
/*row yazıp row percent ve std error kullanılacak*/
proc surveyfreq varmethod=brr;
stratum pairpsu;
cluster secu;
weight sweight;
/*where v024=1;  */
tables v501*knowsany v501* v301 v501*everuse v501*curuse v501*v313 v501*v312/row;
run;
proc surveyfreq varmethod=jackknife;
stratum pairpsu ;
cluster secu;
weight sweight;
/*where v024=1;      */
tables v313*pubsource /row;
run;
proc surveyfreq varmethod=jackknife;
stratum pairpsu;
cluster secu;
weight sweight;
/*where v024=1; */
tables v501*v605/row;
run;
data tnsa;
set tez.TRIR50FL_complex3;
if v208>0 and v213=0 and v222>1 then v=1 ; else v=0 ;
run;

proc surveyfreq varmethod=jackknife;
stratum pairpsu;
cluster secu;
weight sweight;
/*where v024=1;      */
```

```
tables v*vucut/row;
run;
ods html close;
libname tez 'D:\TEZ\sas';
ods html file='D:\TEZ\sas\JK2\jk east birth.xls' RS=none;
data tnsa;
set tez.TRBR50FL_complex;
sweight=v005/1000000;
run;
/*proc contents data=tez.TRBR50FL_complex;
run;*/
data tnsa;
set tez.TRBR50FL_complex;
sweight=v005/1000000;
if (v008-b3)<60  then besyas=1 ; else besyas=0 ;
run;
proc surveyfreq varmethod=jackknife;
stratum pairpsu;
cluster secu;
weight sweight;
where v024=5;
tables besyas * e /row;
run;
data tnsa;
set tez.TRBR50FL_complex;
sweight=v005/1000000;
if (v008-b3>14)and(v008-b3<27)and(b5=1)  then asifilter=1 ; else asifilter=0 ;
run;
proc surveyfreq varmethod=jackknife;
stratum pairpsu;
cluster secu;
weight sweight;
where v024=5;
tables asifilter*h1 asifilter*bcg1 asifilter*dbt3 asifilter*pol3 asifilter*kiz asifilter*asili/row;
run;
data tnsa;
set tez.TRBR50FL_complex;
sweight=v005/1000000;
if (b5=1)and(v008-b3<60)and(hw5<9998)  then antro=1 ; else antro=0 ;
run;
proc surveyfreq varmethod=jackknife;
stratum pairpsu;
cluster secu;
weight sweight;
where v024=5;
tables antro*ygb antro*yga antro*bga/row;
run;
ods html close;
```

A.4.IVEware

```
options set=SRCLIB "C:/Program Files/SAS/srclib" sasautos=('!SRCLIB' sasautos) mautosource ;
libname nisan 'D:/TEZ/iveware' ;
options nodate nonumber ;

data one ;
     set nisan.TRIR50FL ;

ods html file='D:/TEZ/iveware/tr taylor kadin.xls' RS=none;

%regress (NAME=jksetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.TRIR50FL;
WEIGHT     sweight;
STRATUM    pairpsu;
CLUSTER    secu;
estimates  v025 seducno seducsec v501;
RUN;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.eastTRIR50FL;
WEIGHT     sweight;
CLUSTER    v001;
table      knowsany;
by         v501;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.eastTRIR50FL;
WEIGHT     sweight;
CLUSTER    v001;
table      v301;
by         v501;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.eastTRIR50FL;
WEIGHT     sweight;
CLUSTER    v001;
table      everuse;
by         v501;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.eastTRIR50FL;
WEIGHT     sweight;
CLUSTER    v001;
table      curuse;
by         v501;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.eastTRIR50FL;
WEIGHT     sweight;
CLUSTER    v001;
table      v313;
by         v501;
run;

%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisan.eastTRIR50FL;
WEIGHT     sweight;
CLUSTER    v001;
table      v312;
```

```
by        v501;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisan.eastTRIR50FL;
WEIGHT    sweight;
CLUSTER   v001;
table     pubsource;
by        v313;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisan.eastTRIR50FL;
WEIGHT    sweight;
CLUSTER   v001;
table     v605;
by        v501;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisan.eastTRIR50FL;
WEIGHT    sweight;
CLUSTER   v001;
table     vucut;
by        v;
run;
ods html close;
options set=SRCLIB "C:/Program Files/SAS/srclib" sasautos=('!SRCLIB' sasautos) mautosource ;
libname nisanb 'D:/TEZ/iveware' ;
options nodate nonumber ;
ods html file='D:/TEZ/iveware/taylorbirth rural.xls' RS=none;
data one ;
 set nisanb.ruralbirth ;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisanb.ruralbirth ;
WEIGHT    sweight;
CLUSTER   v001;
table     h1;
by        asifilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisanb.ruralbirth ;
WEIGHT    sweight;
CLUSTER   v001;
table     bcg1;
by        asifilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisanb.ruralbirth ;
WEIGHT    sweight;
CLUSTER   v001;
table     dbt3;
by        asifilter;
run;

%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN    nisanb.ruralbirth ;
WEIGHT    sweight;
CLUSTER   v001;
table     pol3;
```

```
by       asifilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisanb.ruralbirth ;
WEIGHT     sweight;
CLUSTER    v001;
table      kiz;
by       asifilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisanb.ruralbirth ;
WEIGHT     sweight;
CLUSTER    v001;
table      asili;
by       asifilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisanb.ruralbirth ;
WEIGHT     sweight;
CLUSTER    v001;
table      ygb;
by       antrofilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisanb.ruralbirth ;
WEIGHT     sweight;
CLUSTER    v001;
table      yga;
by       antrofilter;
run;
%describe (NAME=taylorsetup,DIR=D:/TEZ,SETUP=NEW);
DATAIN     nisanb.ruralbirth ;
WEIGHT     sweight;
CLUSTER    v001;
table      bga;
by       antrofilter;
run;

ods html close;
```

APPENDIX B: SAMPLING ERRORS

Table B 1 Sampling Errors: SPSS, Taylor Series Linearization, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.006	7405	7405	1.706	0.009	0.745	0.771
No education	0.183	0.008	7405	7405	3.226	0.044	0.168	0.200
With secondary education or higher	0.298	0.011	7405	7405	4.421	0.038	0.277	0.320
Currently married (in union)	0.945	0.004	7405	7405	2.141	0.004	0.937	0.952
Knowing any contraceptive method	0.998	0.000	7042	6999	0.769	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.042	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.417	0.004	0.905	0.920
Currently using any contraceptive method	0.730	0.007	7042	6999	1.641	0.009	0.716	0.743
Currently using modern method	0.460	0.007	7042	6999	1.566	0.016	0.445	0.474
Currently using pill	0.053	0.003	7042	6999	1.608	0.064	0.047	0.061
Currently using IUD	0.169	0.006	7042	6999	1.646	0.034	0.158	0.180
Currently using condom	0.143	0.006	7042	6999	2.108	0.042	0.132	0.156
Currently using injectables	0.009	0.001	7042	6999	1.498	0.157	0.006	0.012
Currently using female sterilization	0.083	0.004	7042	6999	1.511	0.049	0.076	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.687	0.205	0.004	0.009
Currently using withdrawal	0.262	0.007	7042	6999	1.965	0.028	0.248	0.277
Obtained method from public sector source	0.600	0.012	3162	3243	1.789	0.020	0.576	0.622
Want no more children	0.588	0.007	7038	6993	1.509	0.012	0.574	0.602
Want to delay birth at least 2 years	0.143	0.006	7038	6993	1.860	0.040	0.132	0.155
Mothers recieved medical care at delivery	0.913	0.008	3857	3463	2.933	0.009	0.896	0.927
Child having health card, seen	0.727	0.021	772	711	1.747	0.029	0.684	0.766
Child received BCG vaccination	0.959	0.006	774	711	0.688	0.006	0.946	0.969
Child received DPT vaccination (3 doses)	0.893	0.012	774	711	1.102	0.013	0.868	0.914
Child received polio vaccination (3 doses)	0.888	0.013	774	711	1.286	0.015	0.860	0.911
Child received measles vaccination	0.893	0.015	774	711	1.898	0.017	0.858	0.919
Child fully immunized	0.805	0.018	774	711	1.582	0.022	0.767	0.838
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.571	0.072	0.090	0.119
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.436	0.249	0.005	0.014
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.257	0.128	0.022	0.036
BMI < 18.5	0.016	0.003	2465	2315	1.270	0.176	0.012	0.023

Table B 2 Sampling Errors: SPSS, Taylor Series Linearization, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	0.000	1.000
No education	0.152	0.010	5429	5615	4.102	0.065	0.134	0.173
With secondary education or higher	0.348	0.015	5429	5615	5.070	0.042	0.320	0.377
Currently married (in union)	0.941	0.005	5429	5615	2.345	0.005	0.931	0.950
Knowing any contraceptive method	0.999	0.000	5141	5284	0.867	0.000	0.997	0.999
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.266	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.438	0.005	0.917	0.934
Currently using any contraceptive method	0.743	0.008	5141	5284	1.758	0.011	0.727	0.759
Currently using modern method	0.478	0.009	5141	5284	1.500	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.697	0.075	0.048	0.065
Currently using IUD	0.175	0.007	5141	5284	1.579	0.038	0.162	0.189
Currently using condom	0.154	0.007	5141	5284	2.173	0.048	0.140	0.169
Currently using injectables	0.008	0.002	5141	5284	1.657	0.202	0.005	0.012
Currently using female sterilization	0.083	0.005	5141	5284	1.545	0.058	0.074	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.661	0.216	0.004	0.011
Currently using withdrawal	0.256	0.008	5141	5284	1.878	0.033	0.240	0.273
Obtained method from public sector source	0.579	0.013	2445	2550	1.684	0.022	0.553	0.605
Want no more children	0.583	0.008	5137	5284	1.455	0.014	0.566	0.599
Want to delay birth at least 2 years	0.146	0.007	5137	5284	2.072	0.049	0.133	0.161
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.273	0.006	0.944	0.968
Child having health card, seen	0.758	0.022	523	515	1.358	0.029	0.712	0.799
Child received BCG vaccination	0.965	0.005	524	515	0.394	0.005	0.954	0.974
Child received DPT vaccination (3 doses)	0.921	0.011	524	515	0.828	0.012	0.896	0.940
Child received polio vaccination (3 doses)	0.917	0.014	524	515	1.344	0.015	0.884	0.941
Child received measles vaccination	0.903	0.019	524	515	2.159	0.021	0.858	0.935
Child fully immunized	0.842	0.021	524	515	1.672	0.025	0.796	0.879
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.391	0.096	0.063	0.092
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.770	0.337	0.004	0.016
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.386	0.188	0.014	0.030
BMI < 18.5	0.013	0.003	1742	1713	1.387	0.249	0.008	0.021

Table B 3 Sampling Errors: SPSS, Taylor Series Linearization, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	0.000	0.000	1.000
No education	0.281	0.013	1976	1790	1.584	0.045	0.256	0.307
With secondary education or higher	0.142	0.013	1976	1790	2.702	0.091	0.118	0.170
Currently married (in union)	0.959	0.005	1976	1790	1.098	0.005	0.948	0.967
Knowing any contraceptive method	0.995	0.001	1901	1716	0.726	0.001	0.992	0.997
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.944	0.002	0.984	0.993
Ever used any contraceptive method	0.872	0.009	1901	1716	1.415	0.010	0.853	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.297	0.018	0.665	0.713
Currently using modern method	0.404	0.015	1901	1716	1.891	0.038	0.373	0.435
Currently using pill	0.046	0.005	1901	1716	1.191	0.114	0.036	0.057
Currently using IUD	0.150	0.011	1901	1716	1.943	0.076	0.128	0.174
Currently using condom	0.110	0.010	1901	1716	2.000	0.092	0.091	0.132
Currently using injectables	0.011	0.003	1901	1716	1.188	0.236	0.007	0.018
Currently using female sterilization	0.085	0.008	1901	1716	1.423	0.090	0.071	0.101
Currently using periodic abstinence	0.002	0.001	1901	1716	1.663	0.640	0.001	0.008
Currently using withdrawal	0.280	0.016	1901	1716	2.322	0.056	0.250	0.313
Obtained method from public sector source	0.675	0.027	716	692	2.394	0.040	0.619	0.726
Want no more children	0.603	0.015	1901	1716	1.675	0.024	0.574	0.631
Want to delay birth at least 2 years	0.134	0.008	1901	1716	1.006	0.059	0.119	0.150
Mothers recieved medical care at delivery	0.802	0.021	1268	988	3.460	0.026	0.757	0.840
Child having health card, seen	0.646	0.021	249	196	0.501	0.033	0.601	0.688
Child received BCG vaccination	0.943	0.010	250	196	0.424	0.010	0.920	0.959
Child received DPT vaccination (3 doses)	0.822	0.016	250	196	0.440	0.020	0.787	0.852
Child received polio vaccination (3 doses)	0.814	0.014	250	196	0.331	0.017	0.783	0.841
Child received measles vaccination	0.865	0.009	250	196	0.167	0.010	0.847	0.882
Child fully immunized	0.710	0.016	250	196	0.300	0.022	0.677	0.741
Height-for-age (-2SD)	0.174	0.017	887	692	1.832	0.099	0.142	0.211
Weight-for-height (-2SD)	0.009	0.003	887	692	0.589	0.264	0.006	0.016
Weight-for-age (-2SD)	0.048	0.008	887	692	1.105	0.158	0.035	0.065
BMI < 18.5	0.026	0.006	723	601	1.150	0.246	0.016	0.042

Table B 4 Sampling Errors: SPSS, Taylor Series Linearization, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.008	1876	3252	1.010	0.009	0.842	0.875
No education	0.119	0.015	1876	3252	3.872	0.123	0.093	0.152
With secondary education or higher	0.338	0.023	1876	3252	4.339	0.067	0.294	0.385
Currently married (in union)	0.938	0.007	1876	3252	1.775	0.008	0.921	0.951
Knowing any contraceptive method	0.999	0.001	1763	3049	0.551	0.001	0.997	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.122	0.001	0.993	0.999
Ever used any contraceptive method	0.940	0.006	1763	3049	1.195	0.007	0.926	0.951
Currently using any contraceptive method	0.763	0.012	1763	3049	1.419	0.016	0.738	0.786
Currently using modern method	0.482	0.012	1763	3049	0.995	0.025	0.459	0.506
Currently using pill	0.058	0.006	1763	3049	1.349	0.111	0.047	0.073
Currently using IUD	0.174	0.011	1763	3049	1.420	0.062	0.154	0.197
Currently using condom	0.155	0.011	1763	3049	1.609	0.070	0.135	0.178
Currently using injectables	0.008	0.003	1763	3049	1.426	0.320	0.004	0.015
Currently using female sterilization	0.084	0.008	1763	3049	1.327	0.091	0.070	0.100
Currently using periodic abstinence	0.005	0.002	1763	3049	1.107	0.338	0.003	0.011
Currently using withdrawal	0.271	0.013	1763	3049	1.506	0.048	0.494	0.576
Obtained method from public sector source	0.536	0.021	859	1483	1.457	0.038	0.493	0.576
Want no more children	0.587	0.012	1761	3044	1.102	0.021	0.562	0.611
Want to delay birth at least 2 years	0.138	0.011	1761	3044	1.702	0.078	0.118	0.161
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.684	0.007	0.959	0.990
Child having health card, seen	0.797	0.034	139	256	0.996	0.043	0.716	0.860
Child received BCG vaccination	0.973	0.001	139	256	0.011	0.001	0.970	0.976
Child received DPT vaccination (3 doses)	0.937	0.017	139	256	0.702	0.018	0.890	0.965
Child received polio vaccination (3 doses)	0.917	0.025	139	256	1.137	0.027	0.847	0.957
Child received measles vaccination	0.904	0.036	139	256	2.009	0.039	0.800	0.957
Child fully immunized	0.846	0.038	139	256	1.504	0.045	0.750	0.910
Height-for-age (-2SD)	0.076	0.012	481	848	0.965	0.156	0.055	0.103
Weight-for-height (-2SD)	0.009	0.005	481	848	1.469	0.592	0.003	0.028
Weight-for-age (-2SD)	0.010	0.005	481	848	1.272	0.501	0.004	0.028
BMI < 18.5	0.015	0.006	484	850	1.120	0.389	0.007	0.032

Table B 5 Sampling Errors: SPSS, Taylor Series Linearization, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.689	0.026	0.678	0.752
No education	0.197	0.019	1013	894	2.297	0.096	0.162	0.238
With secondary education or higher	0.248	0.018	1013	894	1.828	0.074	0.213	0.287
Currently married (in union)	0.950	0.007	1013	894	1.000	0.007	0.934	0.962
Knowing any contraceptive method	0.995	0.002	962	849	0.979	0.002	0.987	0.998
Knowing any modern contraceptive method	0.991	0.003	962	849	1.181	0.003	0.981	0.996
Ever used any contraceptive method	0.881	0.013	962	849	1.554	0.015	0.852	0.905
Currently using any contraceptive method	0.704	0.018	962	849	1.509	0.026	0.666	0.739
Currently using modern method	0.458	0.021	962	849	1.713	0.046	0.416	0.500
Currently using pill	0.041	0.007	962	849	1.202	0.172	0.029	0.057
Currently using IUD	0.183	0.015	962	849	1.479	0.083	0.154	0.215
Currently using condom	0.129	0.013	962	849	1.483	0.102	0.105	0.158
Currently using injectables	0.005	0.002	962	849	0.614	0.361	0.002	0.010
Currently using female sterilization	0.100	0.010	962	849	0.970	0.095	0.082	0.121
Currently using periodic abstinence	0.006	0.003	962	849	1.681	0.556	0.002	0.017
Currently using withdrawal	0.241	0.016	962	849	1.342	0.066	0.210	0.274
Obtained method from public sector source	0.719	0.024	441	392	1.272	0.034	0.668	0.765
Want no more children	0.573	0.016	962	849	0.979	0.028	0.541	0.604
Want to delay birth at least 2 years	0.121	0.011	962	849	1.122	0.092	0.101	0.146
Mothers recieved medical care at delivery	0.940	0.009	497	441	0.788	0.010	0.918	0.957
Child having health card, seen	0.626	0.035	108	95	0.549	0.055	0.550	0.696
Child received BCG vaccination	0.961	0.016	108	95	0.706	0.016	0.910	0.983
Child received DPT vaccination (3 doses)	0.881	0.023	108	95	0.558	0.026	0.822	0.923
Child received polio vaccination (3 doses)	0.877	0.025	108	95	0.603	0.028	0.815	0.921
Child received measles vaccination	0.939	0.017	108	95	0.558	0.018	0.890	0.967
Child fully immunized	0.818	0.027	108	95	0.516	0.033	0.754	0.868
Height-for-age (-2SD)	0.076	0.015	382	339	1.229	0.198	0.051	0.113
Weight-for-height (-2SD)	0.000	0.000	382	339	na	0.000	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.256	0.329	0.015	0.057
BMI < 18.5	0.013	0.006	357	316	1.034	0.466	0.005	0.033

Table B 6 Sampling Errors: SPSS, Taylor Series Linearization, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.718	0.021	0.696	0.757
No education	0.072	0.009	1460	1631	1.771	0.125	0.056	0.092
With secondary education or higher	0.360	0.019	1460	1631	2.250	0.052	0.323	0.399
Currently married (in union)	0.945	0.008	1460	1631	1.659	0.008	0.928	0.959
Knowing any contraceptive method	1.000	0.000	1386	1542	0.573	0.000	0.997	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.614	0.001	0.995	0.999
Ever used any contraceptive method	0.942	0.006	1386	1542	0.815	0.006	0.929	0.952
Currently using any contraceptive method	0.755	0.012	1386	1542	1.038	0.016	0.731	0.778
Currently using modern method	0.488	0.018	1386	1542	1.795	0.037	0.453	0.524
Currently using pill	0.049	0.006	1386	1542	1.117	0.125	0.038	0.063
Currently using IUD	0.184	0.010	1386	1542	0.988	0.056	0.164	0.206
Currently using condom	0.178	0.014	1386	1542	1.977	0.081	0.151	0.209
Currently using injectables	0.009	0.003	1386	1542	1.248	0.313	0.005	0.017
Currently using female sterilization	0.064	0.007	1386	1542	1.173	0.111	0.051	0.080
Currently using periodic abstinence	0.009	0.003	1386	1542	1.713	0.370	0.004	0.019
Currently using withdrawal	0.257	0.016	1386	1542	1.813	0.061	0.227	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.606	0.040	0.548	0.643
Want no more children	0.616	0.016	1385	1540	1.510	0.026	0.584	0.648
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.116	0.068	0.130	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.196	0.005	0.970	0.993
Child having health card, seen	0.709	0.042	142	149	1.211	0.059	0.616	0.788
Child received BCG vaccination	0.964	0.011	142	149	0.526	0.012	0.932	0.981
Child received DPT vaccination (3 doses)	0.943	0.012	142	149	0.368	0.013	0.913	0.963
Child received polio vaccination (3 doses)	0.945	0.010	142	149	0.252	0.010	0.921	0.962
Child received measles vaccination	0.948	0.007	142	149	0.151	0.008	0.931	0.961
Child fully immunized	0.900	0.015	142	149	0.344	0.016	0.865	0.927
Height-for-age (-2SD)	0.045	0.010	472	533	1.099	0.222	0.029	0.070
Weight-for-height (-2SD)	0.005	0.003	472	533	0.939	0.631	0.001	0.017
Weight-for-age (-2SD)	0.021	0.008	472	533	1.580	0.395	0.009	0.046
BMI < 18.5	0.019	0.007	470	529	1.084	0.343	0.010	0.038

Table B 7 Sampling Errors: SPSS, Taylor Series Linearization, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.018	868	477	1.110	0.032	0.517	0.589
No education	0.156	0.016	868	477	1.636	0.101	0.126	0.190
With secondary education or higher	0.305	0.022	868	477	1.926	0.071	0.263	0.350
Currently married (in union)	0.954	0.007	868	477	1.046	0.008	0.936	0.966
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	0.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.677	0.002	0.985	1.000
Ever used any contraceptive method	0.928	0.009	827	455	1.044	0.010	0.907	0.944
Currently using any contraceptive method	0.756	0.015	827	455	0.973	0.020	0.725	0.784
Currently using modern method	0.414	0.025	827	455	2.162	0.061	0.364	0.466
Currently using pill	0.052	0.008	827	455	1.142	0.159	0.038	0.071
Currently using IUD	0.098	0.014	827	455	1.700	0.137	0.074	0.129
Currently using condom	0.120	0.013	827	455	1.327	0.108	0.096	0.149
Currently using injectables	0.009	0.004	827	455	1.366	0.417	0.004	0.022
Currently using female sterilization	0.129	0.014	827	455	1.363	0.105	0.104	0.159
Currently using periodic abstinence	0.004	0.002	827	455	0.691	0.449	0.002	0.010
Currently using withdrawal	0.336	0.023	827	455	2.041	0.070	0.290	0.384
Obtained method from public sector source	0.600	0.030	361	191	1.379	0.051	0.537	0.660
Want no more children	0.568	0.020	827	455	1.399	0.036	0.527	0.609
Want to delay birth at least 2 years	0.124	0.012	827	455	1.145	0.099	0.101	0.151
Mothers recieved medical care at delivery	0.960	0.002	352	197	0.231	0.054	0.955	0.964
Child having health card, seen	0.746	0.041	68	43	0.778	0.605	0.647	0.825
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	0.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.022	68	43	0.567	0.322	0.823	0.921
Child received polio vaccination (3 doses)	0.858	0.010	68	43	0.241	0.058	0.834	0.878
Child received measles vaccination	0.978	0.001	68	43	0.053	0.003	0.976	0.980
Child fully immunized	0.836	0.011	68	43	0.240	0.058	0.811	0.858
Height-for-age (-2SD)	0.070	0.015	224	124	0.900	0.810	0.045	0.109
Weight-for-height (-2SD)	0.015	0.010	224	124	1.169	1.367	0.004	0.054
Weight-for-age (-2SD)	0.028	0.011	224	124	0.950	0.903	0.013	0.059
BMI < 18.5	0.030	0.011	251	142	1.068	0.369	0.014	0.063

Table B 8 Sampling Errors: SPSS, Taylor Series Linearization, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.012	2188	1151	1.472	0.020	0.609	0.659
No education	0.524	0.021	2188	1151	3.946	0.041	0.481	0.566
With secondary education or higher	0.133	0.013	2188	1151	3.154	0.097	0.109	0.161
Currently married (in union)	0.960	0.005	2188	1151	1.429	0.005	0.949	0.969
Knowing any contraceptive method	0.993	0.002	2104	1105	0.902	0.002	0.989	0.996
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.803	0.002	0.985	0.993
Ever used any contraceptive method	0.818	0.013	2104	1105	2.363	0.016	0.790	0.842
Currently using any contraceptive method	0.614	0.015	2104	1105	2.051	0.025	0.583	0.644
Currently using modern method	0.378	0.013	2104	1105	1.620	0.036	0.352	0.405
Currently using pill	0.056	0.006	2104	1105	1.215	0.098	0.046	0.068
Currently using IUD	0.151	0.008	2104	1105	1.170	0.056	0.135	0.169
Currently using condom	0.081	0.007	2104	1105	1.418	0.088	0.068	0.096
Currently using injectables	0.013	0.002	2104	1105	0.862	0.180	0.009	0.018
Currently using female sterilization	0.077	0.006	2104	1105	1.010	0.076	0.066	0.089
Currently using periodic abstinence	0.003	0.001	2104	1105	1.147	0.452	0.001	0.007
Currently using withdrawal	0.229	0.013	2104	1105	1.926	0.056	0.205	0.255
Obtained method from public sector source	0.723	0.020	822	420	1.634	0.028	0.681	0.761
Want no more children	0.571	0.015	2103	1105	1.832	0.026	0.542	0.600
Want to delay birth at least 2 years	0.174	0.011	2103	1105	1.923	0.066	0.152	0.198
Mothers recieved medical care at delivery	0.744	0.022	1691	911	2.098	4.403	0.697	0.786
Child having health card, seen	0.688	0.024	315	167	0.913	0.834	0.638	0.734
Child received BCG vaccination	0.922	0.013	317	167	0.847	0.717	0.893	0.944
Child received DPT vaccination (3 doses)	0.792	0.020	317	167	0.896	0.803	0.748	0.830
Child received polio vaccination (3 doses)	0.808	0.019	317	167	0.868	0.753	0.767	0.844
Child received measles vaccination	0.777	0.020	317	167	0.841	0.708	0.735	0.814
Child fully immunized	0.643	0.023	317	167	0.863	0.745	0.595	0.689
Height-for-age (-2SD)	0.210	0.018	1174	631	1.523	2.319	0.177	0.249
Weight-for-height (-2SD)	0.015	0.004	1174	631	1.002	1.003	0.009	0.024
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.124	1.263	0.044	0.075
BMI < 18.5	0.014	0.003	903	478	0.806	0.255	0.008	0.022

Table B 9 Sampling Errors: Stata, Taylor Series Linearization, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.006	7405	7405	1.706	0.009	0.745	0.771
No education	0.183	0.008	7405	7405	3.226	0.044	0.168	0.200
With secondary education or higher	0.298	0.011	7405	7405	4.423	0.038	0.277	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.140	0.004	0.937	0.952
Knowing any contraceptive method	0.998	0.000	7042	6999	0.769	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.042	0.001	0.277	0.321
Ever used any contraceptive method	0.913	0.004	7042	6999	1.421	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	7042	6999	1.656	0.009	0.716	0.743
Currently using modern method	0.460	0.007	7042	6999	1.573	0.016	0.445	0.475
Currently using pill	0.053	0.003	7042	6999	1.610	0.064	0.047	0.061
Currently using IUD	0.169	0.006	7042	6999	1.662	0.034	0.158	0.181
Currently using condom	0.143	0.006	7042	6999	2.117	0.043	0.132	0.156
Currently using injectables	0.009	0.001	7042	6999	1.498	0.157	0.006	0.012
Currently using female sterilization	0.083	0.004	7042	6999	1.525	0.049	0.075	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.687	0.205	0.004	0.009
Currently using withdrawal	0.262	0.007	7042	6999	1.968	0.028	0.248	0.277
Obtained method from public sector source	0.600	0.012	3163	3243	1.790	0.019	0.577	0.622
Want no more children	0.588	0.007	7039	6993	1.513	0.012	0.574	0.602
Want to delay birth at least 2 years	0.143	0.006	7039	6993	1.855	0.040	0.132	0.155
Mothers recieved medical care at delivery	0.913	0.008	3857	3463	2.934	0.009	0.896	0.927
Child having health card, seen	0.726	0.021	774	711	1.756	0.029	0.683	0.766
Child received BCG vaccination	0.959	0.006	774	711	0.691	0.006	0.946	0.969
Child received DPT vaccination (3 doses)	0.893	0.012	774	711	1.141	0.013	0.868	0.914
Child received polio vaccination (3 doses)	0.888	0.013	774	711	1.332	0.015	0.860	0.911
Child received measles vaccination	0.893	0.015	774	711	1.966	0.017	0.858	0.919
Child fully immunized	0.805	0.018	774	711	1.638	0.022	0.767	0.838
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.590	0.072	0.090	0.119
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.452	0.249	0.005	0.014
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.270	0.128	0.220	0.364
Urban residence	0.016	0.003	2465	2315	1.243	0.180	0.011	0.023

Table B 10 Sampling Errors: Stata, Taylor Series Linearization, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	4.109	0.065	0.134	0.173
With secondary education or higher	0.348	0.015	5429	5615	5.139	0.042	0.319	0.377
Currently married (in union)	0.941	0.005	5429	5615	2.347	0.005	0.931	0.950
Knowing any contraceptive method	0.999	0.000	5141	5284	0.861	0.000	0.997	0.999
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.259	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.433	0.005	0.917	0.934
Currently using any contraceptive method	0.743	0.008	5141	5284	1.761	0.011	0.727	0.759
Currently using modern method	0.478	0.009	5141	5284	1.493	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.690	0.075	0.048	0.065
Currently using IUD	0.175	0.007	5141	5284	1.583	0.038	0.162	0.189
Currently using condom	0.154	0.007	5141	5284	2.167	0.048	0.140	0.169
Currently using injectables	0.008	0.002	5141	5284	1.646	0.202	0.005	0.012
Currently using female sterilization	0.083	0.005	5141	5284	1.543	0.058	0.074	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.651	0.216	0.004	0.011
Currently using withdrawal	0.256	0.008	5141	5284	1.869	0.033	0.240	0.273
Obtained method from public sector source	0.580	0.013	2445	2550	1.644	0.022	0.554	0.604
Want no more children	0.583	0.008	5138	5277	1.454	0.014	0.566	0.599
Want to delay birth at least 2 years	0.146	0.007	5138	5277	2.065	0.049	0.133	0.169
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.235	0.006	0.944	0.968
Child having health card, seen	0.758	0.026	524	515	2.031	0.035	0.702	0.806
Child received BCG vaccination	0.966	0.006	524	515	0.586	0.006	0.952	0.976
Child received DPT vaccination (3 doses)	0.921	0.013	524	515	1.268	0.014	0.891	0.943
Child received polio vaccination (3 doses)	0.917	0.016	524	515	1.729	0.017	0.880	0.943
Child received measles vaccination	0.903	0.020	524	515	2.563	0.023	0.855	0.936
Child fully immunized	0.842	0.023	524	515	2.097	0.027	0.792	0.882
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.426	0.097	0.063	0.092
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.756	0.338	0.004	0.016
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.376	0.188	0.014	0.030
BMI < 18.5	0.013	0.003	1742	1713	1.284	0.244	0.008	0.021

Table B 11 Sampling Errors: Stata, Taylor Series Linearization, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.013	1976	1790	1.716	0.047	0.255	0.308
With secondary education or higher	0.142	0.013	1976	1790	2.713	0.091	0.118	0.170
Currently married (in union)	0.959	0.005	1976	1790	1.105	0.005	0.948	0.967
Knowing any contraceptive method	0.995	0.001	1901	1716	0.724	0.001	0.992	0.997
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.942	0.002	0.984	0.993
Ever used any contraceptive method	0.872	0.009	1901	1716	1.411	0.010	0.853	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.309	0.018	0.665	0.713
Currently using modern method	0.404	0.016	1901	1716	1.904	0.039	0.373	0.435
Currently using pill	0.046	0.005	1901	1716	1.192	0.115	0.036	0.057
Currently using IUD	0.150	0.011	1901	1716	1.952	0.077	0.128	0.174
Currently using condom	0.110	0.010	1901	1716	2.005	0.093	0.091	0.132
Currently using injectables	0.011	0.003	1901	1716	1.186	0.236	0.007	0.018
Currently using female sterilization	0.085	0.008	1901	1716	1.457	0.091	0.071	0.101
Currently using periodic abstinence	0.002	0.001	1901	1716	1.656	0.640	0.001	0.008
Currently using withdrawal	0.281	0.016	1901	1716	2.320	0.056	0.250	0.313
Obtained method from public sector source	0.674	0.027	718	693	2.550	0.040	0.619	0.726
Want no more children	0.603	0.015	1901	1716	1.708	0.024	0.574	0.632
Want to delay birth at least 2 years	0.134	0.008	1901	1716	1.012	0.059	0.119	0.150
Mothers recieved medical care at delivery	0.802	0.021	1268	988	3.305	0.026	0.757	0.840
Child having health card, seen	0.644	0.031	250	196	1.034	0.048	0.580	0.703
Child received BCG vaccination	0.943	0.014	250	196	0.875	0.015	0.908	0.965
Child received DPT vaccination (3 doses)	0.822	0.025	250	196	1.022	0.030	0.768	0.865
Child received polio vaccination (3 doses)	0.814	0.023	250	196	0.857	0.028	0.764	0.855
Child received measles vaccination	0.866	0.017	250	196	0.600	0.019	0.829	0.896
Child fully immunized	0.710	0.026	250	196	0.820	0.037	0.656	0.759
Height-for-age (-2SD)	0.174	0.018	887	692	1.825	0.101	0.142	0.211
Weight-for-height (-2SD)	0.009	0.003	887	692	0.607	0.273	0.006	0.016
Weight-for-age (-2SD)	0.048	0.008	887	692	1.100	0.161	0.035	0.065
BMI < 18.5	0.026	0.007	723	601	1.195	0.262	0.015	0.043

Table B 12 Sampling Errors: Stata, Taylor Series Linearization, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.008	1876	3252	1.036	0.010	0.842	0.875
No education	0.119	0.015	1876	3252	3.877	0.124	0.093	0.152
With secondary education or higher	0.338	0.023	1876	3252	4.414	0.068	0.294	0.385
Currently married (in union)	0.938	0.007	1876	3252	1.777	0.008	0.921	0.951
Knowing any contraceptive method	0.999	0.001	1763	3049	0.804	0.001	0.996	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.208	0.001	0.993	0.999
Ever used any contraceptive method	0.940	0.006	1763	3049	1.197	0.007	0.926	0.951
Currently using any contraceptive method	0.763	0.012	1763	3049	1.428	0.016	0.738	0.786
Currently using modern method	0.482	0.012	1763	3049	0.996	0.025	0.459	0.506
Currently using pill	0.058	0.006	1763	3049	1.348	0.111	0.047	0.073
Currently using IUD	0.174	0.011	1763	3049	1.430	0.062	0.154	0.197
Currently using condom	0.156	0.011	1763	3049	1.613	0.071	0.135	0.179
Currently using injectables	0.008	0.003	1763	3049	1.423	0.320	0.004	0.015
Currently using female sterilization	0.084	0.008	1763	3049	1.332	0.091	0.070	0.100
Currently using periodic abstinence	0.005	0.002	1763	3049	1.105	0.338	0.003	0.011
Currently using withdrawal	0.272	0.013	1763	3049	1.508	0.048	0.246	0.298
Obtained method from public sector source	0.536	0.021	859	1483	1.457	0.038	0.494	0.576
Want no more children	0.587	0.012	1761	3044	1.109	0.021	0.562	0.611
Want to delay birth at least 2 years	0.138	0.011	1761	3044	1.706	0.078	0.118	0.161
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.695	0.007	0.959	0.990
Child having health card, seen	0.797	0.041	139	256	1.506	0.052	0.702	0.868
Child received BCG vaccination	0.973	0.005	139	256	0.130	0.005	0.961	0.981
Child received DPT vaccination (3 doses)	0.937	0.022	139	256	1.124	0.023	0.878	0.969
Child received polio vaccination (3 doses)	0.917	0.029	139	256	1.535	0.031	0.839	0.959
Child received measles vaccination	0.904	0.037	139	256	2.271	0.041	0.800	0.957
Child fully immunized	0.846	0.041	139	256	1.820	0.048	0.746	0.912
Height-for-age (-2SD)	0.076	0.012	481	848	1.010	0.161	0.055	0.104
Weight-for-height (-2SD)	0.009	0.005	481	848	1.452	0.592	0.003	0.028
Weight-for-age (-2SD)	0.010	0.005	481	848	1.257	0.501	0.004	0.028
BMI < 18.5	0.015	0.006	484	850	1.121	0.389	0.007	0.032

Table B 13 Sampling Errors: Stata, Taylor Series Linearization, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.690	0.026	0.678	0.752
No education	0.197	0.019	1013	894	2.298	0.096	0.162	0.238
With secondary education or higher	0.248	0.018	1013	894	1.828	0.074	0.213	0.287
Currently married (in union)	0.950	0.007	1013	894	1.000	0.007	0.934	0.962
Knowing any contraceptive method	0.995	0.002	962	849	0.979	0.002	0.988	0.998
Knowing any modern contraceptive method	0.991	0.003	962	849	1.182	0.003	0.981	0.996
Ever used any contraceptive method	0.881	0.013	962	849	1.553	0.015	0.852	0.905
Currently using any contraceptive method	0.704	0.018	962	849	1.510	0.026	0.666	0.739
Currently using modern method	0.458	0.021	962	849	1.713	0.046	0.416	0.500
Currently using pill	0.041	0.007	962	849	1.201	0.172	0.029	0.057
Currently using IUD	0.183	0.015	962	849	1.479	0.083	0.154	0.215
Currently using condom	0.130	0.013	962	849	1.484	0.102	0.105	0.158
Currently using injectables	0.005	0.002	962	849	0.614	0.361	0.002	0.010
Currently using female sterilization	0.100	0.010	962	849	0.970	0.095	0.082	0.121
Currently using periodic abstinence	0.006	0.003	962	849	1.682	0.556	0.002	0.017
Currently using withdrawal	0.241	0.016	962	849	1.343	0.066	0.210	0.274
Obtained method from public sector source	0.719	0.024	441	392	1.284	0.034	0.668	0.765
Want no more children	0.573	0.016	962	849	0.980	0.028	0.541	0.604
Want to delay birth at least 2 years	0.121	0.011	962	849	1.121	0.092	0.101	0.146
Mothers recieved medical care at delivery	0.941	0.009	497	441	0.790	0.010	0.918	0.957
Child having health card, seen	0.626	0.048	108	95	1.036	0.076	0.526	0.716
Child received BCG vaccination	0.961	0.020	108	95	1.086	0.020	0.896	0.986
Child received DPT vaccination (3 doses)	0.881	0.028	108	95	0.819	0.032	0.812	0.928
Child received polio vaccination (3 doses)	0.877	0.029	108	95	0.837	0.033	0.806	0.925
Child received measles vaccination	0.939	0.022	108	95	0.901	0.023	0.876	0.971
Child fully immunized	0.818	0.034	108	95	0.839	0.042	0.739	0.877
Height-for-age (-2SD)	0.076	0.015	382	339	1.234	0.198	0.051	0.113
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.259	0.329	0.015	0.057
BMI < 18.5	0.013	0.006	357	316	1.036	0.466	0.005	0.033

Table B 14 Sampling Errors: Stata, Taylor Series Linearization, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.719	0.021	0.696	0.757
No education	0.072	0.009	1460	1631	1.772	0.125	0.056	0.092
With secondary education or higher	0.360	0.019	1460	1631	2.250	0.052	0.324	0.399
Currently married (in union)	0.945	0.008	1460	1631	1.659	0.008	0.928	0.959
Knowing any contraceptive method	1.000	0.000	1386	1542	0.571	0.000	0.997	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.612	0.001	0.995	0.999
Ever used any contraceptive method	0.942	0.006	1386	1542	0.811	0.006	0.929	0.952
Currently using any contraceptive method	0.755	0.012	1386	1542	1.032	0.016	0.731	0.778
Currently using modern method	0.488	0.018	1386	1542	1.788	0.037	0.453	0.524
Currently using pill	0.049	0.006	1386	1542	1.113	0.125	0.038	0.063
Currently using IUD	0.184	0.010	1386	1542	0.983	0.056	0.164	0.206
Currently using condom	0.178	0.014	1386	1542	1.968	0.081	0.151	0.209
Currently using injectables	0.009	0.003	1386	1542	1.243	0.313	0.005	0.017
Currently using female sterilization	0.064	0.007	1386	1542	1.169	0.111	0.051	0.080
Currently using periodic abstinence	0.009	0.003	1386	1542	1.706	0.370	0.004	0.019
Currently using withdrawal	0.258	0.016	1386	1542	1.806	0.061	0.227	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.603	0.040	0.548	0.643
Want no more children	0.616	0.016	1385	1540	1.503	0.026	0.584	0.648
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.111	0.068	0.130	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.234	0.005	0.971	0.993
Child having health card, seen	0.709	0.050	142	149	1.713	0.071	0.600	0.799
Child received BCG vaccination	0.964	0.015	142	149	0.920	0.016	0.918	0.985
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.739	0.018	0.898	0.968
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.426	0.013	0.914	0.965
Child received measles vaccination	0.949	0.015	142	149	0.680	0.016	0.907	0.972
Child fully immunized	0.900	0.023	142	149	0.794	0.025	0.845	0.937
Height-for-age (-2SD)	0.045	0.010	472	533	1.153	0.223	0.029	0.070
Weight-for-height (-2SD)	0.005	0.003	472	533	0.982	0.631	0.001	0.017
Weight-for-age (-2SD)	0.021	0.008	472	533	1.654	0.395	0.009	0.046
BMI < 18.5	0.019	0.007	470	529	1.090	0.343	0.010	0.038

Table B 15 Sampling Errors: Stata, Taylor Series Linearization, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.024	868	477	1.966	0.043	0.505	0.601
No education	0.156	0.023	868	477	3.482	0.148	0.115	0.208
With secondary education or higher	0.305	0.023	868	477	2.140	0.075	0.261	0.353
Currently married (in union)	0.954	0.007	868	477	1.086	0.008	0.936	0.967
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.680	0.002	0.985	1.000
Ever used any contraceptive method	0.928	0.009	827	455	1.111	0.010	0.906	0.945
Currently using any contraceptive method	0.756	0.016	827	455	1.160	0.021	0.722	0.787
Currently using modern method	0.414	0.026	827	455	2.289	0.063	0.363	0.467
Currently using pill	0.052	0.008	827	455	1.179	0.161	0.037	0.072
Currently using IUD	0.098	0.014	827	455	1.774	0.140	0.074	0.130
Currently using condom	0.120	0.013	827	455	1.409	0.112	0.096	0.150
Currently using injectables	0.009	0.004	827	455	1.374	0.418	0.004	0.022
Currently using female sterilization	0.129	0.014	827	455	1.471	0.110	0.103	0.161
Currently using periodic abstinence	0.004	0.002	827	455	0.695	0.450	0.002	0.010
Currently using withdrawal	0.336	0.024	827	455	2.082	0.071	0.289	0.385
Obtained method from public sector source	0.600	0.031	361	191	1.374	0.051	0.537	0.660
Want no more children	0.568	0.022	827	455	1.588	0.038	0.524	0.612
Want to delay birth at least 2 years	0.124	0.013	827	455	1.206	0.102	0.101	0.152
Mothers recieved medical care at delivery	0.960	0.009	352	197	0.800	0.010	0.936	0.975
Child having health card, seen	0.746	0.062	68	43	1.491	0.083	0.602	0.851
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.053	68	43	1.952	0.060	0.728	0.953
Child received polio vaccination (3 doses)	0.858	0.048	68	43	1.388	0.056	0.731	0.930
Child received measles vaccination	0.978	0.021	68	43	1.540	0.022	0.858	0.997
Child fully immunized	0.836	0.049	68	43	1.295	0.059	0.711	0.913
Height-for-age (-2SD)	0.070	0.023	224	124	1.796	0.332	0.035	0.135
Weight-for-height (-2SD)	0.015	0.010	224	124	1.327	0.628	0.004	0.054
Weight-for-age (-2SD)	0.028	0.013	224	124	1.295	0.455	0.011	0.069
BMI < 18.5	0.030	0.013	251	142	1.395	0.418	0.013	0.069

Table B 16 Sampling Errors: Stata, Taylor Series Linearization, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.013	2188	1151	1.525	0.020	0.608	0.659
No education	0.524	0.021	2188	1151	3.956	0.041	0.481	0.566
With secondary education or higher	0.133	0.013	2188	1151	3.158	0.097	0.109	0.161
Currently married (in union)	0.960	0.005	2188	1151	1.430	0.005	0.949	0.969
Knowing any contraceptive method	0.993	0.002	2104	1105	0.900	0.002	0.989	0.996
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.802	0.002	0.985	0.993
Ever used any contraceptive method	0.818	0.013	2104	1105	2.365	0.016	0.790	0.842
Currently using any contraceptive method	0.614	0.015	2104	1105	2.068	0.025	0.583	0.644
Currently using modern method	0.378	0.013	2104	1105	1.621	0.036	0.352	0.406
Currently using pill	0.056	0.006	2104	1105	1.214	0.099	0.046	0.068
Currently using IUD	0.151	0.008	2104	1105	1.175	0.056	0.135	0.169
Currently using condom	0.081	0.007	2104	1105	1.418	0.088	0.068	0.096
Currently using injectables	0.013	0.002	2104	1105	0.861	0.180	0.009	0.018
Currently using female sterilization	0.077	0.006	2104	1105	1.022	0.076	0.066	0.089
Currently using periodic abstinence	0.003	0.001	2104	1105	1.145	0.452	0.001	0.007
Currently using withdrawal	0.229	0.013	2104	1105	1.974	0.056	0.204	0.256
Obtained method from public sector source	0.722	0.020	823	420	1.578	0.028	0.680	0.759
Want no more children	0.571	0.015	2104	1105	1.833	0.026	0.542	0.600
Want to delay birth at least 2 years	0.174	0.011	2104	1105	1.927	0.066	0.152	0.198
Mothers recieved medical care at delivery	0.744	0.022	1691	911	4.423	0.030	0.697	0.786
Child having health card, seen	0.685	0.029	317	167	1.232	0.043	0.624	0.740
Child received BCG vaccination	0.922	0.015	317	167	0.958	0.016	0.887	0.947
Child received DPT vaccination (3 doses)	0.792	0.025	317	167	1.223	0.032	0.737	0.838
Child received polio vaccination (3 doses)	0.808	0.023	317	167	1.030	0.028	0.759	0.850
Child received measles vaccination	0.777	0.024	317	167	0.992	0.030	0.726	0.820
Child fully immunized	0.643	0.027	317	167	1.012	0.042	0.587	0.696
Height-for-age (-2SD)	0.211	0.018	1174	631	2.320	0.086	0.177	0.249
Weight-for-height (-2SD)	0.015	0.004	1174	631	1.044	0.240	0.009	0.024
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.272	0.133	0.044	0.075
BMI < 18.5	0.014	0.003	903	478	0.816	0.255	0.008	0.022

Table B 17 Sampling Errors: Stata, Balanced Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.966	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.073	0.043	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.558	0.038	0.276	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.094	0.004	0.937	0.952
Knowing any contraceptive method	0.998	0.000	7042	6999	0.774	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.044	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.316	0.004	0.905	0.920
Currently using any contraceptive method	0.730	0.007	7042	6999	1.729	0.010	0.716	0.744
Currently using modern method	0.460	0.007	7042	6999	1.523	0.016	0.445	0.474
Currently using pill	0.053	0.003	7042	6999	1.621	0.064	0.047	0.061
Currently using IUD	0.169	0.006	7042	6999	1.613	0.034	0.158	0.180
Currently using condom	0.143	0.006	7042	6999	1.974	0.041	0.132	0.155
Currently using injectables	0.009	0.001	7042	6999	1.488	0.156	0.006	0.012
Currently using female sterilization	0.083	0.004	7042	6999	1.785	0.053	0.075	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.682	0.204	0.004	0.009
Currently using withdrawal	0.262	0.007	7042	6999	1.982	0.028	0.248	0.277
Obtained method from public sector source	0.600	0.011	3162	3243	1.756	0.019	0.577	0.622
Want no more children	0.588	0.007	7038	6993	1.496	0.012	0.574	0.602
Want to delay birth at least 2 years	0.143	0.006	7038	6993	1.742	0.039	0.133	0.155
Mothers recieved medical care at delivery	0.913	0.008	3857	3463	3.375	0.009	0.895	0.928
Child having health card, seen	0.726	0.021	774	711	1.742	0.029	0.683	0.765
Child received BCG vaccination	0.959	0.009	774	711	1.698	0.010	0.937	0.974
Child received DPT vaccination (3 doses)	0.893	0.011	774	711	1.018	0.012	0.870	0.913
Child received polio vaccination (3 doses)	0.888	0.012	774	711	1.186	0.014	0.862	0.910
Child received measles vaccination	0.893	0.014	774	711	1.565	0.015	0.862	0.917
Child fully immunized	0.805	0.018	774	711	1.669	0.023	0.767	0.839
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.484	0.069	0.090	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.447	0.249	0.005	0.014
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.245	0.126	0.022	0.036
BMI < 18.5	0.016	0.003	2465	2315	1.304	0.185	0.011	0.023

Table B 18 Sampling Errors: Stata, Balanced Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	3.795	0.062	0.135	0.172
With secondary education or higher	0.348	0.015	5429	5615	5.490	0.044	0.319	0.378
Currently married (in union)	0.941	0.005	5429	5615	2.271	0.005	0.931	0.950
Knowing any contraceptive method	0.999	0.000	5141	5284	0.865	0.000	0.997	0.999
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.270	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.348	0.005	0.917	0.934
Currently using any contraceptive method	0.743	0.008	5141	5284	1.860	0.011	0.727	0.759
Currently using modern method	0.478	0.008	5141	5284	1.416	0.017	0.462	0.494
Currently using pill	0.056	0.004	5141	5284	1.716	0.075	0.048	0.065
Currently using IUD	0.175	0.007	5141	5284	1.530	0.038	0.163	0.188
Currently using condom	0.154	0.007	5141	5284	1.968	0.046	0.141	0.169
Currently using injectables	0.008	0.002	5141	5284	1.610	0.200	0.005	0.012
Currently using female sterilization	0.083	0.005	5141	5284	1.902	0.064	0.073	0.094
Currently using periodic abstinence	0.007	0.001	5141	5284	1.641	0.215	0.005	0.011
Currently using withdrawal	0.256	0.008	5141	5284	1.915	0.033	0.240	0.273
Obtained method from public sector source	0.580	0.013	2445	2550	1.615	0.022	0.555	0.604
Want no more children	0.583	0.008	5137	5277	1.428	0.014	0.567	0.599
Want to delay birth at least 2 years	0.146	0.007	5137	5277	1.921	0.047	0.133	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.199	0.006	0.944	0.967
Child having health card, seen	0.758	0.026	524	515	1.980	0.034	0.703	0.805
Child received BCG vaccination	0.966	0.012	524	515	2.211	0.012	0.934	0.982
Child received DPT vaccination (3 doses)	0.921	0.012	524	515	1.038	0.013	0.894	0.941
Child received polio vaccination (3 doses)	0.917	0.014	524	515	1.464	0.016	0.884	0.941
Child received measles vaccination	0.903	0.018	524	515	2.008	0.020	0.861	0.933
Child fully immunized	0.842	0.024	524	515	2.280	0.028	0.789	0.883
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.397	0.096	0.063	0.092
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.766	0.339	0.004	0.016
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.381	0.189	0.014	0.030
BMI < 18.5	0.013	0.003	1742	1713	1.367	0.250	0.008	0.021

Table B 19 Sampling Errors: Stata, Balanced Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	0.000	0.000	0.000
No education	0.281	0.014	1976	1790	1.938	0.050	0.254	0.309
With secondary education or higher	0.142	0.013	1976	1790	2.699	0.091	0.119	0.169
Currently married (in union)	0.959	0.005	1976	1790	1.156	0.005	0.948	0.967
Knowing any contraceptive method	0.995	0.001	1901	1716	0.727	0.001	0.992	0.997
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.943	0.002	0.984	0.993
Ever used any contraceptive method	0.872	0.009	1901	1716	1.275	0.010	0.854	0.888
Currently using any contraceptive method	0.689	0.012	1901	1716	1.286	0.017	0.665	0.713
Currently using modern method	0.404	0.015	1901	1716	1.852	0.038	0.374	0.434
Currently using pill	0.046	0.005	1901	1716	1.214	0.116	0.036	0.057
Currently using IUD	0.150	0.011	1901	1716	1.966	0.077	0.128	0.174
Currently using condom	0.110	0.010	1901	1716	1.991	0.092	0.091	0.131
Currently using injectables	0.011	0.003	1901	1716	1.250	0.243	0.007	0.018
Currently using female sterilization	0.085	0.007	1901	1716	1.336	0.087	0.071	0.100
Currently using periodic abstinence	0.002	0.001	1901	1716	1.664	0.641	0.001	0.007
Currently using withdrawal	0.281	0.016	1901	1716	2.259	0.055	0.251	0.312
Obtained method from public sector source	0.675	0.027	717	692	2.474	0.040	0.621	0.725
Want no more children	0.603	0.015	1901	1716	1.664	0.024	0.574	0.631
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.964	0.057	0.120	0.150
Mothers recieved medical care at delivery	0.802	0.023	250	196	4.028	0.029	0.752	0.843
Child having health card, seen	0.644	0.030	250	196	1.000	0.047	0.582	0.701
Child received BCG vaccination	0.943	0.014	250	196	0.887	0.015	0.909	0.965
Child received DPT vaccination (3 doses)	0.822	0.026	250	196	1.173	0.032	0.764	0.868
Child received polio vaccination (3 doses)	0.814	0.025	250	196	1.026	0.031	0.760	0.858
Child received measles vaccination	0.866	0.018	250	196	0.687	0.021	0.826	0.897
Child fully immunized	0.710	0.027	250	196	0.890	0.038	0.654	0.760
Height-for-age (-2SD)	0.174	0.017	887	692	1.628	0.095	0.144	0.209
Weight-for-height (-2SD)	0.009	0.002	887	692	0.547	0.259	0.006	0.016
Weight-for-age (-2SD)	0.048	0.007	887	692	1.032	0.156	0.035	0.065
BMI < 18.5	0.026	0.007	723	601	1.219	0.265	0.015	0.043

Table B 20 Sampling Errors: Stata, Balanced Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.009	1876	3252	1.208	0.010	0.841	0.876
No education	0.119	0.014	1876	3252	3.512	0.118	0.094	0.150
With secondary education or higher	0.338	0.024	1876	3252	4.722	0.070	0.293	0.386
Currently married (in union)	0.938	0.007	1876	3252	1.716	0.008	0.922	0.950
Knowing any contraceptive method	0.999	0.001	1763	3049	0.805	0.001	0.996	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.210	0.001	0.993	0.999
Ever used any contraceptive method	0.940	0.006	1763	3049	1.105	0.006	0.927	0.950
Currently using any contraceptive method	0.763	0.013	1763	3049	1.548	0.017	0.737	0.787
Currently using modern method	0.482	0.012	1763	3049	0.938	0.024	0.460	0.505
Currently using pill	0.058	0.007	1763	3049	1.364	0.112	0.047	0.073
Currently using IUD	0.174	0.011	1763	3049	1.399	0.061	0.154	0.196
Currently using condom	0.156	0.010	1763	3049	1.438	0.067	0.136	0.177
Currently using injectables	0.008	0.002	1763	3049	1.378	0.315	0.004	0.015
Currently using female sterilization	0.084	0.009	1763	3049	1.700	0.103	0.068	0.102
Currently using periodic abstinence	0.005	0.002	1763	3049	1.111	0.339	0.003	0.011
Currently using withdrawal	0.272	0.013	1763	3049	1.555	0.049	0.246	0.298
Obtained method from public sector source	0.536	0.020	859	1483	1.430	0.038	0.495	0.575
Want no more children	0.587	0.013	1761	3044	1.145	0.021	0.562	0.611
Want to delay birth at least 2 years	0.138	0.010	1761	3044	1.595	0.075	0.119	0.160
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.664	0.007	0.960	0.990
Child having health card, seen	0.797	0.041	139	256	1.430	0.051	0.706	0.866
Child received BCG vaccination	0.973	0.022	139	256	2.500	0.022	0.878	0.995
Child received DPT vaccination (3 doses)	0.937	0.019	139	256	0.897	0.021	0.887	0.966
Child received polio vaccination (3 doses)	0.917	0.026	139	256	1.288	0.029	0.848	0.956
Child received measles vaccination	0.904	0.032	139	256	1.654	0.035	0.821	0.951
Child fully immunized	0.846	0.043	139	256	2.042	0.051	0.741	0.914
Height-for-age (-2SD)	0.076	0.012	481	848	0.985	0.159	0.055	0.103
Weight-for-height (-2SD)	0.009	0.005	481	848	1.535	0.609	0.003	0.028
Weight-for-age (-2SD)	0.010	0.005	481	848	1.257	0.501	0.004	0.028
BMI < 18.5	0.015	0.006	484	850	1.234	0.408	0.007	0.033

Table B 21 Sampling Errors: Stata, Balanced Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.019	1013	894	1.711	0.026	0.678	0.751
No education	0.197	0.019	1013	894	2.274	0.096	0.163	0.237
With secondary education or higher	0.248	0.018	1013	894	1.801	0.073	0.214	0.286
Currently married (in union)	0.950	0.007	1013	894	1.004	0.007	0.934	0.962
Knowing any contraceptive method	0.995	0.002	962	849	1.000	0.002	0.988	0.998
Knowing any modern contraceptive method	0.991	0.003	962	849	1.192	0.003	0.981	0.995
Ever used any contraceptive method	0.881	0.013	962	849	1.553	0.015	0.853	0.904
Currently using any contraceptive method	0.704	0.018	962	849	1.510	0.026	0.667	0.738
Currently using modern method	0.458	0.021	962	849	1.732	0.046	0.416	0.499
Currently using pill	0.041	0.007	962	849	1.212	0.173	0.029	0.057
Currently using IUD	0.183	0.015	962	849	1.491	0.083	0.155	0.214
Currently using condom	0.130	0.013	962	849	1.493	0.102	0.106	0.158
Currently using injectables	0.005	0.002	962	849	0.618	0.362	0.002	0.010
Currently using female sterilization	0.100	0.010	962	849	0.977	0.096	0.083	0.120
Currently using periodic abstinence	0.006	0.003	962	849	1.690	0.558	0.002	0.017
Currently using withdrawal	0.241	0.016	962	849	1.343	0.066	0.211	0.274
Obtained method from public sector source	0.719	0.024	441	392	1.295	0.034	0.669	0.764
Want no more children	0.573	0.016	962	849	0.983	0.028	0.541	0.603
Want to delay birth at least 2 years	0.121	0.011	962	849	1.130	0.092	0.101	0.145
Mothers recieved medical care at delivery	0.941	0.010	108	95	0.802	0.010	0.919	0.957
Child having health card, seen	0.626	0.048	108	95	1.067	0.077	0.527	0.715
Child received BCG vaccination	0.961	0.020	108	95	1.117	0.021	0.897	0.986
Child received DPT vaccination (3 doses)	0.881	0.029	108	95	0.849	0.033	0.812	0.927
Child received polio vaccination (3 doses)	0.877	0.030	108	95	0.873	0.034	0.806	0.925
Child received measles vaccination	0.939	0.022	108	95	0.928	0.024	0.877	0.970
Child fully immunized	0.818	0.035	108	95	0.864	0.042	0.740	0.876
Height-for-age (-2SD)	0.076	0.015	382	339	1.257	0.200	0.051	0.112
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.257	0.329	0.015	0.056
BMI < 18.5	0.013	0.006	357	316	1.057	0.470	0.005	0.033

Table B 22 Sampling Errors: Stata, Balanced Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.716	0.021	0.697	0.757
No education	0.072	0.009	1460	1631	1.756	0.125	0.056	0.091
With secondary education or higher	0.360	0.019	1460	1631	2.265	0.052	0.324	0.398
Currently married (in union)	0.945	0.008	1460	1631	1.659	0.008	0.928	0.959
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.997	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.616	0.001	0.995	0.999
Ever used any contraceptive method	0.942	0.006	1386	1542	0.813	0.006	0.929	0.952
Currently using any contraceptive method	0.755	0.012	1386	1542	1.034	0.016	0.732	0.778
Currently using modern method	0.488	0.018	1386	1542	1.790	0.037	0.453	0.524
Currently using pill	0.049	0.006	1386	1542	1.115	0.125	0.038	0.063
Currently using IUD	0.184	0.010	1386	1542	0.986	0.056	0.165	0.205
Currently using condom	0.178	0.014	1386	1542	1.963	0.081	0.151	0.208
Currently using injectables	0.009	0.003	1386	1542	1.248	0.313	0.005	0.017
Currently using female sterilization	0.064	0.007	1386	1542	1.177	0.112	0.051	0.079
Currently using periodic abstinence	0.009	0.003	1386	1542	1.711	0.371	0.004	0.018
Currently using withdrawal	0.258	0.016	1386	1542	1.817	0.062	0.228	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.608	0.040	0.549	0.642
Want no more children	0.616	0.016	1385	1540	1.506	0.026	0.584	0.647
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.105	0.068	0.130	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.254	0.005	0.971	0.993
Child having health card, seen	0.709	0.051	142	149	1.769	0.072	0.601	0.799
Child received BCG vaccination	0.964	0.015	142	149	0.950	0.016	0.919	0.985
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.766	0.018	0.898	0.968
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.438	0.013	0.914	0.965
Child received measles vaccination	0.949	0.016	142	149	0.704	0.016	0.908	0.972
Child fully immunized	0.900	0.023	142	149	0.818	0.025	0.846	0.937
Height-for-age (-2SD)	0.045	0.010	472	533	1.164	0.224	0.029	0.070
Weight-for-height (-2SD)	0.005	0.003	472	533	0.995	0.636	0.001	0.017
Weight-for-age (-2SD)	0.021	0.008	472	533	1.662	0.397	0.010	0.045
BMI < 18.5	0.019	0.007	470	529	1.111	0.346	0.010	0.038

Table B 23 Sampling Errors: Stata, Balanced Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.023	868	477	1.915	0.042	0.507	0.599
No education	0.156	0.024	868	477	3.748	0.153	0.114	0.208
With secondary education or higher	0.305	0.021	868	477	1.804	0.069	0.265	0.348
Currently married (in union)	0.954	0.007	868	477	1.002	0.007	0.937	0.966
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.711	0.002	0.985	1.000
Ever used any contraceptive method	0.928	0.008	827	455	0.850	0.009	0.910	0.943
Currently using any contraceptive method	0.756	0.019	827	455	1.603	0.025	0.717	0.791
Currently using modern method	0.414	0.025	827	455	2.190	0.061	0.366	0.465
Currently using pill	0.052	0.009	827	455	1.225	0.165	0.037	0.071
Currently using IUD	0.098	0.014	827	455	1.820	0.142	0.074	0.129
Currently using condom	0.120	0.013	827	455	1.353	0.109	0.097	0.149
Currently using injectables	0.009	0.004	827	455	1.381	0.420	0.004	0.021
Currently using female sterilization	0.129	0.012	827	455	1.080	0.094	0.107	0.155
Currently using periodic abstinence	0.004	0.002	827	455	0.695	0.451	0.002	0.010
Currently using withdrawal	0.336	0.023	827	455	1.988	0.069	0.292	0.382
Obtained method from public sector source	0.600	0.026	361	191	0.949	0.043	0.549	0.649
Want no more children	0.568	0.020	827	455	1.385	0.036	0.528	0.608
Want to delay birth at least 2 years	0.124	0.011	827	455	0.970	0.091	0.104	0.148
Mothers recieved medical care at delivery	0.960	0.010	352	197	0.802	0.010	0.936	0.975
Child having health card, seen	0.746	0.059	68	43	1.381	0.080	0.614	0.844
Child received BCG vaccination	1.000	0.000	68	43	0.000	na	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.059	68	43	2.506	0.067	0.709	0.957
Child received polio vaccination (3 doses)	0.858	0.057	68	43	1.949	0.066	0.708	0.937
Child received measles vaccination	0.978	0.022	68	43	1.724	0.023	0.853	0.997
Child fully immunized	0.836	0.042	68	43	0.966	0.051	0.736	0.903
Height-for-age (-2SD)	0.070	0.024	224	124	1.839	0.336	0.036	0.133
Weight-for-height (-2SD)	0.015	0.010	224	124	1.327	0.628	0.004	0.052
Weight-for-age (-2SD)	0.028	0.013	224	124	1.279	0.453	0.011	0.067
BMI < 18.5	0.030	0.013	251	142	1.445	0.425	0.013	0.069

Table B 24 Sampling Errors: Stata, Balanced Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.013	2188	1151	1.593	0.021	0.608	0.659
No education	0.524	0.022	2188	1151	4.149	0.042	0.481	0.566
With secondary education or higher	0.133	0.013	2188	1151	3.190	0.098	0.109	0.160
Currently married (in union)	0.960	0.005	2188	1151	1.588	0.006	0.948	0.969
Knowing any contraceptive method	0.993	0.002	2104	1105	0.899	0.002	0.989	0.996
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.800	0.002	0.985	0.993
Ever used any contraceptive method	0.818	0.012	2104	1105	2.132	0.015	0.792	0.841
Currently using any contraceptive method	0.614	0.014	2104	1105	1.836	0.023	0.585	0.642
Currently using modern method	0.378	0.013	2104	1105	1.513	0.034	0.353	0.404
Currently using pill	0.056	0.006	2104	1105	1.206	0.098	0.046	0.068
Currently using IUD	0.151	0.008	2104	1105	1.151	0.056	0.135	0.168
Currently using condom	0.081	0.007	2104	1105	1.392	0.087	0.068	0.096
Currently using injectables	0.013	0.002	2104	1105	1.018	0.195	0.009	0.018
Currently using female sterilization	0.077	0.006	2104	1105	0.949	0.074	0.066	0.089
Currently using periodic abstinence	0.003	0.001	2104	1105	1.145	0.452	0.001	0.006
Currently using withdrawal	0.229	0.013	2104	1105	1.915	0.055	0.205	0.255
Obtained method from public sector source	0.723	0.020	822	420	1.568	0.027	0.682	0.760
Want no more children	0.572	0.015	2103	1105	1.809	0.025	0.543	0.600
Want to delay birth at least 2 years	0.174	0.011	2103	1105	1.913	0.066	0.153	0.198
Mothers recieved medical care at delivery	0.744	0.024	317	167	5.341	0.033	0.693	0.789
Child having health card, seen	0.685	0.029	317	167	1.188	0.042	0.626	0.738
Child received BCG vaccination	0.922	0.015	317	167	0.976	0.016	0.887	0.947
Child received DPT vaccination (3 doses)	0.792	0.026	317	167	1.320	0.033	0.736	0.839
Child received polio vaccination (3 doses)	0.808	0.024	317	167	1.173	0.030	0.757	0.852
Child received measles vaccination	0.777	0.025	317	167	1.088	0.032	0.725	0.821
Child fully immunized	0.643	0.029	317	167	1.126	0.045	0.585	0.698
Height-for-age (-2SD)	0.211	0.017	1174	631	2.053	0.081	0.179	0.246
Weight-for-height (-2SD)	0.015	0.004	1174	631	0.985	0.233	0.010	0.024
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.217	0.130	0.045	0.075
BMI < 18.5	0.014	0.003	903	478	0.831	0.258	0.008	0.022

Table B 25 Sampling Errors: Stata,Jackknife 2 Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.960	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.049	0.043	0.169	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.541	0.038	0.276	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.062	0.004	0.937	0.952
Knowing any contraceptive method	0.998	0.000	7042	6999	0.767	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.036	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.325	0.004	0.905	0.920
Currently using any contraceptive method	0.730	0.007	7042	6999	1.756	0.010	0.716	0.744
Currently using modern method	0.460	0.007	7042	6999	1.525	0.016	0.445	0.474
Currently using pill	0.053	0.003	7042	6999	1.610	0.064	0.047	0.061
Currently using IUD	0.169	0.006	7042	6999	1.623	0.034	0.158	0.180
Currently using condom	0.143	0.006	7042	6999	1.968	0.041	0.132	0.155
Currently using injectables	0.009	0.001	7042	6999	1.469	0.155	0.006	0.012
Currently using female sterilization	0.083	0.004	7042	6999	1.774	0.053	0.075	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.685	0.205	0.004	0.009
Currently using withdrawal	0.262	0.007	7042	6999	1.985	0.028	0.248	0.277
Obtained method from public sector source	0.600	0.012	3162	3243	1.785	0.019	0.577	0.622
Want no more children	0.588	0.007	7038	6993	1.510	0.012	0.574	0.602
Want to delay birth at least 2 years	0.143	0.006	7038	6993	1.748	0.039	0.133	0.155
Mothers recieved medical care at delivery	0.913	0.008	3857	3463	3.356	0.009	0.895	0.928
Child having health card, seen	0.726	0.021	774	711	1.742	0.029	0.683	0.765
Child received BCG vaccination	0.959	0.009	774	711	1.737	0.010	0.937	0.974
Child received DPT vaccination (3 doses)	0.893	0.011	774	711	1.026	0.012	0.869	0.913
Child received polio vaccination (3 doses)	0.888	0.012	774	711	1.208	0.014	0.862	0.910
Child received measles vaccination	0.893	0.014	774	711	1.578	0.016	0.862	0.917
Child fully immunized	0.805	0.018	774	711	1.700	0.023	0.767	0.839
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.457	0.069	0.090	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.409	0.245	0.005	0.014
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.228	0.125	0.022	0.036
BMI < 18.5	0.016	0.003	2465	2315	1.286	0.183	0.011	0.023

Table B 26 Sampling Errors: Stata, Jackknife 2 Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.009	5429	5615	3.779	0.062	0.135	0.172
With secondary education or higher	0.348	0.015	5429	5615	5.462	0.043	0.319	0.378
Currently married (in union)	0.941	0.005	5429	5615	2.226	0.005	0.931	0.950
Knowing any contraceptive method	0.999	0.005	5141	5284	0.859	0.005	0.997	0.999
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.250	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.355	0.005	0.917	0.934
Currently using any contraceptive method	0.743	0.008	5141	5284	1.888	0.011	0.726	0.759
Currently using modern method	0.478	0.008	5141	5284	1.435	0.018	0.462	0.495
Currently using pill	0.056	0.004	5141	5284	1.698	0.075	0.048	0.065
Currently using IUD	0.175	0.007	5141	5284	1.548	0.038	0.163	0.189
Currently using condom	0.154	0.007	5141	5284	1.957	0.046	0.141	0.169
Currently using injectables	0.008	0.002	5141	5284	1.593	0.199	0.005	0.012
Currently using female sterilization	0.083	0.005	5141	5284	1.902	0.064	0.073	0.094
Currently using periodic abstinence	0.007	0.001	5141	5284	1.649	0.216	0.005	0.011
Currently using withdrawal	0.256	0.008	5141	5284	1.904	0.033	0.240	0.273
Obtained method from public sector source	0.580	0.013	2445	2550	1.621	0.022	0.555	0.604
Want no more children	0.583	0.008	5137	5277	1.469	0.014	0.566	0.599
Want to delay birth at least 2 years	0.146	0.007	5137	5277	1.949	0.047	0.133	0.161
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.173	0.006	0.944	0.967
Child having health card, seen	0.758	0.026	524	515	1.985	0.034	0.703	0.805
Child received BCG vaccination	0.966	0.012	524	515	2.310	0.012	0.933	0.983
Child received DPT vaccination (3 doses)	0.921	0.012	524	515	1.057	0.013	0.894	0.941
Child received polio vaccination (3 doses)	0.917	0.015	524	515	1.501	0.016	0.883	0.941
Child received measles vaccination	0.903	0.018	524	515	2.048	0.020	0.861	0.933
Child fully immunized	0.842	0.024	524	515	2.344	0.029	0.789	0.883
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.371	0.096	0.063	0.092
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.724	0.335	0.004	0.016
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.364	0.187	0.014	0.030
BMI < 18.5	0.013	0.003	1742	1713	1.353	0.249	0.008	0.021

Table B 27 Sampling Errors: Stata, Jackknife 2 Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.896	0.050	0.254	0.309
With secondary education or higher	0.142	0.013	1976	1790	2.611	0.089	0.119	0.169
Currently married (in union)	0.959	0.005	1976	1790	1.147	0.005	0.948	0.967
Knowing any contraceptive method	0.995	0.001	1901	1716	0.720	0.001	0.992	0.997
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.926	0.002	0.984	0.993
Ever used any contraceptive method	0.872	0.009	1901	1716	1.259	0.010	0.854	0.888
Currently using any contraceptive method	0.689	0.012	1901	1716	1.268	0.017	0.666	0.713
Currently using modern method	0.404	0.015	1901	1716	1.812	0.038	0.374	0.434
Currently using pill	0.046	0.005	1901	1716	1.177	0.114	0.036	0.057
Currently using IUD	0.150	0.011	1901	1716	1.935	0.076	0.129	0.173
Currently using condom	0.110	0.010	1901	1716	1.980	0.092	0.091	0.131
Currently using injectables	0.011	0.003	1901	1716	1.228	0.241	0.007	0.018
Currently using female sterilization	0.085	0.007	1901	1716	1.323	0.087	0.071	0.100
Currently using periodic abstinence	0.002	0.001	1901	1716	1.605	0.630	0.001	0.007
Currently using withdrawal	0.281	0.016	1901	1716	2.268	0.055	0.251	0.312
Obtained method from public sector source	0.675	0.026	717	692	2.421	0.039	0.621	0.725
Want no more children	0.603	0.014	1901	1716	1.613	0.024	0.575	0.631
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.921	0.056	0.120	0.149
Mothers recieved medical care at delivery	0.802	0.023	1268	988	4.004	0.029	0.752	0.843
Child having health card, seen	0.644	0.031	250	196	1.012	0.047	0.582	0.701
Child received BCG vaccination	0.943	0.014	250	196	0.870	0.015	0.909	0.965
Child received DPT vaccination (3 doses)	0.822	0.026	250	196	1.149	0.032	0.765	0.867
Child received polio vaccination (3 doses)	0.814	0.025	250	196	1.010	0.031	0.760	0.858
Child received measles vaccination	0.866	0.018	250	196	0.677	0.021	0.827	0.897
Child fully immunized	0.710	0.027	250	196	0.889	0.038	0.654	0.760
Height-for-age (-2SD)	0.174	0.016	887	692	1.605	0.095	0.144	0.208
Weight-for-height (-2SD)	0.009	0.002	887	692	0.538	0.257	0.006	0.016
Weight-for-age (-2SD)	0.048	0.007	887	692	1.016	0.154	0.035	0.064
BMI < 18.5	0.026	0.007	723	601	1.188	0.261	0.015	0.043

Table B 28 Sampling Errors: Stata, Jackknife 2 Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.009	1876	3252	1.179	0.010	0.841	0.876
No education	0.119	0.014	1876	3252	3.489	0.117	0.094	0.150
With secondary education or higher	0.338	0.024	1876	3252	4.726	0.070	0.293	0.386
Currently married (in union)	0.938	0.007	1876	3252	1.605	0.008	0.922	0.950
Knowing any contraceptive method	0.999	0.001	1763	3049	0.782	0.001	0.997	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.192	0.001	0.993	0.999
Ever used any contraceptive method	0.940	0.006	1763	3049	1.026	0.006	0.927	0.950
Currently using any contraceptive method	0.763	0.013	1763	3049	1.518	0.016	0.737	0.787
Currently using modern method	0.482	0.011	1763	3049	0.928	0.024	0.460	0.505
Currently using pill	0.058	0.006	1763	3049	1.350	0.111	0.047	0.072
Currently using IUD	0.174	0.011	1763	3049	1.397	0.061	0.154	0.196
Currently using condom	0.156	0.010	1763	3049	1.421	0.066	0.136	0.177
Currently using injectables	0.008	0.002	1763	3049	1.334	0.309	0.004	0.014
Currently using female sterilization	0.084	0.009	1763	3049	1.708	0.103	0.068	0.102
Currently using periodic abstinence	0.005	0.002	1763	3049	1.100	0.337	0.003	0.011
Currently using withdrawal	0.272	0.013	1763	3049	1.530	0.048	0.247	0.298
Obtained method from public sector source	0.536	0.020	859	1483	1.416	0.038	0.496	0.575
Want no more children	0.587	0.012	1761	3044	1.111	0.021	0.562	0.611
Want to delay birth at least 2 years	0.138	0.010	1761	3044	1.565	0.075	0.119	0.160
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.626	0.007	0.960	0.990
Child having health card, seen	0.797	0.040	139	256	1.418	0.051	0.707	0.865
Child received BCG vaccination	0.973	0.023	139	256	2.802	0.024	0.867	0.995
Child received DPT vaccination (3 doses)	0.937	0.020	139	256	0.914	0.021	0.886	0.966
Child received polio vaccination (3 doses)	0.917	0.027	139	256	1.334	0.029	0.847	0.957
Child received measles vaccination	0.904	0.033	139	256	1.780	0.037	0.817	0.952
Child fully immunized	0.846	0.045	139	256	2.196	0.053	0.736	0.916
Height-for-age (-2SD)	0.076	0.012	481	848	0.960	0.157	0.056	0.103
Weight-for-height (-2SD)	0.009	0.005	481	848	1.423	0.587	0.003	0.027
Weight-for-age (-2SD)	0.010	0.005	481	848	1.254	0.501	0.004	0.028
BMI < 18.5	0.015	0.006	484	850	1.188	0.401	0.007	0.032

Table B 29 Sampling Errors: Stata, Jackknife 2 Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.674	0.026	0.679	0.751
No education	0.197	0.019	1013	894	2.229	0.095	0.163	0.236
With secondary education or higher	0.248	0.018	1013	894	1.817	0.074	0.214	0.286
Currently married (in union)	0.950	0.007	1013	894	0.953	0.007	0.935	0.961
Knowing any contraceptive method	0.995	0.002	962	849	0.970	0.002	0.988	0.998
Knowing any modern contraceptive method	0.991	0.003	962	849	1.162	0.003	0.981	0.995
Ever used any contraceptive method	0.881	0.013	962	849	1.540	0.015	0.853	0.904
Currently using any contraceptive method	0.704	0.018	962	849	1.501	0.026	0.667	0.738
Currently using modern method	0.458	0.021	962	849	1.703	0.046	0.417	0.499
Currently using pill	0.041	0.007	962	849	1.171	0.170	0.029	0.057
Currently using IUD	0.183	0.015	962	849	1.459	0.082	0.155	0.214
Currently using condom	0.130	0.013	962	849	1.452	0.101	0.106	0.157
Currently using injectables	0.005	0.002	962	849	0.620	0.363	0.002	0.010
Currently using female sterilization	0.100	0.009	962	849	0.951	0.094	0.083	0.120
Currently using periodic abstinence	0.006	0.003	962	849	1.682	0.556	0.002	0.017
Currently using withdrawal	0.241	0.016	962	849	1.325	0.066	0.211	0.273
Obtained method from public sector source	0.719	0.024	441	392	1.259	0.033	0.669	0.763
Want no more children	0.573	0.016	962	849	0.963	0.027	0.542	0.603
Want to delay birth at least 2 years	0.121	0.011	962	849	1.111	0.092	0.101	0.145
Mothers recieved medical care at delivery	0.941	0.009	497	441	0.771	0.010	0.919	0.956
Child having health card, seen	0.626	0.047	108	95	1.020	0.075	0.530	0.713
Child received BCG vaccination	0.961	0.019	108	95	1.071	0.020	0.899	0.985
Child received DPT vaccination (3 doses)	0.881	0.028	108	95	0.805	0.032	0.815	0.926
Child received polio vaccination (3 doses)	0.877	0.029	108	95	0.823	0.033	0.809	0.923
Child received measles vaccination	0.939	0.022	108	95	0.887	0.023	0.879	0.970
Child fully immunized	0.818	0.034	108	95	0.826	0.041	0.742	0.875
Height-for-age (-2SD)	0.076	0.015	382	339	1.225	0.198	0.051	0.111
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.221	0.324	0.016	0.055
BMI < 18.5	0.013	0.006	357	316	1.018	0.462	0.005	0.032

Table B 30 Sampling Errors: Stata, Jackknife 2 Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.700	0.021	0.697	0.757
No education	0.072	0.009	1460	1631	1.756	0.125	0.056	0.091
With secondary education or higher	0.360	0.019	1460	1631	2.205	0.052	0.324	0.398
Currently married (in union)	0.945	0.008	1460	1631	1.649	0.008	0.928	0.959
Knowing any contraceptive method	1.000	0.000	1386	1542	0.560	0.000	0.997	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.598	0.001	0.995	0.999
Ever used any contraceptive method	0.942	0.006	1386	1542	0.805	0.006	0.929	0.952
Currently using any contraceptive method	0.755	0.012	1386	1542	1.028	0.016	0.732	0.778
Currently using modern method	0.488	0.018	1386	1542	1.758	0.037	0.454	0.524
Currently using pill	0.049	0.006	1386	1542	1.103	0.124	0.038	0.063
Currently using IUD	0.184	0.010	1386	1542	0.916	0.054	0.165	0.205
Currently using condom	0.178	0.014	1386	1542	1.957	0.081	0.152	0.208
Currently using injectables	0.009	0.003	1386	1542	1.217	0.309	0.005	0.017
Currently using female sterilization	0.064	0.007	1386	1542	1.160	0.111	0.051	0.079
Currently using periodic abstinence	0.009	0.003	1386	1542	1.680	0.368	0.004	0.018
Currently using withdrawal	0.258	0.016	1386	1542	1.756	0.061	0.228	0.289
Obtained method from public sector source	0.596	0.024	679	757	1.598	0.040	0.549	0.642
Want no more children	0.616	0.016	1385	1540	1.467	0.026	0.585	0.647
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.090	0.067	0.130	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.228	0.005	0.971	0.993
Child having health card, seen	0.709	0.049	142	149	1.656	0.069	0.604	0.796
Child received BCG vaccination	0.964	0.015	142	149	0.899	0.015	0.921	0.984
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.720	0.018	0.900	0.968
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.423	0.013	0.914	0.965
Child received measles vaccination	0.949	0.015	142	149	0.651	0.016	0.910	0.971
Child fully immunized	0.900	0.022	142	149	0.771	0.025	0.848	0.936
Height-for-age (-2SD)	0.045	0.010	472	533	1.134	0.221	0.029	0.069
Weight-for-height (-2SD)	0.005	0.003	472	533	0.971	0.628	0.001	0.017
Weight-for-age (-2SD)	0.021	0.008	472	533	1.631	0.393	0.010	0.045
BMI < 18.5	0.019	0.007	470	529	1.059	0.338	0.010	0.037

Table B 31 Sampling Errors: Stata, Jackknife 2 Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.023	868	477	1.915	0.042	0.507	0.599
No education	0.156	0.024	868	477	3.660	0.151	0.115	0.208
With secondary education or higher	0.305	0.020	868	477	1.719	0.067	0.266	0.346
Currently married (in union)	0.954	0.007	868	477	0.992	0.007	0.937	0.966
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.628	0.002	0.986	1.000
Ever used any contraceptive method	0.928	0.008	827	455	0.843	0.009	0.910	0.943
Currently using any contraceptive method	0.756	0.019	827	455	1.553	0.025	0.718	0.791
Currently using modern method	0.414	0.025	827	455	2.167	0.061	0.366	0.465
Currently using pill	0.052	0.008	827	455	1.162	0.160	0.038	0.071
Currently using IUD	0.098	0.014	827	455	1.724	0.138	0.075	0.129
Currently using condom	0.120	0.013	827	455	1.341	0.109	0.097	0.148
Currently using injectables	0.009	0.004	827	455	1.369	0.418	0.004	0.021
Currently using female sterilization	0.129	0.012	827	455	1.067	0.093	0.107	0.155
Currently using periodic abstinence	0.004	0.002	827	455	0.671	0.443	0.002	0.010
Currently using withdrawal	0.336	0.023	827	455	1.907	0.068	0.293	0.381
Obtained method from public sector source	0.600	0.025	361	191	0.915	0.042	0.550	0.648
Want no more children	0.568	0.020	827	455	1.362	0.035	0.529	0.607
Want to delay birth at least 2 years	0.124	0.011	827	455	0.895	0.087	0.104	0.147
Mothers recieved medical care at delivery	0.960	0.009	352	197	0.767	0.010	0.937	0.975
Child having health card, seen	0.746	0.059	68	43	1.355	0.079	0.615	0.844
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.059	68	43	2.481	0.067	0.710	0.957
Child received polio vaccination (3 doses)	0.858	0.056	68	43	1.899	0.065	0.711	0.937
Child received measles vaccination	0.978	0.022	68	43	1.674	0.022	0.857	0.997
Child fully immunized	0.836	0.042	68	43	0.944	0.050	0.737	0.902
Height-for-age (-2SD)	0.070	0.023	224	124	1.777	0.330	0.036	0.132
Weight-for-height (-2SD)	0.015	0.009	224	124	1.270	0.614	0.005	0.050
Weight-for-age (-2SD)	0.028	0.013	224	124	1.237	0.446	0.012	0.066
BMI < 18.5	0.030	0.012	251	142	1.254	0.396	0.014	0.065

Table B 32 Sampling Errors: Stata, Jackknife 2 Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.013	2188	1151	1.578	0.020	0.608	0.659
No education	0.524	0.022	2188	1151	4.117	0.041	0.481	0.566
With secondary education or higher	0.133	0.013	2188	1151	3.172	0.097	0.110	0.160
Currently married (in union)	0.960	0.005	2188	1151	1.575	0.005	0.948	0.969
Knowing any contraceptive method	0.993	0.002	2104	1105	0.899	0.002	0.989	0.996
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.799	0.002	0.985	0.993
Ever used any contraceptive method	0.818	0.012	2104	1105	2.126	0.015	0.792	0.841
Currently using any contraceptive method	0.614	0.014	2104	1105	1.790	0.023	0.586	0.641
Currently using modern method	0.378	0.013	2104	1105	1.498	0.034	0.353	0.404
Currently using pill	0.056	0.006	2104	1105	1.203	0.098	0.046	0.068
Currently using IUD	0.151	0.008	2104	1105	1.132	0.055	0.136	0.168
Currently using condom	0.081	0.007	2104	1105	1.316	0.084	0.068	0.095
Currently using injectables	0.013	0.002	2104	1105	0.963	0.190	0.009	0.018
Currently using female sterilization	0.077	0.006	2104	1105	0.937	0.073	0.067	0.089
Currently using periodic abstinence	0.003	0.001	2104	1105	1.065	0.435	0.001	0.006
Currently using withdrawal	0.229	0.013	2104	1105	1.910	0.055	0.205	0.255
Obtained method from public sector source	0.723	0.019	822	420	1.508	0.027	0.683	0.759
Want no more children	0.572	0.014	2103	1105	1.796	0.025	0.543	0.600
Want to delay birth at least 2 years	0.174	0.011	2103	1105	1.904	0.066	0.153	0.198
Mothers recieved medical care at delivery	0.744	0.024	1691	911	5.262	0.033	0.694	0.789
Child having health card, seen	0.685	0.029	317	167	1.177	0.042	0.626	0.738
Child received BCG vaccination	0.922	0.015	317	167	0.957	0.016	0.888	0.947
Child received DPT vaccination (3 doses)	0.792	0.026	317	167	1.297	0.033	0.736	0.839
Child received polio vaccination (3 doses)	0.808	0.024	317	167	1.151	0.030	0.757	0.851
Child received measles vaccination	0.777	0.024	317	167	1.061	0.031	0.725	0.821
Child fully immunized	0.643	0.029	317	167	1.109	0.044	0.585	0.697
Height-for-age (-2SD)	0.211	0.017	1174	631	2.025	0.080	0.179	0.246
Weight-for-height (-2SD)	0.015	0.004	1174	631	0.964	0.231	0.010	0.024
Weight-for-age (-2SD)	0.058	0.007	1174	631	1.188	0.128	0.045	0.074
BMI < 18.5	0.014	0.003	903	478	0.802	0.253	0.008	0.022

Table B 33 Sampling Errors: WesVar, Balanced Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.975	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.077	0.031	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.564	0.038	0.275	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.093	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.000	7042	6999	0.775	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.050	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.335	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	7042	6999	1.781	0.010	0.716	0.744
Currently using modern method	0.460	0.007	7042	6999	1.553	0.016	0.445	0.475
Currently using pill	0.053	0.003	7042	6999	1.632	0.064	0.047	0.060
Currently using IUD	0.169	0.006	7042	6999	1.635	0.034	0.157	0.180
Currently using condom	0.143	0.006	7042	6999	2.002	0.041	0.131	0.155
Currently using injectables	0.009	0.001	7042	6999	1.494	0.156	0.006	0.011
Currently using female sterilization	0.083	0.004	7042	6999	1.794	0.053	0.074	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.692	0.204	0.003	0.008
Currently using withdrawal	0.262	0.007	7042	6999	2.020	0.028	0.247	0.277
Obtained method from public sector source	0.600	0.012	3162	3243	1.751	0.019	0.577	0.623
Want no more children	0.588	0.007	7038	6993	1.534	0.012	0.573	0.602
Want to delay birth at least 2 years	0.143	0.006	7038	6993	1.772	0.039	0.132	0.154
Mothers recieved medical care at delivery	0.913	0.009	3857	3463	3.498	0.009	0.896	0.930
Child having health card, seen	0.727	0.021	772	710	1.708	0.029	0.685	0.769
Child received BCG vaccination	0.959	0.009	774	711	1.669	0.010	0.941	0.978
Child received DPT vaccination (3 doses)	0.893	0.011	774	711	1.003	0.012	0.871	0.916
Child received polio vaccination (3 doses)	0.888	0.012	774	711	1.169	0.014	0.864	0.913
Child received measles vaccination	0.893	0.014	774	711	1.537	0.015	0.865	0.920
Child fully immunized	0.805	0.018	774	711	1.647	0.023	0.769	0.842
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.502	0.069	0.089	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.478	0.249	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.272	0.126	0.021	0.035
BMI < 18.5	0.016	0.003	2465	2315	1.394	0.185	0.010	0.022

Table B 34 Sampling Errors: WesVar, Balanced Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	3.800	0.062	0.133	0.171
With secondary education or higher	0.348	0.015	5429	5615	5.499	0.044	0.317	0.378
Currently married (in union)	0.941	0.005	5429	5615	2.283	0.005	0.931	0.951
Knowing any contraceptive method	0.999	0.000	5141	5284	0.870	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.276	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.368	0.005	0.918	0.935
Currently using any contraceptive method	0.743	0.008	5141	5284	1.913	0.011	0.726	0.760
Currently using modern method	0.478	0.008	5141	5284	1.462	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.719	0.075	0.048	0.064
Currently using IUD	0.175	0.007	5141	5284	1.565	0.038	0.162	0.188
Currently using condom	0.154	0.007	5141	5284	1.998	0.046	0.140	0.168
Currently using injectables	0.008	0.002	5141	5284	1.618	0.200	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.918	0.064	0.072	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.652	0.215	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.935	0.033	0.239	0.273
Obtained method from public sector source	0.580	0.014	2445	2550	1.970	0.024	0.551	0.608
Want no more children	0.583	0.008	5137	5277	1.326	0.014	0.567	0.599
Want to delay birth at least 2 years	0.146	0.007	5137	5277	1.783	0.045	0.133	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.248	0.006	0.945	0.969
Child having health card, seen	0.758	0.026	523	514	1.935	0.034	0.706	0.810
Child received BCG vaccination	0.966	0.012	524	515	2.153	0.012	0.942	0.989
Child received DPT vaccination (3 doses)	0.921	0.012	524	515	1.007	0.013	0.897	0.944
Child received polio vaccination (3 doses)	0.917	0.014	524	515	1.426	0.016	0.888	0.946
Child received measles vaccination	0.903	0.018	524	515	1.958	0.020	0.867	0.939
Child fully immunized	0.842	0.024	524	515	2.222	0.028	0.794	0.889
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.406	0.096	0.061	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.784	0.339	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.394	0.189	0.013	0.029
BMI < 18.5	0.013	0.003	1742	1713	1.333	0.240	0.007	0.019

Table B 35 Sampling Errors: WesVar, Balanced Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.933	0.050	0.253	0.309
With secondary education or higher	0.142	0.013	1976	1790	2.691	0.091	0.116	0.168
Currently married (in union)	0.959	0.005	1976	1790	1.151	0.005	0.949	0.968
Knowing any contraceptive method	0.995	0.001	1901	1716	0.726	0.001	0.993	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.946	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.009	1901	1716	1.276	0.010	0.855	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.297	0.018	0.665	0.714
Currently using modern method	0.404	0.015	1901	1716	1.854	0.038	0.373	0.434
Currently using pill	0.046	0.005	1901	1716	1.206	0.115	0.035	0.056
Currently using IUD	0.150	0.011	1901	1716	1.950	0.076	0.127	0.172
Currently using condom	0.110	0.010	1901	1716	2.003	0.092	0.090	0.130
Currently using injectables	0.011	0.003	1901	1716	1.259	0.243	0.006	0.016
Currently using female sterilization	0.085	0.007	1901	1716	1.332	0.087	0.070	0.099
Currently using periodic abstinence	0.002	0.001	1901	1716	1.652	0.638	0.000	0.005
Currently using withdrawal	0.281	0.016	1901	1716	2.283	0.056	0.249	0.312
Obtained method from public sector source	0.675	0.027	717	692	2.321	0.039	0.622	0.728
Want no more children	0.603	0.014	1901	1716	1.655	0.024	0.574	0.632
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.965	0.057	0.119	0.149
Mothers recieved medical care at delivery	0.802	0.023	1268	195	4.276	0.029	0.755	0.848
Child having health card, seen	0.646	0.031	249	196	1.024	0.048	0.584	0.707
Child received BCG vaccination	0.943	0.014	250	196	0.893	0.015	0.915	0.971
Child received DPT vaccination (3 doses)	0.822	0.026	250	196	1.185	0.032	0.769	0.874
Child received polio vaccination (3 doses)	0.814	0.025	250	196	1.035	0.031	0.764	0.864
Child received measles vaccination	0.866	0.018	250	196	0.696	0.021	0.829	0.902
Child fully immunized	0.710	0.027	250	196	0.897	0.038	0.656	0.764
Height-for-age (-2SD)	0.174	0.017	887	692	1.692	0.095	0.141	0.207
Weight-for-height (-2SD)	0.010	0.002	887	692	0.574	0.260	0.005	0.014
Weight-for-age (-2SD)	0.048	0.007	887	692	1.086	0.156	0.033	0.063
BMI < 18.5	0.026	0.007	723	601	1.307	0.262	0.012	0.039

Table B 36 Sampling Errors: WesVar, Balanced Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.009	3252	1876	1.22	0.010	0.842	0.877
No education	0.119	0.014	3252	1876	3.47	0.117	0.091	0.147
With secondary education or higher	0.338	0.024	3252	1876	4.80	0.071	0.290	0.386
Currently married (in union)	0.938	0.007	3252	1876	1.70	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	3049	1763	0.81	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	3049	1763	1.23	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	3049	1763	1.29	0.007	0.927	0.952
Currently using any contraceptive method	0.763	0.013	3049	1763	1.54	0.016	0.738	0.788
Currently using modern method	0.482	0.013	3049	1763	1.22	0.027	0.456	0.509
Currently using pill	0.058	0.007	3049	1763	1.48	0.117	0.045	0.072
Currently using IUD	0.174	0.011	3049	1763	1.44	0.062	0.153	0.196
Currently using condom	0.156	0.011	3049	1763	1.59	0.070	0.134	0.177
Currently using injectables	0.008	0.002	3049	1763	1.26	0.300	0.003	0.013
Currently using female sterilization	0.084	0.008	3049	1763	1.45	0.095	0.068	0.100
Currently using periodic abstinence	0.006	0.002	3049	1763	1.11	0.338	0.002	0.009
Currently using withdrawal	0.272	0.012	3049	1763	1.30	0.045	0.247	0.296
Obtained method from public sector source	0.536	0.022	1483	859	1.62	0.040	0.492	0.579
Want no more children	0.587	0.012	3044	1761	1.03	0.020	0.563	0.610
Want to delay birth at least 2 years	0.138	0.010	3044	1761	1.40	0.070	0.119	0.158
Mothers recieved medical care at delivery	0.980	0.007	1174	651	1.67	0.007	0.965	0.994
Child having health card, seen	0.797	0.041	256	139	1.42	0.051	0.716	0.878
Child received BCG vaccination	0.973	0.022	256	139	2.48	0.022	0.930	1.016
Child received DPT vaccination (3 doses)	0.937	0.019	256	139	0.89	0.021	0.898	0.976
Child received polio vaccination (3 doses)	0.917	0.026	256	139	1.27	0.029	0.864	0.970
Child received measles vaccination	0.904	0.032	256	139	1.64	0.035	0.840	0.968
Child fully immunized	0.846	0.044	256	139	2.02	0.051	0.759	0.933
Height-for-age (-2SD)	0.076	0.012	848	481	1.00	0.159	0.052	0.100
Weight-for-height (-2SD)	0.009	0.005	848	481	1.56	0.610	0.000	0.019
Weight-for-age (-2SD)	0.011	0.005	848	481	1.29	0.504	0.000	0.021
BMI < 18.5	0.015	0.006	850	484	1.04	0.377	0.004	0.026

Table B 37 Sampling Errors: WesVar, Balanced Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.697	0.026	0.679	0.753
No education	0.197	0.019	1013	894	2.311	0.096	0.159	0.235
With secondary education or higher	0.248	0.018	1013	894	1.838	0.074	0.211	0.285
Currently married (in union)	0.950	0.007	1013	894	1.005	0.007	0.936	0.963
Knowing any contraceptive method	0.995	0.002	962	849	0.942	0.002	0.990	0.999
Knowing any modern contraceptive method	0.991	0.003	962	849	1.077	0.003	0.984	0.997
Ever used any contraceptive method	0.881	0.013	962	849	1.457	0.014	0.856	0.906
Currently using any contraceptive method	0.704	0.018	962	849	1.540	0.026	0.667	0.740
Currently using modern method	0.458	0.020	962	849	1.543	0.044	0.418	0.498
Currently using pill	0.041	0.006	962	849	1.033	0.159	0.028	0.054
Currently using IUD	0.183	0.014	962	849	1.238	0.076	0.155	0.210
Currently using condom	0.130	0.014	962	849	1.572	0.105	0.102	0.157
Currently using injectables	0.005	0.002	962	849	1.052	0.472	0.000	0.010
Currently using female sterilization	0.100	0.009	962	849	0.911	0.092	0.082	0.118
Currently using periodic abstinence	0.006	0.003	962	849	1.615	0.545	-0.001	0.012
Currently using withdrawal	0.241	0.015	962	849	1.201	0.063	0.211	0.271
Obtained method from public sector source	0.719	0.026	441	393	1.426	0.036	0.668	0.770
Want no more children	0.573	0.016	962	849	0.988	0.028	0.541	0.604
Want to delay birth at least 2 years	0.121	0.012	962	849	1.295	0.099	0.097	0.145
Mothers recieved medical care at delivery	0.941	0.010	497	441	0.807	0.010	0.921	0.960
Child having health card, seen	0.626	0.048	108	95	1.073	0.077	0.529	0.722
Child received BCG vaccination	0.961	0.020	108	95	1.138	0.021	0.921	1.001
Child received DPT vaccination (3 doses)	0.881	0.029	108	95	0.850	0.033	0.824	0.939
Child received polio vaccination (3 doses)	0.877	0.030	108	95	0.875	0.034	0.818	0.936
Child received measles vaccination	0.939	0.022	108	95	0.932	0.024	0.894	0.983
Child fully immunized	0.818	0.035	108	95	0.873	0.042	0.749	0.887
Height-for-age (-2SD)	0.076	0.015	382	339	1.249	0.199	0.046	0.106
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.279	0.332	0.010	0.049
BMI < 18.5	0.013	0.006	357	316	0.991	0.456	0.001	0.025

Table B 38 Sampling Errors: WesVar, Balanced Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.720	0.021	0.697	0.758
No education	0.072	0.009	1460	1631	1.782	0.126	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.266	0.053	0.322	0.398
Currently married (in union)	0.945	0.008	1460	1631	1.668	0.008	0.930	0.961
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.612	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.871	0.006	0.930	0.953
Currently using any contraceptive method	0.755	0.013	1386	1542	1.333	0.018	0.729	0.782
Currently using modern method	0.488	0.018	1386	1542	1.748	0.036	0.453	0.524
Currently using pill	0.049	0.006	1386	1542	1.020	0.119	0.037	0.061
Currently using IUD	0.184	0.011	1386	1542	1.158	0.061	0.162	0.206
Currently using condom	0.178	0.014	1386	1542	1.824	0.078	0.150	0.206
Currently using injectables	0.009	0.003	1386	1542	1.221	0.309	0.003	0.015
Currently using female sterilization	0.064	0.007	1386	1542	1.160	0.111	0.050	0.078
Currently using periodic abstinence	0.009	0.003	1386	1542	1.637	0.362	0.002	0.015
Currently using withdrawal	0.258	0.016	1386	1542	1.916	0.063	0.225	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.630	0.040	0.548	0.644
Want no more children	0.616	0.014	1385	1540	1.175	0.023	0.588	0.645
Want to delay birth at least 2 years	0.149	0.011	1385	1540	1.217	0.071	0.128	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.215	0.005	0.975	0.995
Child having health card, seen	0.709	0.051	142	149	1.792	0.072	0.607	0.811
Child received BCG vaccination	0.964	0.015	142	149	0.956	0.016	0.934	0.995
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.773	0.018	0.908	0.977
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.443	0.014	0.919	0.970
Child received measles vaccination	0.949	0.016	142	149	0.711	0.016	0.917	0.980
Child fully immunized	0.900	0.023	142	149	0.826	0.025	0.855	0.946
Height-for-age (-2SD)	0.045	0.010	472	533	1.119	0.224	0.025	0.065
Weight-for-height (-2SD)	0.005	0.003	472	533	0.956	0.636	0.000	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.608	0.398	0.004	0.038
BMI < 18.5	0.019	0.007	470	529	1.051	0.337	0.006	0.032

Table B 39 Sampling Errors: WesVar, Balanced Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.023	868	477	1.919	0.042	0.507	0.600
No education	0.156	0.024	868	477	3.750	0.153	0.108	0.203
With secondary education or higher	0.305	0.021	868	477	1.827	0.069	0.263	0.347
Currently married (in union)	0.954	0.007	868	477	1.004	0.008	0.939	0.968
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.729	0.002	0.994	1.002
Ever used any contraceptive method	0.928	0.011	827	455	1.481	0.012	0.906	0.950
Currently using any contraceptive method	0.756	0.018	827	455	1.412	0.023	0.720	0.791
Currently using modern method	0.414	0.023	827	455	1.847	0.056	0.368	0.461
Currently using pill	0.052	0.008	827	455	1.188	0.162	0.035	0.069
Currently using IUD	0.098	0.014	827	455	1.712	0.138	0.071	0.126
Currently using condom	0.120	0.013	827	455	1.238	0.105	0.095	0.145
Currently using injectables	0.009	0.004	827	455	1.383	0.420	0.002	0.017
Currently using female sterilization	0.129	0.016	827	455	1.807	0.121	0.098	0.161
Currently using periodic abstinence	0.004	0.002	827	455	0.637	0.431	0.001	0.008
Currently using withdrawal	0.336	0.024	827	455	2.050	0.070	0.288	0.383
Obtained method from public sector source	0.600	0.030	361	191	1.375	0.050	0.540	0.660
Want no more children	0.568	0.022	827	455	1.679	0.039	0.524	0.613
Want to delay birth at least 2 years	0.124	0.012	827	455	1.067	0.095	0.100	0.148
Mothers recieved medical care at delivery	0.960	0.010	352	197	0.823	0.010	0.941	0.979
Child having health card, seen	0.746	0.060	68	43	1.275	0.080	0.627	0.865
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.060	68	43	2.317	0.068	0.761	1.000
Child received polio vaccination (3 doses)	0.858	0.057	68	43	1.792	0.066	0.744	0.971
Child received measles vaccination	0.978	0.022	68	43	1.577	0.023	0.933	1.023
Child fully immunized	0.836	0.042	68	43	0.889	0.051	0.751	0.920
Height-for-age (-2SD)	0.070	0.024	224	124	1.906	0.336	0.023	0.117
Weight-for-height (-2SD)	0.015	0.010	224	124	1.382	0.629	0.000	0.035
Weight-for-age (-2SD)	0.028	0.013	224	124	1.322	0.452	0.003	0.053
BMI < 18.5	0.030	0.012	251	142	1.326	0.412	0.005	0.055

Table B 40 Sampling Errors: WesVar, Balanced Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.013	2188	1151	1.599	0.021	0.608	0.660
No education	0.524	0.022	2188	1151	4.158	0.042	0.480	0.567
With secondary education or higher	0.133	0.013	2188	1151	3.193	0.098	0.107	0.159
Currently married (in union)	0.960	0.005	2188	1151	1.591	0.006	0.949	0.971
Knowing any contraceptive method	0.993	0.002	2104	1105	0.904	0.002	0.990	0.997
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.805	0.002	0.986	0.994
Ever used any contraceptive method	0.818	0.012	2104	1105	2.144	0.015	0.793	0.842
Currently using any contraceptive method	0.614	0.014	2104	1105	1.846	0.024	0.585	0.643
Currently using modern method	0.378	0.013	2104	1105	1.521	0.034	0.352	0.404
Currently using pill	0.056	0.006	2104	1105	1.212	0.098	0.045	0.067
Currently using IUD	0.151	0.008	2104	1105	1.157	0.056	0.134	0.168
Currently using condom	0.081	0.007	2104	1105	1.400	0.087	0.067	0.095
Currently using injectables	0.013	0.002	2104	1105	1.024	0.196	0.008	0.018
Currently using female sterilization	0.077	0.006	2104	1105	0.953	0.074	0.065	0.088
Currently using periodic abstinence	0.003	0.001	2104	1105	1.148	0.452	0.000	0.005
Currently using withdrawal	0.229	0.013	2104	1105	1.923	0.055	0.204	0.254
Obtained method from public sector source	0.723	0.020	822	420	1.648	0.028	0.683	0.763
Want no more children	0.572	0.013	2103	1105	1.447	0.023	0.546	0.597
Want to delay birth at least 2 years	0.174	0.011	2103	1105	1.745	0.063	0.152	0.196
Mothers recieved medical care at delivery	0.744	0.025	1691	911	5.341	0.033	0.695	0.793
Child having health card, seen	0.688	0.029	315	167	1.224	0.042	0.630	0.746
Child received BCG vaccination	0.922	0.015	317	167	0.995	0.016	0.892	0.952
Child received DPT vaccination (3 doses)	0.792	0.027	317	167	1.356	0.033	0.739	0.845
Child received polio vaccination (3 doses)	0.808	0.024	317	167	1.200	0.030	0.760	0.857
Child received measles vaccination	0.777	0.025	317	167	1.109	0.032	0.727	0.826
Child fully immunized	0.643	0.029	317	167	1.158	0.045	0.585	0.701
Height-for-age (-2SD)	0.211	0.017	1174	631	2.055	0.081	0.176	0.245
Weight-for-height (-2SD)	0.015	0.004	1174	631	0.981	0.233	0.008	0.022
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.212	0.130	0.043	0.073
BMI < 18.5	0.014	0.004	903	478	0.918	0.272	0.006	0.021

Table B 41 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.966	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.071	0.043	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.574	0.038	0.275	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.101	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.000	6999	7042	0.775	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	6999	7042	1.050	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	6999	7042	1.341	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	6999	7042	1.774	0.010	0.716	0.744
Currently using modern method	0.460	0.007	6999	7042	1.541	0.016	0.445	0.475
Currently using pill	0.053	0.003	6999	7042	1.632	0.064	0.047	0.060
Currently using IUD	0.169	0.006	6999	7042	1.641	0.034	0.157	0.180
Currently using condom	0.143	0.006	6999	7042	1.998	0.041	0.131	0.155
Currently using injectables	0.009	0.001	6999	7042	1.496	0.156	0.006	0.011
Currently using female sterilization	0.083	0.004	6999	7042	1.796	0.053	0.074	0.092
Currently using periodic abstinence	0.006	0.001	6999	7042	1.700	0.205	0.003	0.008
Currently using withdrawal	0.262	0.007	6999	7042	2.004	0.028	0.247	0.277
Obtained method from public sector source	0.600	0.012	3243	3162	1.754	0.019	0.577	0.623
Want no more children	0.588	0.007	6993	7038	1.538	0.012	0.573	0.602
Want to delay birth at least 2 years	0.143	0.006	6993	7038	1.772	0.039	0.132	0.154
Mothers recieved medical care at delivery	0.913	0.008	3463	3857	3.489	0.009	0.896	0.930
Child having health card, seen	0.727	0.021	710	772	1.715	0.029	0.685	0.769
Child received BCG vaccination	0.959	0.009	711	774	1.715	0.010	0.941	0.978
Child received DPT vaccination (3 doses)	0.893	0.011	711	774	1.011	0.012	0.871	0.916
Child received polio vaccination (3 doses)	0.888	0.012	711	774	1.191	0.014	0.864	0.913
Child received measles vaccination	0.893	0.014	711	774	1.569	0.016	0.865	0.920
Child fully immunized	0.805	0.018	711	774	1.686	0.023	0.768	0.842
Height-for-age (-2SD)	0.103	0.007	2474	2733	1.491	0.069	0.089	0.118
Weight-for-height (-2SD)	0.009	0.002	2474	2733	1.459	0.247	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2474	2733	1.256	0.126	0.021	0.035
BMI < 18.5	0.016	0.003	2315	2465	1.380	0.184	0.010	0.022

Table B 42 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	3.802	0.062	0.133	0.171
With secondary education or higher	0.348	0.015	5429	5615	5.494	0.044	0.317	0.378
Currently married (in union)	0.941	0.005	5429	5615	2.288	0.005	0.931	0.951
Knowing any contraceptive method	0.999	0.000	5141	5284	0.868	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.263	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.370	0.005	0.918	0.935
Currently using any contraceptive method	0.743	0.008	5141	5284	1.906	0.011	0.726	0.760
Currently using modern method	0.478	0.008	5141	5284	1.450	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.717	0.075	0.048	0.064
Currently using IUD	0.175	0.007	5141	5284	1.564	0.038	0.162	0.188
Currently using condom	0.154	0.007	5141	5284	2.005	0.046	0.140	0.168
Currently using injectables	0.008	0.002	5141	5284	1.617	0.200	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.929	0.065	0.072	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.665	0.216	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.923	0.033	0.239	0.273
Obtained method from public sector source	0.580	0.014	2445	2550	1.970	0.024	0.551	0.608
Want no more children	0.583	0.008	5137	5277	1.326	0.014	0.567	0.599
Want to delay birth at least 2 years	0.146	0.007	5137	5277	1.783	0.045	0.133	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.232	0.006	0.945	0.969
Child having health card, seen	0.758	0.026	523	514	1.936	0.034	0.706	0.810
Child received BCG vaccination	0.966	0.012	524	515	2.257	0.012	0.942	0.989
Child received DPT vaccination (3 doses)	0.921	0.012	524	515	1.031	0.013	0.897	0.945
Child received polio vaccination (3 doses)	0.917	0.015	524	515	1.466	0.016	0.888	0.946
Child received measles vaccination	0.903	0.018	524	515	2.010	0.020	0.866	0.940
Child fully immunized	0.842	0.024	524	515	2.298	0.029	0.793	0.890
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.392	0.096	0.061	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.765	0.337	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.387	0.188	0.013	0.029
BMI < 18.5	0.013	0.003	1742	1713	1.333	0.240	0.007	0.019

Table B 43 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.923	0.050	0.253	0.309
With secondary education or higher	0.142	0.013	1976	1790	2.661	0.090	0.116	0.168
Currently married (in union)	0.959	0.005	1976	1790	1.151	0.005	0.949	0.968
Knowing any contraceptive method	0.995	0.001	1901	1716	0.726	0.001	0.993	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.946	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.009	1901	1716	1.276	0.010	0.855	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.297	0.018	0.665	0.714
Currently using modern method	0.404	0.015	1901	1716	1.854	0.038	0.373	0.434
Currently using pill	0.046	0.005	1901	1716	1.206	0.115	0.035	0.056
Currently using IUD	0.150	0.011	1901	1716	1.950	0.076	0.127	0.172
Currently using condom	0.110	0.010	1901	1716	2.003	0.092	0.090	0.130
Currently using injectables	0.011	0.003	1901	1716	1.259	0.243	0.006	0.016
Currently using female sterilization	0.085	0.007	1901	1716	1.332	0.087	0.070	0.099
Currently using periodic abstinence	0.002	0.001	1901	1716	1.652	0.638	-0.001	0.005
Currently using withdrawal	0.281	0.016	1901	1716	2.283	0.056	0.249	0.312
Obtained method from public sector source	0.675	0.027	717	692	2.321	0.039	0.622	0.728
Want no more children	0.603	0.014	1901	1716	1.655	0.024	0.574	0.632
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.965	0.057	0.119	0.149
Mothers recieved medical care at delivery	0.802	0.023	1268	988	4.265	0.029	0.755	0.848
Child having health card, seen	0.646	0.031	249	195	1.015	0.047	0.585	0.707
Child received BCG vaccination	0.943	0.014	250	196	0.879	0.015	0.915	0.970
Child received DPT vaccination (3 doses)	0.822	0.026	250	196	1.162	0.032	0.770	0.874
Child received polio vaccination (3 doses)	0.814	0.025	250	196	1.023	0.031	0.764	0.864
Child received measles vaccination	0.866	0.018	250	196	0.686	0.021	0.830	0.901
Child fully immunized	0.710	0.027	250	196	0.898	0.038	0.656	0.764
Height-for-age (-2SD)	0.174	0.016	887	692	1.680	0.095	0.141	0.207
Weight-for-height (-2SD)	0.010	0.002	887	692	0.563	0.257	0.005	0.014
Weight-for-age (-2SD)	0.048	0.007	887	692	1.065	0.155	0.033	0.062
BMI < 18.5	0.026	0.007	723	601	1.307	0.262	0.012	0.039

Table B 44 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.009	1876	3252	1.188	0.010	0.842	0.877
No education	0.119	0.015	1876	3252	3.782	0.122	0.090	0.148
With secondary education or higher	0.338	0.021	1876	3252	3.827	0.063	0.295	0.381
Currently married (in union)	0.938	0.007	1876	3252	1.590	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	1763	3049	0.806	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.229	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	1763	3049	1.285	0.007	0.927	0.952
Currently using any contraceptive method	0.763	0.013	1763	3049	1.541	0.016	0.738	0.788
Currently using modern method	0.482	0.013	1763	3049	1.222	0.027	0.456	0.509
Currently using pill	0.058	0.007	1763	3049	1.482	0.117	0.045	0.072
Currently using IUD	0.174	0.011	1763	3049	1.435	0.062	0.153	0.196
Currently using condom	0.156	0.011	1763	3049	1.591	0.070	0.134	0.177
Currently using injectables	0.008	0.002	1763	3049	1.258	0.300	0.003	0.013
Currently using female sterilization	0.084	0.008	1763	3049	1.445	0.095	0.068	0.100
Currently using periodic abstinence	0.006	0.002	1763	3049	1.108	0.338	0.002	0.009
Currently using withdrawal	0.272	0.012	1763	3049	1.301	0.045	0.247	0.296
Obtained method from public sector source	0.536	0.022	859	1483	1.621	0.040	0.492	0.579
Want no more children	0.587	0.012	1761	3044	1.025	0.020	0.563	0.610
Want to delay birth at least 2 years	0.138	0.010	1761	3044	1.398	0.070	0.119	0.158
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.633	0.007	0.965	0.994
Child having health card, seen	0.797	0.041	139	256	1.411	0.051	0.716	0.878
Child received BCG vaccination	0.973	0.023	139	256	2.783	0.024	0.927	1.019
Child received DPT vaccination (3 doses)	0.937	0.020	139	256	0.907	0.021	0.898	0.976
Child received polio vaccination (3 doses)	0.917	0.027	139	256	1.325	0.029	0.863	0.971
Child received measles vaccination	0.904	0.033	139	256	1.798	0.037	0.837	0.971
Child fully immunized	0.846	0.045	139	256	2.199	0.054	0.755	0.937
Height-for-age (-2SD)	0.076	0.012	481	848	0.979	0.157	0.052	0.100
Weight-for-height (-2SD)	0.009	0.005	481	848	1.457	0.589	0.000	0.019
Weight-for-age (-2SD)	0.011	0.005	481	848	1.279	0.501	0.000	0.021
BMI < 18.5	0.015	0.006	484	850	1.040	0.377	0.004	0.026

Table B 45 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.020	1013	894	1.904	0.0	0.7	0.8
No education	0.197	0.021	1013	894	2.919	0.1	0.2	0.2
With secondary education or higher	0.248	0.021	1013	894	2.290	0.1	0.2	0.3
Currently married (in union)	0.950	0.007	1013	894	1.015	0.0	0.9	1.0
Knowing any contraceptive method	0.995	0.002	962	849	0.942	0.0	1.0	1.0
Knowing any modern contraceptive method	0.991	0.003	962	849	1.077	0.0	1.0	1.0
Ever used any contraceptive method	0.881	0.013	962	849	1.457	0.0	0.9	0.9
Currently using any contraceptive method	0.704	0.018	962	849	1.540	0.0	0.7	0.7
Currently using modern method	0.458	0.020	962	849	1.543	0.0	0.4	0.5
Currently using pill	0.041	0.006	962	849	1.033	0.2	0.0	0.1
Currently using IUD	0.183	0.014	962	849	1.238	0.1	0.2	0.2
Currently using condom	0.130	0.014	962	849	1.572	0.1	0.1	0.2
Currently using injectables	0.005	0.002	962	849	1.052	0.5	0.0	0.0
Currently using female sterilization	0.100	0.009	962	849	0.911	0.1	0.1	0.1
Currently using periodic abstinence	0.006	0.003	962	849	1.615	0.5	0.0	0.0
Currently using withdrawal	0.241	0.015	962	849	1.201	0.1	0.2	0.3
Obtained method from public sector source	0.719	0.026	441	393	1.426	0.0	0.7	0.8
Want no more children	0.573	0.016	962	849	0.988	0.0	0.5	0.6
Want to delay birth at least 2 years	0.121	0.012	962	849	1.295	0.1	0.1	0.1
Mothers recieved medical care at delivery	0.941	0.009	497	441	0.779	0.0	0.9	1.0
Child having health card, seen	0.626	0.048	108	95	1.056	0.1	0.5	0.7
Child received BCG vaccination	0.961	0.020	108	95	1.089	0.0	0.9	1.0
Child received DPT vaccination (3 doses)	0.881	0.031	108	95	0.974	0.0	0.8	0.9
Child received polio vaccination (3 doses)	0.877	0.031	108	95	0.948	0.0	0.8	0.9
Child received measles vaccination	0.939	0.021	108	95	0.855	0.0	0.9	1.0
Child fully immunized	0.818	0.035	108	95	0.903	0.0	0.7	0.9
Height-for-age (-2SD)	0.076	0.015	382	339	1.250	0.2	0.0	0.1
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.0	0.0
Weight-for-age (-2SD)	0.030	0.009	382	339	1.151	0.3	0.0	0.0
BMI < 18.5	0.013	0.006	357	316	0.991	0.5	0.0	0.0

Table B 46 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.018	1460	1631	2.294	0.024	0.693	0.763
No education	0.072	0.009	1460	1631	1.716	0.123	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.357	0.054	0.322	0.399
Currently married (in union)	0.945	0.008	1460	1631	1.595	0.008	0.930	0.960
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.612	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.871	0.006	0.930	0.953
Currently using any contraceptive method	0.755	0.013	1386	1542	1.333	0.018	0.729	0.782
Currently using modern method	0.488	0.018	1386	1542	1.748	0.036	0.453	0.524
Currently using pill	0.049	0.006	1386	1542	1.020	0.119	0.037	0.061
Currently using IUD	0.184	0.011	1386	1542	1.158	0.061	0.162	0.206
Currently using condom	0.178	0.014	1386	1542	1.824	0.078	0.150	0.206
Currently using injectables	0.009	0.003	1386	1542	1.221	0.309	0.003	0.015
Currently using female sterilization	0.064	0.007	1386	1542	1.160	0.111	0.050	0.078
Currently using periodic abstinence	0.009	0.003	1386	1542	1.637	0.362	0.002	0.015
Currently using withdrawal	0.258	0.016	1386	1542	1.916	0.063	0.225	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.630	0.040	0.548	0.644
Want no more children	0.616	0.014	1385	1540	1.175	0.023	0.588	0.645
Want to delay birth at least 2 years	0.149	0.011	1385	1540	1.217	0.071	0.128	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.201	0.005	0.975	0.995
Child having health card, seen	0.709	0.049	142	149	1.678	0.070	0.611	0.808
Child received BCG vaccination	0.964	0.015	142	149	0.914	0.015	0.934	0.994
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.733	0.018	0.909	0.976
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.429	0.013	0.920	0.970
Child received measles vaccination	0.949	0.015	142	149	0.667	0.016	0.918	0.979
Child fully immunized	0.900	0.022	142	149	0.786	0.025	0.856	0.945
Height-for-age (-2SD)	0.045	0.010	472	533	1.094	0.222	0.025	0.065
Weight-for-height (-2SD)	0.005	0.003	472	533	0.936	0.630	0.000	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.568	0.393	0.004	0.038
BMI < 18.5	0.019	0.007	470	529	1.051	0.337	0.006	0.032

Table B 47 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.023	868	477	1.843	0.041	0.507	0.599
No education	0.156	0.022	868	477	3.110	0.139	0.112	0.199
With secondary education or higher	0.305	0.024	868	477	2.266	0.077	0.258	0.352
Currently married (in union)	0.954	0.008	868	477	1.111	0.008	0.939	0.969
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.729	0.002	0.994	1.002
Ever used any contraceptive method	0.928	0.011	827	455	1.481	0.012	0.906	0.950
Currently using any contraceptive method	0.756	0.018	827	455	1.412	0.023	0.720	0.791
Currently using modern method	0.414	0.023	827	455	1.847	0.056	0.368	0.461
Currently using pill	0.052	0.008	827	455	1.188	0.162	0.035	0.069
Currently using IUD	0.098	0.014	827	455	1.712	0.138	0.071	0.126
Currently using condom	0.120	0.013	827	455	1.238	0.105	0.095	0.145
Currently using injectables	0.009	0.004	827	455	1.383	0.420	0.002	0.017
Currently using female sterilization	0.129	0.016	827	455	1.807	0.121	0.098	0.161
Currently using periodic abstinence	0.004	0.002	827	455	0.637	0.431	0.001	0.008
Currently using withdrawal	0.336	0.024	827	455	2.050	0.070	0.288	0.383
Obtained method from public sector source	0.600	0.030	361	191	1.375	0.050	0.540	0.660
Want no more children	0.568	0.022	827	455	1.679	0.039	0.524	0.613
Want to delay birth at least 2 years	0.124	0.012	827	455	1.067	0.095	0.100	0.148
Mothers recieved medical care at delivery	0.960	0.009	352	197	0.792	0.010	0.941	0.978
Child having health card, seen	0.746	0.064	68	43	1.490	0.086	0.617	0.875
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.054	68	43	1.859	0.061	0.774	0.988
Child received polio vaccination (3 doses)	0.858	0.057	68	43	1.826	0.067	0.743	0.972
Child received measles vaccination	0.978	0.022	68	43	1.542	0.023	0.934	1.022
Child fully immunized	0.836	0.057	68	43	1.621	0.068	0.721	0.950
Height-for-age (-2SD)	0.070	0.023	224	124	1.817	0.328	0.024	0.116
Weight-for-height (-2SD)	0.015	0.010	224	124	1.358	0.623	0.000	0.035
Weight-for-age (-2SD)	0.028	0.013	224	124	1.313	0.451	0.003	0.053
BMI < 18.5	0.030	0.012	251	142	1.326	0.412	0.005	0.055

Table B 48 Sampling Errors: WesVar, Jackknife 2 Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.013	2188	1151	1.600	0.021	0.608	0.660
No education	0.524	0.022	2188	1151	4.165	0.042	0.480	0.567
With secondary education or higher	0.133	0.013	2188	1151	3.204	0.098	0.107	0.159
Currently married (in union)	0.960	0.005	2188	1151	1.590	0.006	0.949	0.971
Knowing any contraceptive method	0.993	0.002	2104	1105	0.904	0.002	0.990	0.997
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.805	0.002	0.986	0.994
Ever used any contraceptive method	0.818	0.012	2104	1105	2.144	0.015	0.793	0.842
Currently using any contraceptive method	0.614	0.014	2104	1105	1.846	0.024	0.585	0.643
Currently using modern method	0.378	0.013	2104	1105	1.521	0.034	0.352	0.404
Currently using pill	0.056	0.006	2104	1105	1.212	0.098	0.045	0.067
Currently using IUD	0.151	0.008	2104	1105	1.157	0.056	0.134	0.168
Currently using condom	0.081	0.007	2104	1105	1.400	0.087	0.067	0.095
Currently using injectables	0.013	0.002	2104	1105	1.024	0.196	0.008	0.018
Currently using female sterilization	0.077	0.006	2104	1105	0.953	0.074	0.065	0.088
Currently using periodic abstinence	0.003	0.001	2104	1105	1.148	0.452	0.000	0.005
Currently using withdrawal	0.229	0.013	2104	1105	1.923	0.055	0.204	0.254
Obtained method from public sector source	0.723	0.020	822	420	1.648	0.028	0.683	0.763
Want no more children	0.572	0.013	2103	1105	1.447	0.023	0.546	0.597
Want to delay birth at least 2 years	0.174	0.011	2103	1105	1.745	0.063	0.152	0.196
Mothers recieved medical care at delivery	0.744	0.024	1691	911	5.270	0.033	0.696	0.793
Child having health card, seen	0.688	0.028	315	167	1.154	0.041	0.632	0.744
Child received BCG vaccination	0.922	0.014	317	167	0.868	0.015	0.894	0.950
Child received DPT vaccination (3 doses)	0.792	0.026	317	167	1.276	0.032	0.741	0.844
Child received polio vaccination (3 doses)	0.808	0.023	317	167	1.124	0.029	0.762	0.855
Child received measles vaccination	0.777	0.025	317	167	1.181	0.033	0.726	0.827
Child fully immunized	0.643	0.028	317	167	1.109	0.044	0.587	0.700
Height-for-age (-2SD)	0.211	0.018	1174	631	2.253	0.085	0.175	0.246
Weight-for-height (-2SD)	0.015	0.004	1174	631	1.291	0.267	0.007	0.023
Weight-for-age (-2SD)	0.058	0.009	1174	631	1.649	0.151	0.040	0.075
BMI < 18.5	0.014	0.004	903	478	0.918	0.272	0.006	0.021

Table B 49 Sampling Errors: WesVar, Jackknife n Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.994	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.197	0.044	0.167	0.199
With secondary education or higher	0.298	0.011	7405	7405	3.980	0.036	0.277	0.319
Currently married (in union)	0.945	0.004	7405	7405	1.952	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.001	7042	6999	0.849	0.001	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.107	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.471	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	7042	6999	1.832	0.010	0.716	0.744
Currently using modern method	0.460	0.008	7042	6999	1.705	0.017	0.444	0.475
Currently using pill	0.053	0.003	7042	6999	1.666	0.065	0.046	0.060
Currently using IUD	0.169	0.006	7042	6999	1.733	0.035	0.157	0.181
Currently using condom	0.143	0.006	7042	6999	2.083	0.042	0.131	0.155
Currently using injectables	0.009	0.001	7042	6999	1.415	0.152	0.006	0.011
Currently using female sterilization	0.083	0.004	7042	6999	1.619	0.050	0.075	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.665	0.203	0.003	0.008
Currently using withdrawal	0.262	0.007	7042	6999	1.798	0.027	0.248	0.276
Obtained method from public sector source	0.600	0.012	3162	3243	1.986	0.020	0.575	0.624
Want no more children	0.588	0.007	7038	6993	1.352	0.012	0.574	0.602
Want to delay birth at least 2 years	0.143	0.005	7038	6993	1.656	0.038	0.133	0.154
Mothers recieved medical care at delivery	0.913	0.008	3857	3463	3.407	0.009	0.896	0.930
Child having health card, seen	0.727	0.022	772	710	1.873	0.030	0.683	0.771
Child received BCG vaccination	0.959	0.008	774	711	1.147	0.008	0.944	0.974
Child received DPT vaccination (3 doses)	0.893	0.012	774	711	1.115	0.013	0.870	0.917
Child received polio vaccination (3 doses)	0.888	0.013	774	711	1.328	0.015	0.862	0.914
Child received measles vaccination	0.893	0.015	774	711	1.719	0.016	0.863	0.922
Child fully immunized	0.805	0.018	774	711	1.618	0.022	0.769	0.842
Height-for-age (-2SD)	0.103	0.008	2733	2474	1.662	0.073	0.088	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.502	0.251	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.340	0.130	0.021	0.036
BMI < 18.5	0.016	0.003	2465	2315	1.272	0.176	0.011	0.022

Table B 50 Sampling Errors: WesVar, Jackknife n Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	3.919	0.063	0.133	0.172
With secondary education or higher	0.348	0.014	5429	5615	4.576	0.040	0.320	0.375
Currently married (in union)	0.941	0.005	5429	5615	2.031	0.005	0.932	0.950
Knowing any contraceptive method	0.999	0.000	5141	5284	0.839	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.246	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.005	5141	5284	1.573	0.005	0.917	0.935
Currently using any contraceptive method	0.743	0.008	5141	5284	1.944	0.011	0.726	0.760
Currently using modern method	0.478	0.009	5141	5284	1.740	0.019	0.460	0.496
Currently using pill	0.056	0.004	5141	5284	1.783	0.077	0.047	0.064
Currently using IUD	0.175	0.007	5141	5284	1.721	0.040	0.161	0.189
Currently using condom	0.154	0.007	5141	5284	2.111	0.047	0.139	0.169
Currently using injectables	0.008	0.002	5141	5284	1.543	0.195	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.712	0.061	0.073	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.629	0.214	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.749	0.031	0.240	0.272
Obtained method from public sector source	0.580	0.014	2445	2550	1.970	0.024	0.551	0.608
Want no more children	0.583	0.008	5137	5277	1.326	0.014	0.567	0.599
Want to delay birth at least 2 years	0.146	0.007	5137	5277	1.783	0.045	0.133	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.161	0.006	0.945	0.969
Child having health card, seen	0.758	0.028	523	514	2.170	0.036	0.703	0.813
Child received BCG vaccination	0.966	0.009	524	515	1.374	0.010	0.947	0.984
Child received DPT vaccination (3 doses)	0.921	0.013	524	515	1.133	0.014	0.895	0.946
Child received polio vaccination (3 doses)	0.917	0.015	524	515	1.577	0.017	0.887	0.947
Child received measles vaccination	0.903	0.019	524	515	2.073	0.021	0.866	0.940
Child fully immunized	0.842	0.023	524	515	2.013	0.027	0.796	0.887
Height-for-age (-2SD)	0.076	0.008	1846	1781	1.535	0.101	0.061	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.713	0.332	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.346	0.185	0.013	0.029
BMI < 18.5	0.013	0.003	1742	1713	1.333	0.240	0.007	0.019

Table B 51 Sampling Errors: WesVar, Jackknife n Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.015	1976	1790	2.085	0.052	0.252	0.310
With secondary education or higher	0.142	0.013	1976	1790	2.705	0.091	0.116	0.168
Currently married (in union)	0.959	0.006	1976	1790	1.526	0.006	0.948	0.970
Knowing any contraceptive method	0.995	0.002	1901	1716	0.916	0.002	0.992	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	1.086	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.009	1901	1716	1.303	0.010	0.855	0.890
Currently using any contraceptive method	0.689	0.013	1901	1716	1.540	0.019	0.663	0.716
Currently using modern method	0.404	0.014	1901	1716	1.655	0.036	0.375	0.433
Currently using pill	0.046	0.005	1901	1716	1.129	0.111	0.035	0.056
Currently using IUD	0.150	0.011	1901	1716	1.775	0.073	0.128	0.171
Currently using condom	0.110	0.010	1901	1716	1.992	0.092	0.090	0.130
Currently using injectables	0.011	0.003	1901	1716	1.163	0.234	0.006	0.016
Currently using female sterilization	0.085	0.007	1901	1716	1.288	0.086	0.070	0.099
Currently using periodic abstinence	0.002	0.001	1901	1716	1.679	0.643	0.000	0.005
Currently using withdrawal	0.281	0.014	1901	1716	1.967	0.052	0.252	0.309
Obtained method from public sector source	0.675	0.025	717	692	2.099	0.038	0.624	0.726
Want no more children	0.603	0.013	1901	1716	1.431	0.022	0.576	0.630
Want to delay birth at least 2 years	0.134	0.008	1901	1716	1.140	0.062	0.117	0.151
Mothers recieved medical care at delivery	0.802	0.024	1268	988	4.455	0.029	0.754	0.849
Child having health card, seen	0.646	0.032	249	195	1.095	0.049	0.582	0.709
Child received BCG vaccination	0.943	0.013	250	196	0.783	0.014	0.917	0.969
Child received DPT vaccination (3 doses)	0.822	0.026	250	196	1.184	0.032	0.769	0.874
Child received polio vaccination (3 doses)	0.814	0.026	250	196	1.113	0.032	0.762	0.866
Child received measles vaccination	0.866	0.021	250	196	0.964	0.024	0.823	0.908
Child fully immunized	0.710	0.029	250	196	1.049	0.041	0.651	0.769
Height-for-age (-2SD)	0.174	0.018	887	692	1.955	0.102	0.138	0.209
Weight-for-height (-2SD)	0.010	0.003	887	692	0.882	0.322	0.003	0.016
Weight-for-age (-2SD)	0.048	0.008	887	692	1.376	0.176	0.031	0.064
BMI < 18.5	0.026	0.006	723	601	1.212	0.252	0.013	0.039

Table B 52 Sampling Errors: WesVar, Jackknife n Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.009	1876	3252	1.188	0.010	0.842	0.877
No education	0.119	0.015	1876	3252	3.782	0.122	0.090	0.148
With secondary education or higher	0.338	0.021	1876	3252	3.827	0.063	0.295	0.381
Currently married (in union)	0.938	0.007	1876	3252	1.590	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	1763	3049	0.806	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.229	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	1763	3049	1.285	0.007	0.927	0.952
Currently using any contraceptive method	0.763	0.013	1763	3049	1.541	0.016	0.738	0.788
Currently using modern method	0.482	0.013	1763	3049	1.222	0.027	0.456	0.509
Currently using pill	0.058	0.007	1763	3049	1.482	0.117	0.045	0.072
Currently using IUD	0.174	0.011	1763	3049	1.435	0.062	0.153	0.196
Currently using condom	0.156	0.011	1763	3049	1.591	0.070	0.134	0.177
Currently using injectables	0.008	0.002	1763	3049	1.258	0.300	0.003	0.013
Currently using female sterilization	0.084	0.008	1763	3049	1.445	0.095	0.068	0.100
Currently using periodic abstinence	0.006	0.002	1763	3049	1.108	0.338	0.002	0.009
Currently using withdrawal	0.272	0.012	1763	3049	1.301	0.045	0.247	0.296
Obtained method from public sector source	0.536	0.022	859	1483	1.621	0.040	0.492	0.579
Want no more children	0.587	0.012	1761	3044	1.025	0.020	0.563	0.610
Want to delay birth at least 2 years	0.138	0.010	1761	3044	1.398	0.070	0.119	0.158
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.692	0.007	0.965	0.994
Child having health card, seen	0.797	0.047	139	256	1.900	0.059	0.703	0.891
Child received BCG vaccination	0.973	0.016	139	256	1.334	0.016	0.941	1.000
Child received DPT vaccination (3 doses)	0.937	0.021	139	256	1.036	0.022	0.895	0.979
Child received polio vaccination (3 doses)	0.917	0.028	139	256	1.466	0.031	0.860	0.974
Child received measles vaccination	0.904	0.035	139	256	1.922	0.038	0.835	0.973
Child fully immunized	0.846	0.042	139	256	1.873	0.050	0.762	0.930
Height-for-age (-2SD)	0.076	0.013	481	848	1.159	0.171	0.050	0.102
Weight-for-height (-2SD)	0.009	0.005	481	848	1.418	0.581	0.000	0.019
Weight-for-age (-2SD)	0.011	0.005	481	848	1.242	0.494	0.000	0.021
BMI < 18.5	0.015	0.006	484	850	1.040	0.377	0.004	0.026

Table B 53 Sampling Errors: WesVar, Jackknife n Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.020	1013	894	1.904	0.027	0.677	0.755
No education	0.197	0.021	1013	894	2.919	0.108	0.154	0.240
With secondary education or higher	0.248	0.021	1013	894	2.290	0.083	0.207	0.289
Currently married (in union)	0.950	0.007	1013	894	1.015	0.007	0.936	0.964
Knowing any contraceptive method	0.995	0.002	962	849	0.942	0.002	0.990	0.999
Knowing any modern contraceptive method	0.991	0.003	962	849	1.077	0.003	0.984	0.997
Ever used any contraceptive method	0.881	0.013	962	849	1.457	0.014	0.856	0.906
Currently using any contraceptive method	0.704	0.018	962	849	1.540	0.026	0.667	0.740
Currently using modern method	0.458	0.020	962	849	1.543	0.044	0.418	0.498
Currently using pill	0.041	0.006	962	849	1.033	0.159	0.028	0.054
Currently using IUD	0.183	0.014	962	849	1.238	0.076	0.155	0.210
Currently using condom	0.130	0.014	962	849	1.572	0.105	0.102	0.157
Currently using injectables	0.005	0.002	962	849	1.052	0.472	0.000	0.010
Currently using female sterilization	0.100	0.009	962	849	0.911	0.092	0.082	0.118
Currently using periodic abstinence	0.006	0.003	962	849	1.615	0.545	0.000	0.012
Currently using withdrawal	0.241	0.015	962	849	1.201	0.063	0.211	0.271
Obtained method from public sector source	0.719	0.026	441	393	1.426	0.036	0.668	0.770
Want no more children	0.573	0.016	962	849	0.988	0.028	0.541	0.604
Want to delay birth at least 2 years	0.121	0.012	962	849	1.295	0.099	0.097	0.145
Mothers recieved medical care at delivery	0.941	0.010	497	441	0.894	0.011	0.920	0.961
Child having health card, seen	0.626	0.048	108	95	1.056	0.076	0.530	0.721
Child received BCG vaccination	0.961	0.020	108	95	1.089	0.020	0.922	1.000
Child received DPT vaccination (3 doses)	0.881	0.031	108	95	0.974	0.035	0.820	0.943
Child received polio vaccination (3 doses)	0.877	0.031	108	95	0.948	0.035	0.816	0.939
Child received measles vaccination	0.939	0.021	108	95	0.855	0.023	0.896	0.981
Child fully immunized	0.818	0.035	108	95	0.903	0.043	0.747	0.888
Height-for-age (-2SD)	0.076	0.015	382	339	1.250	0.199	0.046	0.106
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.009	382	339	1.151	0.315	0.011	0.048
BMI < 18.5	0.013	0.006	357	316	0.991	0.456	0.001	0.025

Table B 54 Sampling Errors: WesVar, Jackknife n Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.018	1460	1631	2.294	0.024	0.693	0.763
No education	0.072	0.009	1460	1631	1.716	0.123	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.357	0.054	0.322	0.399
Currently married (in union)	0.945	0.008	1460	1631	1.595	0.008	0.930	0.960
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.612	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.871	0.006	0.930	0.953
Currently using any contraceptive method	0.755	0.013	1386	1542	1.333	0.018	0.729	0.782
Currently using modern method	0.488	0.018	1386	1542	1.748	0.036	0.453	0.524
Currently using pill	0.049	0.006	1386	1542	1.020	0.119	0.037	0.061
Currently using IUD	0.184	0.011	1386	1542	1.158	0.061	0.162	0.206
Currently using condom	0.178	0.014	1386	1542	1.824	0.078	0.150	0.206
Currently using injectables	0.009	0.003	1386	1542	1.221	0.309	0.003	0.015
Currently using female sterilization	0.064	0.007	1386	1542	1.160	0.111	0.050	0.078
Currently using periodic abstinence	0.009	0.003	1386	1542	1.637	0.362	0.002	0.015
Currently using withdrawal	0.258	0.016	1386	1542	1.916	0.063	0.225	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.630	0.040	0.548	0.644
Want no more children	0.616	0.014	1385	1540	1.175	0.023	0.588	0.645
Want to delay birth at least 2 years	0.149	0.011	1385	1540	1.217	0.071	0.128	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.275	0.005	0.975	0.996
Child having health card, seen	0.709	0.045	142	149	1.371	0.063	0.620	0.799
Child received BCG vaccination	0.964	0.015	142	149	0.927	0.016	0.934	0.994
Child received DPT vaccination (3 doses)	0.943	0.018	142	149	0.848	0.019	0.907	0.979
Child received polio vaccination (3 doses)	0.945	0.014	142	149	0.569	0.015	0.916	0.974
Child received measles vaccination	0.949	0.017	142	149	0.848	0.018	0.914	0.983
Child fully immunized	0.900	0.024	142	149	0.935	0.027	0.852	0.949
Height-for-age (-2SD)	0.045	0.010	472	533	1.205	0.233	0.024	0.066
Weight-for-height (-2SD)	0.005	0.003	472	533	0.940	0.631	0.000	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.507	0.386	0.005	0.037
BMI < 18.5	0.019	0.007	470	529	1.051	0.337	0.006	0.032

Table B 55 Sampling Errors: WesVar, Jackknife n Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.023	868	477	1.843	0.041	0.507	0.599
No education	0.156	0.022	868	477	3.110	0.139	0.112	0.199
With secondary education or higher	0.305	0.024	868	477	2.266	0.077	0.258	0.352
Currently married (in union)	0.954	0.008	868	477	1.111	0.008	0.939	0.969
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.729	0.002	0.994	1.000
Ever used any contraceptive method	0.928	0.011	827	455	1.481	0.012	0.906	0.950
Currently using any contraceptive method	0.756	0.018	827	455	1.412	0.023	0.720	0.791
Currently using modern method	0.414	0.023	827	455	1.847	0.056	0.368	0.461
Currently using pill	0.052	0.008	827	455	1.188	0.162	0.035	0.069
Currently using IUD	0.098	0.014	827	455	1.712	0.138	0.071	0.126
Currently using condom	0.120	0.013	827	455	1.238	0.105	0.095	0.145
Currently using injectables	0.009	0.004	827	455	1.383	0.420	0.002	0.017
Currently using female sterilization	0.129	0.016	827	455	1.807	0.121	0.098	0.161
Currently using periodic abstinence	0.004	0.002	827	455	0.637	0.431	0.001	0.008
Currently using withdrawal	0.336	0.024	827	455	2.050	0.070	0.288	0.383
Obtained method from public sector source	0.600	0.030	361	191	1.375	0.050	0.540	0.660
Want no more children	0.568	0.022	827	455	1.679	0.039	0.524	0.613
Want to delay birth at least 2 years	0.124	0.012	827	455	1.067	0.095	0.100	0.148
Mothers recieved medical care at delivery	0.960	0.022	352	197	4.589	0.023	0.915	1.000
Child having health card, seen	0.746	0.064	68	43	1.490	0.086	0.617	0.875
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.054	68	43	1.859	0.061	0.774	0.988
Child received polio vaccination (3 doses)	0.858	0.057	68	43	1.826	0.067	0.743	0.972
Child received measles vaccination	0.978	0.022	68	43	1.542	0.023	0.934	1.000
Child fully immunized	0.836	0.057	68	43	1.621	0.068	0.721	0.950
Height-for-age (-2SD)	0.070	0.023	224	124	1.817	0.328	0.024	0.116
Weight-for-height (-2SD)	0.015	0.010	224	124	1.358	0.623	0.000	0.035
Weight-for-age (-2SD)	0.028	0.013	224	124	1.313	0.451	0.003	0.053
BMI < 18.5	0.030	0.012	251	142	1.326	0.412	0.005	0.055

Table B 56 Sampling Errors: WesVar, Jackknife n Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.012	2188	1151	1.411	0.019	0.610	0.659
No education	0.524	0.021	2188	1151	3.717	0.039	0.483	0.565
With secondary education or higher	0.133	0.012	2188	1151	2.766	0.091	0.109	0.157
Currently married (in union)	0.960	0.005	2188	1151	1.309	0.005	0.950	0.970
Knowing any contraceptive method	0.993	0.002	2104	1105	1.246	0.002	0.989	0.997
Knowing any modern contraceptive method	0.990	0.002	2104	1105	1.188	0.002	0.985	0.995
Ever used any contraceptive method	0.818	0.013	2104	1105	2.323	0.016	0.792	0.843
Currently using any contraceptive method	0.614	0.016	2104	1105	2.146	0.025	0.583	0.645
Currently using modern method	0.378	0.013	2104	1105	1.492	0.034	0.352	0.404
Currently using pill	0.056	0.005	2104	1105	1.141	0.095	0.045	0.067
Currently using IUD	0.151	0.010	2104	1105	1.799	0.069	0.130	0.172
Currently using condom	0.081	0.007	2104	1105	1.442	0.088	0.067	0.095
Currently using injectables	0.013	0.002	2104	1105	0.988	0.192	0.008	0.017
Currently using female sterilization	0.077	0.006	2104	1105	1.034	0.077	0.065	0.089
Currently using periodic abstinence	0.003	0.001	2104	1105	1.133	0.449	0.000	0.005
Currently using withdrawal	0.229	0.012	2104	1105	1.579	0.050	0.206	0.252
Obtained method from public sector source	0.723	0.020	822	420	1.648	0.028	0.683	0.763
Want no more children	0.572	0.013	2103	1105	1.447	0.023	0.546	0.597
Want to delay birth at least 2 years	0.174	0.011	2103	1105	1.745	0.063	0.152	0.196
Mothers recieved medical care at delivery	0.744	0.024	1691	911	5.307	0.033	0.695	0.793
Child having health card, seen	0.688	0.028	315	167	1.154	0.041	0.632	0.744
Child received BCG vaccination	0.922	0.014	317	167	0.868	0.015	0.894	0.950
Child received DPT vaccination (3 doses)	0.792	0.026	317	167	1.276	0.032	0.741	0.844
Child received polio vaccination (3 doses)	0.808	0.023	317	167	1.124	0.029	0.762	0.855
Child received measles vaccination	0.777	0.025	317	167	1.181	0.033	0.726	0.827
Child fully immunized	0.643	0.028	317	167	1.109	0.044	0.587	0.700
Height-for-age (-2SD)	0.211	0.018	1174	631	2.253	0.085	0.175	0.246
Weight-for-height (-2SD)	0.015	0.004	1174	631	1.291	0.267	0.007	0.023
Weight-for-age (-2SD)	0.058	0.009	1174	631	1.649	0.151	0.040	0.075
BMI < 18.5	0.014	0.004	903	478	0.918	0.272	0.006	0.021

Table B 57 Sampling Errors: SAS/STAT, Taylor Series Linearization, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.751	0.009	0.745	0.771
No education	0.183	0.008	7405	7405	3.024	0.043	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.422	0.038	0.276	0.320
Currently married (in union)	0.945	0.004	7405	7405	2.103	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.000	7042	6999	0.775	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.050	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.350	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	7042	6999	1.656	0.009	0.716	0.744
Currently using modern method	0.460	0.007	7042	6999	1.541	0.016	0.445	0.475
Currently using pill	0.053	0.003	7042	6999	1.647	0.064	0.047	0.060
Currently using IUD	0.169	0.006	7042	6999	1.601	0.033	0.158	0.180
Currently using condom	0.143	0.006	7042	6999	2.082	0.042	0.131	0.155
Currently using injectables	0.009	0.001	7042	6999	1.503	0.157	0.006	0.011
Currently using female sterilization	0.083	0.004	7042	6999	1.561	0.049	0.075	0.091
Currently using periodic abstinence	0.006	0.001	7042	6999	1.700	0.205	0.003	0.008
Currently using withdrawal	0.262	0.007	7042	6999	1.982	0.028	0.247	0.277
Obtained method from public sector source	0.600	0.011	3162	3243	1.702	0.019	0.577	0.623
Want no more children	0.588	0.007	7039	6993	1.522	0.012	0.573	0.602
Want to delay birth at least 2 years	0.143	0.006	7039	6993	1.791	0.039	0.132	0.154
Mothers recieved medical care at delivery	0.913	0.008	3857	3463	3.026	0.009	0.897	0.929
Child having health card, seen	0.726	0.020	774	711	1.572	0.028	0.686	0.766
Child received BCG vaccination	0.959	0.005	774	711	0.557	0.006	0.949	0.970
Child received DPT vaccination (3 doses)	0.893	0.012	774	711	1.114	0.013	0.870	0.917
Child received polio vaccination (3 doses)	0.888	0.013	774	711	1.300	0.015	0.863	0.914
Child received measles vaccination	0.893	0.015	774	711	1.911	0.017	0.862	0.923
Child fully immunized	0.805	0.018	774	711	1.597	0.022	0.769	0.841
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.602	0.071	0.089	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.479	0.249	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.282	0.127	0.021	0.036
BMI < 18.5	0.439	0.010	1193	1024	1.346	0.023	0.419	0.460

Table B 58 Sampling Errors: SAS/STAT, Taylor Series Linearization, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.009	5429	5615	3.788	0.062	0.133	0.171
With secondary education or higher	0.348	0.015	5429	5615	5.190	0.042	0.318	0.377
Currently married (in union)	0.941	0.005	5429	5615	2.291	0.005	0.931	0.951
Knowing any contraceptive method	0.999	0.000	5141	5284	0.868	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.268	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.401	0.005	0.917	0.935
Currently using any contraceptive method	0.743	0.008	5141	5284	1.789	0.011	0.727	0.760
Currently using modern method	0.478	0.008	5141	5284	1.459	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.743	0.076	0.047	0.064
Currently using IUD	0.175	0.007	5141	5284	1.516	0.037	0.162	0.188
Currently using condom	0.154	0.007	5141	5284	2.113	0.048	0.139	0.169
Currently using injectables	0.008	0.002	5141	5284	1.644	0.201	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.610	0.059	0.073	0.092
Currently using periodic abstinence	0.007	0.001	5141	5284	1.664	0.216	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.880	0.033	0.239	0.273
Obtained method from public sector source	0.580	0.013	2445	2550	1.618	0.022	0.554	0.605
Want no more children	0.583	0.008	5138	5277	1.476	0.014	0.566	0.600
Want to delay birth at least 2 years	0.146	0.007	5138	5277	1.986	0.047	0.132	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.284	0.006	0.945	0.969
Child having health card, seen	0.758	0.026	524	515	1.878	0.034	0.706	0.809
Child received BCG vaccination	0.965	0.006	524	515	0.557	0.006	0.954	0.977
Child received DPT vaccination (3 doses)	0.921	0.013	524	515	1.225	0.014	0.894	0.947
Child received polio vaccination (3 doses)	0.917	0.016	524	515	1.668	0.017	0.886	0.948
Child received measles vaccination	0.903	0.020	524	515	2.475	0.023	0.862	0.944
Child fully immunized	0.842	0.023	524	515	2.024	0.027	0.796	0.887
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.438	0.097	0.061	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.771	0.338	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.389	0.188	0.013	0.029
BMI < 18.5	0.013	0.003	1742	1713	1.382	0.245	0.007	0.019

Table B 59 Sampling Errors: SAS/STAT, Taylor Series Linearization, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.847	0.049	0.253	0.308
With secondary education or higher	0.142	0.013	1976	1790	2.694	0.091	0.116	0.168
Currently married (in union)	0.959	0.005	1976	1790	1.153	0.005	0.949	0.968
Knowing any contraceptive method	0.995	0.001	1901	1716	0.726	0.001	0.993	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.947	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.009	1901	1716	1.258	0.010	0.855	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.237	0.017	0.666	0.713
Currently using modern method	0.404	0.015	1901	1716	1.862	0.038	0.373	0.434
Currently using pill	0.046	0.005	1901	1716	1.159	0.113	0.035	0.056
Currently using IUD	0.150	0.011	1901	1716	1.932	0.076	0.127	0.172
Currently using condom	0.110	0.010	1901	1716	1.993	0.092	0.090	0.130
Currently using injectables	0.011	0.003	1901	1716	1.209	0.238	0.006	0.016
Currently using female sterilization	0.085	0.007	1901	1716	1.379	0.089	0.070	0.100
Currently using periodic abstinence	0.002	0.001	1901	1716	1.662	0.640	0.000	0.005
Currently using withdrawal	0.280	0.016	1901	1716	2.327	0.056	0.249	0.312
Obtained method from public sector source	0.675	0.026	717	692	2.233	0.039	0.623	0.727
Want no more children	0.603	0.014	1901	1716	1.659	0.024	0.574	0.632
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.997	0.058	0.118	0.149
Mothers recieved medical care at delivery	0.802	0.021	1268	988	3.485	0.026	0.760	0.844
Child having health card, seen	0.644	0.027	250	196	0.791	0.042	0.590	0.698
Child received BCG vaccination	0.943	0.011	250	196	0.561	0.012	0.921	0.965
Child received DPT vaccination (3 doses)	0.822	0.024	250	196	1.019	0.030	0.773	0.871
Child received polio vaccination (3 doses)	0.814	0.023	250	196	0.853	0.028	0.768	0.859
Child received measles vaccination	0.865	0.016	250	196	0.575	0.019	0.833	0.898
Child fully immunized	0.710	0.026	250	196	0.815	0.037	0.658	0.762
Height-for-age (-2SD)	0.174	0.017	887	692	1.859	0.100	0.139	0.208
Weight-for-height (-2SD)	0.009	0.003	887	692	0.631	0.273	0.004	0.015
Weight-for-age (-2SD)	0.048	0.008	887	692	1.115	0.159	0.033	0.063
BMI < 18.5	0.026	0.007	723	601	1.306	0.262	0.012	0.039

Table B 60 Sampling Errors: SAS/STAT, Taylor Series Linearization, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.859	0.008	1876	3252	1.090	0.010	0.842	0.876
No education	0.119	0.014	1876	3252	3.517	0.118	0.091	0.147
With secondary education or higher	0.338	0.023	1876	3252	4.455	0.068	0.292	0.384
Currently married (in union)	0.938	0.007	1876	3252	1.723	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	1763	3049	0.550	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.124	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	1763	3049	1.151	0.006	0.927	0.952
Currently using any contraceptive method	0.763	0.012	1763	3049	1.459	0.016	0.738	0.787
Currently using modern method	0.482	0.012	1763	3049	0.951	0.024	0.459	0.505
Currently using pill	0.058	0.007	1763	3049	1.397	0.113	0.045	0.071
Currently using IUD	0.174	0.011	1763	3049	1.355	0.060	0.153	0.195
Currently using condom	0.155	0.011	1763	3049	1.547	0.069	0.134	0.177
Currently using injectables	0.008	0.003	1763	3049	1.413	0.318	0.003	0.013
Currently using female sterilization	0.084	0.008	1763	3049	1.394	0.093	0.068	0.099
Currently using periodic abstinence	0.005	0.002	1763	3049	1.110	0.338	0.002	0.009
Currently using withdrawal	0.271	0.013	1763	3049	1.518	0.048	0.245	0.298
Obtained method from public sector source	0.536	0.020	859	1483	1.407	0.038	0.495	0.576
Want no more children	0.587	0.012	1761	3044	1.124	0.021	0.562	0.611
Want to delay birth at least 2 years	0.138	0.010	1761	3044	1.610	0.076	0.117	0.159
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.689	0.007	0.965	0.994
Child having health card, seen	0.797	0.041	139	256	1.421	0.051	0.716	0.879
Child received BCG vaccination	0.973	0.003	139	256	0.033	0.003	0.968	0.978
Child received DPT vaccination (3 doses)	0.937	0.022	139	256	1.096	0.023	0.894	0.980
Child received polio vaccination (3 doses)	0.917	0.029	139	256	1.496	0.031	0.860	0.974
Child received measles vaccination	0.904	0.037	139	256	2.214	0.041	0.830	0.979
Child fully immunized	0.846	0.041	139	256	1.775	0.048	0.764	0.928
Height-for-age (-2SD)	0.076	0.012	481	848	1.024	0.161	0.052	0.100
Weight-for-height (-2SD)	0.009	0.005	481	848	1.470	0.592	0.000	0.019
Weight-for-age (-2SD)	0.010	0.005	481	848	1.274	0.501	0.000	0.021
BMI < 18.5	0.015	0.006	484	850	1.117	0.391	0.003	0.027

Table B 61 Sampling Errors: SAS/STAT, Taylor Series Linearization, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.689	0.026	0.679	0.753
No education	0.197	0.019	1013	894	2.297	0.096	0.159	0.235
With secondary education or higher	0.248	0.018	1013	894	1.828	0.074	0.211	0.285
Currently married (in union)	0.950	0.007	1013	894	1.000	0.007	0.936	0.963
Knowing any contraceptive method	0.995	0.002	962	849	0.979	0.002	0.990	0.999
Knowing any modern contraceptive method	0.991	0.003	962	849	1.181	0.003	0.984	0.997
Ever used any contraceptive method	0.881	0.013	962	849	1.553	0.015	0.855	0.907
Currently using any contraceptive method	0.704	0.018	962	849	1.509	0.026	0.668	0.740
Currently using modern method	0.458	0.021	962	849	1.713	0.046	0.416	0.500
Currently using pill	0.041	0.007	962	849	1.202	0.172	0.027	0.055
Currently using IUD	0.183	0.015	962	849	1.479	0.083	0.152	0.213
Currently using condom	0.129	0.013	962	849	1.483	0.102	0.103	0.156
Currently using injectables	0.005	0.002	962	849	0.614	0.361	0.001	0.008
Currently using female sterilization	0.100	0.010	962	849	0.970	0.095	0.081	0.119
Currently using periodic abstinence	0.006	0.003	962	849	1.681	0.556	0.000	0.012
Currently using withdrawal	0.241	0.016	962	849	1.342	0.066	0.209	0.273
Obtained method from public sector source	0.719	0.024	441	392	1.267	0.034	0.670	0.767
Want no more children	0.573	0.016	962	849	0.979	0.028	0.541	0.604
Want to delay birth at least 2 years	0.121	0.011	962	849	1.122	0.092	0.099	0.144
Mothers recieved medical care at delivery	0.940	0.009	497	441	0.791	0.010	0.922	0.959
Child having health card, seen	0.626	0.043	108	95	0.831	0.068	0.540	0.711
Child received BCG vaccination	0.961	0.016	108	95	0.733	0.017	0.928	0.993
Child received DPT vaccination (3 doses)	0.881	0.028	108	95	0.816	0.032	0.825	0.938
Child received polio vaccination (3 doses)	0.877	0.029	108	95	0.835	0.033	0.819	0.935
Child received measles vaccination	0.939	0.022	108	95	0.899	0.023	0.895	0.983
Child fully immunized	0.818	0.034	108	95	0.836	0.042	0.750	0.886
Height-for-age (-2SD)	0.076	0.015	382	339	1.232	0.198	0.046	0.106
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.257	0.329	0.010	0.049
BMI < 18.5	0.013	0.006	357	316	1.032	0.466	0.001	0.025

Table B 62 Sampling Errors: SAS/STAT, Taylor Series Linearization, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.718	0.021	0.697	0.758
No education	0.072	0.009	1460	1631	1.771	0.125	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.250	0.052	0.323	0.398
Currently married (in union)	0.945	0.008	1460	1631	1.660	0.008	0.930	0.961
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.614	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.815	0.006	0.930	0.953
Currently using any contraceptive method	0.755	0.012	1386	1542	1.038	0.016	0.732	0.779
Currently using modern method	0.488	0.018	1386	1542	1.795	0.037	0.452	0.524
Currently using pill	0.049	0.006	1386	1542	1.117	0.125	0.037	0.061
Currently using IUD	0.184	0.010	1386	1542	0.988	0.056	0.163	0.205
Currently using condom	0.178	0.014	1386	1542	1.977	0.081	0.149	0.207
Currently using injectables	0.009	0.003	1386	1542	1.248	0.313	0.003	0.015
Currently using female sterilization	0.064	0.007	1386	1542	1.173	0.111	0.050	0.078
Currently using periodic abstinence	0.009	0.003	1386	1542	1.713	0.370	0.002	0.016
Currently using withdrawal	0.257	0.016	1386	1542	1.813	0.061	0.226	0.289
Obtained method from public sector source	0.596	0.024	679	757	1.587	0.040	0.549	0.644
Want no more children	0.616	0.016	1385	1540	1.510	0.026	0.584	0.649
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.116	0.068	0.129	0.169
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.198	0.005	0.975	0.995
Child having health card, seen	0.709	0.047	142	149	1.484	0.066	0.616	0.803
Child received BCG vaccination	0.964	0.015	142	149	0.903	0.015	0.934	0.994
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.740	0.018	0.909	0.976
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.427	0.013	0.920	0.970
Child received measles vaccination	0.948	0.015	142	149	0.681	0.016	0.918	0.979
Child fully immunized	0.900	0.023	142	149	0.795	0.025	0.855	0.945
Height-for-age (-2SD)	0.045	0.010	472	533	1.104	0.223	0.025	0.065
Weight-for-height (-2SD)	0.005	0.003	472	533	0.940	0.631	0.000	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.582	0.395	0.004	0.038
BMI < 18.5	0.019	0.007	470	529	1.086	0.343	0.006	0.033

Table B 63 Sampling Errors: SAS/STAT, Taylor Series Linearization, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.019	868	477	1.265	0.034	0.515	0.591
No education	0.156	0.023	868	477	3.544	0.149	0.109	0.202
With secondary education or higher	0.305	0.022	868	477	1.912	0.071	0.262	0.348
Currently married (in union)	0.954	0.008	868	477	1.131	0.008	0.938	0.969
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.699	0.002	0.994	1.002
Ever used any contraceptive method	0.928	0.008	827	455	0.850	0.009	0.911	0.945
Currently using any contraceptive method	0.756	0.017	827	455	1.306	0.023	0.722	0.790
Currently using modern method	0.414	0.026	827	455	2.226	0.062	0.363	0.465
Currently using pill	0.052	0.008	827	455	0.963	0.146	0.037	0.067
Currently using IUD	0.098	0.014	827	455	1.741	0.139	0.071	0.126
Currently using condom	0.120	0.013	827	455	1.340	0.109	0.094	0.146
Currently using injectables	0.009	0.004	827	455	1.377	0.419	0.002	0.017
Currently using female sterilization	0.129	0.013	827	455	1.289	0.103	0.103	0.156
Currently using periodic abstinence	0.004	0.002	827	455	0.692	0.450	0.000	0.008
Currently using withdrawal	0.336	0.024	827	455	2.213	0.073	0.287	0.384
Obtained method from public sector source	0.600	0.024	361	191	0.897	0.041	0.551	0.649
Want no more children	0.568	0.020	827	455	1.378	0.036	0.528	0.609
Want to delay birth at least 2 years	0.124	0.013	827	455	1.199	0.101	0.099	0.149
Mothers recieved medical care at delivery	0.960	0.003	352	197	0.063	0.003	0.955	0.965
Child having health card, seen	0.746	0.047	68	43	0.787	0.063	0.652	0.840
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.052	68	43	1.742	0.059	0.776	0.985
Child received polio vaccination (3 doses)	0.858	0.047	68	43	1.227	0.055	0.763	0.952
Child received measles vaccination	0.978	0.002	68	43	0.018	0.002	0.973	0.983
Child fully immunized	0.836	0.047	68	43	1.057	0.056	0.743	0.929
Height-for-age (-2SD)	0.070	0.017	224	124	0.989	0.242	0.036	0.104
Weight-for-height (-2SD)	0.015	0.010	224	124	1.368	0.627	0.000	0.035
Weight-for-age (-2SD)	0.028	0.011	224	124	0.905	0.375	0.007	0.049
BMI < 18.5	0.030	0.013	251	142	1.358	0.418	0.005	0.055

Table B 64 Sampling Errors: SAS/STAT, Taylor Series Linearization, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.634	0.012	2188	1151	1.461	0.020	0.609	0.659
No education	0.524	0.022	2188	1151	4.124	0.041	0.480	0.567
With secondary education or higher	0.133	0.013	2188	1151	3.187	0.098	0.107	0.159
Currently married (in union)	0.960	0.005	2188	1151	1.539	0.005	0.950	0.970
Knowing any contraceptive method	0.993	0.002	2104	1105	0.901	0.002	0.990	0.997
Knowing any modern contraceptive method	0.990	0.002	2104	1105	0.801	0.002	0.986	0.994
Ever used any contraceptive method	0.818	0.012	2104	1105	2.121	0.015	0.793	0.842
Currently using any contraceptive method	0.614	0.014	2104	1105	1.822	0.023	0.585	0.642
Currently using modern method	0.378	0.013	2104	1105	1.516	0.034	0.352	0.404
Currently using pill	0.056	0.006	2104	1105	1.217	0.099	0.045	0.067
Currently using IUD	0.151	0.008	2104	1105	1.126	0.055	0.135	0.168
Currently using condom	0.081	0.007	2104	1105	1.391	0.087	0.067	0.095
Currently using injectables	0.013	0.002	2104	1105	0.907	0.184	0.008	0.017
Currently using female sterilization	0.077	0.006	2104	1105	0.936	0.073	0.066	0.088
Currently using periodic abstinence	0.003	0.001	2104	1105	1.148	0.452	0.000	0.005
Currently using withdrawal	0.229	0.013	2104	1105	1.863	0.055	0.204	0.254
Obtained method from public sector source	0.723	0.020	822	420	1.573	0.027	0.684	0.762
Want no more children	0.571	0.014	2104	1105	1.801	0.025	0.542	0.600
Want to delay birth at least 2 years	0.174	0.011	2104	1105	1.891	0.065	0.151	0.197
Mothers recieved medical care at delivery	0.744	0.022	1691	911	4.410	0.030	0.700	0.789
Child having health card, seen	0.685	0.029	317	167	1.231	0.042	0.627	0.743
Child received BCG vaccination	0.922	0.014	317	167	0.907	0.016	0.894	0.951
Child received DPT vaccination (3 doses)	0.792	0.025	317	167	1.243	0.032	0.741	0.843
Child received polio vaccination (3 doses)	0.808	0.023	317	167	1.046	0.028	0.763	0.854
Child received measles vaccination	0.777	0.024	317	167	1.009	0.030	0.730	0.824
Child fully immunized	0.643	0.027	317	167	1.028	0.042	0.589	0.698
Height-for-age (-2SD)	0.210	0.018	1174	631	2.319	0.086	0.174	0.247
Weight-for-height (-2SD)	0.015	0.004	1174	631	1.043	0.240	0.008	0.022
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.271	0.133	0.043	0.073
BMI < 18.5	0.014	0.003	903	478	0.814	0.256	0.007	0.020

Table B 65 Sampling Errors: SAS/STAT, Balanced Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.971	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.070	0.043	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.566	0.038	0.275	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.092	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.000	7042	6999	0.775	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.053	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.342	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	7042	6999	1.779	0.010	0.716	0.744
Currently using modern method	0.460	0.007	7042	6999	1.550	0.016	0.445	0.475
Currently using pill	0.053	0.003	7042	6999	1.631	0.064	0.047	0.060
Currently using IUD	0.169	0.006	7042	6999	1.637	0.034	0.157	0.180
Currently using condom	0.143	0.006	7042	6999	1.992	0.041	0.131	0.155
Currently using injectables	0.009	0.001	7042	6999	1.494	0.156	0.006	0.011
Currently using female sterilization	0.083	0.004	7042	6999	1.797	0.053	0.074	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.709	0.205	0.003	0.008
Currently using withdrawal	0.262	0.007	7042	6999	2.030	0.028	0.247	0.277
Obtained method from public sector source	0.600	0.012	3162	3243	1.762	0.019	0.577	0.623
Want no more children	0.588	0.007	7039	6993	1.536	0.012	0.573	0.602
Want to delay birth at least 2 years	0.143	0.006	7039	6993	1.779	0.039	0.132	0.154
Mothers recieved medical care at delivery	0.913	0.009	3857	3463	3.522	0.009	0.896	0.930
Child having health card, seen	0.726	0.021	774	711	1.720	0.029	0.684	0.768
Child received BCG vaccination	0.959	0.009	774	711	1.677	0.010	0.941	0.978
Child received DPT vaccination (3 doses)	0.893	0.011	774	711	1.007	0.012	0.871	0.916
Child received polio vaccination (3 doses)	0.888	0.012	774	711	1.173	0.014	0.864	0.913
Child received measles vaccination	0.893	0.014	774	711	1.562	0.016	0.865	0.920
Child fully immunized	0.805	0.018	774	711	1.674	0.023	0.768	0.842
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.504	0.069	0.089	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.466	0.248	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.268	0.126	0.021	0.035
BMI < 18.5	0.016	0.003	2465	2315	1.394	0.185	0.010	0.022

Table B 66 Sampling Errors: SAS/STAT, Balanced Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	3.808	0.062	0.133	0.171
With secondary education or higher	0.348	0.015	5429	5615	5.460	0.043	0.318	0.378
Currently married (in union)	0.941	0.005	5429	5615	2.294	0.005	0.931	0.951
Knowing any contraceptive method	0.999	0.000	5141	5284	0.865	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.268	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.366	0.005	0.918	0.935
Currently using any contraceptive method	0.743	0.008	5141	5284	1.906	0.011	0.726	0.760
Currently using modern method	0.478	0.008	5141	5284	1.445	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.717	0.075	0.048	0.064
Currently using IUD	0.175	0.007	5141	5284	1.554	0.038	0.162	0.188
Currently using condom	0.154	0.007	5141	5284	2.013	0.046	0.140	0.168
Currently using injectables	0.008	0.002	5141	5284	1.608	0.199	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.920	0.064	0.072	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.664	0.216	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.923	0.033	0.239	0.273
Obtained method from public sector source	0.580	0.013	2445	2550	1.646	0.022	0.554	0.605
Want no more children	0.583	0.008	5138	5277	1.504	0.014	0.566	0.600
Want to delay birth at least 2 years	0.146	0.007	5138	5277	1.971	0.047	0.133	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.208	0.006	0.945	0.969
Child having health card, seen	0.758	0.026	524	515	1.934	0.034	0.705	0.810
Child received BCG vaccination	0.965	0.012	524	515	2.159	0.012	0.942	0.989
Child received DPT vaccination (3 doses)	0.921	0.012	524	515	1.037	0.013	0.897	0.945
Child received polio vaccination (3 doses)	0.917	0.015	524	515	1.456	0.016	0.888	0.946
Child received measles vaccination	0.903	0.018	524	515	2.019	0.020	0.866	0.940
Child fully immunized	0.842	0.024	524	515	2.296	0.029	0.793	0.890
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.384	0.095	0.062	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.786	0.339	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.395	0.189	0.013	0.029
BMI < 18.5	0.013	0.003	1742	1713	1.436	0.250	0.007	0.020

Table B 67 Sampling Errors: SAS/STAT, Balanced Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.927	0.050	0.253	0.309
With secondary education or higher	0.142	0.013	1976	1790	2.660	0.090	0.116	0.168
Currently married (in union)	0.959	0.005	1976	1790	1.141	0.005	0.949	0.968
Knowing any contraceptive method	0.995	0.001	1901	1716	0.729	0.001	0.993	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.961	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.009	1901	1716	1.261	0.010	0.855	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.294	0.018	0.665	0.714
Currently using modern method	0.404	0.015	1901	1716	1.863	0.038	0.373	0.434
Currently using pill	0.046	0.005	1901	1716	1.207	0.115	0.035	0.056
Currently using IUD	0.150	0.011	1901	1716	1.950	0.076	0.127	0.172
Currently using condom	0.110	0.010	1901	1716	2.009	0.093	0.089	0.130
Currently using injectables	0.011	0.003	1901	1716	1.261	0.243	0.006	0.016
Currently using female sterilization	0.085	0.007	1901	1716	1.340	0.087	0.070	0.099
Currently using periodic abstinence	0.002	0.001	1901	1716	1.662	0.640	0.000	0.005
Currently using withdrawal	0.280	0.016	1901	1716	2.321	0.056	0.249	0.312
Obtained method from public sector source	0.675	0.027	717	692	2.361	0.040	0.621	0.729
Want no more children	0.603	0.015	1901	1716	1.676	0.024	0.574	0.632
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.977	0.058	0.118	0.149
Mothers recieved medical care at delivery	0.802	0.023	1268	988	4.316	0.029	0.755	0.848
Child having health card, seen	0.644	0.031	250	196	1.042	0.048	0.582	0.706
Child received BCG vaccination	0.943	0.014	250	196	0.896	0.015	0.915	0.971
Child received DPT vaccination (3 doses)	0.822	0.026	250	196	1.173	0.032	0.769	0.874
Child received polio vaccination (3 doses)	0.814	0.025	250	196	1.019	0.031	0.764	0.863
Child received measles vaccination	0.865	0.018	250	196	0.687	0.021	0.830	0.901
Child fully immunized	0.710	0.027	250	196	0.906	0.039	0.655	0.765
Height-for-age (-2SD)	0.174	0.017	887	692	1.701	0.096	0.140	0.207
Weight-for-height (-2SD)	0.009	0.002	887	692	0.562	0.257	0.005	0.014
Weight-for-age (-2SD)	0.048	0.007	887	692	1.092	0.157	0.033	0.063
BMI < 18.5	0.026	0.007	723	601	1.317	0.263	0.012	0.039

Table B 68 Sampling Errors: SAS/STAT, Balanced Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.858	0.008	1880	3256	1.014	0.009	0.842	0.874
No education	0.119	0.015	1880	3256	3.950	0.124	0.090	0.149
With secondary education or higher	0.338	0.023	1880	3256	4.378	0.068	0.292	0.383
Currently married (in union)	0.938	0.007	1880	3256	1.767	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	1767	3053	0.808	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	1767	3053	1.197	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	1767	3053	1.217	0.007	0.927	0.952
Currently using any contraceptive method	0.763	0.012	1767	3053	1.475	0.016	0.739	0.788
Currently using modern method	0.482	0.012	1767	3053	1.002	0.025	0.458	0.506
Currently using pill	0.058	0.006	1767	3053	1.347	0.111	0.045	0.071
Currently using IUD	0.174	0.011	1767	3053	1.440	0.062	0.152	0.196
Currently using condom	0.155	0.011	1767	3053	1.632	0.071	0.133	0.177
Currently using injectables	0.008	0.003	1767	3053	1.431	0.320	0.003	0.013
Currently using female sterilization	0.084	0.008	1767	3053	1.326	0.091	0.069	0.099
Currently using periodic abstinence	0.005	0.002	1767	3053	1.120	0.340	0.002	0.009
Currently using withdrawal	0.272	0.013	1767	3053	1.514	0.048	0.246	0.298
Obtained method from public sector source	0.536	0.021	860	1484	1.459	0.038	0.495	0.577
Want no more children	0.587	0.013	1765	3049	1.146	0.021	0.562	0.612
Want to delay birth at least 2 years	0.138	0.011	1765	3049	1.734	0.078	0.116	0.160
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.768	0.008	0.965	0.994
Child having health card, seen	0.797	0.042	139	256	1.487	0.052	0.714	0.881
Child received BCG vaccination	0.973	0.005	139	256	0.139	0.005	0.963	0.983
Child received DPT vaccination (3 doses)	0.937	0.022	139	256	1.114	0.023	0.894	0.981
Child received polio vaccination (3 doses)	0.917	0.029	139	256	1.490	0.031	0.860	0.974
Child received measles vaccination	0.904	0.037	139	256	2.182	0.041	0.830	0.978
Child fully immunized	0.846	0.040	139	256	1.733	0.048	0.765	0.927
Height-for-age (-2SD)	0.076	0.012	481	848	1.046	0.163	0.051	0.101
Weight-for-height (-2SD)	0.009	0.005	481	848	1.516	0.601	0.000	0.019
Weight-for-age (-2SD)	0.010	0.005	481	848	1.313	0.509	0.000	0.021
BMI < 18.5	0.015	0.006	484	850	1.107	0.390	0.003	0.026

Table B 69 Sampling Errors: SAS/STAT, Balanced Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.019	1013	894	1.742	0.0	0.679	0.753
No education	0.197	0.019	1013	894	2.243	0.1	0.160	0.234
With secondary education or higher	0.248	0.018	1013	894	1.792	0.1	0.212	0.284
Currently married (in union)	0.950	0.007	1013	894	1.017	0.0	0.936	0.964
Knowing any contraceptive method	0.995	0.002	962	849	0.960	0.0	0.990	0.999
Knowing any modern contraceptive method	0.991	0.003	962	849	1.183	0.0	0.984	0.997
Ever used any contraceptive method	0.881	0.013	962	849	1.546	0.0	0.855	0.907
Currently using any contraceptive method	0.704	0.018	962	849	1.515	0.0	0.668	0.740
Currently using modern method	0.458	0.021	962	849	1.740	0.0	0.415	0.500
Currently using pill	0.041	0.007	962	849	1.222	0.2	0.027	0.055
Currently using IUD	0.183	0.015	962	849	1.494	0.1	0.152	0.213
Currently using condom	0.129	0.013	962	849	1.477	0.1	0.103	0.156
Currently using injectables	0.005	0.002	962	849	0.615	0.4	0.001	0.008
Currently using female sterilization	0.100	0.010	962	849	0.997	0.1	0.081	0.119
Currently using periodic abstinence	0.006	0.003	962	849	1.708	0.6	0.000	0.012
Currently using withdrawal	0.241	0.016	962	849	1.345	0.1	0.209	0.273
Obtained method from public sector source	0.719	0.024	441	392	1.265	0.0	0.670	0.767
Want no more children	0.573	0.016	962	849	0.986	0.0	0.541	0.604
Want to delay birth at least 2 years	0.121	0.011	962	849	1.103	0.1	0.099	0.143
Mothers recieved medical care at delivery	0.940	0.009	497	441	0.775	0.0	0.922	0.959
Child having health card, seen	0.626	0.047	108	95	1.028	0.1	0.531	0.721
Child received BCG vaccination	0.961	0.020	108	95	1.164	0.0	0.920	1.001
Child received DPT vaccination (3 doses)	0.881	0.029	108	95	0.881	0.0	0.823	0.940
Child received polio vaccination (3 doses)	0.877	0.030	108	95	0.900	0.0	0.817	0.937
Child received measles vaccination	0.939	0.022	108	95	0.931	0.0	0.894	0.983
Child fully immunized	0.818	0.036	108	95	0.920	0.0	0.746	0.889
Height-for-age (-2SD)	0.076	0.015	382	339	1.263	0.2	0.046	0.107
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.286	0.3	0.010	0.049
BMI < 18.5	0.013	0.006	357	316	0.993	0.5	0.001	0.025

Table B 70 Sampling Errors: SAS/STAT, Balanced Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.733	0.021	0.697	0.759
No education	0.072	0.009	1460	1631	1.739	0.124	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.249	0.052	0.323	0.398
Currently married (in union)	0.945	0.008	1460	1631	1.666	0.008	0.930	0.961
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.610	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.799	0.006	0.930	0.953
Currently using any contraceptive method	0.755	0.012	1386	1542	1.021	0.015	0.732	0.779
Currently using modern method	0.488	0.018	1386	1542	1.789	0.037	0.452	0.524
Currently using pill	0.049	0.006	1386	1542	1.130	0.126	0.037	0.062
Currently using IUD	0.184	0.010	1386	1542	1.001	0.057	0.163	0.205
Currently using condom	0.178	0.015	1386	1542	1.991	0.081	0.149	0.207
Currently using injectables	0.009	0.003	1386	1542	1.244	0.312	0.003	0.015
Currently using female sterilization	0.064	0.007	1386	1542	1.178	0.112	0.050	0.078
Currently using periodic abstinence	0.009	0.003	1386	1542	1.732	0.373	0.002	0.016
Currently using withdrawal	0.257	0.016	1386	1542	1.854	0.062	0.225	0.289
Obtained method from public sector source	0.596	0.024	679	757	1.666	0.041	0.548	0.645
Want no more children	0.616	0.016	1387	1543	1.535	0.026	0.584	0.649
Want to delay birth at least 2 years	0.149	0.010	1387	1543	1.145	0.069	0.129	0.170
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.234	0.005	0.975	0.996
Child having health card, seen	0.709	0.052	142	149	1.878	0.074	0.605	0.814
Child received BCG vaccination	0.964	0.015	142	149	0.952	0.016	0.934	0.995
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.786	0.018	0.908	0.977
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.441	0.014	0.919	0.970
Child received measles vaccination	0.948	0.016	142	149	0.709	0.017	0.917	0.980
Child fully immunized	0.900	0.023	142	149	0.801	0.025	0.855	0.945
Height-for-age (-2SD)	0.045	0.010	472	533	1.159	0.228	0.024	0.066
Weight-for-height (-2SD)	0.005	0.003	472	533	0.950	0.635	-0.001	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.595	0.397	0.004	0.038
BMI < 18.5	0.019	0.007	470	529	1.072	0.341	0.006	0.033

Table B 71 Sampling Errors: SAS/STAT, Balanced Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.024	868	477	2.007	0.043	0.505	0.601
No education	0.156	0.023	868	477	3.511	0.148	0.109	0.202
With secondary education or higher	0.305	0.023	868	477	2.147	0.075	0.259	0.351
Currently married (in union)	0.954	0.007	868	477	1.094	0.008	0.939	0.969
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.689	0.002	0.994	1.002
Ever used any contraceptive method	0.928	0.010	827	455	1.132	0.010	0.909	0.947
Currently using any contraceptive method	0.756	0.016	827	455	1.178	0.021	0.723	0.788
Currently using modern method	0.414	0.026	827	455	2.336	0.063	0.362	0.467
Currently using pill	0.052	0.008	827	455	1.210	0.164	0.035	0.069
Currently using IUD	0.098	0.014	827	455	1.797	0.141	0.071	0.126
Currently using condom	0.120	0.013	827	455	1.401	0.111	0.093	0.147
Currently using injectables	0.009	0.004	827	455	1.418	0.425	0.001	0.017
Currently using female sterilization	0.129	0.014	827	455	1.498	0.111	0.101	0.158
Currently using periodic abstinence	0.004	0.002	827	455	0.725	0.460	0.000	0.008
Currently using withdrawal	0.336	0.024	827	455	2.094	0.071	0.288	0.383
Obtained method from public sector source	0.600	0.031	361	191	1.465	0.052	0.538	0.663
Want no more children	0.568	0.022	827	455	1.622	0.039	0.524	0.612
Want to delay birth at least 2 years	0.124	0.013	827	455	1.214	0.102	0.099	0.149
Mothers recieved medical care at delivery	0.941	0.011	356	200	0.728	0.011	0.920	0.963
Child having health card, seen	0.746	0.064	68	43	1.445	0.086	0.618	0.874
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.053	68	43	1.805	0.060	0.774	0.987
Child received polio vaccination (3 doses)	0.858	0.049	68	43	1.324	0.057	0.759	0.956
Child received measles vaccination	0.978	0.022	68	43	1.460	0.022	0.935	1.021
Child fully immunized	0.836	0.051	68	43	1.275	0.061	0.733	0.938
Height-for-age (-2SD)	0.070	0.023	224	124	1.833	0.330	0.024	0.117
Weight-for-height (-2SD)	0.015	0.010	224	124	1.349	0.623	0.000	0.034
Weight-for-age (-2SD)	0.028	0.013	224	124	1.421	0.470	0.002	0.054
BMI < 18.5	0.030	0.013	251	142	1.394	0.423	0.005	0.056

Table B 72 Sampling Errors: SAS/STAT, Balanced Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.637	0.012	2184	1146	1.453	0.019	0.612	0.661
No education	0.525	0.021	2184	1146	3.914	0.040	0.482	0.567
With secondary education or higher	0.133	0.013	2184	1146	3.129	0.097	0.108	0.159
Currently married (in union)	0.960	0.005	2184	1146	1.440	0.005	0.950	0.970
Knowing any contraceptive method	0.993	0.002	2100	1100	0.920	0.002	0.990	0.997
Knowing any modern contraceptive method	0.990	0.002	2100	1100	0.821	0.002	0.986	0.994
Ever used any contraceptive method	0.817	0.013	2100	1100	2.400	0.016	0.791	0.843
Currently using any contraceptive method	0.612	0.015	2100	1100	2.117	0.025	0.581	0.643
Currently using modern method	0.379	0.014	2100	1100	1.656	0.036	0.352	0.406
Currently using pill	0.056	0.006	2100	1100	1.225	0.099	0.045	0.068
Currently using IUD	0.152	0.008	2100	1100	1.162	0.056	0.135	0.169
Currently using condom	0.081	0.007	2100	1100	1.457	0.089	0.067	0.096
Currently using injectables	0.013	0.002	2100	1100	0.865	0.180	0.008	0.017
Currently using female sterilization	0.076	0.006	2100	1100	1.014	0.077	0.065	0.088
Currently using periodic abstinence	0.003	0.001	2100	1100	1.145	0.451	0.000	0.005
Currently using withdrawal	0.227	0.013	2100	1100	1.968	0.057	0.201	0.252
Obtained method from public sector source	0.722	0.020	821	419	1.654	0.028	0.682	0.762
Want no more children	0.571	0.015	2100	1100	1.864	0.026	0.541	0.600
Want to delay birth at least 2 years	0.175	0.011	2100	1100	1.908	0.066	0.152	0.198
Mothers recieved medical care at delivery	0.744	0.022	1691	911	4.131	0.029	0.701	0.787
Child having health card, seen	0.685	0.030	317	167	1.291	0.043	0.625	0.744
Child received BCG vaccination	0.922	0.015	317	167	0.987	0.016	0.892	0.952
Child received DPT vaccination (3 doses)	0.792	0.025	317	167	1.244	0.032	0.741	0.843
Child received polio vaccination (3 doses)	0.808	0.023	317	167	1.056	0.028	0.763	0.854
Child received measles vaccination	0.777	0.023	317	167	0.976	0.030	0.730	0.823
Child fully immunized	0.643	0.027	317	167	1.030	0.043	0.589	0.698
Height-for-age (-2SD)	0.210	0.018	1174	631	2.257	0.085	0.175	0.246
Weight-for-height (-2SD)	0.015	0.004	1174	631	0.972	0.232	0.008	0.022
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.312	0.135	0.042	0.074
BMI < 18.5	0.014	0.003	903	478	0.798	0.254	0.007	0.020

Table B 73 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.963	0.009	0.744	0.772
No education	0.183	0.008	7405	7405	3.072	0.043	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.561	0.038	0.275	0.321
Currently married (in union)	0.945	0.004	7405	7405	2.100	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.000	7042	6999	0.772	0.000	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.050	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.004	7042	6999	1.436	0.004	0.905	0.921
Currently using any contraceptive method	0.730	0.007	7042	6999	1.685	0.009	0.716	0.744
Currently using modern method	0.460	0.007	7042	6999	1.584	0.016	0.445	0.475
Currently using pill	0.053	0.003	7042	6999	1.627	0.064	0.047	0.060
Currently using IUD	0.169	0.006	7042	6999	1.677	0.034	0.157	0.180
Currently using condom	0.143	0.006	7042	6999	2.123	0.042	0.131	0.155
Currently using injectables	0.009	0.001	7042	6999	1.510	0.157	0.006	0.011
Currently using female sterilization	0.083	0.004	7042	6999	1.528	0.049	0.075	0.091
Currently using periodic abstinence	0.006	0.001	7042	6999	1.697	0.205	0.003	0.008
Currently using withdrawal	0.262	0.007	7042	6999	1.991	0.028	0.247	0.277
Obtained method from public sector source	0.600	0.012	3162	3243	1.746	0.019	0.577	0.623
Want no more children	0.588	0.007	7039	6993	1.523	0.012	0.573	0.602
Want to delay birth at least 2 years	0.143	0.006	7039	6993	1.867	0.040	0.132	0.155
Mothers recieved medical care at delivery	0.911	0.008	3862	3470	2.816	0.008	0.896	0.926
Child having health card, seen	0.726	0.021	774	711	1.723	0.029	0.684	0.768
Child received BCG vaccination	0.959	0.006	774	711	0.677	0.006	0.948	0.971
Child received DPT vaccination (3 doses)	0.893	0.012	774	711	1.116	0.013	0.870	0.917
Child received polio vaccination (3 doses)	0.888	0.013	774	711	1.303	0.015	0.862	0.914
Child received measles vaccination	0.893	0.015	774	711	1.919	0.017	0.862	0.923
Child fully immunized	0.805	0.018	774	711	1.605	0.022	0.769	0.841
Height-for-age (-2SD)	0.103	0.007	2733	2474	1.594	0.071	0.089	0.118
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.462	0.247	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.300	0.128	0.021	0.036
BMI < 18.5	0.016	0.003	2465	2315	1.328	0.180	0.010	0.022

Table B 74 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	na	0.000	1.000	1.000
No education	0.152	0.010	5429	5615	3.805	0.062	0.133	0.171
With secondary education or higher	0.348	0.015	5429	5615	5.468	0.043	0.317	0.378
Currently married (in union)	0.941	0.005	5429	5615	2.286	0.005	0.931	0.951
Knowing any contraceptive method	0.999	0.000	5141	5284	0.868	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.268	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.004	5141	5284	1.374	0.005	0.918	0.935
Currently using any contraceptive method	0.743	0.008	5141	5284	1.906	0.011	0.726	0.760
Currently using modern method	0.478	0.008	5141	5284	1.450	0.018	0.461	0.495
Currently using pill	0.056	0.004	5141	5284	1.714	0.075	0.048	0.064
Currently using IUD	0.175	0.007	5141	5284	1.563	0.038	0.162	0.188
Currently using condom	0.154	0.007	5141	5284	2.009	0.046	0.140	0.168
Currently using injectables	0.008	0.002	5141	5284	1.615	0.200	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.918	0.064	0.072	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.666	0.216	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.929	0.033	0.239	0.273
Obtained method from public sector source	0.580	0.013	2445	2550	1.638	0.022	0.554	0.605
Want no more children	0.583	0.008	5138	5277	1.494	0.014	0.566	0.600
Want to delay birth at least 2 years	0.146	0.007	5138	5277	1.971	0.047	0.133	0.160
Mothers recieved medical care at delivery	0.957	0.006	2589	2475	2.284	0.006	0.945	0.969
Child having health card, seen	0.758	0.026	524	515	1.961	0.035	0.705	0.810
Child received BCG vaccination	0.965	0.006	524	515	0.565	0.006	0.953	0.977
Child received DPT vaccination (3 doses)	0.921	0.013	524	515	1.225	0.014	0.894	0.947
Child received polio vaccination (3 doses)	0.917	0.016	524	515	1.669	0.017	0.886	0.948
Child received measles vaccination	0.903	0.020	524	515	2.475	0.023	0.862	0.944
Child fully immunized	0.842	0.023	524	515	2.025	0.027	0.796	0.887
Height-for-age (-2SD)	0.076	0.007	1846	1781	1.438	0.097	0.061	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.771	0.338	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.389	0.188	0.013	0.029
BMI < 18.5	0.013	0.003	1742	1713	1.435	0.250	0.007	0.020

Table B 75 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.924	0.050	0.253	0.309
With secondary education or higher	0.142	0.013	1976	1790	2.673	0.090	0.116	0.168
Currently married (in union)	0.959	0.005	1976	1790	1.148	0.005	0.949	0.968
Knowing any contraceptive method	0.995	0.001	1901	1716	0.726	0.001	0.993	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	0.948	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.009	1901	1716	1.273	0.010	0.855	0.889
Currently using any contraceptive method	0.689	0.012	1901	1716	1.296	0.018	0.665	0.714
Currently using modern method	0.404	0.015	1901	1716	1.856	0.038	0.373	0.434
Currently using pill	0.046	0.005	1901	1716	1.206	0.115	0.035	0.056
Currently using IUD	0.150	0.011	1901	1716	1.955	0.076	0.127	0.172
Currently using condom	0.110	0.010	1901	1716	1.998	0.092	0.090	0.130
Currently using injectables	0.011	0.003	1901	1716	1.257	0.243	0.006	0.016
Currently using female sterilization	0.085	0.007	1901	1716	1.335	0.087	0.070	0.099
Currently using periodic abstinence	0.002	0.001	1901	1716	1.664	0.640	0.000	0.005
Currently using withdrawal	0.280	0.016	1901	1716	2.288	0.056	0.249	0.312
Obtained method from public sector source	0.675	0.027	717	692	2.318	0.039	0.622	0.728
Want no more children	0.603	0.014	1901	1716	1.656	0.024	0.574	0.632
Want to delay birth at least 2 years	0.134	0.008	1901	1716	0.967	0.057	0.119	0.149
Mothers recieved medical care at delivery	0.802	0.020	1268	988	3.205	0.025	0.762	0.842
Child having health card, seen	0.644	0.031	250	196	1.064	0.049	0.581	0.706
Child received BCG vaccination	0.943	0.014	250	196	0.886	0.015	0.915	0.970
Child received DPT vaccination (3 doses)	0.822	0.025	250	196	1.028	0.030	0.772	0.871
Child received polio vaccination (3 doses)	0.814	0.023	250	196	0.862	0.028	0.768	0.859
Child received measles vaccination	0.865	0.017	250	196	0.596	0.019	0.832	0.899
Child fully immunized	0.710	0.026	250	196	0.832	0.037	0.657	0.762
Height-for-age (-2SD)	0.174	0.017	887	692	1.854	0.100	0.139	0.208
Weight-for-height (-2SD)	0.009	0.002	887	692	0.565	0.258	0.005	0.014
Weight-for-age (-2SD)	0.048	0.008	887	692	1.164	0.162	0.032	0.063
BMI < 18.5	0.026	0.007	723	601	1.312	0.263	0.012	0.039

Table B 76 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.858	0.008	1880	3256	1.011	0.009	0.842	0.874
No education	0.119	0.015	1880	3256	3.869	0.123	0.090	0.149
With secondary education or higher	0.338	0.023	1880	3256	4.410	0.068	0.292	0.383
Currently married (in union)	0.938	0.007	1880	3256	1.779	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	1767	3053	0.808	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	1767	3053	1.214	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	1767	3053	1.203	0.007	0.927	0.952
Currently using any contraceptive method	0.763	0.012	1767	3053	1.434	0.016	0.739	0.787
Currently using modern method	0.482	0.012	1767	3053	0.996	0.025	0.458	0.506
Currently using pill	0.058	0.006	1767	3053	1.353	0.111	0.045	0.071
Currently using IUD	0.174	0.011	1767	3053	1.437	0.062	0.152	0.196
Currently using condom	0.155	0.011	1767	3053	1.617	0.071	0.133	0.177
Currently using injectables	0.008	0.003	1767	3053	1.427	0.320	0.003	0.013
Currently using female sterilization	0.084	0.008	1767	3053	1.332	0.091	0.069	0.099
Currently using periodic abstinence	0.005	0.002	1767	3053	1.109	0.338	0.002	0.009
Currently using withdrawal	0.272	0.013	1767	3053	1.507	0.048	0.246	0.298
Obtained method from public sector source	0.536	0.021	860	1484	1.461	0.038	0.495	0.577
Want no more children	0.587	0.012	1765	3049	1.111	0.021	0.562	0.612
Want to delay birth at least 2 years	0.138	0.011	1765	3049	1.710	0.078	0.117	0.160
Mothers recieved medical care at delivery	0.980	0.007	651	1174	1.691	0.007	0.965	0.994
Child having health card, seen	0.797	0.041	139	256	1.468	0.052	0.714	0.880
Child received BCG vaccination	0.973	0.005	139	256	0.127	0.005	0.963	0.983
Child received DPT vaccination (3 doses)	0.937	0.022	139	256	1.097	0.023	0.894	0.980
Child received polio vaccination (3 doses)	0.917	0.029	139	256	1.499	0.031	0.860	0.975
Child received measles vaccination	0.904	0.037	139	256	2.216	0.041	0.830	0.979
Child fully immunized	0.846	0.041	139	256	1.778	0.048	0.764	0.928
Height-for-age (-2SD)	0.076	0.012	481	848	1.025	0.161	0.052	0.100
Weight-for-height (-2SD)	0.009	0.005	481	848	1.471	0.592	0.000	0.019
Weight-for-age (-2SD)	0.010	0.005	481	848	1.274	0.501	0.000	0.021
BMI < 18.5	0.015	0.006	484	850	1.102	0.389	0.003	0.026

Table B 77 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.689	0.026	0.679	0.753
No education	0.197	0.019	1013	894	2.298	0.096	0.159	0.235
With secondary education or higher	0.248	0.018	1013	894	1.828	0.074	0.211	0.285
Currently married (in union)	0.950	0.007	1013	894	1.000	0.007	0.936	0.963
Knowing any contraceptive method	0.995	0.002	962	849	0.979	0.002	0.990	0.999
Knowing any modern contraceptive method	0.991	0.003	962	849	1.181	0.003	0.984	0.997
Ever used any contraceptive method	0.881	0.013	962	849	1.554	0.015	0.855	0.907
Currently using any contraceptive method	0.704	0.018	962	849	1.509	0.026	0.668	0.740
Currently using modern method	0.458	0.021	962	849	1.714	0.046	0.415	0.500
Currently using pill	0.041	0.007	962	849	1.202	0.172	0.027	0.055
Currently using IUD	0.183	0.015	962	849	1.479	0.083	0.152	0.213
Currently using condom	0.129	0.013	962	849	1.483	0.102	0.103	0.156
Currently using injectables	0.005	0.002	962	849	0.615	0.361	0.001	0.008
Currently using female sterilization	0.100	0.010	962	849	0.970	0.095	0.081	0.119
Currently using periodic abstinence	0.006	0.003	962	849	1.681	0.556	0.000	0.012
Currently using withdrawal	0.241	0.016	962	849	1.343	0.066	0.209	0.273
Obtained method from public sector source	0.719	0.024	441	392	1.273	0.034	0.670	0.767
Want no more children	0.573	0.016	962	849	0.980	0.028	0.541	0.604
Want to delay birth at least 2 years	0.121	0.011	962	849	1.122	0.092	0.099	0.144
Mothers recieved medical care at delivery	0.940	0.009	497	441	0.791	0.010	0.922	0.959
Child having health card, seen	0.626	0.048	108	95	1.033	0.076	0.531	0.721
Child received BCG vaccination	0.961	0.020	108	95	1.083	0.020	0.922	1.000
Child received DPT vaccination (3 doses)	0.881	0.028	108	95	0.817	0.032	0.825	0.938
Child received polio vaccination (3 doses)	0.877	0.029	108	95	0.835	0.033	0.819	0.935
Child received measles vaccination	0.939	0.022	108	95	0.900	0.023	0.895	0.983
Child fully immunized	0.818	0.034	108	95	0.837	0.042	0.750	0.886
Height-for-age (-2SD)	0.076	0.015	382	339	1.233	0.198	0.046	0.106
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.010	382	339	1.259	0.330	0.010	0.049
BMI < 18.5	0.013	0.006	357	316	1.032	0.466	0.001	0.025

Table B 78 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.719	0.021	0.697	0.758
No education	0.072	0.009	1460	1631	1.771	0.125	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.251	0.052	0.323	0.398
Currently married (in union)	0.945	0.008	1460	1631	1.660	0.008	0.930	0.961
Knowing any contraceptive method	1.000	0.000	1386	1542	0.574	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.614	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.815	0.006	0.930	0.953
Currently using any contraceptive method	0.755	0.012	1386	1542	1.038	0.016	0.732	0.779
Currently using modern method	0.488	0.018	1386	1542	1.795	0.037	0.452	0.524
Currently using pill	0.049	0.006	1386	1542	1.117	0.125	0.037	0.061
Currently using IUD	0.184	0.010	1386	1542	0.988	0.056	0.163	0.205
Currently using condom	0.178	0.014	1386	1542	1.977	0.081	0.149	0.207
Currently using injectables	0.009	0.003	1386	1542	1.249	0.313	0.003	0.015
Currently using female sterilization	0.064	0.007	1386	1542	1.173	0.111	0.050	0.078
Currently using periodic abstinence	0.009	0.003	1386	1542	1.713	0.370	0.002	0.016
Currently using withdrawal	0.257	0.016	1386	1542	1.814	0.061	0.226	0.289
Obtained method from public sector source	0.596	0.024	679	757	1.606	0.040	0.549	0.644
Want no more children	0.616	0.016	1385	1540	1.510	0.026	0.584	0.649
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.116	0.068	0.129	0.169
Mothers recieved medical care at delivery	0.985	0.005	666	741	1.198	0.005	0.975	0.995
Child having health card, seen	0.709	0.050	142	149	1.721	0.071	0.609	0.810
Child received BCG vaccination	0.964	0.015	142	149	0.923	0.016	0.934	0.994
Child received DPT vaccination (3 doses)	0.943	0.017	142	149	0.741	0.018	0.909	0.976
Child received polio vaccination (3 doses)	0.945	0.013	142	149	0.428	0.013	0.920	0.970
Child received measles vaccination	0.948	0.015	142	149	0.682	0.016	0.918	0.979
Child fully immunized	0.900	0.023	142	149	0.797	0.025	0.855	0.945
Height-for-age (-2SD)	0.045	0.010	472	533	1.104	0.223	0.025	0.065
Weight-for-height (-2SD)	0.005	0.003	472	533	0.940	0.631	0.000	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.582	0.396	0.004	0.038
BMI < 18.5	0.019	0.007	470	529	1.086	0.343	0.006	0.033

Table B 79 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.023	868	477	1.906	0.042	0.507	0.600
No education	0.156	0.024	868	477	3.735	0.153	0.108	0.203
With secondary education or higher	0.305	0.021	868	477	1.817	0.069	0.263	0.347
Currently married (in union)	0.954	0.007	868	477	0.996	0.007	0.939	0.968
Knowing any contraceptive method	1.000	0.000	827	455	na	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.700	0.002	0.994	1.002
Ever used any contraceptive method	0.928	0.008	827	455	0.843	0.009	0.911	0.945
Currently using any contraceptive method	0.756	0.019	827	455	1.592	0.025	0.718	0.794
Currently using modern method	0.414	0.025	827	455	2.182	0.061	0.364	0.465
Currently using pill	0.052	0.009	827	455	1.220	0.164	0.035	0.069
Currently using IUD	0.098	0.014	827	455	1.807	0.142	0.071	0.126
Currently using condom	0.120	0.013	827	455	1.346	0.109	0.094	0.147
Currently using injectables	0.009	0.004	827	455	1.377	0.419	0.002	0.017
Currently using female sterilization	0.129	0.012	827	455	1.079	0.094	0.105	0.154
Currently using periodic abstinence	0.004	0.002	827	455	0.693	0.450	0.000	0.008
Currently using withdrawal	0.336	0.023	827	455	1.966	0.069	0.289	0.382
Obtained method from public sector source	0.600	0.025	361	191	0.960	0.042	0.549	0.651
Want no more children	0.568	0.020	827	455	1.375	0.036	0.528	0.609
Want to delay birth at least 2 years	0.124	0.011	827	455	0.965	0.091	0.102	0.147
Mothers recieved medical care at delivery	0.941	0.011	356	200	0.746	0.011	0.920	0.963
Child having health card, seen	0.746	0.062	68	43	1.352	0.083	0.622	0.870
Child received BCG vaccination	1.000	0.000	68	43	na	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.053	68	43	1.772	0.060	0.775	0.986
Child received polio vaccination (3 doses)	0.858	0.048	68	43	1.260	0.056	0.762	0.953
Child received measles vaccination	0.978	0.021	68	43	1.400	0.022	0.936	1.000
Child fully immunized	0.836	0.049	68	43	1.176	0.059	0.738	0.934
Height-for-age (-2SD)	0.070	0.023	224	124	1.856	0.332	0.024	0.117
Weight-for-height (-2SD)	0.015	0.010	224	124	1.371	0.628	0.000	0.035
Weight-for-age (-2SD)	0.028	0.013	224	124	1.338	0.456	0.002	0.054
BMI < 18.5	0.030	0.013	251	142	1.395	0.423	0.005	0.056

Table B 80 Sampling Errors: SAS/STAT, Jackknife 2 Repeated Replication, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.637	0.012	2184	1146	1.452	0.019	0.612	0.661
No education	0.525	0.021	2184	1146	3.938	0.040	0.482	0.567
With secondary education or higher	0.133	0.013	2184	1146	3.162	0.097	0.107	0.159
Currently married (in union)	0.960	0.005	2184	1146	1.431	0.005	0.950	0.970
Knowing any contraceptive method	0.993	0.002	2100	1100	0.913	0.002	0.990	0.997
Knowing any modern contraceptive method	0.990	0.002	2100	1100	0.814	0.002	0.986	0.994
Ever used any contraceptive method	0.817	0.013	2100	1100	2.371	0.016	0.791	0.843
Currently using any contraceptive method	0.612	0.015	2100	1100	2.086	0.025	0.582	0.643
Currently using modern method	0.379	0.014	2100	1100	1.647	0.036	0.352	0.406
Currently using pill	0.056	0.006	2100	1100	1.216	0.098	0.045	0.068
Currently using IUD	0.152	0.008	2100	1100	1.171	0.056	0.135	0.169
Currently using condom	0.081	0.007	2100	1100	1.441	0.088	0.067	0.095
Currently using injectables	0.013	0.002	2100	1100	0.864	0.180	0.008	0.017
Currently using female sterilization	0.076	0.006	2100	1100	1.024	0.077	0.064	0.088
Currently using periodic abstinence	0.003	0.001	2100	1100	1.149	0.451	0.000	0.005
Currently using withdrawal	0.227	0.013	2100	1100	1.955	0.056	0.201	0.252
Obtained method from public sector source	0.722	0.020	821	419	1.634	0.028	0.682	0.762
Want no more children	0.571	0.015	2100	1100	1.847	0.026	0.541	0.600
Want to delay birth at least 2 years	0.175	0.012	2100	1100	1.931	0.066	0.152	0.198
Mothers recieved medical care at delivery	0.744	0.021	1691	911	4.063	0.029	0.701	0.787
Child having health card, seen	0.685	0.030	317	167	1.305	0.044	0.625	0.744
Child received BCG vaccination	0.922	0.015	317	167	0.986	0.016	0.892	0.952
Child received DPT vaccination (3 doses)	0.792	0.025	317	167	1.244	0.032	0.741	0.843
Child received polio vaccination (3 doses)	0.808	0.023	317	167	1.049	0.028	0.763	0.854
Child received measles vaccination	0.777	0.023	317	167	0.986	0.030	0.730	0.823
Child fully immunized	0.643	0.027	317	167	1.038	0.043	0.588	0.698
Height-for-age (-2SD)	0.210	0.018	1174	631	2.271	0.085	0.175	0.246
Weight-for-height (-2SD)	0.015	0.004	1174	631	0.973	0.232	0.008	0.022
Weight-for-age (-2SD)	0.058	0.008	1174	631	1.301	0.134	0.042	0.073
BMI < 18.5	0.014	0.003	903	478	0.808	0.255	0.007	0.020

Table B 81 Sampling Errors: IVEware, Taylor Series Linearization, Turkey

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.758	0.007	7405	7405	1.751	0.009	0.745	0.771
No education	0.183	0.008	7405	7405	3.024	0.043	0.168	0.199
With secondary education or higher	0.298	0.011	7405	7405	4.445	0.038	0.276	0.320
Currently married (in union)	0.945	0.004	7405	7405	2.103	0.004	0.938	0.953
Knowing any contraceptive method	0.998	0.001	7042	6999	0.882	0.001	0.997	0.999
Knowing any modern contraceptive method	0.996	0.001	7042	6999	1.146	0.001	0.994	0.997
Ever used any contraceptive method	0.913	0.005	7042	6999	1.800	0.005	0.904	0.922
Currently using any contraceptive method	0.730	0.007	7042	6999	1.994	0.010	0.715	0.745
Currently using modern method	0.460	0.008	7042	6999	1.866	0.018	0.444	0.476
Currently using pill	0.053	0.003	7042	6999	1.645	0.064	0.047	0.060
Currently using IUD	0.169	0.006	7042	6999	1.817	0.036	0.157	0.181
Currently using condom	0.143	0.007	7042	6999	2.466	0.046	0.130	0.156
Currently using injectables	0.009	0.001	7042	6999	1.420	0.152	0.006	0.011
Currently using female sterilization	0.083	0.004	7042	6999	1.662	0.051	0.075	0.092
Currently using periodic abstinence	0.006	0.001	7042	6999	1.622	0.199	0.003	0.008
Currently using withdrawal	0.262	0.007	7042	6999	1.878	0.027	0.248	0.276
Obtained method from public sector source	0.600	0.013	3162	3243	2.137	0.021	0.575	0.625
Want no more children	0.588	0.007	7038	6993	1.393	0.012	0.574	0.601
Want to delay birth at least 2 years	0.143	0.005	7038	6993	1.632	0.037	0.133	0.154
Mothers recieved medical care at delivery								
Child having health card, seen	0.726	0.022	772	711	1.887	0.030	0.683	0.770
Child received BCG vaccination	0.959	0.008	774	711	1.154	0.008	0.944	0.974
Child received DPT vaccination (3 doses)	0.893	0.012	774	711	1.203	0.014	0.869	0.917
Child received polio vaccination (3 doses)	0.888	0.013	774	711	1.379	0.015	0.862	0.915
Child received measles vaccination	0.893	0.015	774	711	1.766	0.017	0.863	0.922
Child fully immunized	0.805	0.019	774	711	1.709	0.023	0.769	0.842
Height-for-age (-2SD)	0.103	0.008	2733	2474	1.997	0.080	0.087	0.120
Weight-for-height (-2SD)	0.009	0.002	2733	2474	1.499	0.250	0.004	0.013
Weight-for-age (-2SD)	0.028	0.004	2733	2474	1.411	0.133	0.021	0.036
BMI < 18.5	0.016	0.003	2465	2315	1.251	0.175	0.011	0.022

Table B 82 Sampling Errors: IVEware, Taylor Series Linearization, Urban

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	1.000	0.000	5429	5615	0.000	0.000	1.000	1.000
No education	0.152	0.009	5429	5615	3.788	0.062	0.829	0.866
With secondary education or higher	0.348	0.015	5429	5615	5.192	0.042	0.319	0.377
Currently married (in union)	0.941	0.005	5429	5615	2.291	0.005	0.931	0.951
Knowing any contraceptive method	0.999	0.000	5141	5284	0.857	0.000	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	5141	5284	1.256	0.001	0.996	0.999
Ever used any contraceptive method	0.926	0.005	5141	5284	1.650	0.005	0.917	0.935
Currently using any contraceptive method	0.743	0.009	5141	5284	1.956	0.011	0.727	0.760
Currently using modern method	0.478	0.009	5141	5284	1.837	0.020	0.459	0.497
Currently using pill	0.056	0.004	5141	5284	1.750	0.076	0.048	0.064
Currently using IUD	0.175	0.007	5141	5284	1.803	0.041	0.161	0.189
Currently using condom	0.154	0.008	5141	5284	2.470	0.051	0.139	0.170
Currently using injectables	0.008	0.002	5141	5284	1.556	0.195	0.005	0.011
Currently using female sterilization	0.083	0.005	5141	5284	1.736	0.061	0.073	0.093
Currently using periodic abstinence	0.007	0.001	5141	5284	1.582	0.210	0.004	0.010
Currently using withdrawal	0.256	0.008	5141	5284	1.846	0.032	0.240	0.272
Obtained method from public sector source	0.580	0.015	2445	2550	2.128	0.025	0.551	0.608
Want no more children	0.583	0.008	5138	5277	1.324	0.014	0.567	0.598
Want to delay birth at least 2 years	0.146	0.007	5138	5277	1.754	0.045	0.134	0.159
Mothers recieved medical care at delivery			2589	2475				
Child having health card, seen	0.758	0.027	524	515	2.131	0.036	0.704	0.811
Child received BCG vaccination	0.965	0.009	524	515	1.340	0.010	0.947	0.984
Child received DPT vaccination (3 doses)	0.921	0.013	524	515	1.161	0.014	0.896	0.946
Child received polio vaccination (3 doses)	0.917	0.015	524	515	1.572	0.017	0.887	0.947
Child received measles vaccination	0.903	0.019	524	515	2.084	0.021	0.866	0.940
Child fully immunized	0.842	0.023	524	515	2.014	0.027	0.797	0.886
Height-for-age (-2SD)	0.076	0.008	1846	1781	1.625	0.103	0.061	0.091
Weight-for-height (-2SD)	0.008	0.003	1846	1781	1.705	0.332	0.003	0.014
Weight-for-age (-2SD)	0.021	0.004	1846	1781	1.368	0.187	0.013	0.028
BMI < 18.5	0.013	0.003	1742	1713	1.310	0.238	0.007	0.019

Table B 83 Sampling Errors: IVEware, Taylor Series Linearization, Rural

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.000	0.000	1976	1790	na	na	0.000	0.000
No education	0.281	0.014	1976	1790	1.847	0.049	0.254	0.308
With secondary education or higher	0.142	0.013	1976	1790	2.865	0.094	0.116	0.168
Currently married (in union)	0.959	0.005	1976	1790	1.153	0.005	0.949	0.968
Knowing any contraceptive method	0.995	0.002	1901	1716	0.949	0.002	0.992	0.998
Knowing any modern contraceptive method	0.990	0.002	1901	1716	1.124	0.002	0.985	0.994
Ever used any contraceptive method	0.872	0.011	1901	1716	2.081	0.013	0.850	0.894
Currently using any contraceptive method	0.689	0.016	1901	1716	2.143	0.023	0.659	0.720
Currently using modern method	0.404	0.016	1901	1716	1.936	0.039	0.373	0.435
Currently using pill	0.046	0.005	1901	1716	1.132	0.112	0.036	0.056
Currently using IUD	0.150	0.011	1901	1716	1.862	0.075	0.128	0.172
Currently using condom	0.110	0.011	1901	1716	2.412	0.101	0.088	0.132
Currently using injectables	0.011	0.003	1901	1716	1.151	0.233	0.006	0.016
Currently using female sterilization	0.085	0.008	1901	1716	1.400	0.089	0.070	0.099
Currently using periodic abstinence	0.002	0.001	1901	1716	1.650	0.638	0.000	0.005
Currently using withdrawal	0.280	0.014	1901	1716	1.960	0.051	0.252	0.309
Obtained method from public sector source	0.675	0.025	717	692	1.972	0.036	0.627	0.724
Want no more children	0.603	0.014	1901	1716	1.580	0.023	0.575	0.631
Want to delay birth at least 2 years	0.134	0.008	1901	1716	1.114	0.062	0.118	0.150
Mothers recieved medical care at delivery								
Child having health card, seen	0.644	0.033	250	196	1.183	0.051	0.579	0.709
Child received BCG vaccination	0.943	0.014	250	196	0.842	0.014	0.916	0.969
Child received DPT vaccination (3 doses)	0.822	0.027	250	196	1.257	0.033	0.768	0.875
Child received polio vaccination (3 doses)	0.814	0.026	250	196	1.131	0.032	0.762	0.866
Child received measles vaccination	0.865	0.022	250	196	1.065	0.026	0.821	0.910
Child fully immunized	0.710	0.031	250	196	1.193	0.044	0.648	0.772
Height-for-age (-2SD)	0.174	0.020	887	692	2.388	0.113	0.135	0.212
Weight-for-height (-2SD)	0.009	0.003	887	692	0.899	0.326	0.003	0.016
Weight-for-age (-2SD)	0.048	0.009	887	692	1.444	0.181	0.031	0.065
BMI < 18.5	0.026	0.006	723	601	1.155	0.246	0.013	0.038

Table B 84 Sampling Errors: IVEware, Taylor Series Linearization, West

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.858	0.008	1876	3252	1.086	0.010	0.841	0.875
No education	0.119	0.014	1876	3252	3.509	0.117	0.092	0.147
With secondary education or higher	0.338	0.023	1876	3252	4.452	0.068	0.292	0.383
Currently married (in union)	0.938	0.007	1876	3252	1.724	0.008	0.923	0.952
Knowing any contraceptive method	0.999	0.001	1763	3049	0.806	0.001	0.998	1.000
Knowing any modern contraceptive method	0.998	0.001	1763	3049	1.214	0.001	0.995	1.000
Ever used any contraceptive method	0.940	0.006	1763	3049	1.253	0.007	0.927	0.952
Currently using any contraceptive method	0.763	0.012	1763	3049	1.500	0.016	0.739	0.788
Currently using modern method	0.482	0.014	1763	3049	1.316	0.028	0.455	0.509
Currently using pill	0.058	0.007	1763	3049	1.463	0.116	0.045	0.072
Currently using IUD	0.174	0.011	1763	3049	1.465	0.063	0.153	0.196
Currently using condom	0.155	0.012	1763	3049	1.916	0.077	0.132	0.179
Currently using injectables	0.008	0.002	1763	3049	1.286	0.303	0.003	0.013
Currently using female sterilization	0.084	0.008	1763	3049	1.416	0.094	0.068	0.099
Currently using periodic abstinence	0.005	0.002	1763	3049	1.093	0.335	0.002	0.009
Currently using withdrawal	0.272	0.012	1763	3049	1.359	0.045	0.248	0.297
Obtained method from public sector source	0.536	0.022	859	1483	1.629	0.041	0.493	0.579
Want no more children	0.587	0.012	1761	3044	1.036	0.020	0.563	0.610
Want to delay birth at least 2 years	0.138	0.010	1761	3044	1.386	0.070	0.119	0.157
Mothers recieved medical care at delivery								
Child having health card, seen	0.797	0.046	139	256	1.818	0.058	0.705	0.889
Child received BCG vaccination	0.973	0.015	139	256	1.250	0.016	0.942	1.000
Child received DPT vaccination (3 doses)	0.937	0.020	139	256	0.968	0.022	0.897	0.978
Child received polio vaccination (3 doses)	0.917	0.027	139	256	1.361	0.030	0.863	0.972
Child received measles vaccination	0.904	0.034	139	256	1.840	0.038	0.837	0.972
Child fully immunized	0.846	0.041	139	256	1.755	0.048	0.765	0.927
Height-for-age (-2SD)	0.076	0.013	481	848	1.128	0.007	0.051	0.101
Weight-for-height (-2SD)	0.009	0.005	481	848	1.419	0.582	0.000	0.019
Weight-for-age (-2SD)	0.010	0.005	481	848	1.197	0.486	0.000	0.021
BMI < 18.5	0.015	0.006	484	850	1.011	0.372	0.004	0.026

Table B 85 Sampling Errors: IVEware, Taylor Series Linearization, South

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.716	0.018	1013	894	1.689	0.026	0.679	0.753
No education	0.197	0.019	1013	894	2.297	0.096	0.159	0.235
With secondary education or higher	0.248	0.018	1013	894	1.828	0.074	0.211	0.285
Currently married (in union)	0.950	0.007	1013	894	1.000	0.007	0.007	0.964
Knowing any contraceptive method	0.995	0.002	962	849	0.974	0.002	0.990	0.999
Knowing any modern contraceptive method	0.991	0.003	962	849	1.136	0.003	0.984	0.997
Ever used any contraceptive method	0.881	0.013	962	849	1.510	0.015	0.855	0.906
Currently using any contraceptive method	0.704	0.018	962	849	1.546	0.026	0.668	0.740
Currently using modern method	0.458	0.020	962	849	1.599	0.044	0.417	0.498
Currently using pill	0.041	0.006	962	849	1.025	0.159	0.028	0.053
Currently using IUD	0.183	0.014	962	849	1.220	0.075	0.155	0.210
Currently using condom	0.129	0.014	962	849	1.660	0.108	0.102	0.157
Currently using injectables	0.005	0.002	962	849	1.070	0.477	0.000	0.010
Currently using female sterilization	0.100	0.009	962	849	0.902	0.092	0.082	0.118
Currently using periodic abstinence	0.006	0.003	962	849	1.628	0.548	0.000	0.012
Currently using withdrawal	0.241	0.015	962	849	1.203	0.063	0.211	0.271
Obtained method from public sector source	0.719	0.026	441	392	1.435	0.036	0.668	0.770
Want no more children	0.573	0.016	962	849	0.971	0.027	0.541	0.604
Want to delay birth at least 2 years	0.121	0.012	962	849	1.270	0.098	0.098	0.145
Mothers recieved medical care at delivery			497	441				
Child having health card, seen	0.626	0.047	108	95	1.015	0.075	0.531	0.720
Child received BCG vaccination	0.961	0.019	108	95	1.055	0.020	0.922	0.999
Child received DPT vaccination (3 doses)	0.881	0.032	108	95	1.054	0.036	0.817	0.946
Child received polio vaccination (3 doses)	0.877	0.031	108	95	0.978	0.036	0.814	0.814
Child received measles vaccination	0.939	0.021	108	95	0.816	0.022	0.897	0.981
Child fully immunized	0.818	0.037	108	95	0.967	0.045	0.744	0.891
Height-for-age (-2SD)	0.076	0.015	382	339	1.202	0.196	0.047	0.106
Weight-for-height (-2SD)	0.000	0.000	382	339	na	na	0.000	0.000
Weight-for-age (-2SD)	0.030	0.030	382	339	1.114	1.000	0.011	0.048
BMI < 18.5	0.013	0.006	357	316	0.977	0.453	0.001	0.025

Table B 86 Sampling Errors: IVEware, Taylor Series Linearization, Central

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.728	0.015	1460	1631	1.718	0.021	0.697	0.758
No education	0.072	0.009	1460	1631	1.771	0.125	0.054	0.090
With secondary education or higher	0.360	0.019	1460	1631	2.331	0.053	0.322	0.399
Currently married (in union)	0.945	0.008	1460	1631	1.659	0.008	0.930	0.961
Knowing any contraceptive method	1.000	0.000	1386	1542	0.577	0.000	0.999	1.000
Knowing any modern contraceptive method	0.998	0.001	1386	1542	0.631	0.001	0.996	1.000
Ever used any contraceptive method	0.942	0.006	1386	1542	0.915	0.006	0.930	0.954
Currently using any contraceptive method	0.755	0.013	1386	1542	1.336	0.018	0.729	0.782
Currently using modern method	0.488	0.018	1386	1542	1.740	0.036	0.453	0.523
Currently using pill	0.049	0.006	1386	1542	0.991	0.118	0.038	0.061
Currently using IUD	0.184	0.012	1386	1542	1.293	0.064	0.161	0.207
Currently using condom	0.178	0.014	1386	1542	1.841	0.078	0.150	0.206
Currently using injectables	0.009	0.003	1386	1542	1.156	0.301	0.004	0.015
Currently using female sterilization	0.064	0.008	1386	1542	1.304	0.117	0.049	0.079
Currently using periodic abstinence	0.009	0.003	1386	1542	1.538	0.351	0.003	0.015
Currently using withdrawal	0.257	0.016	1386	1542	1.949	0.064	0.225	0.290
Obtained method from public sector source	0.596	0.024	679	757	1.645	0.041	0.549	0.644
Want no more children	0.616	0.014	1385	1540	1.214	0.023	0.588	0.645
Want to delay birth at least 2 years	0.149	0.010	1385	1540	1.127	0.068	0.129	0.169
Mothers recieved medical care at delivery								
Child having health card, seen	0.709	0.045	142	149	1.398	0.064	0.619	0.799
Child received BCG vaccination	0.964	0.015	142	149	0.916	0.016	0.934	0.994
Child received DPT vaccination (3 doses)	0.943	0.018	142	149	0.886	0.020	0.906	0.979
Child received polio vaccination (3 doses)	0.945	0.016	142	149	0.652	0.016	0.914	0.976
Child received measles vaccination	0.948	0.017	142	149	0.875	0.018	0.914	0.983
Child fully immunized	0.900	0.026	142	149	1.040	0.029	0.849	0.952
Height-for-age (-2SD)	0.045	0.011	472	533	1.266	0.239	0.024	0.066
Weight-for-height (-2SD)	0.005	0.003	472	533	0.926	0.627	0.000	0.011
Weight-for-age (-2SD)	0.021	0.008	472	533	1.586	0.396	0.005	0.038
BMI < 18.5	0.019	0.006	470	529	1.033	0.334	0.007	0.032

Table B 87 Sampling Errors: IVEware, Taylor Series Linearization, North

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.553	0.019	868	477	1.265	0.034	0.515	0.592
No education	0.156	0.023	868	477	3.544	0.149	0.109	0.202
With secondary education or higher	0.305	0.022	868	477	1.958	0.072	0.261	0.349
Currently married (in union)	0.954	0.008	868	477	1.131	0.008	0.938	0.969
Knowing any contraceptive method	1.000	0.000	827	455	0.000	0.000	1.000	1.000
Knowing any modern contraceptive method	0.998	0.002	827	455	1.706	0.002	0.994	1.000
Ever used any contraceptive method	0.928	0.011	827	455	1.590	0.012	0.905	0.951
Currently using any contraceptive method	0.756	0.020	827	455	1.712	0.026	0.717	0.795
Currently using modern method	0.414	0.024	827	455	1.934	0.058	0.367	0.462
Currently using pill	0.052	0.008	827	455	1.177	0.161	0.035	0.069
Currently using IUD	0.098	0.013	827	455	1.656	0.136	0.072	0.125
Currently using condom	0.120	0.013	827	455	1.353	0.110	0.094	0.146
Currently using injectables	0.009	0.004	827	455	1.331	0.412	0.002	0.017
Currently using female sterilization	0.129	0.015	827	455	1.708	0.118	0.099	0.160
Currently using periodic abstinence	0.004	0.002	827	455	0.681	0.447	0.000	0.008
Currently using withdrawal	0.336	0.023	827	455	1.996	0.069	0.289	0.382
Obtained method from public sector source	0.600	0.031	361	191	1.451	0.052	0.538	0.662
Want no more children	0.568	0.022	827	455	1.697	0.039	0.524	0.613
Want to delay birth at least 2 years	0.124	0.012	827	455	1.030	0.094	0.101	0.147
Mothers recieved medical care at delivery			352	197				
Child having health card, seen	0.746	0.064	68	43	1.443	0.086	0.617	0.874
Child received BCG vaccination	1.000	0.000	68	43	0.000	0.000	1.000	1.000
Child received DPT vaccination (3 doses)	0.881	0.054	68	43	1.832	0.061	0.773	0.989
Child received polio vaccination (3 doses)	0.858	0.057	68	43	1.768	0.066	0.744	0.972
Child received measles vaccination	0.978	0.021	68	43	1.442	0.022	0.935	1.000
Child fully immunized	0.836	0.058	68	43	1.637	0.069	0.719	0.952
Height-for-age (-2SD)	0.070	0.023	224	124	1.833	0.330	0.024	0.116
Weight-for-height (-2SD)	0.015	0.009	224	124	1.297	0.611	0.000	0.034
Weight-for-age (-2SD)	0.028	0.012	224	124	1.252	0.441	0.003	0.053
BMI < 18.5	0.030	0.012	251	142	1.260	0.402	0.006	0.054

Table B 88 Sampling Errors: IVEware, Taylor Series Linearization, East

Variable	p	se	n	wn	deff	se/p	lb	ub
Urban residence	0.637	0.013	2188	1151	1.477	0.020	0.612	0.661
No education	0.525	0.022	2188	1151	4.145	0.041	0.481	0.568
With secondary education or higher	0.133	0.013	2188	1151	3.198	0.098	0.107	0.159
Currently married (in union)	0.960	0.005	2188	1151	1.542	0.005	0.949	0.970
Knowing any contraceptive method	0.993	0.002	2104	1105	1.246	0.002	0.989	0.997
Knowing any modern contraceptive method	0.990	0.002	2104	1105	1.252	0.002	0.985	0.995
Ever used any contraceptive method	0.817	0.014	2104	1105	2.775	0.017	0.789	0.845
Currently using any contraceptive method	0.612	0.017	2104	1105	2.471	0.027	0.579	0.645
Currently using modern method	0.379	0.014	2104	1105	1.826	0.038	0.351	0.407
Currently using pill	0.056	0.005	2104	1105	1.148	0.096	0.046	0.067
Currently using IUD	0.152	0.011	2104	1105	1.971	0.072	0.130	0.173
Currently using condom	0.081	0.008	2104	1105	1.685	0.095	0.066	0.096
Currently using injectables	0.013	0.002	2104	1105	1.011	0.194	0.008	0.017
Currently using female sterilization	0.076	0.006	2104	1105	1.043	0.078	0.064	0.088
Currently using periodic abstinence	0.003	0.001	2104	1105	1.115	0.444	0.000	0.005
Currently using withdrawal	0.227	0.012	2104	1105	1.616	0.051	0.204	0.250
Obtained method from public sector source	0.722	0.020	822	420	1.653	0.028	0.682	0.762
Want no more children	0.571	0.014	2104	1105	1.578	0.024	0.544	0.597
Want to delay birth at least 2 years	0.175	0.011	2104	1105	1.706	0.062	0.153	0.196
Mothers recieved medical care at delivery			1691	911				
Child having health card, seen	0.685	0.030	317	167	1.314	0.044	0.625	0.744
Child received BCG vaccination	0.922	0.015	317	167	0.942	0.016	0.893	0.951
Child received DPT vaccination (3 doses)	0.792	0.027	317	167	1.446	0.035	0.738	0.847
Child received polio vaccination (3 doses)	0.808	0.025	317	167	1.296	0.031	0.759	0.858
Child received measles vaccination	0.777	0.025	317	167	1.148	0.032	0.727	0.826
Child fully immunized	0.643	0.030	317	167	1.228	0.046	0.584	0.702
Height-for-age (-2SD)	0.210	0.019	1174	631	2.502	0.089	0.173	0.248
Weight-for-height (-2SD)	0.015	0.004	1174	631	1.256	0.264	0.007	0.023
Weight-for-age (-2SD)	0.058	0.009	1174	631	1.666	0.152	0.041	0.075
BMI < 18.5	0.014	0.004	903	478	0.941	0.275	0.006	0.021

APPENDIX C: REFERENCE TABLES FOR CONCLUSION CHAPTER

Table 20 Variance estimation methods used for different software

Software	Variance estimation method			
	Taylor Series Linearization (TSL)	Balanced Repeated Replication (BRR)	Jackknife Repeated Replication 2 (JK2)	Jackknife Repeated Replication n (JKn)
PASW	✓			
Stata	✓	✓	✓	
WesVar		✓	✓	✓
SAS/STAT	✓	✓	✓	
IVEware	✓			

Table 21 The number of variables which have exactly the same design effect estimate provided by different approaches for Turkey

TURKEY	ISSA SAMPERR	PASW Taylor	Stata Taylor	Stata BRR	Stata JK2	WesVar BRR	WesVar JK2	WesVar JKN	SAS Taylor	SAS BRR	SAS JK2
PASW Taylor	2										
Stata Taylor		3									
Stata BRR	2										
Stata JK2				1							
WesVar BRR											
WesVar JK2				1		4					
WesVar JKN											
SAS Taylor	4		1	1		2	1	1			
SAS BRR						3					
SAS JK2	2					1					
IVEware Taylor								3			

Table 22 The number of variables which have exactly the same deff estimate provided by different approaches for urban

URBAN	ISSA SAMPERR	PASW Taylor	Stata Taylor	Stata BRR	Stata JK2	WesVar BRR	WesVar JK2	WesVar JKN	SAS Taylor	SAS BRR	SAS JK2
PASW Taylor	2										
Stata Taylor	3										
Stata BRR											
Stata JK2				1							
WesVar BRR											
WesVar JK2						4					
WesVar JKN						4	4				
SAS Taylor							1				
SAS BRR							3		2		
SAS JK2						1	2		3	3	
IVEware Taylor									2		

Table 23 The number of variables which have exactly the same deff estimate provided by different approaches for the West

WEST	ISSA SAMPERR	PASW Taylor	Stata Taylor	Stata BRR	Stata JK2	WesVar BRR	WesVar JK2	WesVar JKN	SAS Taylor	SAS BRR	SAS JK2
PASW Taylor	2										
Stata Taylor	4	1									
Stata BRR			1								
Stata JK2											
WesVar BRR	2										
WesVar JK2	2					16					
WesVar JKN	2					16	17				
SAS Taylor											
SAS BRR											
SAS JK2	1		2		1				1		
IVEware Taylor	1					1	1	1			1