

# Measuring Autonomy: Evidence from Bangladesh

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## 1. Introduction

Agency, and in particular women's agency, continues to have a prominent role in the development and poverty debate. For example, in *An Uncertain Glory: India and its Contradictions*, Jean Drèze and Amartya Sen call for further analyses to probe the links between women's agency and developmental outcomes in Bangladesh – and clarify the extent to which: “women's agency and gender relations account for the fact that Bangladesh has caught up with, and even overtaken, India in many crucial fields during the last twenty years ...” (Drèze and Sen 2013, p 61).

But how do we probe links between women's agency and development outcomes in Bangladesh? Quantitative studies of agency, and its relationship to other variables, remain curtailed by the unfinished search for adequate indicators of women's empowerment within the household and other social institutions, in economic activities, and in political space (Review are found in Santos and Samman 2009, Ibrahim and Alkire 2007, Narayan 2005, Alsop, Bertelsen and Holland 2006, and Malhotra, Schuler and Boender 2002). At present, women's agency is most commonly measured through proxies such as education, ownership and control of assets such as land or housing, employment, control over income, and so on. The use of proxy measures faces several problems, especially when the proxies represent development outcomes that agency is understood to advance (Alkire, 2008). Other common indicators of women's empowerment for intra-household relations – decision-making in different domains, attitudes towards gender roles such as wife beating, and exposure to information – also face challenges. For example, Kishor and Subaiya's detailed 23-country study of the Demographic and Health Surveys of the correlates of 23 different empowerment indicators concluded that there was no single adequate indicator of empowerment: “The finding that variables such as education, employment, and media exposure, among others, have different relationships with each of the 23 different women's empowerment variables examined in this report, suggests that these empowerment indicators are not equivalent or even close substitutes for one another”. They also found that policy-relevant determinants of

empowerment differed across countries and regions within countries: “different facets of women’s empowerment do not all relate in the same way to one another or to various explanatory variables” (2008:201 both quotes).

At the same time, Bangladesh has been commended for its significant progress in women’s empowerment, and a large and distinguished set of studies document this social change (). Studies in Bangladesh conform that agency has intrinsic value to people, who are able to exert their energies to advance goals they value and have reason to value – whether these pertain to themselves and their communities or to other subjects altogether (Levine xx). At the same time agency – and particularly women’s agency in the case of Bangladesh – appears to be catalytic and/or instrumental to achieving a raft of other valued development outcomes (Kabeer xx, ). Yet indicators of agency in Bangladesh, as elsewhere, are deeply contested (), and this measurement problem limits the reach of quantitative studies.

This paper explores the value-added of a new measure of domain-specific autonomy in the context of Bangladesh, where the rich existing literature enables us to spot more easily duplication and value-added of analyses more directly than in contexts that have not been privy to the same extent of qualitative and quantitative studies. Analyses uncover new insights on the linkages between men’s and women’s autonomy and other development outcomes such as income, education, and occupation, as well as personal characteristics such as age and household composition. The analyses also document the extent to which the indicator supplies new information that is not present in measures of household decision-making for the same domain. While empowerment must be approached using multiple indicators and with a deep contextual understanding, it is possible that this measure - the Relative Autonomy Index (RAI) – could prove to be a particularly useful tool for policy-relevant analyses.

The measure under scrutiny in this paper is a new direct measure of motivational autonomy proposed by Ryan and Deci (2000), and emanating from what is known as ‘self determination theory’ (SDT) in psychology. This measure of autonomy is particularly suitable to the analysis of human development and poverty for several reasons (Alkire, 2006). “First, its definition is very similar to the one proposed by Sen’s capability approach. Second, the SDT approach is conceptually one of the most advanced psychological approaches to motivational autonomy and self-determination and has been operationalized in widely used and well-validated measures of autonomy across different nations (Chirkov, 2009; Chirkov et al. 2011). These empirical studies in a wide variety of contexts demonstrate the validity of this measure and its capacity to predict both the outcomes of human functioning and the psychological well-being of the agent. Third, the domains can be chosen to suit the particular analysis or poverty context. Fourth this measure does not seem to replicate any existing measures of poverty. It represents a direct measure of motivational autonomy which is innovative and potentially distinct from poverty measures (a claim this paper confirms). Therefore it may allow facilitate analyses of the interaction between poverty and agency. Fifth, the measure empirically represents the (positionally objective) state of mind of an acting individual; that is, it seeks to reflect their own values, rather than fixing a definition of

autonomy from without. Sixth, the measure appears to be cross-culturally comparable (and the assumption can be re-tested in this and future studies). Furthermore, the measure seems to frame autonomy in a way that is valued in individualistic and collectivist cultures alike – which is critically important as most indicators of agency are correlated with individualism (Chirkov et al., 2003).”

This paper proceeds as follows: the next section presents the conceptual framework, survey question, and aggregation of the Relative Autonomy Index. Section 3 introduces the dataset, which is nationally representative of rural Bangladesh. Section 4 presents and discusses the internal validity tests for the elements of the RAI across all domains, disaggregated by gender. The internal validity tests employ factor analysis, multiple correspondence analysis, cluster analysis, and correlations. Section 4 presents tests of reliability – Cronbach’s Alpha and the Mokken Scale procedure. External validity tests are presented in Section 5 and include means comparison, correlation, and regression analyses as to the determinants of autonomy in rural Bangladesh and possible proxies of it. Section 6 concludes.

## **2. Conceptual Framework**

The Relative Autonomy Index (RAI) is a measure of motivational autonomy developed by psychologists Richard Ryan, Ed Deci, Valery Chirkov and others (Chirkov, Ryan, & Deci, 2011; Ryan and Deci 2000, 2012), within the context of the Self-Determination Theory (SDT). This is a direct measure of the individual’s ability to act on what he or she values. This measure is computed with reference to specific domains or activities; which allows us to account for the variation of the individual’s level of autonomy across different aspects of his or her life.

According to the SDT formulation, a person is autonomous when his or her behavior is experienced as willingly enacted and when he or she fully endorses the actions in which he or she is engaged and/or the values expressed by them. People are therefore most autonomous when they act in accord with their authentic interests or integrated values and desires (Deci & Ryan, 1985; Ryan & Deci, 2000; Ryan, Deci, & Grolnick, 1995). SDT contrasts autonomous behavior with controlled behavior, ‘in which one’s actions are experienced as controlled by forces that are phenomenally alien to the self, or that compels one to behave in specific ways regardless of one’s values or interests’ (Chirkov et al., 2003). The RAI measures the extent to which the person’s motivation for his or her behavior in a specific domain is fairly autonomous as opposed to somewhat controlled.

More specifically, human behavior is driven by intrinsic and extrinsic motivations. Intrinsic motivation is associated with the enjoyment of the activity in itself. This is the perfect example of autonomous behavior. Extrinsic motivation is the performance of a behavior in an instrumental way, i.e. with the goal of attaining an outcome aside from the behavior itself. According to the SDT, motivation can be categorized into four different types, depending on the degree to which the individual has self-endorsed the behavior. These types are external, introjected, identified and integrated. External motivation occurs when one’s action is effectively coerced - by another person, or by force of circumstances. Introjected motivation

is that in which the individual acts to please others or to avoid blame – regardless of whether or not he or she personally values this particular course of action. Identified motivation occurs when the person's behavior reflects conscious valuing of self-selected goals and activities. Integrated motivation occurs when the person's actions are shaped based on his or her own system of values, goals and identities. These forms of motivation are placed on a self-determination continuum. External and introjected motivations constitute relatively controlled forms of extrinsic motivation, while identified and integrated motivations are considered relatively autonomous. The summary of conceptual definitions of the self-determination continuum is presented in Figure 1.

[Figure 1]

The distinction between all types of motivations is not relevant in every context (Ryan & Connell, 1989; Levesque et al., 2007). In our analysis we combined the different forms of autonomous motivation into one single subscale. Thus, we use three subscales: external, introjected and autonomous motivation. The specific questions that we use are based on the SDT Self-Regulation questionnaires, and were revised through several field exercises (Alkire 2005, Alkire et al., 2013). These questions, ask individuals to rate each of three possible motivations for their actions in a specific domain, ranging from “never true” (lowest score, 1) to “always true” (highest score, 4). The survey questions fielded in this study were worded as follows:

“Your actions with respect to [DOMAIN] are:

- Motivated by a desire to avoid punishment or gain reward? [external motivation]
- Motivated by a desire to avoid blame or so that other people speak well of you? [introjected motivation]
- Motivated by and reflect your own values and/or interests?” [autonomous motivation]

The score of these subscales is combined into one single measure, the Relative Autonomy Index (RAI). This measure is the weighted sum of the person's scores in the subscales. The subscales weights are a function of their position in the self-determination continuum: -2 for external motivation, -1 for introjected motivation and +3 for autonomous motivation. The RAI, thus, varies between -9 and 9. Positive scores are interpreted as indicating that the individual's motivation for his or her behavior in that specific domain tends to be relatively autonomous; while negative scores indicate a relatively controlled motivation.

### 3. Data<sup>1</sup>

We use data from the Bangladesh Integrated Household Survey (BIHS). This survey was designed and supervised by researchers at the International Food Policy Research Institute (IFPRI) and conducted from December 2011 to March 2012. The BIHS sample is nationally

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<sup>1</sup> This section draws from Sraboni et al. (2013a, 2013b).

representative of rural Bangladesh and representative of rural areas of each of the 7 administrative divisions of the country.

The sample design of the BIHS followed a stratified sampling in two stages—selection of PSUs and selection of households within each PSU—using the sampling frame developed from the community series of the 2001 population census of Bangladesh. In the first stage, a total sample of 275 PSUs were allocated among the 7 strata (7 divisions) with probability proportional to the number of households in each stratum. In the 2nd stage, 20 households were randomly selected from each PSU. Sampling weights were adjusted using the sampling frame of the 2011 population census. The total sample size is 5,500 households,

The BIHS questionnaires include several modules that provide an integrated data platform to answer a variety of research questions, as well as separate questionnaires for self-identified primary male and female decision-makers in sampled households. In particular, the survey includes a module specifically designed to collect data for computing the Women's Empowerment in Agriculture Index (WEAI) (Alkire et al. 2013). This module includes the autonomy questions that provide the data to construct the Relative Autonomy Index. This module covers 18 domains of decision making.<sup>2</sup>

The total sample size is 5,500 households, with information regarding the self-identified primary male and female decision-makers in 4,566 of these households. However, as in each domain of decision-making, autonomy information was only provided by those respondents who actually make decisions in that domain, the relevant sample in each domain is smaller and varies across domains (Table 1).

[Table 1]

#### **4. Internal Validity**

This section focuses on assessing how well the RAI measures the autonomy of individuals. This will involve two different analyses. First, we will examine whether the data collected is consistent with the hypotheses of our measurement model. Second, we will perform some standard tests to assess the internal consistency of the scale as a whole.

##### **4.1 Conceptual Validation**

In order to assess the adherence of our data to the measurement model described above, we test two main hypotheses.

- (1) There are three dimensions in our autonomy data. Each of these dimensions reflects one of the latent characteristics that we are attempting to measure: external, introjected and autonomous motivations.

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<sup>2</sup> The BIHS WEAI questionnaire used the pilot version of the questionnaire covering 18 domains of decisionmaking; other countries implementing the WEAI as part of the Feed the Future monitoring effort used the final version of the WEAI, which has fewer domains.

- (2) There is an ordered correlation among the motivation subscales. As the subscales correspond to a continuum of autonomy, we expect that adjacent subscales correlate more strongly than subscales further apart on the continuum (Ryan and Connell, 1989).<sup>3</sup>

#### **4.1.1 Dimensional Structure**

In this section we examine the structure of the full set of motivation questions. We investigate the feasibility of a three dimension structure, in which each dimension captures one of the latent characteristics that we are attempting to measure: external, introjected and autonomous motivations.

The main limitation of this approach in this context is that it disregards the domain-specific nature of our autonomy measure. In other words, it assumes that questions about the same type of motivation but referring to different areas of decision-making load on a common factor. We believe that this assumption may be verified in the context of closely related areas of decision making.

Following Guio, Gordon and Marlier (2012), we analyze the structure of the data using three different statistical methods: a factor analysis, a multiple correspondence analysis and a cluster analysis.

##### ***Factor Analysis***

We start by performing an exploratory factor analysis (EFA) to test if a three-factor solution that discriminates the items of the three motivation subscales emerges. To facilitate the interpretation of the factor loadings we rotate the axes. We use oblique rotation, given that the motivation subscales are likely to be correlated. We perform this analysis separately by gender.

##### **Men**

Firstly, we consider the full set of items. The sample under analysis is very small, as there are only 365 men that answered the motivation questions for all 13 areas of decision-making. According to Kaiser criterion<sup>4</sup>, there are four factors in the data. The first two factors account for 80 percent of the variance, while the last two account for 9 and 6 percent. Considering a four factor solution, we find that the factors 1, 3 and 4 discriminate the questions from the subscales autonomous, introjected and external, respectively. On the other hand, factor 2 combines questions from external and introjected subscales.

Secondly, we perform an EFA considering only the areas of decision making related to agriculture, which comprise the domains ‘agriculture production’, ‘what inputs to buy’, ‘what

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<sup>3</sup> While the terminology might be interpreted to imply that Identified motivation is negatively correlated with external and introjected motivations, the external and identified motivations are not necessarily negatively correlated, but are likely to have very low correlations since they are on the opposite extremes of the scale (Ryan, personal communication).

<sup>4</sup> The rule is to drop all factors with eigenvalues under 1.0.

crops to grow' and 'who and when to take the crops to the market'.<sup>5</sup> The sample under analysis increases to 2,608 men. Considering this restricted set of questions and a larger sample, a three factor structure emerges. As shown in Table 2, we find that the set of questions supposed to measure different subscales are discriminated in different factors. Factors capturing external and introjected subscales are strongly correlated, and they are both weakly correlated with the factor capturing autonomous subscale. We obtain similar results if we consider the set of decision-making domains not related with economic activities.<sup>6</sup>

[Table 2]

### Women

Considering the full set of items, the sample under analysis consists only of 271 women. According to Kaiser criterion, there are four factors in the data. The first factor accounts for 59 percent of the variance, the second and the third account for 17 and 10 percent respectively, while the fourth factor only accounts for 3 percent. Considering a four factor solution, we find that the set of questions supposed to measure different subscales are discriminated in different factors, but introjected questions are separated into two different factors. The introjected motivation questions regarding wage and employment, minor household expenses, expression of religious faith, definition of daily tasks and family planning are discriminated in factor 4. In terms of correlations, we find that factors capturing external and autonomous motivations are strongly correlated, and they are both negatively correlated with the introjected factors.

As in the case of men, when we consider the smaller set of areas of decision-making related to agriculture and, thus, have a larger sample, the three factor structure emerges (see Table 2).<sup>7</sup> However, unlike the case of men, we find that contrary to theory, the factors capturing external and autonomous motivations are again strongly correlated.

As long as we have a reasonably sized sample, the EFA results suggest that there is a three factor structure. So, we perform a Confirmatory Factor Analysis (CFA) to test how well our measurement model fits the data. We consider a model with three latent constructs, each one measured with four indicators, one for each area of decision making related with agriculture.<sup>8</sup> We estimated two models: a factor loading invariant model, assuming the factor loadings are identical for all individuals; and a factor loading variant model, assuming that factor loadings may be different across gender.

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<sup>5</sup> We considered also including 'raising livestock' here. However, this domain is less correlated with the other and its inclusion would result in a significant reduction of the sample under analysis.

<sup>6</sup> We considered the following domains as non-related with economics activities: minor household expenditures, what to do if you have a serious health problem, how to protect yourself from violence, whether and how to express religious faith, what kind of tasks you will do on a particular day and whether or not to use family planning to space or limit births.

<sup>7</sup> As in the case of men, this three factor structure emerges whether we consider the set of domains related to agriculture (sample of 2,302 women), or the non-work domains (sample of 1,104 women).

<sup>8</sup> We focus the Confirmatory Factor Analysis on the agriculture related domains because these are the ones that are more correlated.

We find that the factor loadings<sup>9</sup> for all items are very high, always above 0.75. In both models the factor with the lowest factor loadings is the one corresponding to introjected motivation. The goodness-of-fit indices and statistics are presented in columns (1) and (2) of Table 3. The results are mixed. The chi-square statistic is significant, which does not support a good fit; and the measure Root Mean Square Error of Approximation (RMSEA) is close or equal to the maximum cut-point for an acceptable fit. On the other hand, the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) are above the threshold for an excellent fit; and the measure Standardized Root Mean Square Residual (SRMR) also suggests a good fit, as it is far below the threshold 0.1.

[Table 3]

Examining the modification indices (suggested by STATA), we find that the fit of both models could be improved if we would allow the indicators regarding the domain ‘agriculture production’ to be correlated with other latent variables besides the one they are intended to measure (for instance, allowing the item related to external motivation to be also correlated with introjected motivation). However, as the cross-loading of these indicators is not theoretically justifiable, we opted to measure the model fit removing those items from the analysis. The goodness-of-fit measures of the models with this new specifications are presented in columns (3) and (4) of Table 3. Although the chi-square statistic remains significant, its value decreases sharply; and all the other measures improve.<sup>10</sup>

Comparing the goodness-of-fit measures of the factor variant and factor invariant models, we see that the latter always display better fit than the former. Therefore, the hypothesis of factorial invariance between gender groups seems to be supported.

### ***Multiple Correspondence Analysis***

Here, we examine the data structure using a multiple correspondence analysis (MCA). This descriptive method can be seen as a generalization of the Primary Component Analysis to categorical data. In very simple terms, this technique divides each categorical variable into dummy variables that represent the categories of the original variable; and describes the pattern of the dataset geometrically by locating each of these ‘new’ dummy variables in a low-dimensional space.

We performed a multiple correspondence analysis using the questions related with agriculture (a smaller set of variables and larger sample of individuals). We perform this analysis separately by gender. In the case of men, we find that three dimensions explain 71 percent of

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<sup>9</sup> Under our fully standardized and simple structure model, these factor loadings can be interpreted as correlation coefficients between each item and the corresponding latent factor (Abell, Springer, Kamata, 2009).

<sup>10</sup> The modification indices also suggest that our original model has correlated errors, between items in the same scales and between items in different scales. Correlated errors within a subscale are not a desirable property for a psychometric scale (Abell, Springer, Kamata, 2009, p. 164). However, we believe that here the correlated errors within subscales do not reflect a weakness of our measurement model, but result from the fact we are performing a factor analysis combining items from different areas of decision making. Although the items may be related to an overall latent factor, they may also reflect the correlation between the areas of decision-making.



the inertia<sup>11</sup>. The first dimension explains 28.7 percent, the second 26.5, and the third 15.3.<sup>12</sup> Similarly for women, the percentages of inertia explained by each dimension are: 27.7, 25.6 and 12.0. Figure 2 in Appendix plots the point coordinates of items related to ‘what inputs to buy’ and ‘what crops to grow’ in dimensions 1 and 2. We do not include items regarding the other two agricultural domains because they tend to overlap, making the reading of the graphic difficult.

[Figure 2]

### *Cluster Analysis*

Finally, we examine if a cluster analysis groups the motivation questions according to the type of motivation they are intended to measure. We performed the analysis separately by gender. We compute a proximity matrix based on the squared Euclidean Distance. Then clusters were produced using the hierarchical average linkage method.<sup>13</sup> First, we performed this analysis considering the full set of domains. The resulting dendrograms are presented in Figure 3. Second, to be able to draw conclusions based on a larger sample, we conduct a new cluster analysis focusing only on the domains related to agriculture. The respective dendrograms are presented in Figure 4.

[Figure 3]

### Men

Let’s focus first on the case of men. The dendrogram in Figure 3 suggests that there are two broad clusters that distinguish controlled and autonomous motivations. This two-cluster structure is corroborated by the Calinski-Harabasz stopping rule. However, according to the Duda–Hart stopping rule, there are five clusters. According to this rule, the autonomous motivation questions are all grouped in the same cluster, but the external and introjected questions are divided in two different clusters each. Under this structure, controlled and autonomous motivations are separated; but some external questions are closer to some introjected questions than to other external questions.

When considering a more restricted set of domain, the results are similar. The Calinski-Harabasz stopping rule suggests that a two-cluster is the optimal structure. This solution distinguishes between controlled and autonomous motivations, but not between external and introjected motivations. On the other hand, Duda-Hart stopping rule suggests a three-groups solution, distinguishing between the three types of motivations.

[Figure 4]

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<sup>11</sup> The concept of inertia in multiple correspondence analysis is equivalent to variance in factor analysis (Abdi and Valentim, 2007).

<sup>12</sup> The fourth dimension already only explains 8.7 percent of the inertia.

<sup>13</sup> The cluster analysis was also conducted considering alternative linkage methods, namely complete linkage and Ward’s method. The same structure was identified using the different methods.

## Women

In the case of women, both Calinski-Harabasz and Duda-Hart stopping rules suggest that a three-group is the most distinct hierarchical structure. The three clusters distinguish the three types of questions. When we consider the full set of domains, the two closer clusters are the ones related to external and identified motivation. But when we consider the smaller set of questions and the larger sample, we find that the two closer clusters correspond to the external motivations, as expected.

Overall, the structure that emerges from this analysis corroborates the separation between controlled and autonomous motivations. In the case of women, the analysis also distinguishes controlled motivations between external and introjected. In the case of men, the latter distinction is less clear.

### **4.1.2 Correlations within Areas of Decision-making**

As the subscales correspond to a continuum of autonomy, we expect contiguous subscales to correlate more strongly than subscales in opposite extremes. Thus, we expect the lowest correlation to occur between external and identified motivations. To investigate this we compute Spearman and Pearson correlation matrices for each domain, considering the samples of men and women separately. The matrices are presented in Table 4.

[Table 4]

We observe very distinct patterns of correlation for men and women. In the sample of men, we find that external and introjected motivations are strongly correlated in all domains; and that both of these controlled forms of motivation correlate weakly with autonomous motivation (the absolute value of the correlation coefficients is below 0.08 in most domains). Based on Spearman correlations, there are some domains where we observe a pattern of ordered correlation, i.e. in which the lowest correlation is between external and identified subscales. These domains are ‘what inputs to buy’, ‘what crops to grow’, ‘livestock raising’, ‘own wage and salaried employment’ and ‘family planning’. However, in most cases this correlation is not very different from the correlation between identified and external correlation. This evidence seems to suggest that men’s autonomy maybe could be addressed with two general categories of motivation: controlled and autonomous.

In the sample of women, we find that external motivation is strongly correlated with both introjected and identified motivations. In fact, in most domains related with economic activities (‘agriculture production’, ‘what inputs to buy’, ‘what crops to grow’, ‘non-farming business activity’, ‘own wage and salaried employment’), external motivation is more correlated with autonomous than with introjected motivation. A potential explanation for this pattern of correlation is that women in Bangladesh tend to internalize societal norms and “make them their own”; qualitative work is required to probe this issue further. This divergence of the correlation patterns does raise questions about whether the weighted aggregation structure of the RAI can be interpreted in the same way for men and women.

## 4.2 Reliability

In this section we conduct some tests to assess the internal consistency of the scale as a whole.

### 4.2.1 Cronbach's Alpha

We test the internal consistency of motivation subscales using Cronbach's Alpha. This coefficient reflects the extent to which a set of items measures a latent construct. Generally, in social sciences an Alpha above 0.7 is understood as "satisfactory", above 0.8 is seen as "good", and above 0.9 is considered "excellent".

We compute Cronbach's Alpha for each autonomy subscale considering different areas of decision making, similarly to the approach adopted in the analysis of dimensional structure.<sup>14</sup> We start by computing Alpha considering all areas of decision making (13 items). As the number of items can artificially inflate Alpha (Cortina, 1993), we also calculate Alpha considering only the areas of decision making related with agriculture (4 items), and considering only the domains not related with economic activities (6 items).

[Table 5]

Table 5 shows that Cronbach's Alpha for external and identified motivation subscales are "excellent". The introjected motivation has slightly lower Alphas, but they are "good" or "excellent", always above 0.85, thus confirming the consistency of motivation scales.

### 4.2.2 Mokken Scale Procedure

We perform an additional test of reliability using nonparametric Item Response Theory (IRT). We perform a Mokken Scale Procedure (MSP). This is "an automated item selection procedure for selecting unidimensional scales of polytomous items from multidimensional datasets" (Hemker, Sijtsma and Molenaar, 1995, p. 337).

The MSP is based on Loevinger's H coefficient. This coefficient corresponds to the observed between-item covariance divided by the maximum possible covariance given the marginal distribution of the two items. The coefficient can be computed for a pair of items  $i$  and  $j$  ( $H_{ij}$ ); for item  $i$  ( $H_i$ ), by averaging  $H_{ij}$  across  $j$ ; and for a whole scale ( $H$ ), averaging  $H_i$  across  $i$ . Coefficient  $H_i$  may be interpreted as a measure of the discrimination power of item  $i$  and, hence, the coefficient  $H$  can be seen as a measure of the discrimination of the scale (Sijtsma, Majjer and Van der Ark, 2011). Mokken (1971) suggested the following rule to describe the quality of a scale:

Loevinger's H	Scale quality
$0 \leq H < 0.3$	Unscalable

<sup>14</sup> Cronbach's Alpha is suitable to test the reliability of multiple-items scales. In our model, each autonomy subscale related to a specific area of decision making is measured with only one question. Therefore, it is not possible to assess internal consistency of autonomy subscales within areas of decision making.

$0.3 \leq H < 0.4$	Weak
$0.4 \leq H < 0.5$	Medium
$0.5 \leq H$	Strong

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This procedure allows us to test if the questions that are supposed to measure different types of motivation are grouped into different Mokken scales. We assume a lower bound for Loevinger's H of 0.5. We perform this test considering the full set of domains and restricting the analysis to the domains related with agriculture. We perform the MSP separately for men and women.

### Men

Considering the full set of items, the MSP identifies two scales. The first scale groups the autonomous motivation questions, and it has a H coefficient of 0.87. The second scale combines all external and introjected motivation questions, and it has a H coefficient of 0.59, so in both cases the scale quality is strong, but the external and introjected questions are grouped. This dimension structure is very similar to the one reflected by the cluster analysis – but recall it is only for 365 men.

Considering the set of items related with agriculture and the larger sample, the results are much more in line with our measurement model. The MSP identifies three scales, each grouping the set of items intended to measure one of the types of motivations. The respective H coefficients vary between 0.67 for introjected motivation and 0.90 for identified motivation, all indicating strong scale quality.

### Women

Considering the full set of items and smaller sample, the MSP identifies five scales. The first combines all external and identified motivation questions, and has a H coefficient of 0.75. The introjected motivation questions are separated into four different scales. The first of these scales groups the questions related with agriculture.<sup>15</sup>

Similarly to the case with men, when we only consider the questions related with agriculture and the larger sample, the MSP identifies three scales, each grouping the set of items intended to measure one of the types of motivations. The respective H coefficients vary between 0.71 for introjected motivation and 0.91 for external motivation – again indicating strong scale quality.

## **5. External Validity**

This section focuses on the relationship between relative autonomy and individual's characteristics. Our main hypothesis is that the autonomy indicators yield new and valuable

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<sup>15</sup> The second scale groups the questions regarding expression of religious faith, definition of daily tasks and family planning; the third scale groups the domains household minor expenditures and health; finally, the fourth scale groups the questions regarding non-farming business and own wage and salary employment. The introjected questions regarding raising livestock and protection from violence are not included in any scale.

information that is not contained in standard socio-economic and demographic variables. If this is the case, its measurement and analysis could provide additional information. In this section we try to identify the determinants of autonomy and examine to what extent this concept is captured by other common proxies for empowerment, particularly decision-making.

## 5.1 Means comparisons

We start by comparing the average autonomy indices across different population sub-groups. We define the groups splitting the sample in terms of gender, age group, level of education, per capita expenditure quintile, and geographic locations (administrative division). The purpose of this exercise is to investigate if there are population sub-groups that are clearly more autonomous than others.

[Table 6]

Table 6 presents the average indicators by gender and the results of the test of equal means across gender. At a significance level of 10 percent we reject the null hypothesis in seven of the 13 domains. Men are on average more autonomous in decisions related with economic activities ('what crops to grow', 'when and who to take crops to market', 'non-farming business and own wage and salaried employment'). Women, on the other hand, tend to report higher levels of autonomy in all other areas of decision-making, and the difference is significant in the domain of 'protection from violence', 'expression of religious faith' and 'family planning'.

[Table 7]

[Table 8]

The means displayed in Table 7 suggest that in most domains the average autonomy of men and women increases with age. Table 8 presents the average RAIs by education level. These estimates do not show a clear and consistent pattern for the relationship between autonomy and education. Table 9 presents the average RAIs by per capita expenditure quintile and Table 10 presents the average RAIs by division.

[Table 9]

[Table 10]

## 5.2 Correlations

In this section we examine the correlation between the relative autonomy indicators and a set of common proxies of empowerment. We start by looking at the correlations with the indicators of general functionings: (i) individual education level, defined as the highest level of education achieved; and (ii) income, proxied by per capita expenditure quintile to which

the household belongs<sup>16</sup>. Then, we look at the relationship with empowerment and agency general indicators. As general empowerment indicators we use the step ladder (10 steps) questions about respondent's satisfaction with his or her:

- power to make important decisions that change the course of your life;
- possibilities of going to other places outside your village; and
- contact with friends or relatives.

As general agency indicators we used the indicator 'ability to change things in the community'<sup>17</sup> and 'influence in the community', based on a step ladder question (9 steps)<sup>18</sup>.

Finally, we look at correlations between the relative autonomy index, the indicator of whether the individual feels he or she can make his or her own personal decisions in that specific domain<sup>19</sup>, and the indicator of the individual's satisfaction with his or her decisions in that domain.

[Table 11]

As all our variables are categorical, we examine the Spearman correlation coefficients (Table 11).<sup>20</sup> We report the Spearman and Kendall tau rank correlations in Appendix. Contrary to what is commonly assumed, we find that autonomy is practically uncorrelated with education, and it is relatively weakly correlated with our proxy for income. The correlation between autonomy and income is higher among men (average of 0.13 across domains) than among women (average of 0.07).

The general indicators of empowerment are correlated with autonomy in all domains. But again, the magnitude of this correlation is, on average, higher in the sample of men than in the sample of women. This difference is smaller for the indicator of power to make important decisions (0.17 vs. 0.13), and larger for contact with friends and relatives (0.28 vs. 0.06). The correlations with the indicators of agency are in general relatively weak and not significant in all domains. In the case of men, in particular, the correlation between ability to make changes in the community and RAI is negative in most domains.

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<sup>16</sup> The variable per capita expenditure quintile is highly correlated with the household wealth quintiles. It has a Pearson correlation coefficient of 0.79, and a Spearman coefficient of 0.98.

<sup>17</sup> The wording of the respective question is "do you feel that a [man / woman] like yourself can generally change things in the community where you live if s/he wants to". And the answer scale is 1 "No, not at all", 2 "Yes, but with a great deal of difficulty", 3 "Yes, but with a little difficulty", 4 "Yes, fairly easily" and 5 "Yes, very easily".

<sup>18</sup> The wording of the question is "please imagine a nine-step ladder, where on the bottom, the first step, stand people who have NO influence on the community, and step 9, the highest step, stand those who have influence in the community. On which step are you?"

<sup>19</sup> We consider the definition used in the context of Women's Empowerment in Agriculture Index: the indicator assumes value one if the individual makes the decisions, or if feels he or she could make it to a medium extent if he or she wanted (Alkire et al., 2013).

<sup>20</sup> These correlations tend to be more appropriate to deal with categorical variables. They also have the advantage of being less sensitive to outliers, since they use ordinal (rank) values to compute the correlation. This also means that they do not require us to make any assumption of normality regarding the distribution of the variables.

Looking at the domain-specific indicators, we find that RAI and satisfaction with decisions made are more strongly correlated: the average correlation coefficient across domains is 0.38 for men and 0.33 for women. This means that, on average, individuals with higher autonomy are more satisfied with their actions; however the level of correlation is still relatively low.

On the other hand, the question of whether the respondent either makes a decision in the domain, or feels he or she could make a decision if she wished – which is an improvement on the standard decision-making questions that are often used to proxy empowerment – has low correlations for both men and women across all domains. In all but two cases correlations are 0.1 or under; the highest value is 0.15 and applies both to women’s decision-making regarding religious faith and to protection from violence.

In summary, the two indicators that are more correlated with individuals’ relative autonomy, consistently across gender, are the domain-specific indicator of satisfaction with decisions made and the general indicator of satisfaction with ‘power to make important decisions that change one’s course of life’, but even these correlation values are relatively low. This evidence is in line with the predictions of the SDT theory.

### 5.3 Regression Analysis

The correlation analysis provides only a very rudimentary view of the relationship between different indicators, as it ignores both interactions between variables and non-linear relations. In order to provide a more formal analysis of the relationship between autonomy and other individual’s characteristics we use a regression analysis. The purpose of this exercise is two fold. First, we want to identify the potential determinants of autonomy. Second, we want to examine into what extent other indicators could be used as proxies for individual relative autonomy in Bangladesh.

#### 5.3.1 Empirical Specification

We start by estimating the following equation:

$$RAI_i = \beta_0 + \beta_1 X_i + \beta_2 F_i + \beta_3 H_i + \varepsilon_i \quad (1)$$

where  $RAI_i$  is the vector of individual  $i$ ’s relative autonomy indices in the different domains,  $X_i$  is a vector of individual and household demographic characteristics,  $F_i$  is a vector of indicators of individual’s general functionings,  $H_i$  is a vector of indicators of housing quality and assets, and  $\varepsilon_i$  is an error term.

In a second round of regressions we include an additional set of explanatory variables,  $Z_i$  (potential proxies for RAI), to see how these are associated with autonomy, once we control for the individual and household’s characteristics.

$$RAI_i = \beta_0 + \beta_1 X_i + \beta_2 F_i + \beta_3 H_i + \beta_4 Z_i + \varepsilon_i \quad (2)$$

The vector  $X_i$  includes:

- the individual's age,
- dummy variables that assumes the value one
  - o if the individual is the head of the household;
  - o if the respondent is married;
  - o if the household head's occupation is related with agriculture (farming, fishing or fish raising, and livestock and poultry raising)
- the number of household members; and
- the number of household members younger than six years old.

The vector  $F_i$  includes:

- individuals' education measured as years of education;<sup>21</sup>
- a dummy that equals one if the individual's occupation is related with agriculture; and
- an indicator of health that equals one if respondent can easily 'stand up after sitting down', 'walk for 5 km' and 'carry 20 liters of water for 20 meters'.

The vector  $H_i$  includes:

- housing quality indicators, namely
  - o an indicator of sanitation,<sup>22</sup>
  - o drinking water,<sup>23</sup> and
  - o cooking fuel.<sup>24</sup>
- three asset dummies,
  - o one proxying for access to information (equal one if household has a TV, radio, phone or mobile phone),
  - o another for support to mobility (equal one if household owns a bicycle, rickshaw, van, boat, or motorbike), and
  - o another for support to livelihood (equal one if household owns livestock or cultivable land); and
- per capita expenditure quintile to which the household belongs.<sup>25</sup>

The summary statistics of all the variables used are presented in Appendix.

Given the nature of our dependent variable, we use an ordered probit model.<sup>26</sup> All our regressions are estimated separately for men and women.<sup>27</sup> Our estimation strategy also

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<sup>21</sup> Measuring education level with dummies for level of education achieved instead of years of education does not affect the conclusions presented below.

<sup>22</sup> Dummy equals one if household members use *pucca*, or sanitary toilet with or without flush.

<sup>23</sup> Dummy equals one if source of drinking water is piped water, own tube well, rain water, or deep tube well for irrigation.

<sup>24</sup> Dummy equals one if main source of cooking fuel is electricity, supply gas, LPG, or kerosene.

<sup>25</sup> The housing characteristics and assets dummies capture whether the household has basic conditions and assets. The per capita expenditure quintile proxies the relative position of the household in terms of income. The highest correlations of per capita expenditure quintile are with sanitation (0.28), cooking fuel (0.11), assets for access to information (0.26) and assets for support to livelihood (0.10). None of these correlations is likely to lead to multicollinearity problems.



accounts for the survey design (we use svy commands). Division dummies are included in all regressions to control for location specific effects.

### 5.3.2 Results

#### *Determinants of autonomy*

Estimates of equation (1) for the RAI in domains of ‘agriculture production’, livestock raising’, ‘non-farm business’ and ‘protection from violence’ are presented in Tables 12.1 (sample of men) and 12.2. (sample of women). We selected these domains because they cover a broad spectrum of activities (including the main occupation of men and women in the sample) and allow us to illustrate our main conclusions. The estimates of the regressions for the RAI on other domains are reported in the Appendix. For each RAI we present two sets of results: one without the per capita household expenditure quintile, and another with such control. This way we can assess how the inclusion of this control affects the coefficients of the other variables, especially of the housing quality and assets variables. In these tables we only display the variables that have significant coefficients in at least one of the regressions of men, or women.

[Table 12.1]

[Table 12.2]

Three general features become apparent when we look at these tables. First, men and women’s relative autonomy seems to be determined by different factors. Second, geographical location, which may proxy different cultural norms in each of Bangladesh’s divisions, affects the autonomy of both men and women. Third, the factors that determine relative autonomy vary across domains of decision-making.

**Differences across gender.** Men’s autonomy is positively associated with income. The coefficient of the quintile of per capita expenditure is significant at 1% level in all regressions of men’s RAI, except in the domains of ‘expression of religious faith’ (only significant and 5% level) and ‘family planning’. On the other hand, this coefficient is not significant in any of the regressions of women’s RAI, except in ‘protection from violence’ and ‘own wage and employment’, where the coefficient is negative. The negative coefficient in the wage and employment regression for women likely reflects the premium given to female seclusion, such that better-off women are more likely to withdraw from the labor market. The negative sign on protection from violence, however, highlights the possibility that domestic violence (which is likely to be the form of violence to which women are more exposed in Bangladesh, given the high incidence of domestic violence) does not decrease with income.

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<sup>26</sup> The Relative Autonomy Index (RAI) is a Likert Scale. So, it could be analyzed as an interval scale (Allen and Seaman, 2007; Brown, 2011; Carifio and Perla, 2007). However, given its distribution we think it is more appropriate to use an ordered categorical model.

<sup>27</sup> Otherwise, as there is a male and female from each household, the errors are likely to be correlated.

Women's relative autonomy, on the other hand, is associated with their occupation. The results suggest that women engaged in activities related with agriculture tend to have lower levels of autonomy than women engaged in other activities. This relationship is significant at 1% level in all domains, except 'non-farming business activity'. The occupation of most women in rural Bangladesh is either livestock/poultry raising (50% of the sample) – here classified as related with agriculture – or housewife (42%). So, housewives seem to have higher autonomy than other women, possibly because they are able to fulfill social expectations of female seclusion by not leaving the homestead to work.

Less important, but curious, we find that sanitation tends to be negatively associated with men's autonomy, but positively associated with women's RAI. It is possible that having better sanitary facilities on one's homestead reduces women's vulnerability in terms of having to use facilities outside, but this effect does not hold for men.<sup>28</sup>

**Geographical location.** The high significance of the location dummies suggests that, after controlling for income distribution, basic housing conditions and individuals' characteristics, there are local factors that have a strong effect on individuals' autonomy. For instance, individuals living in Rajshahi and Rangpur seem to have lower autonomy than those who live in Dhaka; in contrast, those who live in Khulna seem to have higher autonomy. These results are consistent with the greater exposure of individuals living in the greater Dhaka area to nongovernmental organizations, which tend to target the poor and women, as well as the possible influence of being near the Indian border (and the major metropolitan area of Kolkatta) on individuals living in Khulna (see map of Bangladesh in Figure 5).

[Figure 5]

**Determinants of autonomy in specific domains.** The pattern of determinants of women's autonomy in the domain of 'protection from violence' is particularly interesting. Women's education is not significantly associated with autonomy in any other domain, except for this. This is an important result, given the high rates of intimate partner violence in Bangladesh: increasing women's education thus continues to be an important policy priority for women's overall empowerment and welfare. Being the household head is also associated with women's autonomy only in this domain, and 'how to deal with serious health problem'. Finally, household income is negatively associated with women's autonomy in 'protection from violence' and 'own wage and salaried employment.'

Another interesting aspect of women's autonomy is related with the impact of ownership of specific assets in autonomy in different domains. For instance, assets related to access to information and support to mobility seem to have a positive impact on women's autonomy in the domain 'non-farming business activity'. Assets to support livelihood also have a positive impact on women's autonomy in protection from violence. Assets, particularly those related to information, mobility, and livelihoods, thus appear to have a positive impact on women's

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<sup>28</sup>Indeed, in some parts of South Asia, having the husband assure that the home to which a bride is moving has its own toilet has become a condition for marriage.

autonomy, in contrast to income. These results are potentially relevant to programs that seek to increase women's control of assets.

### *Other possible proxies*

The analysis above has shown that neither age, education nor income are suitable proxies for relative autonomy of men and women. Now, we investigate if the indicators of satisfaction with decisions made and power to make important decisions are valid candidates to act as proxies for autonomy, by testing if their association with RAI remains significant after controlling for individuals' characteristics.

[Table 13.1]

[Table 13.2]

Tables 13.1 and 13.2 present the estimates of equation (2) for the RAI in the same domains considered above, except 'livestock raising'. The estimates of the regressions for the RAI on other domains are reported in the Appendix. For each RAI we present three sets of results, where we examine sensitivity of adding the following explanatory variables:

- (i) The indicator "feel can make decision";
- (ii) The indicators "feel can make decisions" and "satisfaction with decisions made";  
and
- (iii) The indicators "feel can make decisions" and "satisfaction with power to make important decisions".

The indicator "feel can make a decision" is not significantly associated with RAI in all domains. So, as suggested by the correlation analysis, this indicator is not a good candidate to proxy autonomy.

The indicators "satisfaction with decisions made" and "power to make important decisions", on the other hand, are significantly associated with higher levels of autonomy of men and women in all domains. Nevertheless, in most cases, the inclusion of these indicators as explanatory variables does not affect the significance of the other determinants of autonomy (except for the variable "feel can make the decisions"). This suggests that, although these indicators contribute to explaining the variation in the RAI (especially, "satisfaction with decisions made", which inclusion leads to large increases in the F-statistic), they do not account for a large portion of the variation, which is indicated by the significance of all the relationships previously identified. Under these circumstances, it remains unclear whether these indicators can be used as proxies for autonomy, or are simply indicators that are also correlated with autonomy.

## **6. Conclusion**

In this paper we provide a detailed examination of a measure of individuals' autonomy, the Relative Autonomy Index, using data representative of Bangladeshi rural areas. The paper

presents two distinct analyses. In the first part of the paper we perform several descriptive statistic analyses to investigate the conceptual validity of our measure, and to assess the internal consistency of its scale. The second one provides an analysis of autonomy of men and women in rural Bangladesh and investigates to what extent this concept is captured by other common proxies of empowerment.

We report mixed results in terms of the conceptual validity of the RAI. On one hand, when we consider a reasonably sized sample, our statistical methods identify three dimensions in the data, each one corresponding to one of the motivations subscales, as predicted by our measurement model. On the other hand, we only find an ordered correlation among the motivation subscales in the sample of men, and only in five of the 13 domains. This means that in most cases the correlations between our subscales do not perfectly fit the self-determination continuum. Interestingly, we find gendered patterns of correlations. In the sample of men we find that external and introjected motivations are strongly correlated, but both are weakly correlated with autonomous motivations. This might be interpreted as evidence that the autonomy of Bangladeshi men can be assessed with reference to only two broad categories of motivation: controlled and autonomous. In the sample of women, we find that external motivation is positively and strongly correlated with introjected and autonomous motivations, while the correlations between introjected and autonomous motivations tend to be weak. We speculate that the strong correlation between external and autonomous motivation reflects that Bangladeshi women internalize societal norms and “make them their own”; but qualitative work is needed to study this issue. In terms of reliability, Cronbach’s Alpha and the Mokken Scale Procedure – again, when done with base in a large sample and with respect to closely related domains – indicate that the scale is very good.

Our exploratory analysis of the determinants of autonomy of men and women in Bangladesh shows that neither age, education, nor income, are suitable proxies for autonomy. This implies that the RAI adds new information about the individuals. In general, we find that while men’s autonomy is largely determined by the income of the household, women’s autonomy is closely related to their occupation. Finally, we do not find robust evidence that decision-making indicator “feel can make decisions”, empowerment indicator “power to make decisions”, and domain-specific indicator “satisfaction with decisions made” constitute valid proxies for autonomy.

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